UNIVERSITY OF ZAGREB

FACULTY OF SCIENCE

DEPARTMENT OF PHYSICS

DEPARTMENT OF GEOPHYSICS

PROPOSAL OF A UNIVERSITY POST-GRADUATE DOCTORAL STUDY PROGRAM IN

PHYSICS

DOMAIN OF NATURAL SCIENCES

FIELD OF PHYSICS

Zagreb, May 27, 2009.

1. INTRODUCTION

The authors of the proposed doctoral program in physics see it as a continuation of a long tradition of doctorates in physics at the University of Zagreb. Let us mention the long tradition of Croatian geophysics (the geophysical observatory dates from 1861., with scientists and teachers such as Andrija Mohorovičić), as well as regular lectures in natural sciences at the Philosophical Faculty, begun in 1876., with Vinko Dvořák as the first physics professor at the renewed University of Zagreb.
Physics in Zagreb was among the first in this part of Europe which had postgraduate programs leading to a doctorate, following the internationally recognized pattern. Namely, Professors Ivan Supek and Mladen Paić have introduced lectures for postgraduate students already in the 1950's, as an introduction to scientific research under the guidance of a mentor.
The gradual relocation of the Faculty of Science to new buildings at Horvatovac, in the immediate vicinity of the Ruđer Bošković Institute and the Institute of Physics has created a "natural science park" with new opportunities to organize doctoral studies.
The doctoral programs proposed here have been adjusted to encompass the recommendations of the National Council for High Education of July 14, 2006. They are comparable with and developed in the same manner as the best modern studies in the world. The studies are at present structured into 7 branches, as follows:

1. Elementary particle physics
2. Nuclear physics
3. Condensed matter physics
4. Atomic and molecular physics and astrophysics
5. Biophysics
6. Medical physics
7. Geophysics

A special effort is made to connect the doctoral studies in physics at the University of Zagreb to those of other Central European universities. Cooperation along these lines has already been institutionalized, especially in the physics of elementary particles, resulting in letters of intent and cooperation contracts, signed by the rectors or heads, respectively, of the following institutions:

1. Charles University - Prague (Faculty of Mathematics and Physics)
2. Comenius University Bratislava (Faculty of Physics, Mathematics and Informatics)
3. Eötvös University Budapest
4. International School for Advanced Studies (SISSA), Trieste
5. University of Ljubljana
6. University of Padua
7. University of Trieste
8. University of Vienna (Faculty of Physics)
9. University of Zagreb (Faculty of Science - PMF)

2. GENERAL

2.1. Name of study course:

University postgraduate doctoral study in physics

2.2. Responsible and implementing institution:

University of Zagreb, Faculty of Science, DEPARTMENT OF PHYSICS, Bijenička cesta 32, 10002 Zagreb, and DEPARTMENT OF GEOPHYSICS, Horvatovac bb, 10000 Zagreb. Participation of teachers from other Croatian institutions (Ruđer Bošković Institute, Institute of Physics, Faculty of Mining, Geology, and Oil, and DRI) has been envisaged in respective cooperation agreements. Their status, as well as that of future collaborators, is to be regulated by said agreements, or by direct arrangement with the mentor or lecturer, and/or by election of lecturers to nominal teaching positions. Visits of teachers from leading foreign institutions are also possible. The implementation of the doctoral studies is in the care of the Doctoral Study Council, nominated by the Joint Council of the Departments of Physics and of Geophysics, to which the Doctoral Study Council is responsible. The Doctoral Study Council consists of a Head, his or her Deputy, and Heads of the various study branches. Each student is in the care of a Reporter, proposed by the Doctoral Study Council and named by the Joint Council of the Departments of Physics and Geophysics at the time of enrollment. The Head of each study branch shall convene the Council of the study branch, consisting of all the respective lecturers, reporters, and mentors, engaged for the current academic year, at least once per semester.

2.3. Study length:

The post-graduate doctoral study (PGDS in the following) of physics is composed in several branches as a regular three-year (six semesters) university course of study, lasting in principle up to four years, which may be further extended for students who do not study full time.

2.4. Conditions of enrollment:

- To enroll in the first year of study, a student must have completed a corresponding (under)graduate study of physics or respectively geophysics. Candidates whose studies so far have not been completely compatible may enroll in the first year with additional obligations to pass prescribed examinations, chosen among the (under)graduate curricula at the Faculty of Science. Students required to fulfill these obligations may obtain an extension of at most one academic year to do so.
- The minimal average grade in the corresponding (under)graduate studies shall not be less than 3,5. Enrolling with a lower average grade, or with not completely compatible previous studies, is possible by taking additional (under)graduate subjects, contingent upon the recommendation of two professors, one of which will be selected Reporter for the student in question by the Joint Council of the Physics and Geophysics Departments. The choice of additional subjects is prescribed by the Doctoral study Council, at the recommendation of the Head of the respective branch of study.
- Students who have passed all exams of the corresponding specialist studies may also enroll in the doctoral study program. The necessary additional coursework and time required to complete the doctoral studies shall be individually determined by the Joint Council of the Physics and Geophysics Departments, at the recommendation of the Doctoral study Council.

2.5. Conditions of study:

- In the course of study the student should successfully complete all activities prescribed in the program and acquire at least 180 ECTS points. During the first two years of study the student may acquire 60 ECTS points by following the courses chosen among those offered within the doctoral study of Physics, and passing the requisite examinations. All obligatory courses with the exception of the Seminar should be passed within the first year, and all enrolled courses by the end of the second year. The remaining 120 ECTS points may be acquired through scientific research and seminars during the second and third year of study. Students who study full time shall defend their thesis at the end of the third year, or during the year after that by extension granted by the Doctoral study Council, further extensions being possible if granted by the Joint Council of the Physics and Geophysics Departments. The Doctoral Study Council shall nominate a mentor for each student upon enrollment in the second year of study, as well as a Committee of three members, who are responsible for the student's induction into scientific research. The Committee shall as a rule consist of the mentor, Reporter, and Head of the respective study branch.

2.6. Competence acquired by completing the PGDS:

Upon completion of the doctoral studies in physics, a Doctor of natural sciences in the field of physics shall be competent for contemporary scientific research in physics. The following specific academic titles shall be acquired:

- Doctor of natural sciences in the field of physics (Elementary particle physics)
- Doctor of natural sciences in the field of physics (Nuclear physics)
- Doctor of natural sciences in the field of physics (Condensed matter physics)
- Doctor of natural sciences in the field of physics (Atomic and molecular physics and Astrophysics)
- Doctor of natural sciences in the field of physics (Biophysics)
- Doctor of natural sciences in the field of physics (Medical physics)
- Doctor of natural sciences in the field of physics (Geophysics)

3. PROGRAM DESCRIPTION

3.1. Structure and organization of the doctoral program:

- Doctoral studies in physics include both teaching and research components. Students participate in both with professors who are high-grade active researchers in their own fields. The proposed doctoral studies cover a wide field of contemporary physics, beginning with the smallest scales (elementary particles, nuclear physics, atomic and molecular physics), continuing with nanoscales studied by solid state physics, all the way to scales relevant to the universe as a whole in astrophysics. In particular, physics research has contributed to the development of other sciences, so the Physics Department intends e.g. to develop doctoral studies in biophysics, as a connection between biology and physics. Further one should mention the studies of

geophysics with the obvious applications in meteorology, seismology and oceanography. We foresee that the doctors of the current graduate school of physics will be invaluable in research at Croatian research institutes, in higher education and research at Croatian universities, as well as in industrial research and development. We note that research experience in physics as a basic science enables researchers to make important contributions to other natural and biomedical sciences. It is also known that employees who acquired knowledge and quantitative methods and attitudes with their training in physics are often useful for responsible positions in banks, public administration and elsewhere. Therefore it is essential for Croatia to focus on the development of the above-mentioned scientific and professional profiles in the framework of its modernization, thus limiting the present unacceptably high rate of "brain drain" in a natural way.

Studies are organized as follows:

- In the first year of study the emphasis is on obligatory taught courses, offered every academic year. Participating in appropriately chosen elective courses shall shift the emphasis towards full scientific research activity during the higher years. Every year, the Joint Council of the Departments of Physics and of Geophysics shall determine which elective courses are to be offered in that year within each branch of study. These shall be selected from the list appended below, which the Joint Council may extend according to the needs of the cooperating institutions, and the number and interests of students. In addition to elective courses within a given study branch, a student may choose elective courses from other branches, and courses from other doctoral studies at the University of Zagreb, as well as from international inter-university studies.
- During the first year of study each student shall enroll in courses with a total workload of 60 ECTS points. If the student does not pass the obligatory courses by the first year, and the electives by the second, he or she may continue studies at one of the specialist branches, subject to the recommendation of the Head of the respective study branch. Before asking for transfer the student is required to give a Seminar open to all students of the doctoral studies in physics. In the Seminar, the student shall present some problem of current interest, based on primary and secondary literature (original articles, review articles, books). The subject of the Seminar shall be proposed by the Reporter responsible for the student, and vetted by the Head of the respective study branch.
- Grades for each course are given by the respective teacher, who shall enter them in the student's index, taking into account the sum of the student's accomplishments in the course, including his or her performance at the exam itself.
- Part of the studies may be executed through intensive activities, international studies (Joint International Graduate Studies), as well as in the English language.
- At the beginning of the second year, the student shall begin to participate in the scientific activities of a research laboratory, and in the mentor's research subject, choosing among the offerings put up by the Joint Council of the Departments of Physics and Geophysics, based on the recommendation of the Council of Doctoral Studies, based in particular on cooperation contracts between the Faculty of Science and other scientific and higher education institutions. The student enrolls in elective courses by submitting a proposal to the Doctoral Study Council, after consultation with the reporter, mentor, and Head of the respective study branch. In the third year, the student shall enroll in research with the mentor, and one seminar above the public presentation of the thesis subject, given in front of the three-member committee nominated by

the Council of Doctoral Studies.

- During the second and third year, before defending their thesis, students must acquire 120 ECTS points, as follows:
  - up to 80 ECTS points by authoring or coauthoring research publications (20 points for each work published in an internationally reviewed journal, up to 60 points if published in a journal listed in Current Contents, according to the grading given by the three-member Committee, based on the significance of the work and the candidate's own contribution).
  - exceptionally, at the student's request and with the mentor's agreement, these eighty points may be obtained prior to publication, based on a thesis written in English, positively evaluated by a three- or five-member committee nominated by the Joint Council of the Departments of Physics and Geophysics at the recommendation of the Council of Doctoral Studies. In these cases at least one, respectively two, members of the Committee must be renowned foreign scientists.
  - up to 40 ECTS points for at least 2 public seminars before the three-member Committee; one seminar during the third year shall be the public presentation of the chosen subject of the doctorate, while the other shall take a wider view of the study branch; the subjects shall be determined by the Doctoral study council, at the joint recommendation of the mentor and Head of the study branch;
  - up to 20 ECTS points by enrolling and passing additional elective courses or by participating in university teaching.

- The doctoral thesis is defended before a Committee of at least three members, one of which is the mentor. When by the candidate's request a thesis is defended which has not yet resulted in the publication of a paper in a CC journal, the defense shall be in English, and at least one member of the committee shall be a renowned foreign scientist. The Committee shall be formed by the Joint Council of the Physics and Geophysics Departments, at the recommendation of the Council of Doctoral Studies

4. PLAN OF STUDIES FOR POSTGRADUATE DOCTORAL STUDY OF PHYSICS

1. ELEMENTARY PARTICLES AND FIELDS

			Hours per yr	Hours per yr	
Code	Author	Subject title	Lect.	Ex.	Points
Basic courses:					
26101	B. Nižić P.Prester, A.Ilakovac	Field Theory I and II	45 + 45	30 + 30	15
26102	B. Guberina I.Picek K.Kumericki	Elementary Particle Physics I and II	45 + 45	30 + 30	15
26104	K. Kadija	Experimental High Energy Physics	30+ 30	45+ 45	15
26105	M. Furić, M. Planinić	Experimental Methods in Elementary Particle Physics	30 + 30	45 + 45	15
27107	Sector coordinator	Seminar			6
Remark I.: Students are required to take two of four basic courses (26101,26102,26104,26105) depending on theoretical or experimental orientation. RemarkII:Research seminar(course 27107) is obligatory for all students					
Elective courses:					
27109	A. Švarc	Intermediate Energy Physics	30	15	8
27110	D. Klabučar	Hadronic Physics	30	15	8
27111	S. Meljanac	Group Theory	30	15	8
27112	D. Svrtan	Geometry and Topology	30	15	8
27113	S. Pallua	Gravitation and Cosmology	30	15	8
27114	T. Prokopec	Equilibrium and Nonequilibrium Field Theory	30	15	8
27115	L. Bonora	Superstring Theory and Branes	30	15	8
27116	B. Melić	Effective Field Theory and Physics of Heavy Quarks	30	15	8
27117	V. Brigljević	Complex analysis methods with applications in particle physics and astrophysics	30	15	8

Remark III: Three of the elective course have to be taken and passed. Along with the elective courses above, students can choose one of basic courses.
Remark IV: Elective courses from other sectors of graduate study in physics can also be taken.
Remark V: Students can choose subfield in astrophysics, in which case they have to choose courses

27312(Structure and evolution of stars) and 27113(Gravitation and cosmology), along with their other basic courses

2. NUCLEAR PHYSICS

Code	Author	Course	Hours/year		ECTS
			Lectures	Practice	
Obligatory courses:					
26201	D. Vretenar	Nuclear structure I	30	15	10
26202	D. Vretenar	Nuclear structure II	30	15	10
26203	D. Bosnar M. Milin	Experimental nuclear physics	20	15+10	10
26204	M. Planinić D. Bosnar	Experimental techniques in nuclear physics	20	15+10	10
The PhD student takes 3 compulsory courses (30 ECTS) and 3 optional courses (30 ECTS) from a pool of 10 over two terms (autumn and spring).					
Supplementary courses:					
27206	M. Jakšić	Nuclear techniques and applications (in materials and environmental sciences)	15	30	10
27207	D. Bosnar	Radiation detectors and medical applications of nuclear methods	20	15+10	10
27208	M. Milin	Nuclear astrophysics	30	15	10
27209	D. Klabučar	Hadronic physics	30	15	10
27210	T. Nikšić	The nuclear many-body problem	30	15	10
27211	N. Paar	Mathematical modeling and numerical methods	30	15	10

3. CONDENSED MATTER PHYSICS

Code	Author	Course	Hours/year		ECTS
			Lectures	Practice	
Obligatory courses:					
26301 T1	A. Bjeliš	Condensed Matter Physics I	45	15+15	10
26302 T2	M. Šunjić	Condensed Matter Physics II	45	15+15	10
26303 E1	E. Babić and A. M. Tonejc	Experimental Investigation in Solid State Physics I	10	50+15	10
26304 E2	E. Babić and A. M. Tonejc	Experimental Investigation in Solid State Physics II	10	50+15	10
27305 S	Subfield study coordinator	Seminar			6
Note: Theoretically oriented students have to take courses T1, T2 and E1, while experimentally oriented students have to take courses T1, E1 and E2. All students take the Seminar.					
Elective courses:					
27306	M. Šunjić	Surface physics and nanostructures	30	5+10	8
27307	S. Barišić	Theory of phase transitions	30	15	8
27308	H. Buljan	Nonlinear continua	15	7	4
27309	S. Barišić	High Tc superconductivity	15	7	4
27311	D. Babić	Physics of polymers	15	7	4
27312	E. Tutiš	Physics of semiconductors	15	7	4
27313	A. Tonejc	Physics of metals and alloys	15	7	4
27314	A. Hamzić	Superfluidity and superconductivity	15	7	4
27315	E. Babić, K. Zadro	Disordered systems	15	7	4
	A. Hamzić	Spintronics	15	7	4

Students can select certain courses from other doctoral programmes, especially from other physics subfields, as well as from mathematics and chemistry.

4. ATOMIC, MOLECULAR AND OPTICAL PHYSICS (AMOP) AND ASTROPHYSICS: AMOP MODULE

Code	Author	Course	Hours/year		ECTS	Study year
			Lect.	Exc.		
Compulsory AMOP courses: Theoretically oriented AMOP : T1 and T2 + E1 or E2, seminar Experimentally oriented AMOP : E1 and E2 + T1 or T2, seminar						
26401 T1: Theor. AMOF I	Z. Maksić	Quantum theory of atoms and molecules	45	20	14	1.
26402 T2: Theor. AMOF II	S. Bosanac	Atomic and molecular collision processes	30	15	10	1.
26403 E1: Exp. AMOF I	G. Pichler	Atomic physics and spectroscopy	30	15	10	1.
26404 E2: Exp. AMOF II	D. Kirin	Molecular physics and spectroscopy	30	15	10	1.
27405		Seminar	60	0	6	2.
Free selection AMOP courses:						
27406 Th	M. Movre	Physics of cold collisions	30	15	8	1.-3.
27407 Th	R. Beuc	Theory of optical spectra of two-atomic systems	30	15	8	1.-3.
27408 Th	H. Buljan	Nonlinear optics	30	15	8	1.-3.
27409 Th	B. Vršnak	Plasma physics	30	15	8	1.-3.
27410 Exp	S. Milošević	Atomic and molecular beams	15	30	8	1.-3.
27411 Exp	N. Demoli	Optics and holography	15	30	8	1.-3.
27411 Exp	D. Veža	Nonconventional methods in laser spectroscopy	15	30	8	1.-3.
Free selection non-AMOP courses:						
27413 Th – Interdisciplinary course AMOP - CMP	B. Gumhalter	Interactions of atoms and photons with surfaces	30	15	8	1.-3.
X	X	Free choice from the other DS in physics (particle physics, condensed matter physics, nuclear physics, …)	~ 30	~ 15	~ 8	1.-3.

4. ATOMIC, MOLECULAR AND OPTICAL PHYSICS (AMOP) AND ASTROPHYSICS: ASTROPHYSICS MODULE

Compulsory courses

Code	Author	Course	Hours/year		
			Lect	Lect	
26414	K. Pavlovski	Physics of Stars and Stellar Populations	30 + 15		10
26415	S. Pallua	Gravitation and Cosmology	30 + 15		10
27416		Seminar			6

Students are required to take one theoretical course from one of this branches Elementary particle physics, Nuclear physics, Condensed matter physics, Atomic and molecular physics and astrophysics. Seminar is obligatory for all students. In total, students must collect 36 ECTS points of compulsory courses.

Free selection (3 optional courses)

27417	Ž. Ivezić	Galactic Dynamics	15 + 15	8
27418	D. Krajnović	Galactic Astronomy	15 + 15	8
27419	B. Vršnak	Solar Magnetohydrodinamics	15 + 15	8
27409	B. Vršnak	Plasma physics	15 + 15	8
27208	M. Milin	Nuclear astrophysics	15 + 15	8
27211	N. Paar	Mathematical modeling and numerical methods	15 + 15	8

5. BIOPHYSICS

Code	Author	Title	Hours/year		Points
			Lectures	Practice	
Obligatory courses:					
26501	D. Krilov / J. Brnjas-Kraljević	General biophysics*	30	15	10
26502	I. Weber and collaborators	Experimental methods in biophysics	24	40	12
27503	Program leader	Seminar in biophysics (1. year)	30	0	8
Elective courses:					
27504	G. Pifat	Molecular biophysics	20	10	6
27506	I. Weber	Cell biophysics	20	20	8
27507	D. Krilov	Biophysics of membranes and lipoproteins	30	15	10
27508	D. Juretić	Bioenergetics	20	15	8
27509	Sa. Tomić	Modeling of Biomacromolecules	15	10	6
27510	S. Supek	Neurodynamics	15	15	6
27605	J. Brnjas-Kraljević	Magnetic Tomography	15	15	6
27512	V. Paar	Higher order repeats in human genome	20	15	6
27513	A. Smith	Introduction to physics of soft and biological systems	30	15	10

Experimental methods in biophysics

Code	Author	Modul	Lectures	Prac.	Points
27551	M. Kveder –Ilakovac, B. Rakvin	EPR spectroscopy	6	10	3
27552	D. Vikić-Topić	NMR spectroscopy	6	10	3
27553	A.M. Tonejc	Electron microscopy	6	10	3
27554	I. Weber	Light microscopy	6	10	3
27555	V. Svetličić	Atomic force microscopy	6	10	3
27556	G. Baranović	Vibrational spectroscopy	6	10	3
27557	M. Luić / Z. Štefanić	Crystallography of macromolecules	6	10	3
27558	S. Kazazić	Mass spectrometry	6	10	3
27559	Si. Tomić / T. Vuletić	Dielectric spectroscopy	6	10	3
27560	H. Zorc	Biofotonics	6	10	3
27561	J. Brnjas-Kraljević, M. Kveder- Ilakovac	Fluorescence spectroscopy	6	10	3

In addition to attending the *General biophysics course* and the *Seminar,* students are obliged to make a choice of 4 sets of

lectures from Experimental methods in biophysics. For students in theoretical biophysics the course *Introduction to physics of soft and biological systems* is also compulsory. In total, students must collect 60 points.

6. MEDICAL PHYSICS

Code	Author	Course	Hours/yr		ECTS
			Lect.	Exer	
Obliged subjects:					
26601	S. Lončarić	Physics of nuclear medicine	30	15	7
26602	M. Vrtar	Physics of radiology, radiotherapy and dosimetry	30	15	7
26603	B. Breyer, G. Žauhar	Physics and technology of medical ultrasound	30	15	7
26605	S. Lončarić	Methods of tomographic reconstruction in medicine	20	15	5
26606	S. Tonković	Biomedical electronics and instrumentation	20	15	5
27212	D.Vretenar	Mathematical modeling and numerical methods	30	15	7
26607	Ž. Reiner	Selected chapters of physiology and pathophisiology	15	15	3
26608	R. Štern-Padovan	Radiological anatomy	15	15	3
27613	Subfield study coordinator	Doctor seminar	60	0	6
Elective subjects:					
26604	M. Vrtar, S.Lončarić, D. Kubelka	Radiation protection in medical physics	20	15	5
27605	J. Brnjas-Kraljević	Magnetic tomography	15	15	3
27611	Z.Roller-Lutz	Application of laser in medicine	15	15	3
27612	Z. Krajina	Oncology and radiotherapy	15	15	3

The subject "Medical physics" from master of physics study or from any direction of professor of physics study will be recognised with **5 ECTS** on postgraduate doctor or specialist study. The total amount of ECTS points for doctor study must be **180**. At least **60 ECTS** come from exams (subjects of doctoral study) during the first two years. Additional **120 ECTS** come from scientifically activities and articles.

7. GEOPHYSICS

Code	Author	Course	Hours/year		ECTS
			Lectures	Practice	
Obligatory courses:					
76701	Z. Pasarić	Data Analysis in Geophysics	30	15	12
76702	D. Herak and B. Grisogono	Seminar in Geophysics I	30	0	20
77703	M. Herak and M. Orlić	Seminar in Geophysics II	60	0	40
Supplementary courses:					
77704	D. Koračin and Z. Bencetić Klaić	Atmospheric Modeling	45	30	12
77705	Z. Bencetić Klaić	Selected Lectures in Atmospheric Physics	30	15	9
77706	B. Grisogono	Selected Chapters in Atmospheric Turbulence	30	15	9
77707	V. Grubišić and B. Grisogono	Mesoscale Meteorology	30	15	9
77708	M. Orlić	Dynamical Oceanography	45	15	12
77709	D. Degobbis and R. Precali	Physical and Chemical Properties of Seawater	30	15	9
77710	Z. Pasarić and G. Beg Paklar	Selected Topics in Physical Oceanography	30	15	9
77801	D. Herak	Physics of the Earth's Interior	45	15	15
77802	M. Herak	Physics of the Earthquake Source	45	15	15
77803	B. Tomljenović	Seismotectonic Parameters and Earthquake Magnitude	30	15	9
77804	M. Herak	Selected Chapters of Seismology	30	15	9
77805	F. Šumanovac	Selected Chapters of Geophysical Exploration	30	15	9
77906	G. Verbanac	Planetary Magnetism	20	20	9

5. PROGRAMME OF STUDIES FOR POSTGRADUATE DOCTORAL STUDY OF PHYSICS

1. ELEMENTARY PARTICLES AND FIELDS

Postgraduate Doctoral Study of Physics
COURSE: Field Theory
AUTHOR(S) OF PROGRAMME : Bene Nižić, scientific associate, Institut "Rudjer Bošković" Predrag Dominis Prester, assistant professor, Department of Physics, University of Rijeka Amon Ilakovac, associate professor, Faculty of Science, University of Zagreb
TEACHING TECHNIQUES: lectures (3), exercises (2), two semesters
ECTS : 15
COURSE ACHIEVEMENTS: The aim of the course is to teach students fundamental concepts and calculational techniques of quantum field theory, and to apply them to the elementary particle physics.
COURSE PROGRAMME (by blocks of 2 weeks-or 10 class hours consisting of 6 lectures and 4 exercises): Field Theory I 1. Classical field theory. (Lagrange and Hamilton formalisms. Symmetries and Noether theorem) Quantization of Klein-Gordon field. 2. Quantization of free fields – spin 1/2 i 1. 3. Interacting field theory. (Spin, statistics and local fields. Discrete symmetries. CPT theorem) 4-5. Perturbation theory and S-matrix. (Feynman rules. Cross sections. Decay rate. Tree level) 6. One-loop corrections. Introduction to renormalization. 7-8. Path integral methods. 9. Renormalization in Quantum electrodynamics. (Vacuum polarization. Anomalous magnetic moment. Electron self energy) 10. General renormalization theory. (Classification of divergences. Renormalizability. Elimination of divergences in arbitrary order of perturbation) 11. Renormalization group. (Running couplings. Renormalization group equations. Varieties of asymptotic

behavior. Critical phenomena. Critical exponents)
12. Infrared effects.
(Soft photons. Cancellation of divergences. General infrared divergences. Jets.
Lee-Nauenberg theorem.)
13-14. Nonabelian gauge theories.
(Gauge invariance. Lagrangians and simple Lie groups. Quantization.
Faddeev-Popov method. Ghosts)
15. Reserved for extension of a chosen topic.
Field Theory II.
1. BRST quantization.
2-3. Renormalization of gauge theories.
(Zinn-Justin equation. Background field gauge. One-loop calculations. QCD.
Asymptotic freedom)
4-5. Spontaneously broken global symmetries.
(Goldstone bosons. Approximate symmetries. Pions as Goldstone bosons.
Effective field theories. SU(3) X SU(3).)
6. Operator product expansions.
(Sum rules. Deep inelastic scatering)
7-8. Spontaneously broken gauge symmetries.
(Higgs mechanism. Renormalizable ξ-gauges. Electroweak theory.
Standard model of elementary particles)
9-10. Anomalies.
($\pi^\circ \rightarrow 2\gamma$. Calculation in general case. Anomaly-free gauge theories.
Consistency conditions)
11-12. Extended field configurations.
(Topological classifications. Monopoles. Instantons. Solution of U(1) problem.
Theta angle. Peccei-Quinn symmetry. Vacuum decay)
13-15. Extensions of chosen topics, also through student seminars.

OBLIGATORY LITERATURE:
S. Weinberg: The Quantum Theory of Fields I i II (Cambridge, 1995, 1996)

SUPPLEMENTARY LITERATURE:
M. E. Peskin and D. V. Schroeder: An Introduction to Quantum Field Theory (Addison Wesley, 1995)
Lewis H. Ryder: Quatum Field Theory (Cambridge University Press, 1985)
J. D. Bjorken and S. D. Drell: Relativistic Quantum Fields (Mc Graw – Hill, 1965)

EXAMINATION PROCEDURE (relative weights indicated):
Homework and projects (70%), final examination (30%)

Postgraduate Doctoral Study of Physics – Elementary Particle Physics

COURSE: Elementary Particles

AUTHOR(S) OF COURSE PROGRAMME

Dr. sc. B. Guberina, Senior Scientist, Rudjer Bošković Institute, Zagreb
Dr. sc. Ivica Picek, Full Professor, Prirodoslovno-matematički fakultet Sveučilišta u Zagrebu
Dr. sc. Kresimir Kumericki, Physics department, Faculty of science, University of Zagreb

TEACHING TECHNIQUES *(lectures+practice+seminar)*:

ECTS: 15

COURSE ACHIEVEMENTS

Basic understanding of fundamental building blocks of matter, and of fundamental forces in nature. Student becomes qualified for quantitative calculations of observable quantities. The course deepens student's understanding of general theoretical methods and enables him to follow the newest results in accelerator and nonaccelerator experiments.

COURSE PROGRAMME

1. Elementary particles from tree to loop level (annihilation at Z-resonance and LEP-physics observables);
2. Basic loop-types from QED to QCD and QFD (vacuum polarization, self-energy diagrams, and anomalous triangle loop), dimensional regularization, renormalizable gauges and Feynman rules;
3. Inputs to the Standard Model (SM): symmetries and currents, current algebra, symmetry breaking and Goldstone bosons;
4. Electroweak and QCD sectors of the SM, and the respective phase transitions;
5. Electroweak parameters (masses and couplings);
6. Electroweak precision observables (flavour universal and nonuniversal);
7. Fermionic sector of the SM (protective chiral symmetry, Yukawa sector and minimal flavour violation);
8. Electroweak processes (leptonic, semileptonic and nonleptonic weak decays) and effective QCD corrected operators;
9. Flavour physics and CP violation (CKM mixing parameters and kaon system and B-meson system);
10. Old and new SM: lepton mixing, neutrino oscillations and masses (seesaw mechanisms);
11. Scalar sector of the SM and SSB (generalized scalar sector and custodial symmetry);
12. Bounds on weakly coupled Higgs boson, and strongly coupled Higgs options;
13. Gauge hierarchy problem and proposed BSM solutions (supersymmetry, Little/Littlest Higgs, extra (spatial) dimensions;
14. Top and Higgs physics at colliders;
15. Early universe, baryogenesis and leptogenesis

Dimensional transmutation, renormalization group, Wilson operator expansion
Strong interactions and quark models.

Chiral quark models and chiral perturbation theory. Nonperturbative low-energy QCD bag-model, instantons, lattice calculations. Heavy-quark physics. Heavy-light systems. Neutrino masses and oscillations. Leptogenesis. CP violation and Higgs sector. Beyond the standard model. Effective field theories. Grand unification, supersymmetry, supergravity and superstrings. Flavour problem. Particle physics and cosmology. Inflationary cosmology. Phase transitions. Dark matter – particle candidates. Einstein-Hilbert vacuum action. Topological objects. Accelerator physics. Nonaccelerator physics. Astrophysical experiments.

STUDENTS' ACTIVITIES AND THEIR EVALUATION

Class attendance, homework during the semester, presentation of seminar work at the end of semester.

OBLIGATORY LITERATURE

1. Cheng T-P and L-F Li, Gauge Theory of Elementary Particle Physics, Oxford University Press, 1984
2. Donoghue J.F., E. Golowich and B. Holstein, Dynamics of the Standard Model, Cambridge University Press, 1992.
3. G.C. Branco, L. Lavoura, J.P. Silva, CP VIOLATION,Clarendon Press, Oxford 1999
4. E. V. Linder, First Principles of Cosmology, Addison-Wesley, 1997
5. M.E. Peskin and D.V. Schroeder, Quantum Field Theory, Addison-Wesley Publishing Company, 1995.
6. P. Pascual and R. Tarach, Renormalization for the Practitioner, Springer 1984.
7. P. J. E. Peebles, Principles of Physical Cosmology, Princeton University Press, 1993

SUPPLEMENTARY LITERATURE

1. Manohar, A.V., Wise, M.B., Heavy Quark Physics, Cambridge University Press, 2000.
2. M. Fukugita i T. Yanagida, *Physics of Neutrinos and Applications to Astrophysics*, Springer-Verlag, 2003
3.Mohapatra R.N., Unification and Supersymmetry, Springer 1986.
4. Okun L.B., Kvarki i leptoni, Nauka, Moskva 1980.
5. Picek I., Fizika elementarnih čestica, HINUS, Zagreb, 1997.
6. A. Linde, Particle Physics and Inflationary Cosmology, e-edition ArXiv: hep-th/0503203
7. N. D. Birrell, P. C. W. Davies, Quantum Fields in Curved Space, Cambridge University Press, 1982.
8. I. L. Buchbinder, S. D. Odintsov, I. L. Shapiro, Effective Action in Quantum Gravity, IOP Publishing Ltd. 1992.
9. L. S. Brown, Quantum Field Theory, Cambridge University Press, 1996.

EXAMINATION PROCEDURE:

Home works, seminar work, oral exam.

Postgraduate Doctoral Study of Physics

COURSE: Experimental high energy physics

AUTHOR(S) OF COURSE PROGRAMME:

Dr. Krešo Kadija, senior scientist, Ruđer Bošković Institute, Zagreb, Croatia

TEACHING TECHNIQUES:

Lectures+practice+seminar

ECTS: 15

COURSE ACHIEVEMENTS:

The aims of the course are:

- to give a non-mathematical but complete introduction to the concepts of high energy physics, with particular emphasis on familiarizing the students with our current understanding of the relationship between the theoretical description of high energy physics and the experimental observable reality
- to further develop student's problem solving skills

COURSE PROGRAMME :

- Introduction to elementary particles and their interaction
  - Lecture 1, Historical introduction, Griffits: Chapter 1
  - Lecture 2, Leptons quarks and hadrons, Martin & Shaw: Chapter 2
  - Lecture 3, Relativistic kinematics, Martin & Shaw: Appenix A
  - Lecture 4, Amplitudes and cross sections, Martin & Shaw: Appenix B
  - Lecture 5, Trigger and production cross sections from NA49 experiment
- Accelerators and detectors
  - Lecture 6, Accelerators, Martin & Shaw: Chapter 3.1
  - Lecture 7, Particle detectors, Martin & Shaw: Chapter 3.3
- Quark states and colour
  - Lecture 8, Charmonium and bottonium, Martin & Shaw: Chapter 6.1
  - Lecture 9, Top quark , D0 and CDF results,
  - Lecture 10, Colour charges, Martin & Shaw: Chapter 6.3
- QCD, Jets, Gluons and the Parton Model
  - Lecture 11, The strong coupling constant, Martin & Shaw: Chapter 7.1
  - Lecture 12, Asymptotic freedom, Martin & Shaw: Chapter 7.1
  - Lecture 13, Two and three jet events, Martin & Shaw: Chapter 7.2

- Deep inelastic scattering and structure function
  - Lecture 14, Inelastic electron and muon scattering, Martin & Shaw: Chapter 7.4
  - Lecture 15, The parton model and Bjorken scaling, Martin & Shaw: Chapter 7.4
  - Lecture 16, Parton distributions and scaling violation, Martin & Shaw: Chapter 7.4
- Deconfinement
  - Lecture 17, Physics of heavy ion collisions at ultrarelativistic energies
  - Lecture 18, Screening and J/Psi production
  - Lecture 19, Boson interferometry
- Weak interactions
  - Lecture 20, C, P violation , Martin & Shaw: Chapter 10.1
  - Lecture 21, CP conservation, , Martin & Shaw: Chapter 10.2
  - Lecture 22, U1 detector
  - Lecture 23, Discovery of the W+- and Z0 bosons, Martin & Shaw: Chapter 8.1
  - Lecture 24, Charged current reactions, Martin & Shaw: Chapter 8.2.1 and 8.2.2
  - Lecture 25, Lepton-quark symmetry, Martin & Shaw: Chapter 8.2.3
  - Lecture 26, CKM matrix, Martin & Shaw: Chapter 8.3.1
- Electroweak interactions
  - Lecture 27, Neutral currents, Martin & Shaw: Chapter 9.1
  - Lecture 28, Unification condition: W and Z masses, Martin & Shaw: Chapter 9.1.2
  - Lecture 29, Experimental tests of neutral currents, Perkins: Chapters 9.7.1-9.7.5
  - Lecture 30, Z0 formation: The # of neutrino families, Martin & Shaw: Chapter 9.1.4
  - Lecture 31, Unification and the gauge principle, Martin & Shaw: Chapter 9.2.1
  - Lecture 32, Particle masses and the Higgs field, Martin & Shaw: Chapter 9.2.2
- Search for Higgs boson
  - Lecture 33, The CMS experiment
  - Lecture 34, H2gamma, CMS TDR II, Chapter 2.1
  - Lecture 35, H4 electrons, CMS TDR II, Chapter 2.2
  - Lecture 36, H4 muons, CMS TDR II, Chapter 3.1
  - Lecture 37, H 2 muons, CMS TDR II, Chapter 3.2
- Physics beyond the Standard Model

Lecture 38, Multi-boson production and TGC, CMS TDR II, Chapter 9.4

Lecture 39, MSSM Higgs bosons, CMS TDR II, Chapter 11.1

Lecture 40, MSSM Higgs boson channels, CMS TDR II, Chapter 11.2

Lecture 41, Measurement of MSSM parameters, CMS TDR II, Chapter 11.3

Lecture 42, Grand Unification, Martin & Shaw: Chapter 11.2

Lecture 43, SUSY- sparticle production and decays, Martin & Shaw: Chapter 11.3.1

Lecture 44, Higgs in Randall-Sundrum model, CMS TDR II, Chapter 12.1

Lecture 45, Higher dimensional black holes, CMS TDR II, Chapter 14.8

Lecture 46, Double charged H in Littlest Higgs model, CMS TDR II, Chapter 12.2

Lecture 47, Technicolour-alternative to Higgs mech., CMS TDR II, Chapter 15.1

- Connection between particle physics and astrophysics

Lecture 47, Neutrino mixing and oscillations, Martin & Shaw: Chapter 11.1.1

Lecture 48, Solar neutrino problem, Martin & Shaw: Chapter 11.1.2

Lecture 49, Dark matter - lightest SUSY particle, Martin & Shaw: Chapter 11.4

- Computational physics

Lecture 50, Monte Carlo Method

Lecture 51, Physics Generators (Fritiof, Pythia)

Lecture 52, Detector simulation (Geant)

STUDENTS' ACTIVITIES AND THEIR EVALUATION: Students talks (approx. 30 minutes) on selected topics, and the student projects based on Monte Carlo generation and detector simulation of physics processes.

OBLIGATORY LITERATURE (Selected chapters) :

1. B. R. Martin @ G. Shaw, Particle Physics, 2nd Edition,
John Wiley @ Sons, NY, 1997.

2. CMS Collaboration, Technical design report, Vol. II, Physics Performance
J. Phys. G: Nucl. Part. Phys. 34 (2007), 995-157

SUPPLEMENTARY LITERATURE (Selected chapters):

1. D. H. Perkins, Introduction to High Energy Physics, 4th Edition, Cambridge University Press, Cambridge, 2000

2. D. Griffiths, Introduction to elementary particles, Harper@Row, Publishers, Inc., NY, 1987
EXAMINATION PROCEDURE: One computer-based laboratory exercise (35%), two seminars (10%+10%) and oral examination (45%).

Postgraduate Doctoral Study of Physics

COURSE: EXPERIMENTAL METHODS IN ELEMENTARY PARTICLE PHYSICS

AUTHOR(S) OF COURSE PROGRAMME:
Miroslav Furic.Full Professor,Department of Physics,Facuty of Science,University of Zagreb
Mirko Planinic, Associate Professor, Department of Physics, Faculty of Science, University of Zagreb

TEACHING TECHNIQUES:
lectures, exercises, seminar, lab projects

ECTS: 15

COURSE ACHIEVEMENTS:
This course covers a wide array of experimental particle physics techniques ranging from introductory particle accelerator design to the interaction of particles with matter. It includes detailed discussions of charged particle tracking detectors as well as electromagnetic and hadronic calorimeter design and concludes with general purpose detectors which are necessary for modern particle physics experiments.

COURSE PROGRAMME (divided in 15 teaching units where one unit will last approximately two weeks):
1) Interaction of the Radiation with Matter:
Energy Loss of Heavy Charged Particles by Atomic Collisions, Čerenkov Radiation.
Required reading: Leo, Chapters 2.2 and 2.3
2) Energy Loss of Electrons and Positrons, The Interaction of Photons and Neutrons with Matter.
Required reading: Leo, Chapters 2.4, 2.7 and 2.8
3) General Characteristics of Detectors:
Sensitivity, Detector Response, Energy Resolution, Response Time,
Detector Efficiency.
Required reading: Leo, Chapter 5
4) Ionization Detectors
Ionization and Transport Phenomena in Gases, The Cylindrical Proportional Counter
Required reading: Leo, Chapters 6.1- 6.5
5) Multiwire Proportional Chamber (MWPC), The Drift Chamber,
The Time Projection Chamber (TPC), The Gas Electron Multiplier (GEM)
Required reading: Leo, Chapters 6.6- 6.8
F. Sauli, "GEM: A new concept for electron amplification in gas detectors,"
Nucl. Instrum. and Meth. A386, pp. 531, 1997.
6) Scintillation Detectors. Detector Mounting and Operation.
Required reading: Leo, Chapters 7 and 9
7) Photomultipliers and Photodiodes. Time of Flight. Wavelength Shifting.
Required reading: Leo, Chapter 8, Green, Chapter 2
8) Semiconductor Detectors.
Required reading: Leo, Chapter 10
9) Pulse Signals in Electronics. Signal Transmission. Electronics for Pulse Signal Processing. Pulse Height Selection and Coincidence Technique.

Required reading: Leo, Chapters 13 and 15

10) Magnetic fields.
-Solenoidal fields, Dipole fields-fringe fields, Momentum measurements and error, Particle beam and quadrupole magnets.
Required reading: Green, Chapter 7
11) Energy measurements.
-Electromagnetic calorimetry, Hadronic calorimetry
Required reading: Green, Chapters 11 and 12
12) General purpose detectors.
Required reading: Green, Chapter 13
13) Linear Accelerators.
Required reading: Wiedemann, Chapter 2
14) Circular Accelerators
Required reading: Wiedemann, Chapter 3
15) Linear Beam Dynamics
Required reading: Wiedemann, Chapter 5

STUDENTS' ACTIVITIES AND THEIR EVALUATION :
class attendance seminars and lab projects

OBLIGATORY LITERATURE :

1. W.R. Leo, Techniques for Nuclear and Particle Physics Experiments, Springer-Verlag New York, LLC, 1994
2. D. Green, The Physics of Particle Detectors, Cambridge University Press, 2005
3. H. Wiedemann, Particle Accelerator Physics I, Springer, 2nd edition (1999).

SUPPLEMENTARY LITERATURE:

8. D. H. Perkins: Introduction to High Energy Physics, 2nd Edition, Addison Wesley, Reading, MA, 1982.

EXAMINATION PROCEDURE:
Seminar 20%, homework 20%, lab project 20%, oral 40%

Postgraduate Doctoral Study of Physics

COURSE: Intermediate energy physics (Physics of resonant states)

AUTHOR(S) OF COURSE PROGRAMME
Dr.sc. Alfred Švarc, senior scientist

TEACHING TECHNIQUES: 25 + 12 + 1

ECTS: 8

COURSE ACHIEVEMENTS

The aim of the course is to provide the minimum necessary level of knowledge needed for students to actively enter the field of elastic and inelastic scattering of mesons and baryons at intermediate energies, to be able to follow the literature and make quantifications of processes sufficient for their independent work. The special emphasis will be put on the issue of resonant states, and the connection between theoretical predictions and experimentally determined facts

COURSE PROGRAMME

1. Hadronic phenomenology.
   - Baryons and baryonic spectra
   - Mesons and mesonic spectra.
2. Conservation of isospin, baryon number, strangeness and charm.
3. S-matrix and analytic properties of scattering amplitudes.
   - Definitions of S and T matrices
   - Unitarity
   - Link with observables.
4. Dispersion relations, partial wave expansion, analytic properties.
5. Phase shifts.
6. Definitions of bound states and resonances.
7. Spin structure of scattering amplitude.
8. Polarization phenomena in hadronic physics.
9. T-matrix close to threshold of reactions.
10. Off shell extrapolation of scattering amplitudes.
11. Fitting of phase shifts to experimental data, methods and applications.
12. Coupled-channel methods.
13. Multi-channel separable potentials.
14. The notion of continuum ambiguity and its importance for scattering in inelastic energy domain.
15. Review of existing resonant states with the estimation of their reliability

STUDENTS' ACTIVITIES AND THEIR EVALUATION

preparing and publicly presenting one seminar paper per student; the paper will not be of general nature but will have a well defined aim; one of the following alternatives will be chosen
To use one of the world-existing PWA codes and to perform the independent fitting procedure on the locally defined experimental base
To apply the predictions of different PWA results onto the chosen processes (scattering or reaction) and discuss the sensitivity of different observables upon the chosen input
To connect the chosen theoretical model with experimentally determined set of resonant states and discuss the validity of the model
To improve isolated sub-parts of existing PWA codes
To analyze the stability of numerical methods applied in a chosen cases

OBLIGATORY LITERATURE

9. D. Martin, T.D. Spearman: Elementary Particle Theory, North-Holland Publishing Company, Amsterdam 1970

SUPPLEMENTARY LITERATURE

1. John R. Taylor: Scattering Theory, John Wiley & Sons, Inc., New York, London, Sydney, Toronto 1972.
2. G. Hoehler: Elastic and Charge Exchange Scattering of Elementary Particles; Subvolume b: Pion-Nucleon Scattering, Part 2. Methods and results of Phenomenological Analysis. Landolot-Boernstein, Numerical Data and Functional Relationships in Science and Technology, Ed. H. Schopper, Springer-Verlag Berlin-Heidelberg-New York 1983
3. C. Itzykson, J.B. Zuber: Quantum Field Theory, McGraw-Hill International Book Company, 1980
4. K. Huang: Quarks, Leptons & Gauge Fields, World Scientific (1982)
5. T. Ericson and W. Weise: Pions and Nucleons, Oxford Science Publications (1988)

6. C. Bourrely, E. Leader and J. Soffer, Polarization Phenomena in Hadronic Reeactions, Phys. Rep. 59 No 2 (1980) 95-297
7. M.P. Locher, M.E. Sainio, A. Švarc: Dibaryon Resonances, Advances in Nuclear Physics, Vol. 17 (1986) 47-142

EXAMINATION PROCEDURE: preliminary (40%) + written (30 %) + oral (30%)

Postgraduate Doctoral Study of Physics

COURSE: Hadronic physics

AUTHOR OF COURSE PROGRAMME: Prof. dr. sc. Dubravko Klabučar, full professor, Physics Department, Faculty of Science (PMF), University of Zagreb

TEACHING TECHNIQUES: lectures 30 + exercises/seminar 15

ECTS: 8

COURSE ACHIEVEMENTS: Through this course, postgraduate students of elementary particle physics and nuclear physics (both theoretical and experimental) should achieve the up-to-date level of understanding of quark substructure of hadrons and their processes. The key experimental facts and their implications are especially stressed, as is the role of the basic principles of symmetries and of field theory. The course teaches the applications of basic and somewhat more advanced techniques of quantum field theory on the problem of quark substructure of hadrons and their processes.

COURSE PROGRAMME: (divided in 15 weeks)

1. Hadronic phenomenology: baryons, mesons and experimental facts on their spectra and processes (Review of Particle Physics by PDG; Mosel, Appendix B). Hadron interactions by meson exchange (Povh et al., Sec. 16.3). Conservation of isospin, strangeness, charm and baryon number (Mosel, Ch. 4).
2. Quantum numbers of quarks, SU(N) symmetries and representations: building of baryon and meson multiplets (Mosel, Ch. 4 and 5).
3. Brief history of quark-parton concept. Lepton scattering on nucleons (and hadron production from e+e- annihilation) as evidence for quarks and gluons (Povh et al., selected parts of Ch. 6, 7, 8 and 9).
4. Basics of gauge theories, comparison of QED and QCD. Qualitatively on asymptotic freedom and confinement in QCD, nonperturbative QCD at low energies (Mosel, Ch. 2 and 3, Höll et al. Sec. 1, Mosel Ch 15).
5. Hadrons as quark and gluon composites (Höll et al., Sec. 3). Heavy quarkonia as the simplest case (Povh et al., Ch. 13). Characteristics of the light-quark sector, largely unknown low-energy interactions, and the need for modeling (Höll et al. Sec. 3).
6. Some phenomenological models of hadrons useful in the light-quark sector: constituent quark models, MIT bag model, topological and non-topological solitons of effective meson theories, Skyrmions as baryons in the chiral topological soliton model (Mosel, Ch. 16 and 17).
7. Chiral symmetry and its breaking: explicit breaking versus spontaneous/dynamical breaking. Pion as a Goldstone boson, PCAC (Mosel, Ch. 6, 7.1 and 7.2; Höll et al. Sec. 3.2).
8. Sigma-models as examples of spontaneous chiral symmetry breaking (Mosel, Ch. 7.2.1 and 7.2.2).
9. Nambu-Jona-Lasinio (NJL) model as a simple example of dynamical chiral symmetry breaking, of generation of the quark condensate and of the constituent quark mass (Mosel, Ch. 7.2.3; Höll et al. Sec. 4.1).
10. Extending NJL to more realistic interactions through Dyson-Schwinger (DS) approach to quarks and hadrons. System of DS equations for Green functions of a quantum field theory (Höll et al., Sec. 3).

11. DS equation for quark propagators, and Bethe-Salpeter equation for bound states of quarks. Resolution of the dichotomy "quark-antiquark bound state or Goldstone boson" for pseudoscalar mesons (Höll et al., Secs. 5.1 and 5.2).
12. DS description of pseudoscalar, scalar, vector and axial mesons as quark-antiquark bound states from the light to the heavy quark sector. Models of the quark interactions at low and intermediate energies. Relationship with "ab initio" DS calculations. (Höll et al., Sec. 5.2.2).
13. Some processes with hadrons in DS approach. Resolution of the problems with Abelian axial anomaly which otherwise affect approaches where light pseudoscalars are described as quark-antiquark bound states. (Höll et al., Sec. 5.2.1).
14. Various selected topics (now mostly from Höll et al.). – selection based on the current importance of a topic or on some recent progress. Examples: survey on nucleon electromagnetic form factors -experimental and theoretical perspective, progress in DS approach to baryons (Höll etal., Sec. 6).
15. Some insights on hot hadronic/QCD matter, especially from DS approach, on the restoration of the dynamically broken chiral symmetry around the critical temperature and on related matters, e.g., evolution of psedoscalar and scalar meson masses with temperature (Roberts and Schmidt, Ch. 4).

STUDENTS' ACTIVITIES AND THEIR EVALUATION

class attendance, seminars and projects

OBLIGATORY LITERATURE

U. Mosel: "Fields, Symmetries and Quarks", Springer-Verlag, revised and enlarged edition 1999.

A. Höll, C. D. Roberts and S. V. Wright: "Hadron physics and Dyson-Schwinger equations", Lectures given at 20th Annual Hampton University Graduate StudiesProgram, Newport News, Virginia, June 2005, available in e-Print Archive as nucl-th/0601071.

Current edition of "Review of Particle Physics" by Particle Data Group [presently, C.Amsler et al., Phys. Lett. B667, 1 (2008).], also available (especially updates) from http://pdg.lbl.gov/

SUPPLEMENTARY LITERATURE

A. Hosaka and T. Toki: "Quarks, Baryons and Chiral Symmetry", World Scientific Publishing Company 2001.

B.Povh, K. Rith, C. Scholz and F. Zetsche: "Particles and Nuclei", Springer-Verlag 2008.

C. D. Roberts and S. M. Schmidt: "Dyson-Schwinger equations: Density, temperature and continuum strong QCD", Prog.Part.Nucl.Phys.45(2000)S1-S103, also available in e-Print Archive as nucl-th/0005064.

R. Alkofer and L. von Smekal: "The infrared behavior of QCD Green's functions:confinement, dynamical symmetry breaking, and hadrons as relativistic bound states",Phys. Rept. 353 (2001) 281, also available in e-Print Archive as hep-ph/0007355.

J. F. Donoughe, E. Golowich and B. R. Holstein: "Dynamics of the Standard Model", Cambridge University Press 1992.

M. D. Scadron: "Advanced Quantum Theory and its Applications Through Feynman Diagrams" (Second Edition, Texts and Monographs in Physics), Springer-Verlag 1991.

F. Mandl and G. Shaw, "Quantum Field Theory", John Wiley and Sons, revised edition 1993.

F. E. Close: "An Introduction to Quarks and Partons", Academic Press 1979.

EXAMINATION PROCEDURE: student activities through the semester (homework projects and seminar, 55%) followed by oral examination (45%)

Postgraduate Doctoral Study of Physics

COURSE: Groups

AUTHOR(S) OF COURSE PROGRAMME
Stjepan Meljanac, Senior Scientist, Ruđer Bošković Institute and University in Zagreb
Marijan Milekovic.Associate Professor,Faculty of Science,University of Zagreb

TEACHING TECHNIQUES
25(lectures) + 12(practice) + seminars

ECTS: 8

COURSE ACHIEVEMENTS
The aim of this course is to learn the basics of the group theoretic methods in quantum mechanics and elementary particle physics, including the topics like classification of physical states, calculating the tensor invariants, decomposition of representations to irreducible representations, selection rules and the relationship between the symmetries and conservation laws.

COURSE PROGRAMME
The basics of the algebraic theory of groups and their representations. Representations of the finite groups, specially of the symmetric groups. The finite dimensional representations of the classical groups. The Young tableaux. The basics of the theory of Lie algebras and their representations. The structure of the semi-simple Lie algebras. Dynkin´s diagrams. The representations of the semi-simple Lie algebras. Topological properties of groups and their representations. The connectedness properties of the groups. The fundamental group. The basics of the theory of Lie groups. The relationship between Lie groups and Lie algebras.

The course program includes 15 thematic units each of which takes one lecture.These thematic units are as follows:

I SU(N) groups and algebras
II Killing form
III The structure of simple Lie algebras
IV Simple roots
V Cartan matrix
VI The classical Lie algebras
VII The exceptional Lie algebras
VIII Representations of Lie algebras
IX Casimir operators and Freudenthal's formula
X Weyl group
XI Weyl's dimension formula
XII Decomposition of product representations
XIII Subalgebras
XIV Branching rules
XV Elements of supersymmetry and superalgebras

STUDENTS' ACTIVITIES AND THEIR EVALUATION
Homeworks and seminars.

OBLIGATORY LITERATURE
R. N. Cahn, Semi-Simple Lie Algebras and their Representations, Benjamin-

Cummings,1984.

SUPPLEMENTARY LITERATURE

1. Wu-Ki Tung: Group Theory in Physics, World Sci., Philadelphia, 1985.
2. J..A. De Azcarraga, J. M. Izquierdo: Lie groups, Lie algebras, cohomology and some and some applications in physics
3. W. Fulton, J. Harris: Representation Theory, A first Course, Springer, 1991.
1. R. Gilmore: Lie groups, Lie algebras and some of their applications, John Wiley & Sons, 1974.
5. L. S. Pontryagin: Topological groups, Gordon and Breach, 1977.
6. H. Boerner: Representations of Groups, North Holland, Amsterdam, 1963.
7. H. Weyl: Classical Groups, Princeton, 1939.
8. H. Weyl: The Theory of Groups and Quantum Mechanics, Dover, New York, 1950.
9. B. C. Wybourne: Classical groups for physicists, John Wiley & Sons, 1974.
10. H. Georgi: Lie algebras in particle physics/From isospin to unified theories/, The Benjamin/Cummings Publish. Comp. Inc. 1982.
11. Naimark M. A., Stern A. I.: Theory of Group Representations, Springer, Berlin, 1982
12. L. Frappat, A. Sciarino, and P. Sorba, Dictionary on Lie Algebras and Superalgebras (Academic, San Diego, 2000).

EXAMINATION PROCEDURE:
Seminars, written examination and viva voce.

Postgraduate Doctoral Study of Physics
COURSE: GEOMETRY AND TOPOLOGY
AUTHOR(S) OF COURSE PROGRAMME :Prof.dr.sc. Dragutin Svrtan, Full Professor, Department of Mathematics, University of Zagreb.
TEACHING TECHNIQUES: lectures and exercises
ECTS: 8
COURSE ACHIEVEMENTS: The aim of this course is to introduce the particle physics students to basics of modern differential geometry and topology together with some applications to the gauge theories.
COURSE PROGRAMME: 1. Manifolds 2. Differential forms 3. DeRham cohomology 4. Riemannian geometry 5. Connectios and curvatures 6. Diferential forms and Hodge theory 7. Complex manifolds 8. Hermitian manifolds and hermitian differential geometry 9. Fibre bundles 10.Connectios on fibre bundles 11.Gauge theories 12.Characteristic classes 13.Chern classes 14 Chern-Simmons forms 15. Elementary versions of the Index theorem
STUDENTS' ACTIVITIES AND THEIR EVALUATION: Homework exams (5 ECTS)
OBLIGATORY LITERATURE: 1.M.Nakahara: *Geometry,Topology and Physics*, Second Edition (Graduate Student Series in Physics),IOP Publishing, Bristol 2003. 2. F.Morgan: *Riemannian Geometry. A Beginners Guide*. Jones and Bartlett Publishers, London 1993..
SUPPLEMENTARY LITERATURE: 1. V.V.Prasolov: *Elements of Combinatorial and Differential topology*. Graduate studies in Mathematics.Volume 74. Amer.Math.Soc.,Rhode Island 2006. 2.H.Eschrig: *Topology and Geometry for physicists* (2008) http://www.ifw-dresden.de/institutes/itf/members/helmut/tt.pdf. 3. A.Schwarz: *Topology for physicists ,Springer Verlag, Berlin ,1994* 4 B.A. Dubrovin, A.T. Fomenko, S.P. Novikov: *Modern Geometry Methods and Applications*, Volumes 1-3. Springer-Verlag 1987.
EXAMINATION PROCEDURE: Seminar(1 hour)+oral exam (3 ECTS)

Postgraduate Doctoral Study of Physics

COURSE: Gravity and Cosmology

AUTHOR(S) OF COURSE PROGRAMME:

Silvio Pallua, full professor, Division of Theoretical Physics, Departmet of Physics, Faculty of Science, University of Zagreb

TEACHING TECHNIQUES *:*

Lectures, exercises, seminars

ECTS: 8

COURSE ACHIEVEMENTS *:*

Introducing students to basics of modern cosmology where meet general relativity and elementary particle physics. Accent will be on physical concepts but also on their mathematical formulation and thus methods of differential geometry will be introduced and used.

COURSE PROGRAMME divided in 15 teaching units:

Units 1, 2 : Short review of general relativity

(BG) Ch3 and Appendix A

Unit 3 : Distance measurements in Universe

(W) Chapter I, Section 1.3 and 1.4

(BG) section 4.4

Units 4, 5 : Cosmography, homogeneity and isotropy of the universe and Robertson-Walker metric

BG sections 4.1,4.2,4.3

(RI) Ch22

Units 6, 7 : Thermodynamics of the early universe

(BG) Ch3

Units 8, 9 : Thermal relics from the Big Bang, Matter-Antimatter Asymmetry, Freeze out and Dark Matter, Nucleosynthesis, Photon recombination

BG Ch9

Unit 10 : Cosmic Microwave Background Radiation

BG Ch11

Units 11, 12 : Measurement of cosmological parameters

BG Ch4

Unit 13 : Inflation BG Ch10, (LD) Units 14, 15 : Acceleration of the Universe. Dark energy. BG Ch10
STUDENTS' ACTIVITIES AND THEIR EVALUATION: Class work, exercises, seminars
OBLIGATORY LITERATURE : (BG) Lars Bergstrom, Ariel Goobar : *Cosmology and Particle Physics*, John Wiley & Sons, 1999
SUPPLEMENTARY LITERATURE: (RI) R. D'Inverno: *Introduction to Einstein Relativity*, Clarendon Press, 2000 (W) S.Weinberg: *Cosmology*, Oxford Unversity Press, 2008 (TC) Mark Trodden, Sean M. Carroll : *Introduction to Cosmology*, TASI lectures, HYPERLINK "http://arxiv.org/astro/ph0401547"http://arxiv.org/astro/ph0401547 (LD) A.R.Liddle,Acceleration of the Universe, arXiv, astro-ph/0009491
EXAMINATION PROCEDURE: Exercises (30%), seminars (25%), oral examination (45%)

Postgraduate Doctoral Study of Physics

COURSE:
Equilibrium and Nonequilibrium Quantum field theory

AUTHOR(S) OF COURSE PROGRAMME
Tomislav Prokopec, Associate Professor, Spinoza Institute and Institute of Theoretical Physics, the University of Utrecht

TEACHING TECHNIQUES
Lectures + homeworks

ECTS: 8

COURSE ACHIEVEMENTS
To master the basics of thermal quantum field theory: propagators and loop calculations. To learn nonequilibrium field theory and kinetic theory as its limit. Applications include: QCD and electroweak phase transition.

COURSE PROGRAMME
1. Introduction: QCD and electroweak theory at high temperatures and the early Universe
2. Thermal field theory: Matsubara and real time formalism
3. Thermal propagators
4. A simple example of thermal self-mass calculation
5. Debye screening
6. Landau damping
7. Hard thermal loops (HTL) for Yang Mills Theories
8. HTLs in quantum chromodynamics (QCD)
9. Phase diagrams for the electroweak theory and QCD
10. Equilibrium dynamics: Langevin equations in field theory
11. Bödeker effective theory.
12. Non-equilibrium dynamics: 2PI effective action in Schwinger-Keldysh formalism
13. Kadanoff-Baym equations
14. Transport coefficients.

STUDENTS' ACTIVITIES AND THEIR EVALUATION
Attendance of lectures. Homeworks.

OBLIGATORY LITERATURE
Textbook:
1. Michel Le Bellac, Thermal Field Theory, Cambridge University Press, Cambridge,1996.
Available on public archive:
2. K. Rajagopal and F. Wilczek, The condensed matter physics and QCD [http://xxx.lanl.gov arXiv:hep-ph/0011333], 2000.

SUPPLEMENTARY LITERATURE
1. J. Zinn-Zustin, Quantum Field Theory and Critical Phenomena, Clarendon Press, Oxford, 1996.
2. E. M. Lifshitz and L. P. Pitaevskii, Physical Kinetics, Course of Theoretical Physics, Volume 10, Pergamon Press, Oxford, 1981.
3. L. McLerran, The Color Glass Condensate at Small x Physics: 4 Lectures [arXiv:hep-ph/0104285]
4. D. Bödeker (1999), From hard thermal loops to Langevin dynamics, Nucl. Phys. B559, 502-538, 1999 [arXiv:hep-ph/9905239]

EXAMINATION PROCEDURE: homeworks (problem solving). If unsatisfactory: oral examination.

Postgraduate Doctoral Study of Physics

COURSE: EFFECTIVE FIELD THEORIES AND HEAVY QUARK PHYSICS

AUTHOR(S) OF COURSE PROGRAMME *(full name, position, affiliation)*:

Dr. Blazenka Melic, senior research associate, Institut Rudjer Boskovic, Zagreb

TEACHING TECHNIQUES: lectures + exercises; seminars

ECTS: 8

COURSE ACHIEVEMENTS:

i) learning how to construct and apply effective field theories; ii) learning how to apply concepts of renormalization and renormalization group to effective field theories; iii) introduction into the theory and phenomenology of heavy quark physics

COURSE PROGRAMME:

PART ONE – Effective field theories

- Basic principles of effective field theories
- Effective field theories - examples
- Concepts of field theory applied on effective field theories - renormalization, renormalization group, summation of leading logarithms
- Matching of full and effective theory.
- Effective field theory of weak interaction - Fermi's theory - Lagrangian of weak interaction
- Renormalization of the local composite operators
- QCD renormalization of weak interaction

PART TWO – An application: Theory and phenomenology of heavy quark physics

- Heavy quark effective theory
- Background field method
- Renormalization of the heavy quark effective theory
- Heavy hadron inclusive semileptonic decays
- Heavy hadron inclusive nonleptonic decays- lifetimes of heavy hadrons
- Heavy hadron exclusive semileptonic decays – determination of the CKM matrix elements
- Heavy hadron exclusive nonleptonic decays - factorization of matrix elements - different models.

STUDENTS' ACTIVITIES AND THEIR EVALUATION:

class attendance and homework problems

OBLIGATORY LITERATURE:

There are no books entirely devoted to effective field theories, but several aspects of the subject are discussed in the following textbooks:

Heavy Quark Physics, Aneesh V.Manohar and Mark B. Wise, Cambridge University Press, 2000; Weak Interactions and Modern Particle Theory, H. Georgi, Benjamin-Cummings ,1984.

More relevant are lectures given at various schools, of which I recommend in particular:

A.V. Manohar, EFFECTIVE FIELD THEORIES, lectures given at 35th Internationale Universitatswochen fuer Kern- und Teilchenphysik, Schladming, Austria, 2-9 Mar 1996, e-archive: hep-ph/9606222

A. Pich, EFFECTIVE FIELD THEORY: COURSE, talk given at Les Houches Summer School in Theoretical Physics, Les Houches, France, 28 Jul - 5 Sep 1997, e-archive: hep-ph/9806303

SUPPLEMENTARY LITERATURE:

Renormalization, J. Collins, Cambridge Univ. Press, 1984; Quantum Field Theory, M. E. Peskin and D.V. Schroeder, Westview Press, 1995; Quantum Field Theory, L. Ryder, Cambridge Univ. Press, 1985.

EXAMINATION PROCEDURE:

homework problems, final colloquium and oral examination

Postgraduate Doctoral Study of Physics

COURSE: EFFECTIVE FIELD THEORIES AND HEAVY QUARK PHYSICS

AUTHOR(S) OF COURSE PROGRAMME *(full name, position, affiliation)*:

Dr. Blazenka Melic, senior research associate, Institut Rudjer Boskovic, Zagreb

TEACHING TECHNIQUES: lectures + exercises; seminars

ECTS: 8

COURSE ACHIEVEMENTS:

i) learning how to construct and apply effective field theories; ii) learning how to apply concepts of renormalization and renormalization group to effective field theories; iii) introduction into the theory and phenomenology of heavy quark physics

COURSE PROGRAMME:

PART ONE – Effective field theories

- Basic principles of effective field theories
- Effective field theories - examples
- Concepts of field theory applied on effective field theories - renormalization, renormalization group, summation of leading logarithms
- Matching of full and effective theory.
- Effective field theory of weak interaction - Fermi's theory - Lagrangian of weak interaction
- Renormalization of the local composite operators
- QCD renormalization of weak interaction

PART TWO – An application: Theory and phenomenology of heavy quark physics

- Heavy quark effective theory
- Background field method
- Renormalization of the heavy quark effective theory
- Heavy hadron inclusive semileptonic decays
- Heavy hadron inclusive nonleptonic decays- lifetimes of heavy hadrons
- Heavy hadron exclusive semileptonic decays – determination of the CKM matrix elements
- Heavy hadron exclusive nonleptonic decays - factorization of matrix elements - different models.

STUDENTS' ACTIVITIES AND THEIR EVALUATION:

class attendance and homework problems

OBLIGATORY LITERATURE:

There are no books entirely devoted to effective field theories, but several aspects of the subject are discussed in the following textbooks:

Heavy Quark Physics, Aneesh V.Manohar and Mark B. Wise, Cambridge University Press, 2000; Weak Interactions and Modern Particle Theory, H. Georgi, Benjamin-Cummings ,1984.

More relevant are lectures given at various schools, of which I recommend in particular:

A.V. Manohar, EFFECTIVE FIELD THEORIES, lectures given at 35th Internationale Universitatswochen fuer Kern- und Teilchenphysik, Schladming, Austria, 2-9 Mar 1996, e-archive: hep-ph/9606222

A. Pich, EFFECTIVE FIELD THEORY: COURSE, talk given at Les Houches Summer School in Theoretical Physics, Les Houches, France, 28 Jul - 5 Sep 1997, e-archive: hep-ph/9806303

SUPPLEMENTARY LITERATURE:

Renormalization, J. Collins, Cambridge Univ. Press, 1984; Quantum Field Theory, M. E. Peskin and D.V. Schroeder, Westview Press, 1995; Quantum Field Theory, L. Ryder, Cambridge Univ. Press, 1985.

EXAMINATION PROCEDURE:

homework problems, final colloquium and oral examination

Postgraduate Doctoral Study of Physics

COURSE: Complex analysis methods with applications in particle physics and astrophysics

AUTHOR(S) OF COURSE PROGRAMME:

Dr. sc. Vuko Brigljević, Senior Research Associate, Ruđer Bošković Institute

TEACHING TECHNIQUES:

Lecture + practice

ECTS: 8

COURSE ACHIEVEMENTS :

- Gain an overview of the statistical methods and concepts used for the analysis and interpretation of the complex data in modern experiments in particle physics or astrophysics; this will allow the student to understand the presentation of current results.
- Gain a good understanding of the presented methods that will make the student able to assess which method to apply on a specific question and be aware of its strengths and weaknesses.
- Get hands-on experience of some of the methods on selected problems through exercises. This will also give the opportunity to the students to get familiar with some of the common software tools used, especially in the context of the ROOT analysis framework (RooFit, TMVA), that are most likely to be useful for their own research work.

COURSE PROGRAMME :

- Review of Basic concepts in probability
  - Definitions of probability: frequentistic vs Bayesian
  - Probability distributions
  - Errors
- Model estimation
  - Properties of estimators
  - Chi square method
  - Likelihood method
  - Method of moments
  - Estimation with constraints (kinematical fitting) using Lagrange multipliers
  - Convoluting and unfolding
  - Estimation through Monte Carlo reweighting

- Hypothesis testing
  - Confidence intervals
  - The Neyman Pearson theorem
  - When to set a limit, when to claim a discovery?
- Selected multivariate analysis methods
  - Types of multivariate problems
  - Variable selection
  - Neural Networks
  - Likelihood ratios
  - Decision Trees
  - Overview of other methods: Fisher discriminants, Matrix element method, …

STUDENTS' ACTIVITIES AND THEIR EVALUATION:

1. Class attendance
2. Projects in practice sessions (hands-on application of the methods)

OBLIGATORY LITERATURE:

Chose one of the following:

1. R.J. Barlow, Statistics – A guide to the Use of Statistical Methods in the Physical Sciences, Wiley, 1989
2. G. Cowan, Statistical Data Analysis, Oxford University Press, 1988.

SUPPLEMENTARY LITERATURE (*authors, title, publisher, edition, year of publishing*):

1. W.T. Eadie *et al.*, Statistical Methods in Experimental Physics, North Holland, 1971.
2. J. A. Hertz *et al.*, Introduction to the Theory of Neural Computation (Santa Fe Institute Studies in the Sciences of Complexity)
3. A.G. Frodesen *et al.*, Probability and Statistics in Particle Physics, Universitetsforlaget, Bergen, 1979, Westview Press, 1991.
4. C.M. Bishop, Neural Networks for Pattern Recognition, Oxford University Press, 1996.

EXAMINATION PROCEDURE:

1. Evaluation of Project
2. Oral examination on the concepts covered in the course.

2. NUCLEAR PHYSICS

Postgraduate Doctoral Study of Physics

COURSE: NUCLEAR STRUCTURE I

AUTHOR(S) OF COURSE PROGRAMME: Prof. dr. sc. Dario Vretenar, Faculty of Natural Sciences and Mathematics, University of Zagreb, Zagreb, Croatia

TEACHING TECHNIQUES : lectures (30 hours) + tutorials (15 hours) +seminars

ECTS: 10

COURSE ACHIEVEMENTS: The goal is to provide a clear, logical and unifying treatment of modern nuclear structure theory, ranging from nuclear forces to structure models, nuclear excitations and reactions. The course is designed to provide graduate students with a basic understanding of physical ideas and concepts in the description of a variety of phenomena governed by the strong, electromagnetic and weak interactions in atomic nuclei. The syllabus includes the necessary mathematical techniques, an overview of modern theoretical low-energy nuclear physics, and a number of seminars.

COURSE PROGRAMME:

1. Nuclear forces
   - deuteron
   - nucleon-nucleon scattering and nuclear forces
   - nucleon-nucleon potentials
   - three-nucleon systems and NNN interactions
2. Models of nuclear structure I
   - structure of light nuclei from NN and NNN forces
   - the mean-field concept and the nuclear shell model
   - deformed nuclear potential and rotations
   - the Hartree-Fock self-consistent field
   - pairing correlations, Hartree-Fock-Bogoliubov theory
3. Electromagnetic transitions
   - the nuclear electromagnetic current
   - the quantized electromagnetic field
   - emission of electromagnetic radiation
   - selection rules and sum rules
   - effective charge
4. Weak interactions I
   - simple theory of beta-decay
   - allowed transitions
   - nuclear beta-decay
   - neutrino in beta-decay

STUDENTS' ACTIVITIES AND THEIR EVALUATION: homework assignments and projects.

OBLIGATORY LITERATURE : 1. John Dirk Walecka, Theoretical Nuclear And Subnuclear Physics, World Scientific Publishing Company, (2004). 2. Amos De Shalit, Herman Feshbach, Theoretical Nuclear Physics, John Wiley & Sons Inc (1974). 3. Herman Feshbach, Theoretical Nuclear Physics: Nuclear Reactions, John Wiley & Sons Inc (1993). 4. Peter Ring, Peter Schuck, The Nuclear Many-Body Problem, Springer (2005). 5. Walter Greiner, Joachim A. Maruhn, Nuclear Models, Springer (2006).
SUPPLEMENTARY LITERATURE:
EXAMINATION PROCEDURE: Written and oral examination. Homework problems and seminars are graded.

Postgraduate Doctoral Study of Physics

COURSE: NUCLEAR STRUCTURE II

AUTHOR(S) OF COURSE PROGRAMME: Prof. dr. sc. Dario Vretenar, Faculty of Natural Sciences and Mathematics, University of Zagreb, Zagreb, Croatia

TEACHING TECHNIQUES : lectures (30 hours) + tutorials (15 hours) +seminars

ECTS: 10

COURSE ACHIEVEMENTS: The goal is to provide a clear, logical and unifying treatment of modern nuclear structure theory, ranging from nuclear forces to structure models, nuclear excitations and reactions. The course is designed to provide graduate students with a basic understanding of physical ideas and concepts in the description of a variety of phenomena governed by the strong, electromagnetic and weak interactions in atomic nuclei. The syllabus includes the necessary mathematical techniques, an overview of modern theoretical low-energy nuclear physics, and a number of seminars.

COURSE PROGRAMME**:**

10. Forces in the nuclear medium
   - In-medium modifications of NN interactions
   - Nuclear matter: equation of state
   - Asymmetric nuclear matter and neutron matter EOS
   - Global effective nuclear interactions

11. Models of nuclear structure II
   - Harmonic vibrations
   - Nuclear density-functional theory: the mean-field approximation and configuration mixing
   - Restoration of broken symmetries
   - Algebraic models

12. Weak interactions II
   - Double beta-decay
   - Forbidden transitions
   - Muon absorption
   - Neutrino-nucleus scattering

13. Electromagnetic transitions II
   - Electron scattering on nuclei
   - Coulomb excitations
   - Muonic atoms

14. Low-energy nuclear reactions
   - Compound nucleus
   - Fusion and fission
   - Direct reactions

STUDENTS' ACTIVITIES AND THEIR EVALUATION: homework assignments and projects.

OBLIGATORY LITERATURE :
1. John Dirk Walecka, Theoretical Nuclear And Subnuclear Physics, World Scientific

Publishing Company, (2004). 2. Amos De Shalit, Herman Feshbach, Theoretical Nuclear Physics, John Wiley & Sons Inc (1974). 3. Herman Feshbach, Theoretical Nuclear Physics: Nuclear Reactions, John Wiley & Sons Inc (1993). 4. Peter Ring, Peter Schuck, The Nuclear Many-Body Problem, Springer (2005). 5. Walter Greiner, Joachim A. Maruhn, Nuclear Models, Springer (2006). 6. C.A. Bertulani, P. Danielewicz, Introduction to Nuclear Reactions, Taylor & Francis (2004).
SUPPLEMENTARY LITERATURE:
EXAMINATION PROCEDURE: Written and oral examination. Homework problems and seminars are graded.

Postgraduate Doctoral Study of Physics
COURSE: Experimental nuclear physics
AUTHOR(S) OF COURSE PROGRAMME: dr. Damir Bosnar, Associate Professor and dr. Matko Milin, Assistant Professor, Faculty of Science, University of Zagreb
TEACHING TECHNIQUES: lectures (20 hours) + practice (15 hours) + seminar (10 hours)
ECTS: 10
COURSE ACHIEVEMENTS: Aim of the course is to introduce to students methods and techniques of modern experimental nuclear physics. Furthermore, a selection of experiments essential for today's nuclear physics will be presented as well as application of nuclear methods and techniques in other fields.
COURSE PROGRAMME: Interaction of radiation with matter (charged particles, gammas, neutrons, neutrinos). Biological effects of radiation and radiation protection. Basic detector types. Principles and workings of ionization chamber, scintillation detectors, semiconductor detectors and Cherenkov detectors. Principles of nuclear electronics, data acquisition and analysis. Radiation sources and accelerators. Measurement of characteristic parameters of atomic nuclei and nucleons. Nuclear reactions and spectroscopy. Selected examples of application of nuclear methods in other fields: medicine, energy, materials and environment.
STUDENTS' ACTIVITIES AND THEIR EVALUATION: class attendance, project related to a selected experiment. Lab exercises. Seminar.
OBLIGATORY LITERATURE: W.R.Leo, Techniques for Nuclear and Particle Physics Experiments: A How-To Approach, Springer, 2006 G.F: Knoll, Radiation Detection and Measurement, John Wiley and Sons, 2000 B. Povh, K. Rith, Ch. Scholz, F. Zetsche, Particles and Nuclei: An Introduction to the Physical Concepts, Springer, 2006
SUPPLEMENTARY LITERATURE: D.Poenaru, W.Greiner (eds.), Experimental Techniques in NuclearPhysics, Walter de Gruyter Publishing, 1997 Selected scientific publications
EXAMINATION PROCEDURE: seminar, lab exercise, exam

Postgraduate Doctoral Study of Physics
COURSE: Experimental Techniques in Nuclear Physics
AUTHOR(S) OF COURSE PROGRAMME : Dr. Mirko Planinić, Assistant Professor, Faculty of Science, University of Zagreb Dr. Damir Bosnar, Associated Professor, Faculty of Science, University of Zagreb
TEACHING TECHNIQUES : 20+15+10 Lectures+practice+seminar
ECTS: 10
COURSE ACHIEVEMENTS : This course aims to give the student an overview and understanding of detectors, electronics and software used in modern experimental Nuclear Physics. The course will cover in detail the relevant nuclear experiments.
COURSE PROGRAMME : Detectors, electronics, data collecting and data analysis in Nuclear Physics. Specific measurements: particle trajectories, measurement of time, measurement of particle energy and impulse, particle identifications. Measurement with detector systems – detailed study of few modern experiments in Nuclear Physics: physics motivation, accelerators, detectors, electronics and data analysis.
STUDENTS' ACTIVITIES AND THEIR EVALUATION : Class attendance, project: detailed study of one chosen experiment and seminar presentation. Labortory exercise presentation.
OBLIGATORY LITERATURE : G.F. Knoll: Radiation Detection and Measurement, John Wiley and Sons, 2000 B. Povh, K. Rith, Ch. Scholz, F. Zetsche: Particles and Nuclei: An Introduction to the Physical Concepts, Springer, 2006 K. Kleinknecht: Detectors for Particle Radiation, Cambridge University Press, 2003
SUPPLEMENTARY LITERATURE : P.R.Bevington, D.K.Robinson: "Data reduction and error analysis for the physical sciences", McGraw-Hill, 2002. Original scientific papers.
EXAMINATION PROCEDURE: Seminar, laboratory exercise, exam.

Postgraduate Doctoral Study of Physics
COURSE: Nuclear techniques and applications (in research of materials and environment)
AUTHOR(S) OF COURSE PROGRAMME: Dr.sc. Milko Jakšić, Research advisor, R. Bošković Institute
TEACHING TECHNIQUES: lectures (15 hours) + experiments (30 hours)
ECTS: 10
COURSE ACHIEVEMENTS: Students will get acquainted with a wide spectrum of nuclear physics techniques and their applications. Techniques based on the use of accelerators will be demonstrated on the basis of detector systems being used for different reaction products being exploited. Particular importance will be devoted to the analysis and to the modification of materials. The second part of course will be devoted to other non-medical applications, mostly to the techniques used in the environmental applications. The course includes experimental work with different detectors and detection systems which are frequently the basis of more complex systems used in experimental high energy physics.
COURSE PROGRAMME: A. Materials modification using ion beams, stopping power of ions in matter 1. Ion implantation, stopping power (nuclear contribution), 2. Stopping power (electron contribution) B. Ion beam analysis techniques 3. RBS (Rutherford Backscattering) spectroscopy and non-Rutherford cross sections, Si particle detectors, 4. ERDA (Elastic Recoil Detection Analysis) spectrosopy with nanometer depth resolution, TOF (Time of flight) detection system with MCP detectors 5. NRA (Nuclear Reaction Analysis), light element analysis, scintilation counters 6. PIXE (Particle Induced X-ray Emission) spectroscopy, Si(Li) detectors, C. Techniques of analysis using neutrons (reactors, neutron generators) 7. NAA (neutron activation analysis) using prompt gamma ray detection, localisation of different materials using time of flight techniques D. Applications of positron annihilation spectroscopy 8. PAS (Positron Annihilation Spectroscopy) E. Radioactive decay, radioactivity in environment, dating techniques Gamma spectroscopy, Ge detectors 14C dating techniques, 14C in the environment, proportional counters, liquid scintilation counters Note: Practical experiments denoted by numbers are the basis of of this course.
STUDENTS' ACTIVITIES AND THEIR EVALUATION: After the obligatory attendance to the introductory lecture that will be presented to students before each of ten experiments, students will take part in experiment with specific tasks given to complete. Using the data acquired during the experiment students will have to make homework in order to obtain the final result and conclusions of the exercise.
OBLIGATORY LITERATURE: Selected chapters of books 1 to 4: 1. W.R. Leo, Techniques for Nuclear and Particle Physics Experiments, Springer, Berlin, 1994 2. J.R.Tesmer, M.Nastasi:: Handbook of Modern Ion Beam Materials Analysis, Materials

Research Society, Pittsburgh, USA, 1995 3. G.F. Knoll: Radiation Detection and Measurement, John Wiley and Sons, New York, 2000 4. J. Csikai, CRC Handbook of Fast Neutron Generators, Volume I and II, CRC press,inc., Boca Raton, Forida, 1987. 5. Obelić, B: http://www.irb.hr/zef/c14-lab/ (Internet pages, Laboratory for measurements of low level radioactivity. 6. I. Krajcar Bronić: Fizikalne metode datiranja u arheologiji i umjetnosti, u: I to je fizika... – Zbornik popularnih predavanja na Sveučilištu povodom Svjetske godine fizike. Hrvatsko fizikalno društvo, Zagreb, 2006, str. 69-77. http://www.wyp2005.hr/tjedan_fizike/zbornik.pdf
SUPPLEMENTARY LITERATURE: Original scientific papers
EXAMINATION PROCEDURE: As the primary aim of this course is experimental work, examination will be based on student performance during the experiments and according to success in student's homework.

Postgraduate Doctoral Study of Physics
COURSE: Radiation Detectors and Medical Applications of Nuclear Methods
AUTHOR(S) OF COURSE PROGRAMME: Dr. Damir Bosnar, Associated Professor, Faculty of Science, University of Zagreb
TEACHING TECHNIQUES: 20+15+10 Lectures+practice+seminar
ECTS: 10
COURSE ACHIEVEMENTS : Nuclear methods have broad range of applications in medical diagnostics and therapy. The aim of the curse is to give an overview and understanding of the main methods, and to discuss possibilities of their improvements along with the introduction and development of new methods especially profiting from the rapid development of the new detectors and electronics in experimental nuclear and subnuclear physics. Theoretical content of the curse will be suplemented by the laboratory exercises using appropriate detectors, electronics and software packages, and with the visits to the relevant clinics and institutes.
COURSE PROGRAMME : Radiation and its interaction with matter. Biological effects of radiation. Radiation detection and protection. Basic radiation detectors in medical applications. Isotope production for nuclear diagnostics and therapy. Medical therapy using radiation. Physics of X-rays and medical applications. Gamma camera. Positron annihilation spectroscopy. PET – physical principles, detector system, imaging. Ultrasound. NMR- physical principles, detector system, imaging, applications of polarized 3He for NMR imaging of porous systems.
STUDENTS' ACTIVITIES AND THEIR EVALUATION : Class attendance, laboratory exercises (basics of the relevant detectors and electronics), seminar which includes practical work on the one of the systems for the medical imaging and presentation of the results.
OBLIGATORY LITERATURE : S. Webb: The Physics of Medical Imaging, Taylor & Francis, 1988 Knoll: Radiation Detection and Measurement, John Wiley & Sons, 2000
SUPPLEMENTARY LITERATURE :Original scientific papers.
EXAMINATION PROCEDURE: Laboratory exercises, seminar, exam.

Postgraduate Doctoral Study of Physics
COURSE: Nuclear astrophysics
AUTHOR(S) OF COURSE PROGRAMME: dr. Matko Milin, assistant professor, Faculty of Science, University of Zagreb
TEACHING TECHNIQUES: lectures (30 hours) + practice (15 hours)
ECTS: 10
COURSE ACHIEVEMENTS: Aim of the course is to establish the link between physics of the atomic nuclei (fermi scale) with the processes at the largest possible scales: in stars and galaxies and Universe as a whole. The course will focus on getting experience and practical knowledge needed for scientific work in nuclear astrophysics and it will also provide students with the latest research results in the area. Experimental approach to specific problems of nuclear astrophysics will be stressed.
COURSE PROGRAMME: Basic astrophysical quantities. Standard cosmological model. Formalism of nuclear reactions. Direct nuclear reactions. Resonant processes. Nuclear reaction rates. Primordial nucleosynthesis. Nucleosynthesis in stars: quiescent burning and explosive processes. Degenerate Fermi gas. Neutrons stars. Gamma-ray and x-ray astronomy. Neutrino astrophysics. Cosmic rays. Experimental methods in nuclear astrophysics. Modern topics in nuclear astrophysics. Project: indirect measurement of a reaction important for nuclear astrophysics.
STUDENTS' ACTIVITIES AND THEIR EVALUATION: class attendance, homework, project
OBLIGATORY LITERATURE: 1. C.E.Rolfs i W.S.Rodney, Cauldrons in the Cosmos, University of Chicago Press, Chicago (1988) 2. D.D.Clayton, Principles of Stellar Evolution and Nucleosynthesis, University of Chicago Press, Chicago (1983)
SUPPLEMENTARY LITERATURE: D.Arnett, Supernovae and Nucleosynthesis, Princeton University Press, Princeton (1996) Selected scientific publications.
EXAMINATION PROCEDURE: Homework (20%), project (30%), oral exam (50%)

Postgraduate Doctoral Study of Physics
COURSE: Hadronic physics
AUTHOR OF COURSE PROGRAMME: Prof. dr. sc. Dubravko Klabučar, full professor, Physics Department, Faculty of Science (PMF), University of Zagreb
TEACHING TECHNIQUES: lectures 30 + tutorials/seminar 15
ECTS: 10
COURSE ACHIEVEMENTS: Through this course, postgraduate students of elementary particle physics and nuclear physics (both theoretical and experimental) should achieve the up-to-date level of understanding of quark substructure of hadrons and their processes. The key experimental facts and their implications are especially stressed, as is the role of the basic principles of symmetries and of field theory. The course teaches the applications of basic and somewhat more advanced techniques of quantum field theory on the problem of quark substructure of hadrons and their processes.
COURSE PROGRAMME: 1. Hadronic phenomenology: baryons, mesons and experimental facts on their spectra and processes. Hadron interactions by meson exchange. Conservation of isospin, strangeness, charm and baryon number. Brief history of quark-parton concept. 2. Quantum numbers of quarks, SU(N) symmetries and representations: building of baryon and meson multiplets. 3. Basic notions of gauge theories: brief comparison of electrodynamics and chromodynamics. Perturbative and nonperturbative regimes and effects of quantum chromodynamics (QCD).Qualitative discussion of asymptotic freedom and confinement in QCD. Properties of QCD at low and intermediate energies. 4. Chiral symmetry and its dynamical breaking: generating of constituent quark masses, pion as a Goldstone boson, PCAC. Hadrons as quark and gluon composites. 5. Models of hadrons: constituent quark models, MIT bag model, Nambu-Jona-Lasinio model, topological and non-topological solitons, sigma-models and Skyrmions - baryons in the chiral topological soliton model. Topological and non-topological hybrid models. 6. Dyson-Schwinger approach to quarks and hadrons: Dyson-Schwinger equation for quark propagators, and Bethe-Salpeter equation for bound states of quarks. Resolution of the dichotomy "quark-antiquark bound state or Goldstone boson" for pseudoscalar mesons. Some processes with hadrons constructed in this way. Resolution of the problems with Abelian axial anomaly which otherwise affect approaches where light pseudoscalars are described as quark-antiquark bound states.
STUDENTS' ACTIVITIES AND THEIR EVALUATION class attendance, seminars and projects

OBLIGATORY LITERATURE

U. Mosel: "Fields, Symmetries and Quarks", Springer-Verlag, revised and enlarged edition 1999.

A. Holl, C. D. Roberts and S. V. Wright: "Hadron physics and Dyson-Schwinger equations", Lectures given at 20th Annual Hampton University Graduate StudiesProgram, Newport News, Virginia, June 2005, available in e-Print Archive as nucl-th/0601071.

Current edition of “Review of Particle Physics” by Particle Data Group [at the moment, S. Eidelman et al., Physics Letters B592, 1 (2004).], also available (especially updates) from http://pdg.lbl.gov/

SUPPLEMENTARY LITERATURE

A. Hosaka and T. Toki: "Quarks, Baryons and Chiral Symmetry", World Scientific Publishing Company 2001.

R. Alkofer and L. von Smekal: "The infrared behavior of QCD Green's functions:confinement, dynamical symmetry breaking, and hadrons as relativistic bound states",Phys. Rept. 353 (2001) 281, also available in e-Print Archive as hep-ph/0007355.

J. F. Donoughe, E. Golowich and B. R. Holstein: "Dynamics of the Standard Model", Cambridge University Press 1992.

M. D. Scadron: "Advanced Quantum Theory and its Applications Through Feynman Diagrams" (Second Edition, Texts and Monographs in Physics), Springer-Verlag 1991.

F. Mandl and G. Shaw, "Quantum Field Theory", John Wiley and Sons, revised edition 1993.

Shau-Jin Chang, “Introduction to Quantum Field Theory", World Scientific Publishing Co. 1990.

F. E. Close: "An Introduction to Quarks and Partons", Academic Press 1979.

EXAMINATION PROCEDURE: student seminar followed by oral examination

Postgraduate Doctoral Study of Physics

COURSE: The Nuclear Many-Body Problem

AUTHOR(S) OF COURSE PROGRAMME:
Dr. Tamara Nikšić, assistant professor, Department of Physics, University of Zagreb

TEACHING TECHNIQUES: 30 lecture hours, 15 tutorial hours

ECTS: 10

COURSE ACHIEVEMENT:
Aim of this course is to develop the students' skills needed to conduct research in the area of the nuclear many-body problem. The latest results of the density functional theory will be presented, not only in nuclear structure physics, but also in atomic and molecular physics and condensed matter physics. A special emphasis has been placed on the path integral formulation since this topic is avoided in standard undergraduate courses in many-particle physics.

COURSE PROGRAMME:
Review of the thermodynamics and statistical mechanics; formalism of the second quantization; path integral formulation for the single-particle quantum mechanics; many-body generalization; fermion and boson path integrals; perturbation theory for the log of the partition function and for the Green's function derived from the fermion path integral; Feynman's rules and diagrams at T=0 in coordinate and momentum space; Dyson's equation; calculation of the observables using the Green's function; spectral representation of the Green's function; physical interpretation of the Green's function; the quasiparticle concept, model for quasiparticle spectral function; experimental verification of quasiparticle picture in heavy nuclei; phenomenological approach to the Landau Fermi liquid theory; observable properties of a normal Fermi liquid; phenomenology of the nuclear finite systems: Skyrme and covariant energy functionals; introduction to the density functional theory; basic properties of the nucleon-nucleon force; construction of the low-momentum, model-independent potential from the phenomenological NN potentials by applying renormalization group methods; scattering in the many-body system; linear response and correlations functions; quasi-elastic scattering

STUDENTS' ACTIVITIES AND THEIR EVALUATION:
Students are obliged to solve three problems from the textbook J.W. Negele and H. Orland, Quantum Many-Particle Systems (60% of the grade), and to write a seminar paper with a topic from a current
research in the area of the nuclear many-body problems (40% of the grade).

OBLIGATORY LITERATURE:

15. J.W. Negele and H. Orland, Quantum Many-Particle Systems, Perseus, 1988.
16. A.L. Fetter and J.D. Walecka, Quantum Theory of Many-Particle Systems, Dover, 2003.
17. G.A. Lalazissis, P. Ring, D. Vretenar, Extended Density Functionals in Nuclear Structure Physics, Lecture Notes in Physics 641, Springer, Berlin Heidelberg, 2004.
18. M. Bender, P.-H. Heenen, P.-G. Reinhard, Rev. Mod. Phys. 75, 121 (2003).

SUPPLEMENTARY LITERATURE:

EXAMINATION PROCEDURE: Assignments (60% of the grade) and final project (40% of the grade)

Postgraduate Doctoral Study of Physics
COURSE: Mathematical modeling and numerical methods
AUTHOR(S) OF COURSE PROGRAMME: doc. dr. sc. Nils Paar
TEACHING TECHNIQUES: 30 lecture hours + 15 tutorial hours
ECTS: 10
COURSE ACHIEVEMENTS: Gaining the competences in numerical techniques and their implementation in modeling various physical systems. The emphasis is on a series of projects that the student should be able to carry out with minimal help from the instructor. Each project consists in modeling and solving numerically on a computer a physical problem that the student had already encountered in courses on classical mechanics, quantum physics, and statistical physics. This should also lead to a better understanding of the various physical concepts introduced in specialized undergraduate and graduate courses.
COURSE PROGRAMME: Integration of functions. Root finding. Numerical derivatives. Nonlinear sets of equations. Solving ordinary differential equations. Two point boundary value problems. Gaussian quadratures and orthogonal polynomials. Special functions; Bessel functions, modified Bessel functions, spherical Bessel functions, spherical harmonics. Solution of linear algebraic equations. Eigenvalue problems. Eliptic and parabolic partial differential equations. Monte Carlo methods. Minimization or maximization of functions. Fourier transform and spectral methods. Mathematical modeling as a process of creating a mathematical representation of some physical phenomenon. (Identification of the problem, variables and parameters. Basic assumptions. Mathematical representation. Simple models. Verifying and refining a model.)
STUDENTS' ACTIVITIES AND THEIR EVALUATION: Regular attendance of lectures. Several projects must be carried out (modeling a given physical problem, numerical solution, implementation in a computer code, evaluation of results). The evaluation of students is based on achievements in the projects.
OBLIGATORY LITERATURE: 19. S.E. Koonin, D.C. Meredith: Computational Physics, Addison-Wesley, 1990. 20. P.L. DeVries: A First Course in Computational Physics, John Wiley, 1994. 21. W.H. Press, S.A. Teukolsky, W.T. Vetterling, B. P. Flannery: Numerical Recipes, The Art of Scientific Computing, Cambridge University Press, 1988.
SUPPLEMENTARY LITERATURE: 22. 1. S. S. M. Wong, Computational Methods in Physics and Engineering, World Scientific Publishing Co., 1997.
EXAMINATION PROCEDURE: oral exam, oral presentation of the conducted projects

3. CONDENSED MATTER PHYSICS

COURSE TITLE: Condensed Matter Physics I		
COURSE TEACHERS: Professor Aleksa Bjeliš, Department of Physics, Faculty of Science, University of Zagreb		
STUDY PROGRAMME: Doctoral study of physics		
YEAR OF STUDY: 1		
SEMESTER: 1 (winter)		
TEACHING METHODS	CONTACT HRS PER WEEK	DELIVERED BY (*teacher or assistant*)
Lectures	3	teacher
Exercises	1	assistant
Seminars	1	assistant professor or assistant
ECTS credits: 10		

DEVELOPMENT OF GENERAL AND SPECIFIC COMPETENCIES – KNOWLEDGE AND SKILLS:

1. It is assumed that students have a background covered by the course Solid State Physics of the bachelor and master program of research physics at the University of Zagreb, or by some equivalent course. It is expected that by entering the course one understands basic microscopic concepts and mechanisms beyond the characteristic elastic, conducting, magnetic, optical, thermodynamic and other properties of various types of condensed systems.
2. The present course has two purposes. The first aim is to introduce necessary theoretical methods (like second quantization), and to bring them to the advanced level of understanding and applicability. Secondly, the course shall cover the topics that reflect the state of art of contemporary physics of condensed matter. In particular, the accent shall be put on examples of strongly correlated systems with electron-electron and electron-phonon couplings.

DESCRIPTION OF THE COURSE:

1. Many body system and Second quantization

Permutation symmetry of indistinguishable particles; boson and fermion systems. Operators in the second quantization representation.

2. Interacting fermions

Concept of Fermi liquid
Landau theory of Fermi liquids
Hartree-Fock approximation in general
Self-consistent equations of motion for the pair electron-hole and the corresponding dielectric response
Generalization to multiband systems, combination of metallic and dipolar screening
Optical and photoemission properties of various conducting systems, nano-strucures
Electron systems of reduced spatial dimension, deviations from the Fermi liquid behaviour; Luttinger liquids
Charge and spin density waves

3. **Insulators**

Dielectric function of insulators
Wannier excitons
Frenkel excitons
Optical properties of insulators
van der Waals interaction
Electron tunneling between neighbouring atoms
Metal-insulator transition

4. Magnetism

Tensor of magnetic susceptibility
Hubbard model of local coupling
Hubbard model in the limit of weak coupling; Stoner magnetism
Itinerant anti-ferromagnetic and modulated magnetic orders in the limit of weak (Umklapp) coupling; effects of Fermi surface nesting
Hubbard model at half filling in the limit of strong local coupling; Heisenberg model
Ferromagnetic and anti-ferromagnetic spin waves
Orbital and Pauli coupling of electrons to external magnetic field
Magnetic breakdown and corresponding effects
Giant magnetoresistence and spintronics

5. Phonons and electron-phonon coupling

Harmonic displacements of neutral lattice and ionic lattice; phonons
Electron-phonon coupling in the tight binding approach
Electron-phonon coupling for nearly free electrons
Polarons
Effective attractive interaction between electrons caused by electron-phonon coupling

6. Superconductivity

Cooper pairing
Bardeen-Cooper-Schrieffer ground state
BCS state at finite temperatures
Electrodynamics of superconducting state
Non-local response
Quantization of magnetic field flux
Ginzburg-Landau expansion

Vortices in superconductors; Abrikosov lattice
High temperature superconductors

7. Selected research topics in the theoretical condensed matter physics (according to the students interests) common contents of courses T1 and T2

STUDENT OBLIGATIONS DURING THE COURSE: The course will be organized through lectures, exercises, individual student work on more demanding examples expressed through written or oral colloquia, and student seminars within the general scheme of the second part of studies, supervised by the lecturers and possibly by the mentor of the doctoral theses.

CONDITIONS FOR THE CONFIRMATION OF ATTENDANCE: Presence at 70% of lectures and exercises; at least 25% points collected at colloquia.

METHODS TO EVALUATE STUDENT PERFORMANCE: The final stage of the examination comprises written and oral parts; students who collect sufficient number of points at seminars and colloquia will be waived from the written part.

COURSE(s) NEEDED FOR THIS COURSE: Quantum mechanics, Statistical physics, Classical electrodynamics, Solid State Physics.

COMPULSORY LITERATURE:

1. C. Kittel, ***Quantum Theory of Solids,*** John Wiley and Sons, New York, 1987.
2. J. W. Negele and H. Orland, ***Quantum Many-Particle Systems,*** Addison-Wesley Publ. Comp., 1987.
3. P. M. Chaikin and T. C. Lubensky, ***Principles of condensed matter physics***, Cambridge U. Press, 1995.

ADDITIONAL READING:

Original, particularly review, articles, monographies, etc.

STUDY PROGRAMME: Doctoral study of physics		
COURSE TITLE: Condensed Matter Physics II		
COURSE AUTHOR: Professor Marijan Šunjić		
YEAR OF STUDY: 1		
SEMESTER: 1st (Autumn) and 2nd (Spring)		
TEACHING METHODS	CONTACT HRS PER WEEK	DELIVERED BY (*teacher or assistant*)
Lectures	3	teacher
Exercises	1	assistant
Seminars	1	teacher or assistant
ECTS credits: 10		

DEVELOPMENT OF GENERAL AND SPECIFIC COMPETENCIES – KNOWLEDGE AND SKILLS:

1. It is assumed that the students have a background knowledge corresponding to the bachelor and master programme in research physics at the University of zagreb, or some equivalent programme. this includes mathematical methods, classical and quantum physics, statistical physics and some basic understanding of solid state physics.

2. The course shas three parallel directions: To introduce the student to some advanced quantum mechanical (i.e. field theoretical) methods in solid state physics, to acquaint him with a number of many-body phenomena that influence the ground state properties and excitations in standard condensed matter systems, including discussion of their experimental observations, and to demonstrate the application and analyse the physical consequences of the theoretically obtained results.

DESCRIPTION OF THE COURSE:

Field theoretical methods in solid state physics
Many body systems, exact and approximate methods
Green's functions - propagators. Definitions, properties.
Perturbation method, Feynman diagrams. Vacuum fluctuations, connected and disconnected diagrams. Linked Cluster Theorem.
Particle self-energy, Dyson equation. Quasiparticle - definition and properties.
Ground state energy: Coulomb (Hartree) and exchange (Fock) energies, correlation energy
Equation of motion for the Green's function, solution methods (Hartree, Hartree-Fock)
Boson Green's functions, Fermion-boson interaction
Polaron, renormalization of particle mass and energy

Linear response theory
Correlation functions and the differential cross section. Dynamical and static structure factors
Neutron and x-ray scattering in crystals: differential cross section, elastic scattering, Debye-Waller factor, phonon emission and absorption
Response functions
Kubo formula, spectral representation
Properties of response functions, connection with correlation functions
Free fermion response function (Lindhard)
Static and dynamic limits, Kohn anomaly and Friedel oscillations
Boson response function
Current-current response function. Conductivity. Optical properties.
Collective phenomena in the Coulomb gas
Dynamically screened Coulomb interaction. Random Phase Approximation (RPA)
Excitation spectrum, plasmons in the electron gas. Landau damping
Dynamical and static longwavelength limits. Thomas-Fermi screening
Connection with the dielectric function.
GW approximation, ground state energy
Electron states in condensed matter
Localized state spectra
Nonperturbative calculation, cumulant expansion, Independent Boson Model (IBM)
Properties of the spectra: ground state energy shift, satellites, sum rules, Koopmans theorem
Adiabatic and sudden transitions, effects on relaxation and screening
Examples: electron-phonon and electron- electron interaction, discrete and continuous excitations
Electronic state decay, irreversibility, Fano-Anderson model
Delocalized state spectra; Radiation absorption spectra
Many-electron systems
Hamiltonian of the many-body system with Coulomb interaction
Self-consistent Hartree Hartree approximation for the wavefunction
Variational derivation of the Hartree equations, Harteree-Fock approximation and equations
Exchange - Fermi hole, exchange energy
Thomas-Fermi approximation: Electrons in a neutral atom, Charge in the electron gas
Density functional theory
Kohn-Hohenberg theorem, ground state energy as the density functional
Self-consistent Kohn-Sham equations
Local density approximation (LDA), Approximations for the exchange and correlation energy
Examples, discussion of the results
Density matrices
Definitions and properties. Natural orbitals; Hartree-Fock approximation
Free fermions - Fermi hole
Pair distribution function and the static structure factor
Selected research topics (related to student interests) in theoretical solid state physics
(joint topics between courses T1 and T2)

STUDENT OBLIGATIONS DURING THE COURSE:

Attendance of lectures, homework and seminar projects, passing two colloquia

METHODS TO EVALUATE STUDENT PERFORMANCE:

Results of the homework and seminar projects, oral and written colloquium, oral examination.

EXAMINATION METHODS:

Written and oral.

COURSE(s) NEEDED FOR THIS COURSE:

Classical electrodynamics, Statistical physics, Quantum mechanics, Solid state physics, Mathematical (incl. numerical) methods

COMPULSORY LITERATURE:

23. A.P.Abrikosov, J.I.Gorkov, I.E. Dyaloshinskii, Methods of Quantum Field Theory in Statistical Physics, (new ed.), Dover 1976
24. A.L.Fetter-J.D.Walecka: Quantum Theory of Many-Particle Systems, McGraw Hill, New York, 2003
3. M. Šunjić: Kvantna fizika mnoštva čestica, (Školska knjiga, Zagreb, 2002)
5. G.D.Mahan: Many-Particle Physics, Plenum, 1990
6. S.Doniach, E.H.Sondheimer: Green's Functions for Solid State Physicists, Benjamin, 1974
7. P.Nozieres: Theory of Interacting Fermi Systems, Westview Press 1997
8. C. Kittel, Quantum Theory of Solids, 2nd ed., Wiley & Sons, 1966
9. E.N. Economou, Green's functions in quantum physics, 3rd ed., Springer 2007
10. K. Burke and friends, The ABC of DFT, http://chem.ps.uci.edu/ ~kieron/dft/book
11. H. Bruus and K. Flensberg, Many-body Quantum Theory in Condensed Matter Physics, Oxford UP 2004

ADDITIONAL READING:

Monographs, selected review and research papers.

Postgraduate Doctoral Study of Physics

COURSE: Experimental Investigation in Solid State Physics I,II

AUTHOR(S) OF COURSE PROGRAMME:
Prof. dr. sc. Emil Babić, full professor of physics, Department of Physics, Faculty of Science, University of Zagreb
Prof. dr. sc. Anđelka Tonejc, full professor of physics, Fizički odsjek, PMF, Sveučilište u Zagrebu

TEACHING TECHNIQUES:
Introductory lecture, experimental work in laboratory in connection with the Ph. Thesis; evaluation of results of measurements. The results should be presented in written form, in the form of an article; the oral presentation of the seminars should be in front of professors, mentor and the students of doctoral study of solid state physics, in power point presentation. The laboratory work will be done in the experimental labs of Physics Department, Faculty of Science, Institute of Physics and at Institute "Ruđer Bošković"
The list of experimental labs is given as "Supplement", with the principal investigator, with the main techniques and experimental equipment.

ECTS: 20 (10+10)

COURSE ACHIEVEMENTS :
The main goal of this course is that students acquire"know-how" required in solving up-to-date problems in the solid state physics (SSP). Associated with this goal is their work on the most advanced scientific equipment in Croatia, as well as on the equipment made available via collaboration with several EU countries and USA.
The competences/skills acquired by the students are: scientific way of thinking, detailed knowledge of selected topics in SSP, expertise in modern experimental research methods, the ability to communicate the results of scientific work (seminars) and ability to write down scientific papers.

COURSE PROGRAMME:
Description of the Course:
The course is based on the independent (under the guidance of mentor) research of students by using the research facilities of Department of Physics, Institute "Ruđer Bošković" and Institute of Physics in Zagreb. The research with the techniques currently not available in Zagreb (e.g. synchrotron radiation, thermal neutrons, etc) is also possible via collaborations agreement with relevant institutions. Accordingly, the course encompasses almost all topics of research in contemporary solid state physics (SSP) and broad spectrum of experimental methods. In particular, the student can choose the systems of central interest in SSP (e.g. atomic monolayers, nanoparticles and nanostructures, molecular/ nano magnets, self-organizing and low-dimensional materials, soft matter, etc.) and use numerous advanced microscopic (e.g. diffraction of waves and particles, spectroscopies covering broad frequency ranges, STM, AFM, magnetic resonances, etc) and macroscopic (transport of charge and heat, thermodynamic and magnetic measurements, mechanical measurements, etc.) research techniques. The advanced methods for sample preparation (e.g. single crystals, thin and thick films. amorphous alloys, ceramics and composites, nanoparticles and nanostructures, etc.), processing and characterization are also available. Taking into account the importance / frequent use of structure, transport and thermodynamic, as well as high frequency studies in the contemporary SSP, the students are

introduced into these researches. Some topics covered are:

1. Investigation of microstructure of materials

X-ray diffraction on single crystal and polycrystalline samples. The diffraction image as the finger-print of microstructure. The precise measurements of crystal periodicies. The peak broadening analysis (the shape and the size coherently diffracting domains, crystal lattice deformation, stacking faults). The solid solutions, the precipitation processes in solid solutions. Phase transitions and phase diagrams. The radial density distribution function in amorphous materials. New developments in diffraction; the synchrotron radiation; neutron diffraction. Crystal structure determination from diffraction image of polycrystalline samples (Rietveld method).

Application of electron microscopy and electron diffraction in materials science.

The modern methods of examination of materials in an electron microscope:

Scanning electron microscope (SEM), SEM for environmental examination (ESEM), of materials by energy dispersive X-ray analyses (X-ray mapping), Transmission electron microscopy and selected area electron diffraction (TEM and SAED), High resolution electron microscopy (HRTEM).The interpretation of the TEM images and diffraction of the polycrystalline, monocrystalline and amorphous samples.

The diffraction contrast. The defects characterization in the material. Characterization of stacking faults, twens and antiphase boundaries using bright and dark field images.

The phase contrast. The high resolution imaging and Z- contrast imaging with the resolution beyond 0.1 nm.

The crystallographic image processing of high resolution images in order to determine the lattice deformation, dislocations grain and phase boundaries. The latest discoveries in electron microscopy will be given: observation of oxygen positions and bonds in cuprates; atomic –scale imaging of individual dopant atoms and clusters in silicon.

The comparison of ED, X-ray and neutron diffraction.

Exercises: Practical work in EM laboratory; the evaluation of TEM, HRTEM and ED images. The practical presentation of the methods working in the JEOL 200 kV EM. The HRTEM image processing analyses of some images and ED. Investigation of materials by Raman spectroscopy.

2.Transport and thermodynamic research

The use of modern transport and thermodynamic (including magnetic and mechanical) measurement methods in the study of different phenomena in SSP. The examples of the research of selected systems (e.g. spin and metallic glasses, superparamagnets, heavy fermions, semiconductors, organic conductors, superconductors, spin/ charge density systems, nanosystems etc,) by use of following measurements: electrical resistivity (including different methods and anisotropic systems) magnetoresistivity (energy bands, the Kohler rule...), the Hall coefficient and conductivity, heat capacity and thermal conductivity, magnetization (including phase transitions, relaxation and dynamic M-H loops) and magnetic susceptibility (static and dynamic).

3. High-frequency (microwave) research

The dynamics of fast processes and measurement frequency. The reason and the purpose of the microwave measurement. Wavelength and dimensions of the circuit. Resonant structure and its perturbation. The experimental problems at high-frequencies. Measurements in magnetic and electrical field component of microwave radiation. Determination of complex susceptibility and conductivity, examples: complex conductivity in

superconductors, superconducting fluctuations in the vicinity of TC, dynamics of vortices in the mixed state, determination of the coherence length and anisotropy in single crystals and epitaxial films, dynamics of the charge/spin density waves.

STUDENTS' ACTIVITIES AND THEIR EVALUATION :

The student has to participate in one experiment from each of two proposed scientific topics, from the COURSE PROGRAMME. The experimental work will take place in the Labs of Physics Department, Institute „Rudjer Bošković“ and Institute of Physics. The list of laboratories is regulated by the contract between University and Institutes.

The selection of topics and laboratories will be regulated in agreement with the mentor of the student (proposed by the Council of Physics Department) and co-ordinator of the study prof. dr. sc. Anđelka Tonejc. All students are obliged to be present at seminars, to active participate in discussion with other students and in this way to obtain the wide insight into contemporary SSP and the investigations in this field of science.

OBLIGATORY LITERATURE :

25. Jenkins R., Snyder R.L. : X-ray Powder Diffractometry, John Wiley, New York, 1996.
26. Vainshtein B.K. et al., Modern Crystalography, Springer, Berlin,1995.
27. Reimer, L., 4th ed.: Transmission Electron Microscopy Physics of Image formation and Microanalysis, Springer-Verlag, Berlin, 1997.
28. Ruhle, M. and Wilkens, M. : Electron Microscopy, in Cahn, R.W. and Haasen P., eds. Physical Metallurgy; fourth, revised edition, Elsevier Science BV, 1986.
29. Studies of High Temperature Superconductors, Volume 18, A. V. Narlikar, eds,Nova Science, 1996.
30. Dressel M. et al. , High Frequency Resonant Techniques for Studying the Complex Electrodinamic Response in Solids, Ferroelectrics, 1996.

SUPPLEMENTARY LITERATURE :

New literature from the scientific journals and monographs suggested by mentor from the selected topics chosen by student.

EXAMINATION PROCEDURE:

The results should be presented in written form, in the form of an article; the oral presentation of the seminars with discussion will be in front of professors, mentor and the students of doctoral study of solid state physics, in power point presentation.

Supplement:

Solid State Physics Research Laboratories:

1. Solid State Physics Research Laboratories of Department of Physics,
Faculty of Science, University of Zagreb

- Structure and properties of selected nanomaterials obtained by modern techniques,
A. Tonejc ; Philips XRD diffraktometar, JEOL 2010 200kV Electron microscope

- Electromagnetic properties of nanostructuired materials
E. Babić; Superconducting magnet system 5 T.

- Nano magnets, K. Zadro; SQUID.

- Microwave investigation of new materials
M. Požek; Superconducting magnet system 10 T, microwave equipment.

- Nanoscopic properties of some anorganic and organic conductors,
I. Kokanović, Superconducting magnet system 10 T.

A. Hamzić, Superconducting magnet system 18 T, resistivity and Hall resistivity equipment.

2. Institute Rudjer Bošković

- Laboratories for semiconductors,
B. Pivac, Fundamental properties of nanostructures and defects in semiconductors and dielectrics

- Molecular Physics Laboratories,
K. Furić, Physics and application of nanostructures, Raman spectroscopy, Raman spectrometer.

- Thin film laboratories,
N. Radić, New amorphous and nanostructured thin films.
D. Gracin, Thin Si-alloys films between amorphous and ordered structures
B. Šantić, Semiconducting materials for use in optoelectronics and nano technology

- Laboratory for Chemistry of Materials,
S. Musić, Syntesis and microstructure of metalic oxides and oxid glasses,
(Moessbauer and FT-IR spectroscopy, XRD, FE SEM)

- Magnetic Resonances Laboratories,
B. Rakvin, Molecular structure and dinamics of systems with paramagnetic particles

- XRD diffraction laboratory,
B.Gržeta: Doped optoelectronic and ceramic nanomaterials, Philips XRD diffraktometer

3.Institute of Physics

- P. Pervan, Surface Physics Laboratory.

- A. Smontara, Laboratory for investigation of heat capacity, thermoelectric properties, heat conductivity and thermoelectric properties.

- M. Miljak, Laboratory for Magnetism and Magnetic, Susceptometer

- M. Prester, Laboratory for Magnetism Investigation by Inductive Techniques, ac susceptometer.

- S. Tomić, Laboratory for Dielectrics Spectroscopy in Solid State and Galvano-magnetic Measurements

- O. Milat, Laboratoriy for structure of materials.

- K. Biljaković, Laboratory for investigation complex systems.

COURSE TITLE: Physics of surfaces and nanostructures		
COURSE TEACHER/TEACHERS: Professor Marijan Šunjić		
STUDY PROGRAMME: Doctoral study of physics		
YEAR OF STUDY: 1		
SEMESTER: 2nd (Spring)		
TEACHING METHODS	CONTACT HRS PER WEEK	DELIVERED BY
Lectures	2	teacher
Exercises	1	assistant
Seminars	1	teacher or assistant
ECTS credits: 8		

DEVELOPMENT OF GENERAL AND SPECIFIC COMPETENCIES – KNOWLEDGE AND SKILLS:

1. It is assumed that the students have a background knowledge corresponding to the bachelor and master programme in research physics at the University of Zagreb, or some equivalent programme. This includes mathematical methods, classical and quantum physics, statistical physics and some basic understanding of solid state physics.

2. The goal is to introduce the students, through lectures and seminar projects, to the basic concepts of the physics of surfaces and nanostructures, their atomic and electronic structure and excitations, and to the many body processes which influence the ground state and excitations in these systems, including the discussion of experimental methods and results, and finally to demonstrate the application and analyze the physical meaning of the theoretically obtained results.

DESCRIPTION OF THE COURSE:

Systems with reduced dimensions, surfaces, interfaces, thin films, quantum wells, nanowires, nanotubes, quantum dots, graphene, fullerene. Modification of electronic and crystal structure.

Basic concepts and structure of surfaces, relaxation, reconstruction, segregation, ideal 2D lattice (net) symmetry, reciprocal lattice (volume and surface), coverage, real and ideal surface, surface defects

Processes and experimental methods, diffraction - general (neutrons, X-rays, electrons), Low energy electron diffraction (LEED)- kinematical and dynamical, atom scattering, interaction of radiation with the electrons in crystals, absorption, emission, fluorescence, electron inelastic scattering, photoemission (ARUPS, XPS-ESCA), EXAFS, NEXAFS), SEXAFS, Auger emission, electron microscopy (TEM, SEM), FIE, FEE

Metal surfaces, infinite barrier model (IBM), local density of states, Bardeen oscillations, dipole layer and potential, potentials near surfaces (electrostatic, exchange, correlation), work function

Insulator and semiconductor surfaces, surface states, electrostatic potential and space charge layer, inverted (accumulation and depletion) layers; quantized 2D electron gas, electrons on helium, image potential states

Elementary excitations at planar surfaces and other nanostructures , plasmons and LO phonons, Rayleigh waves, discrete linear models (acoustic), surface excitations in small systems, retardation effects and polaritons, quantum description of the metallic slab ((RPA: IBM and SCIBM, LDA)

Adsorption and desorption, general: adsorption, chemisorption, physisorption, bonding mechanisms (van der Waals, ionic and covalent bonds), Newns-Anderson model, substrate-adsorbate tunneling: ionic and neutral adsorption, resonant electron sates on adsorbates.

STM and similar processes, phenomenological description, basic theoretical formulation (STM, AFM), review of experimental results

STUDENT OBLIGATIONS DURING THE COURSE: Attendance (70%) of lectures and excercises, homework and seminar projects, passing two colloquia with minimum 25% points

METHODS TO EVALUATE STUDENT PERFORMANCE: Results of the homework and seminar projects, oral and written colloquium, oral examination.

EXAMINATION METHODS: Written and oral. Students who collect enough points for the seminar papers and at colloquia can be relieved of the written exam.

COURSE(s) NEEDED FOR THIS COURSE: Classical electrodynamics, Statistical physics, Quantum mechanics, Solid state physics, Mathematical (incl. numerical) methods

COMPULSORY LITERATURE:

31. N.W. Aschroft, N. D. Mermin, *Solid State Physics,* Holt, Rinehart and Winston, 1976.
32. C. Kittel, *Quantum Theory of Solids;* Willey & Sons, 1953
33. D. Langreth, H. Suhl, eds., *Many-Body Phenomena at Surfaces*, Academic Press, 1984
34. A. Prutton, ed. *Electronic Properties of Surfaces*, Adam Hilger, Bristol, 1984
35. M. Šunjić, *Surface Elementary Excitations*, in *Dynamics of Gas-Surfaace Interactions*, Springer Series in Chemical Physics, Vol. 21., G. Benedek, U. Valbusa, eds., 1982
36. A . Zangwill, *Physics of Surfaces*, Cambridge University Press, 1988
7. D.P. Woodruff, T. A. Delchar, *Modern techniques of surface science*, Cambridge University Press, 1985
8. Hans Luth, Solid surfaces, interfaces and thin films, Springer 2001

ADDITIONAL READING:

Monographs, selected review and research papers.

Postgraduate Doctoral Study of Physics

COURSE: Theory of Phase Transitions

AUTHOR(S) OF COURSE PROGRAMME
Professor Slaven Barišić, Department of Physics, Faculty of Science, Zagreb

TEACHING TECHNIQUES (lectures + seminars): 30 + 15 hours

ECTS: 8

COURSE ACHIEVEMENTS:
The course is meant to give an operational knowledge in approaching the phase transitions from the Landau classical point of view, starting from the roots. The roots are taken in the Gaussian theory of spatial correlations and in the Langevin theory of the temporal fluctuations. The goal is to give students a strong intuitive grasp of the spatial and temporal aspects of the problem, which is useful not only for phase transitions but opens the students towards the Landau-Prigodine hydrodynamics with associated nonlinear problems. The course illustrates all these universal concepts through the scaling properties of equal time correlation functions derived from the Wilson renormalization group approach.

COURSE PROGRAMME:
Thermodynamical theory of fluctuations. Spatial correlations. Temporal fluctuations. Symmetry of the kinetic coefficients. Fluctuation-dissipation theorem. Phase transitions. Landau theory of phase transitions. Scaling laws. Renormalization group. Wilson's expansion. Limit of the order parameter with a large number of components. Low dimensional problems by transfer matrix and saddle point methods. Dimensional crossovers.

STUDENTS' ACTIVITIES AND THEIR EVALUATION
Class attendance, homework

OBLIGATORY LITERATURE:

37. L.D. Landau, E.M. Lifshitz: Statistical Physics I, Pergamon Press (1980).
38. C. Kittel, Elementary Statistical Physics, John Wiley & Sons (1958).
39. M. Toda, R. Kubo, N. Saito, Statistical Physics I, II, Springer (1992).
40. H.E. Stanley: Introduction to Phase Transitions and Critical Phenomena, Oxford Univ. Press (1971).
41. Shang - Keng Ma: Modern Theory of Critical Phenomena, W.A. Benjamin (1976).
42. M. Gitterman, V. Halpern: Phase Transitions, World Scientific (2004).

SUPPLEMENTARY LITERATURE:

43. P. Pfeuty, G. Touluse, Introduction to the Renormalisation Group and to Critical Phenomena, John Wiley & Sons (1977).
44. E.M. Lifshitz, L.P. Pitaevskii, Statistical Physics II, Pergamon Press (1980).

EXAMINATION PROCEDURE:
Written and oral exams

Postgraduate Doctoral Study of Physics

COURSE: Nonlinear Continua

AUTHOR(S) OF COURSE PROGRAMME:
Prof. dr. sc. Aleksa Bjeliš, Doc. dr. sc. Hrvoje Buljan,
Department of Physics, Faculty of Science, University of Zagreb

TEACHING TECHNIQUES (lectures + exercises /seminars): 15+7 hours

ECTS: 4

COURSE ACHIEVEMENTS:
The aim of the course is to teach students elementary ideas associated nonlinear phenomena (such as solitons, modulation instabilities, turbulence) and nonlinear wave equations, and methods for solving these equations (numerical simulations, inverse scattering method). It is important to expose the idea that identical nonlinear phenomena and nonlinear wave equations appear in different physical systems as phenomenologically relevant models.

COURSE PROGRAMME:
Nonlinear wave equations. Elementary principles of wave propagation in linear systems: dispersion. Elementary ideas connected with nonlinear wave dynamics: self-action. Stationary waves (solitons): stable balance between linear effects (dispersion) and nonlinear effects. Stability and bifurcations. Modulation instability. Spontaneous pattern formation; self-organization. Turbulence. Nonlinear wave equations and nonlinear phenomena in different physical systems. Nonlinear Schrödinger equation (NLSE): Nonlinear optics, Bose-Einstein condensates (Gross-Pitaevskii equation). Korteveg de Vries equation (KdV): Long waves in shallow water, ion acoustic waves. Sine-Gordon equation (SGE): system of mechanical oscillators, kvantum optics. Methods for solving nonlinear wave equations: numerical simulations, inverse scattering method.

STUDENTS' ACTIVITIES AND THEIR EVALUATION:
Continuous attendance of lectures, solving practical problems, creation of one seminar work which contains solving of a project assignment; this involves using modern literature (e.g., recent scientific papers) and presenting the work in front of other students in the group.

OBLIGATORY LITERATURE:
Parts from the books below which cover the course programme.

45. R.K. Dodd, J.C. Eilbeck, J.D. Gibbon, H.C. Morris, Solitons and nonlinear wave equations, Academic Press, London (1982).
46. S.P. Novikov, S.V. Manakov, L.P. Pitaevskii, V.E. Zakharov, Theory of Solitons, Plenum (1968).
47. L.D. Landau, E.M. Lifshitz, Fluid Mechanics, Pergamon Press (1987).

SUPPLEMENTARY LITERATURE:

B. Witham, Linear and nonlinear waves, (John Wiley and Sons, New York, 1999).
Robert W. Boyd, Nonlinear optics (Academic Press, San Diego, 2003).
M. C. Cross and P.C. Hohenberg, Rev. Mod. Phys. 65, 851 (1993).

Recent scientific papers from the fields of physics where nonlinear wave equations covered by the programme appear.

EXAMINATION PROCEDURE:

Succesfull completion of the course includes success in solving practical problems, creation of a seminar work, and final oral exam covering all of the course topics.

Postgraduate Doctoral Study of Physics
COURSE: High Tc superconductivity
AUTHOR(S) OF COURSE PROGRAMME Professor Slaven Barišić, Department of Physics, Faculty of Science, Zagreb
TEACHING TECHNIQUES (lectures+ seminars): 15+7 hours
ECTS: 4
COURSE ACHIEVEMENTS: The goal of the course is to give a brief comprehensive review of the physics of cuprate superconductors in order to develop an interface for the communication between the young experimental and theoretical researchers. In author's view this communication is essential for further advancement of this important field of research.
COURSE PROGRAMME: Short introduction to phenomenology and theory of superconductivity. High-Tc superconductors: Discovery, crystal structure, and transport properties. Application of spectroscopic methods to cuprate superconductors: photoemission, neutron scattering, NMR, optical properties, Raman scattering. Particularities of the normal state. Mott localization, antiferromagnetism. Superconductivity and its particularities. Electronic models. Theoretical methods for systems with strong local interaction on one site in the unit cell: auxiliary bosons or fermions, locally gauge invariant theories. Strong correlations and the properties of the normal state. Theoretical scenarios for the high-Tc superconductivity: excitons, phonons, polarons, magnons; pre-formed Cooper pairs.
STUDENTS' ACTIVITIES AND THEIR EVALUATION: class attendance, homework
OBLIGATORY LITERATURE: 48. P.G. de Gennes, Superconductivity of Metals and Alloys, W.A. Benjamin, New York 1966. 49. M. Cyrot, D.Pavuna, Superconductivity and High Tc Materials, World Scientific, 1992. 50. N. Plakida, High Temperature Superconductivity - Experiment and Theory, Springer, 1995. 51. P.W. Anderson, The Theory of in the High-Tc Cuprates, Princeton University Press, 1997. 52. A. Marouchkine, Room-Temperature Superconductivity, Cambridge Univ. Sc. Publ., 2007.
SUPPLEMENTARY LITERATURE: Original and review scientific papers
EXAMINATION PROCEDURE: oral exams

Postgraduate Doctoral Study of Physics

COURSE: Physics of polymers

AUTHOR(S) OF COURSE PROGRAMME:
Dr. sc. Dinko Babić, Department of Physics, Faculty of Science, Zagreb

TEACHING TECHNIQUES (lectures+seminars): 15+7 hours

ECTS: 4

COURSE ACHIEVEMENTS
The goal of the course is to furnish introductory information on the physics of polymers, including the conducting polymers. The emphasis is on the synthesis and characterization of new polymers. The basic physical ideas behind the physics of polymers are also explained, starting from the appropriate models of chemical bonding. The course is suitable for students of experimental and theoretical physics interested in this field of research.

COURSE PROGRAMME:
The concept of mer, (mono, di, tri,...) mers, polymers, copolymers. Complexity of the chemical bonding in polymers. Saturated and non saturated, conjugated polymers. Natural and synthetic polymers. The usual methods of polymerization and the characterization of polymeric materials. Cross linking of chains and its consequences on the polymer properties. Structural, chemical, mechanical and thermal properties of polymers. Nature of the transport of charge in conducting polymers. Applicative aspects of polymers: interdisciplinarity, application of fundamental understandings, processibility of polymers, engineering. Electronics based on polymers. Polymeric composites. Advantages and disadvantages of polymers in applications.

STUDENTS' ACTIVITIES AND THEIR EVALUATION
class attendance, homework seminars

OBLIGATORY LITERATURE:

53. P.J. Flory, Statistical Mechanics of Chain Molecules, Interscience Publishers, New York (1969).
54. P.G. de Gennes, Introduction to Polymer Dynamics, Cambridge University Press (1990).
55. B. Sapoval, C. Hermann, Physics of Semiconductors, Springer, New York (1993).
56. N.F. Mott, E.A. Davis, Electronic Processes in Non-Crystaline Materials, Clarendon Press, Oxford (1979).
57. P. Bastiansen, Polymer Electronics, Philips Research Co., Eindhoven (1998).
58. P.W. Atkins, Physical Chemistry, Oxford University Press (1994).

SUPPLEMENTARY LITERATURE:
Selected original scientific papers and review articles

EXAMINATION PROCEDURE:
oral exams, seminars

Postgraduate Doctoral Study of Physics

COURSE: Physics of Semiconductors

AUTHOR(S) OF COURSE PROGRAMME
Dr. sc. Eduard Tutiš, higher scientific associate, Institute of Physics, Zagreb

TEACHING TECHNIQUES (lectures, consultations + seminars): 15 + 7 hours

ECTS: 4

COURSE ACHIEVEMENTS:
The aim of the course is to provide a perspective and basic understanding of development that made semiconductors the basis of wide variety of devices: amplifiers, electronic logic components, sensors and light emitters, termoelectric devices and various converters. The course first focuses on the understanding of the microscopic origin of high sensibility of material properties on doping, temperature, magnetic field etc. The junctions and semiconductor structures are studied as cornerstones for construction of semiconducting devices. Current developments in fundamental and applied research are illustrated trough examples of materials and structures that extend the limits set by classical semiconductors, artificial quantum mechanical structures and molecular devices.

COURSE PROGRAMME:

Fixed part:

10. The history of application and understanding semiconductors. Electronic structure of some semiconducting materials. Doping
11. Scattering of charge carriers and transport properties of semiconductors. Electronic conductivity, thermoelectric effects, classical semiconductors in magnetic field. Examples of simple devices.
12. Semiconductor junction, the interface of metal and semiconductor, heterostructures. Semiconductor diode, bipolar transistor.
13. Optical properties of semiconductors. Absorption of light and photoconductivity. The recombination of charge carriers.
14. Low dimensional semiconductor structures, quantum wells and quantum dot, artificial materials

Variable part (up to three subjects to be chosen, based on the audience):

15. Amorphous silicon – electronic states, doping, transport, applications. Polycrystalline silicon
16. Conduction in disordered organic materials and polymers. Organic light emitting diodes and displays.
17. Polaronic states and polaron conduction in semiconductors
18. Physical principles and examples of memory devices based of semiconductor-metal composites
19. Semiconductors based on carbon. Carbon nanotubes and related structures
20. Magnetic semiconductors. Spintronics.

21. Quantum Hall effect 22. Electronic devices based on single or few molecules
STUDENTS' ACTIVITIES AND THEIR EVALUATION class attendance, problem assignments, seminars
OBLIGATORY LITERATURE: 59. B .Sapoval and C. Hermann, Physics of Semiconductors, Springer Verlag (2003) 60. G. Parker, Introductory Semiconductor Device Physics, IOP Publishing (2004) 61. J. Orton, The Story of Semiconductors, Oxford University Press (2004) 62. R.A. Smith, Semiconductors, 2nd Edition, Cambridge University Press (1978)
SUPPLEMENTARY LITERATURE: Physics and applications of low-dimensional semiconductor structures, chapter 5. in E. O'Reilly, Quantum Theory of Solids, Taylor and Francis (2002) J.I. Pankove, Optical properties in semiconductors, Dover (1975) S.M. Sze (ed), Modern semiconductor device physics, John Wiley & Sons, (1998) R.E Prange S.M. Girvin (eds.) The quantum Hall effect, Springer (1990) Additional titles may be specified for the purpose of seminars, mostly related to recent papers published in scientific and popular journals.
EXAMINATION PROCEDURE: seminar, written exam (problem solving), oral exam

Postgraduate Doctoral Study of Physics
COURSE: Physics of Metals and Alloys (Nanomaterials)
AUTHOR(S) OF COURSE PROGRAMME: Professor Antun Tonejc
TEACHING TECHNIQUE (lectures+practice/seminars): 15+7 hours
ECTS: 4
COURSE ACHIEVEMENTS: To provide a students with basic concepts of physics of nanomaterials, using experimental facts and theoretical models.
COURSE PROGRAMME: 1. Crystal structure of mono crystals, polycrystals, quasicrystals, nanocrystals and nanoglasses. 2. Point defects and dislocations 3. Diffusion in crystalline and nanocrystalline materials 4. Physical methods for nanomaterials characterisation 5. Phase diagrams 6. Structure of metals, solid solutions, intermetallic compounds and glassy materials 7. Diffusive and nondiffusive phase transformations 8. Metastable state of materials 9. Metastable micro- and nanostructures 10. Mechanical properties of micro- and nanocrystals 11. Magnetic properties of micro- and nanocrystals 12. Nanotubes 13. Nanocrystalls as new materials for applications
STUDENTS' ACTIVITIES AND THEIR EVALUATION: Students have to attend lectures and give one seminar of a selected topic (40 minutes long seminar). Students have to work out homeworks and colloquia.
OBLIGATORY LITERATURE: R. W. Cahn, P. Haasen, Physical Metallurgy, Vol. I-III, North-Holland, Amsterdam (1996). J. I. Gersten, F. W. Smith, The Physics and Chemistry of Materials, Yohn Wiley&Sons, New York (2001).
SUPPLEMENTARY LITERATURE: W. D. Callister, Materials Science and Engineering, Yohn Wiley&Sons, New York (2003). A. R. West, Basic Solid State Chemistry, Yohn Wiley&Sons, New York (1999).
EXAMINATION PROCEDURE: Oral examination and colloquia

Postgraduate Doctoral Study of Physics
COURSE: Superfluidity and Superconductivity
AUTHOR(S) OF COURSE PROGRAMME Professor Amir Hamzić, Department of Physics, Faculty of Science, Zagreb
TEACHING TECHNIQUES (lectures+seminars): 15+7 hours
ECTS: 4
COURSE ACHIEVEMENTS: Basic knowledge - superfluidity and superconductivity are unique physical phenomena which occur at low temperatures and which are characterized by a flow (with a constant velocity in a long time interval) of a large number of particles that are condensed in the same quantum state. These are the only examples of the movement of the system with macroscopic dimensions which is not altered by some dissipative process. The applied concepts of condensations can be equally applied in other systems that are not associated with low temperatures.
COURSE PROGRAMME: Basic properties of superfluids (He4, He3). Condensates and excitations. Vortex. Sounds. Basic characteristics of superconductivity; materials. Similarities and differences between superfluids and superconductors. Thermodynamics and electrodynamics of the superconductive state. Phenomenologic and microscopic models. Mixed state. Josephson effect. Technology and applications of superconductivity.
STUDENTS' ACTIVITIES AND THEIR EVALUATION class attendance, homework (numerical and problem assignments) seminars
OBLIGATORY LITERATURE: D.R.Tilley and J.Tilley; Superfluidity and Superconductivity, IOP Publishing (1990). M.Cyrot and D.Pavuna; Introduction to Superconductivity and High Tc-Materials, World Scientific Publishing (1992). C. Enss and S. Hunkliger; Low-Temperature Physics, Springer (2005)
SUPPLEMENTARY LITERATURE: C.T. Lane; Superfluid Physics, McGraw-Hill (1962). M. Tinkham; Introduction to Superconductivity, MacGraw-Hill (1975).
EXAMINATION PROCEDURE: oral exams, seminars

Postgraduate Doctoral Study of Physics
COURSE: Disordered systems
AUTHOR(S) OF COURSE PROGRAMME Professors of Physics: Krešo Zadro and Emil Babić, University of Zagreb, Faculty of Sciences and Mathematics
TEACHING TECHNIQUES: Lectures + Seminars
ECTS: 4
COURSE ACHIEVEMENTS : The main goal of the course is to introduce the students with the effects of disorder on the properties of different systems and the new features brought by disorder. The competences/expertize acquired by students are: conceptual understanding of the different types of disorder, the knowledge of the modern methods for the description of the disorder (percolation theory, fractals, etc.) and the ability of independent description of the influence of disorder on selected properties of condensed systems.
COURSE PROGRAMME : Disorder: the topological and chemical disorder, quasy cristalline systems. Fractals: predetermined and random fractals, fractal dimension and fractal growth. Percolation: percolation as the critical phenomenon, correlation length, transport through the fractal/percolation systems, fractons, dynamical exponnents. The disordered magnets, random field model, random exchange model, dilute magnets, spin glasses, superparamagnets. Experimental research: fractal growth (dielectric breakdown, electrodeposition, etc.), structure (diffraction paterns) and physical properties (transport, thermodynamics and mechanical). Seminar: students perform computer simulations of different models (e.g. random walk, DLA, percolation, cellular automata, etc.
STUDENTS' ACTIVITIES AND THEIR EVALUATION : Course attendance (obligate) and work on seminar exercize / project.
OBLIGATORY LITERATURE: 1. Fractals and Disordered Systems, eds. A.Bunde and S.Havlin, Springer, Berlin 1996. 2. Computer Simulations with Mathematica, R.J.Gaylord and P.R.Wellin, Springer, New York, 1995.
SUPPLEMENTARY LITERATURE: Newer monographs and papers from the chosen field.
EXAMINATION PROCEDURE: Presentation of results of seminar/project and exam.

Postgraduate Doctoral Study of Physics

COURSE: SPINTRONICS

AUTHOR OF COURSE PROGRAMME

Dr. Amir Hamzić, full professor, Department of Physics, Faculty of Science, Zagreb

TEACHING TECHNIQUES:

lectures+ seminars (15+7)

ECTS: 4

COURSE ACHIEVEMENTS:
The course provides an overview of concepts and basic phenomena, as well as experimental results and and theoretical approaches in spintronics. This new field of research in condensed matter physics exploits the influence of the spin (and not only electrical charge as in traditional electronics) on the mobility of the electrons in ferromagnetic materials. The advances in generating, manipulating and detecting spin-polarized electrons and currents made also possible an entire new technology consisting of spin-based sensor, memory and logic devices. While emerging nanotechnology was once a prerequisite for the begining of spintronics, this reseach is, in its turn, nowadays a driving force behind the rapid development of nanotechnology.

COURSE PROGRAMME:
Spin-polarized transport and magnetoresistive effects (Mott's theory, two-current model). Multilayered magnetic nanostructures. AF coupling in layered structures. Giant magnetoresistance. Spin-valve structures. CPP and CIP geometry; spin injection and accumulation. Magnetic tunnel junctions and tunnel magnetoresistance. Magnetic switching and microwave generation by spin transfer (STT). Spintronics with semiconductors; molecular spintronics with carbon nanotubes; new materials (diluted magnetic semiconductors and oxide heterostructures). Applications (data storage – hard discs, detectors and sensors, magnetic memories - MRAM, microwave oscillators).

STUDENTS' ACTIVITIES AND THEIR EVALUATION
class attendance, seminars

OBLIGATORY LITERATURE:

1. Barthelemy, Fert, Petroff; *Giant Magnetoresistance of Magnetic Multilayers*; in Handbook of Magnetic materials - Vol. 12 / K.H.J. Buschow (ed). Elsevier, (1999).
2. Journal of Magnetism and Magnetic Materials, 200 (1999); special issue *Magnetism Beyond 2000,* (1999).
3. Žutić, Fabian, and Das Sarma; *Spintronics: Fundamentals and applications*; Rev.Mod.Phys. 76 (2004).
4. Baibich et al.; Phys.Rev.Lett. 61 (1988); Binach et al.; Phys.Rev.B39 (1989)

SUPPLEMENTARY LITERATURE

Original scientific publications.

EXAMINATION PROCEDURE:
oral exam, seminars

4. ATOMIC, MOLECULAR AND OPTICAL PHYSICS (AMOP) AND ASTROPHYSICS: AMOP MODULE

Postgraduate Doctoral Study of Physics : Atomic,Molecular and Astro Physics
COURSE: Quantum Theory of Atoms and Molecules
AUTHOR(S) OF COURSE PROGRAMME Zvonimir Maksic, Full professor at the Faculty of Science and Mathematics in Zagreb and distinguished scientist at Rudjer Boskovic Institute, Zagreb
TEACHING TECHNIQUES Lectures and seminars
ECTS: 14
COURSE ACHIEVEMENTS the aim of this course is to explain the most important modern methods of the quantum theory of atoms and molecules used in revealing their elelctronic structure. A particular emphasis will be laid down on the conceptual side of the problem.
COURSE PROGRAMME The Hartree-Fock Model, the canonical equations, interpretation of solutions to the HF equations (Koopmans', Brillouin's and virial theorems), polycentric molecules and Roothaan's equations, Feynmann's theorem, Closed and open shells, computational realization – the basis sets, Problem of the elctron correlation, configuration interaction, natural orbitals, multiconfiguration self consistent field methods, perturbational treatment of the correlation, Moeller-Plesset approach, complete active space SCF theory (CASSCF), distinction between static and dynamic correlation , CASSCF+PT2 procedure, multireference configuration interaction methods, Theory of density functionals, time-independent B3LYP DFT method.
STUDENTS' ACTIVITIES AND THEIR EVALUATION class attendance, consultations, seminars
OBLIGATORY LITERATURE 1. A.Szabo and N.S.Ostlund, "Modern Quantum Chemistry", Sec.Ed. McGraw-Hill, New York, 1989. 2. T.Helgaker,P.Joergensen and J.Olsen, "Molecular Electronic Structure Theory", Wiley,Chichester, 2000. 3. Cristopher Cramer, "Essentials of Computational Chemistry – Theories and Models", Wiley, Chichester, 2004. 4. W.Koch and M.C.Holthausen, "Chemist Guide to Density Functional Theory", Wiley, New York, 2000.
SUPPLEMENTARY LITERATURE Z.B.Maksic, "Theoretical Models of Chemical Bonding", Springer-Verlag, Berlin-Heidelberg, Vols. 1-3, 1990-1991.
EXAMINATION PROCEDURE: Tests and oral examination

Postgraduate Doctoral Study of Physics
COURSE: Atomic and molecular dynamic processes
AUTHOR(S) OF COURSE PROGRAMME: znanstveni savjetnik, Slobodan Bosanac, institut Ruđer Bošković
TEACHING TECHNIQUES : lectures, seminars
ECTS: 10
COURSE ACHIEVEMENTS: Theoretical basis for dynamic processes with atoms and molecules and their interaction with the electromagnetic field
COURSE PROGRAMME: Classical and quantum methods for describing dynamics of atoms and molecules, elastic and inelastic collision processes, collisions at ultra-low energies, control of dynamics with the electromagnetic field
STUDENTS' ACTIVITIES AND THEIR EVALUATION: lectures, seminars, projects
OBLIGATORY LITERATURE: Slobodan Danko Bosanac, Dynamics of particles and the electromagnetic field, World Scientific (2005)
SUPPLEMENTARY LITERATURE:
EXAMINATION PROCEDURE: oral exam or seminar

Postgraduate Doctoral Study of Physics Direction 3. ATOMIC AND MOLECULAR PHYSICS AND ASTROPHYSICS
COURSE: Atomic physics and spectroscopy
AUTHOR(S) OF COURSE PROGRAMME: dr. sc. Goran Pichler, scientific advisor, project leader, Institute of Physics, Zagreb
TEACHING TECHNIQUES: lectures, seminars
ECTS: 10
COURSE ACHIEVEMENTS: Understanding the broadening mechanisms of spectral lines, laser cooling and trapping, as well as the formation of ultracold molecules. Acceptance of most recent knowledge from femtosecond and attosecond laser spectroscopy.
COURSE PROGRAMME: Laser spectroscopy of atoms and molecules. Absorption, emission and Raman linear and nonlinear spectroscopy. Sub-Doppler laser spectroscopy. Laser spectroscopy of collisional processes between atoms, electrons, molecules and clusters in the presence of laser radiation (weak and strong electromagnetic fields). Broadening of spectral lines in gas, vapor and plasmas. Nonlinear methods of laser Raman spectroscopy: SRS, CARS, DFWM. Laser cooling and trapping of atoms and molecules. Collisions between ultracold atoms and molecules. Laser spectroscopy of ultracold atoms and molecules. Bose-Einstein condensation in ultracold alkali vapor. Effects of ultra fast laser pulses on atoms and molecules.
STUDENTS' ACTIVITIES AND THEIR EVALUATION: presence at lectures and seminars, consultations and performing some project tasks
OBLIGATORY LITERATURE (authors, title, publisher, edition, year of publishing): 1. W. Demtroeder: “Laser Spectroscopy: Basic Concepts and Instrumentation”, Springer, Berlin, 2003, 3rd edition. 2. S. Svanberg: “Atomic and Molecular Spectroscopy: Basic Aspects and Practical Applications, Springer, 1991, Berlin. 3. R. W. Boyd: “Nonlinear Optics”, Academic Press, INC. Boston, 2nd edition, 2003. 4. W. T. Silfvast: “Laser Fundamentals”, Cambridge University Press, 1996. 5. C. J. Foot: Atomic Physics, Oxford University Press, 2005.
SUPPLEMENTARY LITERATURE: the most recent papers from atomic physics and spectroscopy from NATURE, SCIENCE and Physical Review Letters.
EXAMINATION PROCEDURE: oral examination

Postgraduate Doctoral Study of Physics
COURSE: Molecular physics and spectroscopy
AUTHOR(S) OF COURSE PROGRAMME: Davor Kirin, Senior Scientist , Ruđer Bošković Institute POB 180, 10002 Zagreb Vlasta Mohaček Grošev, senior research associate, Ruđer Bošković Institute POB 180, 10002 Zagreb
TEACHING TECHNIQUES: lectures, laboratory work
ECTS: 10
COURSE ACHIEVEMENTS (aim of the course and development of general and specific competitions - knowledge and skills): Basic knowledge and skills in molecular physics and molecular spectroscopy.
COURSE PROGRAMME (concise description of teaching topics): Introduction to basic principles of molecular physics and molecular spectra. Particular attention is given to posible applications of molecular spectroscopy. Basic ideas of molecules and molecular spectroscopy (infrared, microwave and Raman spectroscopy). Energy levels of molecules, rotational, vibrational and electronic spectra. Spectroscopic instruments, sources of radiation and detectors. Human eye as a detector of radiation. Color vision . Rotations of molecules; microwave spectroscopy. Vibrations of molecules, infrared and Raman spectroscopy. Application of the group theory on clasification of molecular spectra. Selection rules in molecular spectroscopy.
STUDENTS' ACTIVITIES AND THEIR EVALUATION (class attendance, homework, seminars, projects): Practical laboratory projects.
OBLIGATORY LITERATURE (authors, title, publisher, edition, year of publishing): 63. C. N. Banwell and E.M. McCash: Fundamentals of Molecular Spectroscopy, Mc-Graw-Hill,ISBN: 0070840075 64. W. Demtroeder: Laser Spectroscopy, Springer, Berlin 2003. ISBN: 354057171X
SUPPLEMENTARY LITERATURE (authors, title, publisher, edition, year of publishing): 65. G. Herzberg: Molecular Spectra and Molecular Structure I: Diatomic Molecules, Van Norstad, New York, 1950., 66. Infrared and Raman Spectra of Polyatomic Molecules, Van Norstad , McGraw-Hill Companies, New York 1946 67. E. B. Wilson Jr., J. C. Decius and P. C. Cross: Molecular Vibrations, Dover Publications 1980. 048663941X
EXAMINATION PROCEDURE: Oral exam + solved problems in written form (part of experimental work in molecular spectroscopy)

Postgraduate Doctoral Study of Physics
COURSE: Physics of cold collisions
AUTHOR(S) OF COURSE PROGRAMME: Dr Mladen Movre, Scientific Adviser, Institute of Physics, Zagreb
TEACHING TECHNIQUES: lectures + seminar
ECTS: 8
COURSE ACHIEVEMENTS: Understanding of basic concepts of cold collisions, formation of cold molecules and Bose-Einstein condensates. Dynamics of cold collisions in the ligth field. Numerical methods.
COURSE PROGRAMME: Basic concepts: cross sections, treshold laws, scattering length. Inelastic collisions of ground-state atoms: good quantum numbers, relaxation mechanisms, resonances. MQDT treatment of cold collisions. Collisions of metastable rare gases: Penning and associative ionization. Collisions od bosons vs. collisions of fermions. Structure of excited states: quasimolecular picture, Movre-Pichler Hamiltonian. Bound states in long-range potentials: pure long-range molecules. Alkaline-earth metals: paradigm for cold collisions, optical potential model. Optical collisions od cold metastable helium atoms. Dynamics of cold collisions in the ligth field: generalized Gallagher-Pritchard model, semiclassical picture and quantum mechanical calculations. Bose-Einstein condensation. Numerical methods. Time-independent methods for bound and scattring states, coupled equations, boundary conditions. Complex multichannel Numerov method and other propagators for continuum states, DVR methods for bound states. Complex time propagation. Review of time-dependent methods.
STUDENTS' ACTIVITIES AND THEIR EVALUATION: class attendance, consultations, seminar, project
OBLIGATORY LITERATURE: 1. J. Weiner, V. S. Bagnato, S. Zilio and P. S. Julienne: "Experiments and theory in cold and ultracold collisions", Reviews of Modern Physics 71, 1-85 (1999) 2. H. Friedrich: "Theoretical Atomic Physics", Springer, Berlin (1998)
SUPPLEMENTARY LITERATURE: 3. P. S. Julienne, A. M. Smith and K. Burnett: "Theory of collisions between laser cooled atoms", Advances in Atomic Molecular and Optical Physics 30, 141-198 (1993) 4. R. Campargue, editor: "Atomic and molecular beams. The State of the Art 2000", Springer, Berlin (2001)
EXAMINATION PROCEDURE: oral exam

Postgraduate Doctoral Study of Physics

COURSE: Theory of optical spectra of the diatomic molecules

AUTHOR(S) OF COURSE PROGRAMME:
Research Adviser, Dr. sc. Robert Beuc, Institute of Physics

TEACHING TECHNIQUES : lectures+seminar

ECTS**:** 8

COURSE ACHIEVEMENTS:
Training of the theoretical analysis of diatomic molecules' spectra, and their simulation in hot and ultra cold conditions.

COURSE PROGRAMME :
Symmetries of homonuclear, heteronuclear and heteroisotopic diatomic systems. Long-range potentials, electrostatic potentials, exchange interaction, Rayleigh-Schrödinger perturbation calculation, dispersion and induction interaction, damping functions. Ultra-long-range Rydberg molecules, trilobites. Discrete and continuous spectra of diatoms, optical collisions, satellite rainbows, shape resonances. Impact and quasistatic profiles of spectral lines. Atomic and molecular transitions in strong laser field, dressed states. Nonadiabatic processes, predissociation of molecular states (Feshbach resonances), perturbations in the discrete spectrum. Franck-Condon factor, time-dependent perturbation calculation, semiclassical approximation, quantum-mechanical Fourier grid method. Absorption and emission spectra at ultra-cold temperatures, formation of ultra-cold molecules by the photoassociation, optical detection of ultra-cold molecules, Bose-Einstein condensation of a rarefied molecular gas and application of femtosecond laser pulses. Spectroscopy of atoms and molecules adsorbed at cold helium droplets.

STUDENTS' ACTIVITIES AND THEIR EVALUATION : seminars

OBLIGATORY LITERATURE :

68. H.Friedrich : Theoretical Atomic Physics, Springer Verlag Berlin, 1998.
69. J.O. Hirschfelder: Intermolecular forces, Advances in Chemical Physics, Vol 12, Interscience Publishers, John Wiley and Sons, New York, 1967.
70. J. Szudy and W. E. Baylis: Profiles of Rainbow Satellites and Line Wings Associated with Optical and Radiative Collisions, Phys. Reports, 226, 127-228 (1996)
71. H.J.Metcalf and P. van der Straten: Laser Cooling and Traping, Springer Verlag, Berlin,1999.

SUPPLEMENTARY LITERATURE :

72. F. Masnou-Seeuws and P. Pillet Formation of ultracold molecules via photoassociation in a gas of laser cooled atoms: Advances in Atomic Molecular and Optical Physics 47, 53-127 (2001)
73. Frank Stienkemeier and Kevin K Lehmann: Spectroscopy and dynamics in helium nanodroplets, J. Phys. B: At. Mol. Opt. Phys. 39 (2006) R127–R166 doi:10.1088/0953-4075/39/8/R01

EXAMINATION PROCEDURE: Oral exam

Postgraduate Doctoral Study of Physics
COURSE: Nonlinear Optics
AUTHOR(S) OF COURSE PROGRAMME: Hrvoje Buljan, Assistant Professor, Department of Physics, University of Zagreb, Bijenička c. 32, 10000 Zagreb, Croatia
TEACHING TECHNIQUES: 20 hours of lectures, 20 hours of practice, and 10 hours devoted to seminars
ECTS: 8
COURSE ACHIEVEMENTS: The aim of the course is to provide a conceptual and systematic understanding of topics from nonlinear optics listed in the course program. Specific skills that will be developed relate to numerical and analytical techniques for solving nonlinear equations (such as the nonlinear Schrodinger equation).
COURSE PROGRAMME: Nonlinear optical susceptibility. Nonlinear wave equations (nonlinear Schrodinger equations and similar systems); focus is given to the derivation of these equations and solving techniques (numerical and analytical). Sum and difference frequency generation. Second harmonic generation. Phase matching. Intensity dependent refractive index. Self-focusing. Optical solitons. Modulation instability. Nonlinear wave mixing: two wave mixing and four wave mixing. Analogous phenomena in nonlinear atom optics; a brief encounter is given of fundamental nonlinear phenomena in atom optics.
STUDENTS' ACTIVITIES AND THEIR EVALUATION: Students should continuously follow lectures and exercises, participate in quiz-tests, and fulfil home-assignments. They are expected to present a seminar during the course.
OBLIGATORY LITERATURE: R.W. Boyd, Nonlinear Optics, Academic Press, San Diego, 1992
SUPPLEMENTARY LITERATURE: Y.R. Shen, Principles of Nonlinear Optics, John Wiley and Sons, Hoboken, New Jersey, 2003 D.L. Mills, Nonlinear Optics, Springer, Berlin, 1998.
EXAMINATION PROCEDURE: Written and oral exam; seminar presentation.

Postgraduate Doctoral Study of Physics
COURSE: Plasma Physics
AUTHOR(S) OF COURSE PROGRAMME: Dr. Vršnak Bojan, scientific advisor, University of Zagreb, Faculty of Geodesy, Kačićeva 26, 10000 Zagreb
TEACHING TECHNIQUES: lectures + practice (30+15)
ECTS: 8
COURSE ACHIEVEMENTS: The aim of the course is comprehension of basic physical processes in laboratory and astrophysical plasma systems. Through various task-projects students will achieve practical knowledge in solving various theoretical problems, as well as skills in reducing and interpreting the in situ measurements of space plasma.
COURSE PROGRAMME: Basic characteristics of plasmas. Orbital method: motion of charged particles in electric and magnetic fields; collisions. Hydrodynamical approach: Magnetohydrodynamics; Two-component model. Kinetic approach: beasic equations, non-maxwellian distributions. Systems in equilibrium. Oscillations and waves in plasma. Ideal and dissipative processes: particularly: shock waves, magnetic field reconnection, types of instabilities. Loss of equilibrium. Magnetohydrodynamical and kinetic instabilities. Electromagnetic radiation from plasma systems. Applications: laboratory plasmas and diagnostics; processes in the solar atmosphere, solar wind and Earth's megnetosphere.
STUDENTS' ACTIVITIES AND THEIR EVALUATION: Basic: class attendance, seminars, individual consultations. Particular: theoretical and empirical task-projects concerning dynamical processes in the solar atmosphere, the solar wind and the space weather.
OBLIGATORY LITERATURE: B. Vršnak: Temelji fizike plazme, Školska knjiga, Zagreb, 1996
SUPPLEMENTARY LITERATURE: A.O. Benz: Plasma Astrophysics, Kluwer, Dordrecht, 1993 E.R. Priest: Solar Magnetohydrodynamics, Reidel, Dordrecht, 1984 L. Landau: Electrodynamics of Continuous Media, Pergamon, Oxford, 1984
EXAMINATION PROCEDURE: Written exercises and oral examination

Postgraduate Doctoral Study of Physics
COURSE: ATOMIC AND MOLECULAR BEAM METHODS
AUTHOR(S) OF COURSE PROGRAMME: Dr. Slobodan Milošević, scientific advisor (II) Zagreb, Croatia
TEACHING TECHNIQUES: 15 hours lectures and 30 hours practise
ECTS: 8
COURSE ACHIEVEMENTS: Development of specific knowledge and skills in the field of atomic and molecular beam methods with emphasis on cooling techniques and quantum matter studies.
COURSE PROGRAMME: Main idea of the course is to show development and latest achievements of the atomic and molecular beam methods. Program contains review of basic techniques of preparation and detection of beams and their application from fundamental research to technological applications with special attention given to atom optics and nanotechnology. Basics: historical development, free jet sources, low energy sources, high energy sources, detection: spectroscopy techniques, selection of states and velocities, basic principles of laser cooling, new sources of cold molecules. Applications: atomic and molecular scattering (elemental chemical reactions), cluster production in beams, helium droplets, transition from atoms to condense matter, metrology: atomic clocks, primary standards, high resolution spectroscopy, atom optics, light forces atomic and molecular interferometry. Atomic lithography, production of nanostructures, laser ablation and buffer gas cooling, electrostatic and magnetic techniques for cooling and manipulation of beams, trapping.
STUDENTS' ACTIVITIES AND THEIR EVALUATION: Class attendance, seminars, projects, visits to the laboratory
OBLIGATORY LITERATURE: 1. G. Scoles, Atomic and Molecular Beam methods, Vol. 1 1988. (Pergamon Press)
SUPPLEMENTARY LITERATURE: Paul R. Berman, editor, Atom Interferometry, Advances in Atomic and Molecular Physics Supplement 3 (Academic Press, 1996) ISBN: 0120924609 vidi: http://coffee.mit.edu/pubs/AAMOP/AAMOP-Title.html http://rleweb.mit.edu/ifm/pubs/AAMOP/AAMOP-Contents.html Pierre Meystre, Atom Optics (http://www.amazon.com/exec/obidos/ASIN/0387952748/o/qid=992203726/sr=2-1/ref=aps_sr_b_1_1/103-4467354-6249446) Roger Campargue, Atomic and Molecular Beams: State of the art 2000 http://www.amazon.com/exec/obidos/ASIN/3540673784/qid=992203868/sr=1-3/ref=sc_b_3/103-4467354-6249446
EXAMINATION PROCEDURE: Student's project (in electronic form), oral presentation.

Postgraduate Doctoral Study of Physics
COURSE: OPTICS AND HOLOGRAPHY
AUTHOR OF COURSE PROGRAMME: Nazif Demoli, senior scientific associate, Institute of Physics
TEACHING TECHNIQUES: lectures + practice + seminar
ECTS: 8
COURSE ACHIEVEMENTS: The aim of the course is to give the student basic knowledge and skills of the optics and holography fields. We use a modern approach to understanding different topics, from the first theories on the nature of light to the experiments actual today. Particularly, the course covers the practical laboratory work with exercises that were unavailable in previous studies. Such exercises are: making of various types of classical holograms (amplitude, phase, time-averaged, rainbow), recording of digital holograms, measuring of object deformation using holographic interferometry, measuring of object displacements using laser interferometry, etc.
COURSE PROGRAMME: Introduction. Theories on the nature of light (from the early ideas to the new discoveries). Signals and systems (optical filtering, characterization of signals, sampling, linear systems). Geometrical optics (paraxial approximation, matrix methods, aberrations). Wave optics (Maxwell equations, solutions, properties, coherence). Light interference (conditions, examples, interferometers). Light diffraction (approximations, Fresnel, Fraunhofer, FT property of lens). Holography (history, mathematical description, classification of holograms). Digital holography (concept, conditions, problems, solutions). Holography applications (display, holographic interferometry, optical correlating). Holographic interferometry (mathematical description, fringe interpretation, properties, examples). Optical correlating (mathematical description, correlator types, examples). Correlation filters (classical, synthetic, matrix notation, types). Hybrid opto-electronic systems (light modulators, examples of pattern recognition systems).
STUDENTS' ACTIVITIES AND THEIR EVALUATION: Active class attendance is obligatory (thematic discussions), completion of laboratory practice, detailed elaboration of laboratory work and the obtained results, seminar presentation with a topic from a course programme.
OBLIGATORY LITERATURE: 1. M. Born, E Wolf, Principles of Optics, Pergamon Press, Oxford, 1980. 2. J. W. Goodman, Introduction to Fourier Optics, McGraw-Hill, New York, 1968. 3. N. Demoli, Optika i holografija, lectures of the course in the ppt format.
SUPPLEMENTARY LITERATURE: 1. E. Hecht, Optics, Pearson Education, Inc., San Francisco, 2002. 2. M. Paić, Osnove fizike IV dio: svjetlost – holografija - laseri, Liber, Zagreb, 1983.

3. J. D. Gaskill, Linear Systems, Fourier Transforms, and Optics, John Wiley & Sons, New York, 1978. 4. P. Hariharan, Optical Holography: Principles, Techniques, and Applications, Cambridge University Press, 1996.
EXAMINATION PROCEDURE: Upon the completion of the course students have the oral examination open to all. Grade is an average value of the results of laboratory practice, seminar, and oral examination.

Postgraduate Doctoral Study of Physics
COURSE: Nonconventional techniques in atomic spectroscopy
AUTHOR(S) OF COURSE PROGRAMME: Damir Veža, professor, Physics Department, Faculty of Science, Uni-Zagreb, Croatia
TEACHING TECHNIQUES: Lectures, seminar.
ECTS: 8
COURSE ACHIEVEMENTS: Development of specific knowledge and skills in the field of atomic and laser spectroscopy.
COURSE PROGRAMME: A. Limitations of classical and laser-spectroscopic techniques: Classical spectroscopy with monochromators vs. Laser- and Fourier-transform-spectroscopy. Laser atomic absorption spectroscopy. Laser induced fluorescence. Doppler-limited and Doppler-free spectroscopy. B. Advantages of nonconventional classic and laser-spectroscopic techniques: Fourier-transform spectroscopy. Optogalvanic, optoacoustic and thermionic detection. Spectroscopy of waves in low-pressure plasmas. C. Modulation spectroscopy: Opto-electronic characteristics of semiconductor laser diodes. Methods of wavelength stabilization and tuning of SLD's. Wavelength-, frequency- and phase- modulation spectroscopy. Simultaneous modulation and demodulation of radiation of several laser diodes. D. Application of nonconventional techniques: new wavelength standards, detection of oscillations in plasmas, trace element detection, detection of pollutants in the atmosphere.
STUDENTS' ACTIVITIES AND THEIR EVALUATION: Class attendance, seminars, projects.
OBLIGATORY LITERATURE: 1. W. Demtroeder: Laser Spectroscopy (Springer, Berlin-New York 1996)
SUPPLEMENTARY LITERATURE: 1. F. S. Pavone and M. Inguscio: Frequency and wavelength modulation spectroscopy-comparison of experimental methods using an AlGaAs diode laser. Appl. Phys. B56 p. 118 (1993) 2. J. Franzke, D. Veza, M. A. Bratescu, K. Niemax: Pseudosonic wave detection in laser spectrometry, Spectrochimica Acta 53B, p. 613-620 (1998) 3. E. Dumanic, D. Pavicic, M. Pavlovic and D. Veza: Dependence of optogalvanic signal on discharge impedance (submitted) 4. M. Pavlovic and D. Veza: Optogalvanic detection of plasma oscillations in hollow cathode discharge (in preparation, 2006) 5. R. S. Stewart and J. E. Lawler (eds.): Optogalvanic Spectroscopy (Hilger, London 1991)
EXAMINATION PROCEDURE: Student's project (in written form), oral examination.

Postgraduate Doctoral Study of Physics
COURSE: Interactions of particles and photons with surfaces
AUTHOR(S) OF THE COURSE PROGRAMME: Dr. Branko Gumhalter, science councelor, Institute of Physics, Zagreb, Croatia
TEACHING TECHNIQUES : lectures+seminars
ECTS: 8
COURSE ACHIEVEMENTS: Development of specific knowledge on interactions of quantum particles and radiation fields with surfaces
PROGRAMME OF THE COURSE: -Notion and characteristics of van der Waals interactions, -van der Waals interactions between separated neutral atoms, -Polarization of dielectric surfaces by external charges or electric fields (static, dynamic), fundamentals of electron dynamics at surfaces, -Vibrational dynamics at surfaces, -Interactions of neutral, ionized and excited atoms and molecules with surfaces, interatomic interactions at surfaces, potential energy hypersurfaces, -Motion of atomic particles near and at surfaces (processes of adsorption, desorption and migration, electron and photon stimulated processes), -Elastic and inelastic scattering of atomic and subatomic particles at surfaces and atomic layers, investigations of atomic interactions with surfaces and of surface dynamics, -Experimental and theoretical investigations of electronic structure of surfaces, adsorbed atoms and molecules (spectroscopies based on one- and two-photon photoemission, photoabsorption, theoretical models and methods).
STUDENTS' ACTIVITIES AND THEIR EVALUATION: class attendance, homework, seminars, projects.
OBLIGATORY LITERATURE: 74. C. Cohen-Tannoudji, J. Dupont-Roc and G. Grynberg, Interaction Processes between Photons and Atoms, Wiley, New York, 75. Inelastic Energy Transfer in Interactions with Surfaces and Adsorbates, Editors B. Gumhalter, A.C. Levi and F. Flores, World Scientific, Singapore, 1993. 76. H. Petek and S. Ogawa, Progress in Surf. Sci. 56(1997)239. 77. On-line accessible reviews and publications.
SUPPLEMENTARY LITERATURE: to be negotiated with the attendants
EXAMINATION PROCEDURE: through oral examinations and seminars

4. ATOMIC, MOLECULAR AND OPTICAL PHYSICS (AMOP) AND ASTROPHYSICS: ASTROPHYSICS MODULE

Postgraduate Doctoral Study of Physics
COURSE: Physics of Stars and Stellar Populations
AUTHOR(S) OF COURSE PROGRAMME Dr. Krešimir Pavlovski, profesor, Department of Physics, Faculty of Sciences, University of Zagreb
TEACHING TECHNIQUES lectures + seminar
ECTS: 10
COURSE ACHIEVEMENTS Understanding of stellar structure and evolution is fundamental for astrophysics. The aim of this course is to give detail treatment of these important topics. All important phases in stellar evolution would be covered appropriately, from formation of stars, through evolution on main-sequence, and advanced phases until end phases (white dwarfs, or neutron stars through supernova explosion). Also, influence of rotation and oscillations on stellar stellar structure and evolution would be considered. Finally, an introduction for study and constructing of simple stellar populations, as prerequisite for understanding properties and evolution of galaxies, would be given.
COURSE PROGRAMME 1) Observational properties of stars, 2) Equations of state of ideal and degenerate gas, 3) Equations of stellar structure, role of density, 3) Virial theorem, 4) Transport of energy by radiation and convection, 5) Thermonuclear processes in stellar interior, 6) Simple stellar models, 7) Star formation (Jeans criterium), 8) Main-sequence stars, stellar stability, 9) Evolution of high-mass stars, 10) Evolution of low-mass stars (Solar model and its evolution), 11) Compact stars (white dwarfs and neutron stars), 12) Supernovae, 13) Simple stellar populations, 14) Rotation of stars, 15) Stellar oscillations
STUDENTS' ACTIVITIES AND THEIR EVALUATION class attendance plus 1 seminar
OBLIGATORY LITERATURE R. Kippenhann & A. Weigert: Stellar Structure and Evolution, Springer, 1987
SUPPLEMENTARY LITERATURE Pralnik
EXAMINATION PROCEDURE: Oral exam + evaluation of seminars

Postgraduate Doctoral Study of Physics
COURSE: Galactic Dynamics
AUTHOR(S) OF COURSE PROGRAMME Dr. Željko Ivezić, assistant profesor, Astronomy Department, University of Washington, Seattle, USA
TEACHING TECHNIQUES: lectures + seminar
ECTS: 8
COURSE ACHIEVEMENTS The aim of the course is to give an overview of the potential theory, stellar kinematics (including Boltzmann and Jeans equations), dynamics of stellar systems; and the detailed analysis of the structure of our Galaxy Milky Way.
COURSE PROGRAMME 78. Potential theory: spherical, axi-symmetric, tri-axial systems 79. Stellar kinematics: orbits, integrals of motion, Jeans theorem, Boltzmann and Jeans equations, phase mixing 80. Dynamics of stellar systems: analytic models, stability, disks (spiral structure, bars, warps), slow processes (diffusion of orbits, Fokker-Planck equation, dynamic friction) 81. Milky Way Galaxy: structure, detailed analysis of kinematics and dynamics
STUDENTS' ACTIVITIES AND THEIR EVALUATION class attendance plus 1 seminar
OBLIGATORY LITERATURE J. Binney & S. Tremaine: Galactic Dynamics, Princeton University Press, 1987
SUPPLEMENTARY LITERATURE G. Bertin: Dynamics of Galaxies, Cambridge University Press, 2000
EXAMINATION PROCEDURE: Oral exam + evaluation of seminars

Postgraduate Doctoral Study of Physics
COURSE: Galactic Astronomy
AUTHOR(S) OF COURSE PROGRAMME Dr. Davor Krajnović, post-doc researcher, University of Oxford
TEACHING TECHNIQUES lectures + seminar
ECTS: 8
COURSE ACHIEVEMENTS The goal of the course is to present detail theory of the formation and evolution of galaxies. This approach would be based on the recent observational studies and theoretical modelling. In the series of the lectures terminolgy, observations and theory would be presented. It is planned that students present also 2 talks, and 1 paper on the recent and open problem in the galactic astronomy.
COURSE PROGRAMME 1) Introdutction to formation and evolution of the galaxies 2) Milky Way Galaxy (structure, characteristics, origin, interstellar matter, open and globular clusters) 3) Local Group of Galaxies (contents and methodology of research) 4) Nearby galaxies (properties of spiral galaxies, barred galaxies, eliptical galaxies, scalling relations, kinematics) 5) Dynamical models (stellar orbits, formation of spiral arms, bars, axisimmetric models, triaxial galaxies) 6) Stellar populations (metallicity and age of stras, star formation and relation to galaxy evolution) 7) Active galaxies (AGNs, type of activities, supermassive black holes) 8) Groups and clusters of galaxies (dependence of galaxy properties on its environment, distribution of galaxies on the large distances, structure of the Universe and cosmological models) 9) Theoretical approach and modelling of galaxy formation (N-body calculations, semi-analytical models, success and drawbacks of the models)
STUDENTS' ACTIVITIES AND THEIR EVALUATION class attendance, 2 seminars, 1 project
OBLIGATORY LITERATURE J. Binney & M. Merrifield: Galactic Astronomy, Princeton University Press, 1998
SUPPLEMENTARY LITERATURE J. Binney & S. Tremaine: Galactic Dynamics, Princeton University Press, 1987
EXAMINATION PROCEDURE: Oral exam + evaluation of seminars and project

Postgraduate Doctoral Study of Physics
COURSE: Solar Magnetohydrodinamics
AUTHOR(S) OF COURSE PROGRAMME: Dr. Bojan Vršnak, senior scientist, University of Zagreb, Faculty of Geodesy
TEACHING TECHNIQUES: lectures + seminar
ECTS: 8
COURSE ACHIEVEMEN: The aim of the course is introduction to magnetohydrodinamics and its application for understanding and investigation of the Sun. After description of solar global structure, attention would be given to solar activity and process in its photosphere, chromosphere and corona, and their influence on the Earth.
COURSE PROGRAMME: Introduction (a) Structure of the Sun, b) Solar activity, c) Solar-terrestrial physics) Basics of MHD approximations (a) MHD equations, and basic parameters, b) application on astrophysical conditions, c) MHD waves, shock waves, d) instabilities, e) magnetic reconections Solar MHD dinamo (a) differential rotation, (b) interactins of magnetic fields, convection, nad rotation, c) global system of electrical currents and storage of energy, d) Solar activity cycles Active regions (a) sunspots, b) corona Solar prominences (a) origin and structure, b) loss of stability, c) eruption process Eruptive processes (a) coronal mass ejection, b) solar flares, c) interrelations of CME and flares, d) gloabal shock waves Coronal holes and solar wind (a) Parker model of solar wind, b) magnetic field of heliosphere, c) geomagnetic stors, d) Forbush effect, e) Space weather
STUDENTS' ACTIVITIES AND THEIR EVALUATION: lecture attendance, seminars
OBLIGATORY LITERATURE: E. R. Priest: Solar Magnetohydrodynamics (Springer, 1984)
SUPPLEMENTARY LITERATURE: M. Aschwanden: Physics of the Solar Corona (Springer 2005) B. Vršnak: Temelji fizike plazme (Šk. knjiga, 1996)
EXAMINATION PROCEDURE: Oral exam + seminar

5. BIOPHYSICS

Postgraduate Doctoral Study of Physics
COURSE: Experimental methods in biophysics
AUTHORS OF COURSE PROGRAMME: Goran Baranović, Ruđer Bošković Institute, senior scientist Jasminka Brnjas-Kraljević, School of medicine Zagreb, full professor Marina Ilakovac-Kveder, Ruđer Bošković Institute, senior scientist Marija Luić, Ruđer Bošković Institute, senior scientist Boris Rakvin, Ruđer Bošković Institute, senior scientist Vesna Svetličić, Ruđer Bošković Institute, senior scientist Silvija Tomić, Institute of physics, senior scientist Anđelka Tonejc, PMF Zagreb, full professor Dražen Vikić-Topić, Ruđer Bošković Institute, senior scientist Igor Weber, Ruđer Bošković Institute, senior scientist Hrvoje Zorc, Ruđer Bošković Institute, senior research associate Saša Kazazić, Ruđer Bošković Institute, research associate Tomislav Vuletić, Institute of physics, research associate Zoran Štefanić, Ruđer Bošković Institute, senior assistant
TEACHING TECHNIQUES: Course programme is built up from a number of independent modules. Each module comprises of introductory theoretical lectures (6 hours), and of experimental work in a laboratory (10 hours). Therefore, the course material will be communicated predominantly through practical work and participation in the ongoing projects, and only to a lesser part ex catedra.
ECTS: Students choose 4 among 11 offered modules, and each module contributes 3 ECTS to the total of 12 ECTS for this course.
COURSE ACHIEVEMENTS: The goal of the course is to introduce students to a wide range of experimental physical methods used in biophysical research, and to offer them an opportunity to work in laboratories that routinely use these methods in their scientific research. Besides an immediate laboratory experience, students will gain direct insight into a range of research themes and activities of practicing biophysicists in Croatia.
COURSE PROGRAMME: EPR spectroscopy: Spin state manipulation. Basic relaxation theory. Paramagnetic centers and biophysics. NMR spectroscopy: Basics of one- and two-dimensional NMR spectroscopy. Multidimensional NMR spectroscopy of biosystems. NMR spectral parameters (chemical shifts, coupling constants and relaxation times) and molecular structure and conformation. Dipole-dipole interactions and nuclear Overhauser effect (NOE). Quantitative determination of NOE for conformational determination. Electron microscopy: The modern methods of examination of materials in an electron

microscope: Transmission electron microscopy (TEM) and selected area electron diffraction (SAED), High resolution electron microscopy (HRTEM), Convergent beam electron diffraction (CBED). The interpretation of the TEM and ED images of the polycrystalline, monocrystalline and amorphous samples. Scanning electron microscope (SEM), SEM for enviromental examination (ESEM), energy dispersive X-ray analyses (X-ray mapping); Exercises: Practical work in EM laboratory; the evaluation of TEM, HRTEM and ED images. The practical presentation of the methods working in the JEOL 200 kV EM. The HRTEM image processing analyses of some images and ED.
Light microscopy: Optics of the light microscope. Special methods of light microscopy. Microbiophotonics. Methods of digital image processing and analysis. Confocal scanning microscopy. Practical work with a confocal microscope.
Scanning probe microscopy: Atomic Force Microscopy belongs to the new generation of microscopic techniques which are known as Scanning Probe Microscopy (SPM). The concept on which all SPMs are based is the generation of images of surfaces by measuring the physical interaction between a sharp tip and the sample. AFM is non-destructive method which gives real three-dimensional image of the sample with a vertical resolution of 0.1 nm and lateral resolution down to 1 nm. It is suitable for investigating macromolecules, polymers, vesicles, liquid crystals, colloids, cells and cell organelles as well as abiotic particles in natural conditions i.e. in air and in fluid.
Vibrational spectroscopy: Electromagnetic radiation and its interaction with molecules. Absorption experiment in different spectral ranges. Light diffraction experiment. Vibrational spectroscopy. Biatomic molecules. Anharmonicity. Multiatomic molecules. Characteristic vibrations. Calculation of vibrational spectra by the methods of quantum chemistry and the use of computer program packages with analysis of calculation results.
Macromolecular crystallography: Determination of biological macromolecular 3D-structure based on X-ray diffraction experiments. An overview of modern microcrystallisation and data collection methods (using robotics and synchrotron radiation), structure solution and refinement methods, electron density map interpretation applying latest software.
Mass spectrometry: Principles, instrumentation and applications. Methods of ionization. Ionization of biopolymers: (i) ionization by electrospreading (ESI), (ii) matrix-supported laser desorption ionization (MALDI). Mass analyzers: sector (magnetic and electrostatic), quadrupole, Fourier transform ionic cyclotron resonance (FT ICR), with time of flight analysis (TOF). Analysis of mixtures (GC-MS, HPLC-MS). Tandem mass spectrometry (MS/MS, MSn). Methods of fragmentation (CID, IRMPD, ECD, ETD, EDD). Mechanisms of fragmentation. Interpretation of spectra. Structural analysis of proteins by mass spectrometry.
Dielectric spectroscopy: Dielectric spectroscopy in the 40 Hz to 100 MHz frequency range and its application in investigation of structures and interactions in polyelectrolytes. Polyelectrolytes (biopolymers in solutions; DNK as an example of a semi-stiff, strongly charged polymer); relation between dielectric properties and fundamental spatial scaling and exponential laws in diluted and semidiluted polyelectrolyte solutions.
Biophotonics: An overview of basic interactions of light with tissues will be given, with an emphasis on photobiology of tissues, and the optics of skin (2 hours). In the second part, attention will be given to photodynamic processes that include usage of natural and artificial photosensitisers, and the methods of photodynamic diagnostics and therapy (4 hours). Practical work will include optical spectroscopy of tissues in the laboratory, and clinical photodynamic diagnostics and therapy.
Fluorescence spectroscopy: Fluorescence emission. Quantum yield. Emission polarization.

Fluorophores.

STUDENTS' ACTIVITIES AND THEIR EVALUATION:
Attendance of lectures, laboratory practice, seminars, proposal of a research project.

OBLIGATORY LITERATURE:
EPR spectroscopy: A. Abragam, B. Bleany: Electron paramagentic resonance of transition ions, Clarendon press, Oxford, 1970
NMR spectroscopy: H. Friebolin: Basic One- and Two-Dimensional NMR Spectroscopy, Fourth Edition, Wiley-VCH, 2004; U. Holzgrabe, I. Wawer, B. Diehl: NMR Spectroscopy in Drug Development and Analysis, Wiley-VCH, 1999; R. R. Ernst, Angew. Chem. Int. Ed. Engl. 31, 805-823, 1992; H. Kessler, M. Gehrke, and C. Griesinfer, Chem. Int. Ed. Engl. 27, 490-536, 1988.
Electron microscopy: D.B. Williams and C.B. Carter, Transmission Electron Microscopy, A Textbook for Materials Science, Plenum Press, New York 1996.
Light microscopy: Douglas B. Murphy, Fundamentals of light microscopy and electronic imaging, Wiley-Liss, Inc., 2001.
Scanning probe microscopy: N.C. Santos, M.A.R.B. Castanho (2004). An overview of the biophysical applications of atomic force microscopy. Biophys Chem 107: 133-149.
Vibrational spectroscopy: J. M. Hollas: Modern spectroscopy, John Wiley & Sons, Chicester, 2004.
Macromolecular crystallography: Alexander McPherson, Introduction to Macromolecular Crystallography, John Wiley & Sons Inc., 2002.
Mass spectrometry: J. H. Gross "Mass Spectrometry: A Textbook", Springer, Berlin, 2004; I. A. Kaltashov and S. J. Eyles "Mass Spectrometry in Biophysics: Conformation and Dynamics of Biomolecules", John Wiley & Sons, 2005.
Dielectric spectroscopy: F.Bordi, C.Cametti and R.H.Colby, J.Phys.: Condens. Matter 16, R1423-R1463 (2004); T.Vuletić, T.Ivek and S.Tomić, Dielectric Spectroscopy Center – Manual.
Biophotonics: Paras N. Prasad:"Introduction to Biophotonics", Wiley 2003
Fluorescence spectroscopy: Joseph R. Lakowicz: Principles of fluorescence spectroscopy, Plenum Press, New York 1983

SUPPLEMENTARY LITERATURE:
NMR spectroscopy: S. Braun, H.-O. Kalinowski, S. Berger: 150 and More Basic NMR experiments - A practical Course, Wiley-VCH, 1998.
Mass spectrometry: M. L. Gross, R. Caprioli, "Encyclopedia of mass spectrometry" Elsevier, 2003; F. W. McLafferty and F. Turecek, "Interpretation of Mass Spectra", 4th edition, University Science Books, Mill Valley, CA, 1993.
Dielectric spectroscopy: A.V.Dobrynin and M.Rubinstein, Prog. Polym. Sci. 30, 1049-1118 (2005).
Light microscopy: Methods in Enzymology, Vols. 360-361, Biophotonics, G. Marriott and I. Parker, eds., Academic Press, 2003. (selected chapters); Methods in Enzymology, Vol. 307, Confocal Microscopy, P. Michael Conn, ed., Academic Press, 1999. (selected chapters)
Electron Microscopy: J.C.H. Spence: Experimental High-Resolution Electron Microscopy of Materials, Oxford University Press, Oxford, 1988; second edition 2003.

EXAMINATION PROCEDURE:
Instead of a final exam, candidates are supposed to give a seminar from a selected scientific area, and to propose a smaller research project that should include a literature survey from a selected field of investigation.

Postgraduate Doctoral Study of Physics
COURSE: Cell biophysics
AUTHOR OF COURSE PROGRAMME: Igor Weber, Ruđer Bošković Institute, scientific advisor
TEACHING TECHNIQUES (lectures+practice+seminar): 20L + 10P + 10S
ECTS: 8 ECTS
COURSE ACHIEVEMENTS: Introducing multidisciplinary approach to investigation of biological systems based on example of eukaryotic cell. Emphasis is put onto physical principles and research methods as a supplement to prevailing biochemical approaches to cell biology.
COURSE PROGRAMME: Supramolecular structure of eukaryotic cells. Dimensions and internal organization of cells and their compartments. Hierarchy of forces in the world of cells. Structure and function of the cytoskeleton. Viscoelastic properties of cells. Biological molecular motors, cell motility. Structure and dynamics of biomembranes. Mechanisms of transport across biomembranes. Mechanisms of transport inside the cytoplasm. Signaling pathways and transfer of information in the cell. Experimental methods in cell biophysics. Cytomics.
STUDENTS' ACTIVITIES AND THEIR EVALUATION: Lectures, colloquia and seminars.
OBLIGATORY LITERATURE: J. Howard, Mechanics of Motor Proteins and the Cytoskeleton, Sinauer Associates, 2001.
SUPPLEMENTARY LITERATURE: D. Boal, Mechanics of the Cell, Cambridge University Press, 2002.
EXAMINATION PROCEDURE: Oral and written examinations, compulsory seminars.

Postgraduate Doctoral Study of Physics
COURSE: Modelling of Biomacromolecules - Structure & Function
AUTHOR(S) OF COURSE PROGRAMME: Sanja Tomić, higher research associate, Ruđer Bošković Institute
TEACHING TECHNIQUES (lectures+practice+seminar): 15+3+9
ECTS: 6
COURSE ACHIEVEMENTS: Basic understanding of algorithms and techniques that are utilized for modelling of biomacromolecules. Awareness (knowledge) of the available 'state of the art' computational tools for modelling of biomacromolecules, and ability to easily gain additional knowledge that would enable them to use this methods.
COURSE PROGRAMME: Modelling of biomacromolecules has rapidly developed during the last three decades and has become very popular among bio scientist. During the course students will learn about the web databases of macromolecules and their ligands, force fields and techniques that are most commonly used in modelling of biomacromolecules. They will learn how to build macromolecular complexes and their mutants, how to recognize the active site and dock a substrate, parameterisation and optimisation of the molecules. How to model possible conformational changes of macromolecules and ligands using molecular mechanics, molecular dynamics, Monte Carlo based methods, normal modes analysis, essential dynamics and stochastic dynamics. They will become aware of importance of solvent and periodicity in simulation of biomolecules, approximations in approaches for binding free energy calculation (procedures used to estimate the electrostatic free energy, entropy of (de)solvatation, conformational/rotational entropy of the substrate and the amino acid residues in the protein active site). Methods used to calculate amino acid pKa in protein and Brown dynamics simulations of proteins preceding the complex formation will be also explained. On concrete examples students will learn about techniques and approaches that are used in 3D-QSAR (3-dimensional quantitative structure activity relationship) analysis. Interpretation of models predicting biological response and suggestions of the modification that would change this response. Finally they will become familiar with designing of virtual (in silico) experiment.
STUDENTS' ACTIVITIES AND THEIR EVALUATION: class attendance, small practical projects including 2-3 students, seminars
OBLIGATORY LITERATURE: Andrew R. Leach 'Molecular Modelling: Principles and Applications', 1998, Addison Wesley Longman Limited, Edinburgh Gate, Harlow, Essex, England Van Gunsteren W. F. , Weiner P. K., and Wilkinson A. J. (Eds) 'Computer Simulation of Biomolecular Systems', ESCOM, Dordrech 1997.
SUPPLEMENTARY LITERATURE: Van Gunsteren W. F., Klebe G. and Kubinyi H. '3D QSAR Methods in Drug Design', 'Molecular Modeling and Prediction of Bioactivity', 2000, Eds. Gundertofte K. and Jorgensen F. S. Plenum, Kluwer Academic/Plenum Publishers, New York. D.C. Raparot, 'The Art of Molecular Dynamics Simulations', 2005, Cambridge, University Press, UK + relevant publications in journals

EXAMINATION PROCEDURE: Final exam will consist from seminar work on selected topics including the most recent publications in scientific journals and of practical work on mini project.

Postgraduate Doctoral Study of Physics
COURSE: NEURODYNAMICS
AUTHOR(S) OF COURSE PROGRAMME Selma Supek, Assistant Professor, Department of Physics, Faculty of Science
TEACHING TECHNIQUES (lectures+practice+seminar): 15 + 5 + 10
ECTS: 6
COURSE ACHIEVEMENTS: The goal of the course is to introduce the students to the neurodynamic methods for functional brain imaging, their neurophysiological basis and the physical principles of the detection and the analysis methods as well as to the insights they could provide into the dynamics of the cognitive processes.
COURSE PROGRAMME: Cellular neurodynamics. Bioelectromagnetism. Electro- and magnetoencephalography (EEG, MEG) – measurements and experimental design. Transcranial magnetic stimulation (TMS). Cortical connectivity. Spatio-temporal source localization. Cortical oscillations. Multi-modal integration. Functional and retinotopic organization of the human visual cortex. Cognitive neurodynamics.
STUDENTS' ACTIVITIES AND THEIR EVALUATION: Lectures, seminars, projects
OBLIGATORY LITERATURE: Arthur W. Toga, John C. Mazziotta (Eds), Brain Mapping: The Methods, 2nd ed., Elsevier Science, 2002 Malmivuo J. and Plonsey R.: "Bioelectromagnetism: Principles and Applications of Bioelectric and Biomagnetic Fields", http://butler.cc.tut.fi/~malmivuo/bem/bembook/
SUPPLEMENTARY LITERATURE Selected recent review and research articles.
EXAMINATION PROCEDURE: Written exam, seminar and a written report

Postgraduate Doctoral Study of Physics
COURSE: Molecular biophysics
AUTHOR(S) OF COURSE PROGRAMME : Greta Pifat-Mrzljak, full professor, Ruđer Bošković Institute
TEACHING TECHNIQUES: 20 hours of lectures and 10 hours of seminars
ECTS: 6
COURSE ACHIEVEMENTS: The major aim of the course is to pursuit the strategy and tactics of theoretical and experimental research in the field of membrane biophysics with the emphasis on structure – function relationship of biological molecules using different biophysical methods and techniques. The main general knowledge presented will give an overview of the biological structures and intermolecular interactions and major biophysical methods to be used to study biological macromolecules. Specifically the students will be acquainted with the main biophysical techniques and methods to study the macromolecular conformations. The course will prepare the students to attend the International Summer School on Biophysics “Supramolecular Structure and Function” sponsored by IUPAB and UNESCO as “Master Classes of UNESCO”
COURSE PROGRAMME: Introduction to biophysical research; structure-function relationships of biological macromolecules: proteins, nucleic acids and supramolecular assemblies: membranes and lipoproteins,; thermodynamics of chemical and physical equilibrium in biological systems; interactions of macromolecules with ligands, basic biophysical techniques, optical (UV-VIS, IR) spectroscopies (NMR, ESR, fluorescence) circular dichroism, mass spectrometry, etc.
STUDENTS' ACTIVITIES AND THEIR EVALUATION: - lectures would be appreciated seminars will be given from each student based on search on internet of particular topic for which an initial paper will be given for theoretical exercises the homework will be used
OBLIGATORY LITERATURE: 1. T. F. Weiss, Cellular Biophysics, 1996 MIT, ISBN 0-262-23184-0 2. B. Alberts i suradnici, Molecular Biology of the Cell, 4th edition, New York: Garland Publishing, 2002 3. K.E.van Holde, W.C. Johnson, P.S.Ho: "Principles of Physical Chemistry", Prentice Hall, Upper Saddle River, USA, 1998. 4. F.Noll, R. Winter: "Methoden der Biophysikalischen Chemie", Springer, New York, 1998. 5. Bengt Nölting: "Methods in Modern Biophysics", Springer, New York, 2004. 6. Roland Glaser: "Biophyics", Springer, New York, 2004.
SUPPLEMENTARY LITERATURE: 1. D. Voet, J.G. Voet, "Biochemistry", J. Wiley, New York, 1995 2. T.F. Weiss: "Molecular Biophysics I, II", MIT Press, Cambridge, USA, 1996. 3. Peter Bergethon:"The Physical Basis of Biochemistry", The Foundation of Molecular Biophysics, Springer Verlag, New York, 2004. 4. Michel Daune, " Molecular Biophysics", Oxford Univ. Press, 1999.

EXAMINATION PROCEDURE: written exam with 4 numerical problems and 20 questions covering all topics followed by oral exam

Postgraduate Doctoral Study of Physics
COURSE: Higher order repeats in human genome
AUTHOR(S) OF COURSE PROGRAMME : Vladimir Paar,
TEACHING TECHNIQUES: 20 hours of lectures and 10 hours of seminars
ECTS: 6
COURSE ACHIEVEMENTS: Understanding and operational skills for identifying and analyzing higher order repeats in given genomic sequences
COURSE PROGRAMME: Repeats and higher order repeats in centromeric and pericentromeric regions. Identification of higher order repeats in NCBI assembly. Chromosome-specific and HOR-specific pattern in human genome. CENP-B box and pJalpha motif distributions in human genome. Various computational algorithms for treating HORs. Substitutions, additions and deletions in HOR structure. Polymorphism in HOR structure
STUDENTS' ACTIVITIES AND THEIR EVALUATION: Lectures, presentation of published articles, test computations
OBLIGATORY LITERATURE: 1. Robert H. Tamarin: “Principles of Genetics”, McGraw-Hill, 7th Edition 2001, ISBN: 0072334193 2. K. H. Andy Choo: “The Centromere”, Oxford University Press, Oxford 1997, ISBN: 019857780x 3. selected scientific papers
SUPPLEMENTARY LITERATURE: Selected scientific papers
EXAMINATION PROCEDURE: Exams, seminars

Postgraduate Doctoral Study of Physics
COURSE: Biophysics of membranes and lipoproteins
AUTHOR(S) OF COURSE PROGRAMME: Dubravka Krilov, PhD, Associate Professor, University of Zagreb Medical School
TEACHING TECHNIQUES: 30 hours of lectures + 15 hours of seminars
ECTS: 10
COURSE ACHIEVEMENTS: To get acquainted the student with the structural properties of supramolecular associations of lipids and proteins, and the physical basis of their dynamics and biological functions. The student has to learn the biophysical methods which give the information about the conformations of such complexes. It is necessary to get the knowledge about the building and use of models which are important for the study of particular interactions - models of membrane lipid bilayer, membrane channels, transport of particles and ions through membranes, structural models of lipoprotein classes, lipoprotein oxidation and other interactions of these particles with specific molecules.
COURSE PROGRAMME: Macromolecular associations. Lipid in biological membranes and plasma lipoproteins. Proteins in biological membranes and plasma lipoproteins. Interaction of lipids and proteins in complexes. Structure and dynamics of lipid bilayer: arrangement of bilayer, phases and phase transitions. Forces in lipid bilayer and its elastic properties. Transport of molecules through the membrane: diffusion and osmosis. Electrical properties of membrane. Transport of ions through the membrane (passive and active transport). Action potential and transfer of impulse: Huxley-Hodgkin model, saltatory conduction of neurons and voltage gated ionic channels. Plasma lipoproteins: classification, organization, molecular composition, physiological role. Structure and dynamics of low-density lipoproteins (LDL). The binding of LDL with receptors and ions. Structure of high-density lipoproteins (HDL) and molecular mechanisms of their protective effect in suppression of the development of atherosclerosis.
STUDENTS' ACTIVITIES AND THEIR EVALUATION: It is expected that the students independently elaborate and present one seminar at their choice from the list of topics; there will be a short written quiz after each topic; the grades from quizzes and seminar and the activity at the seminars will be taken into account for the final grade of the course.
OBLIGATORY LITERATURE: In the library of Physics and Biophysics department in Medical School: T.F. Weiss: Cellular Biophysics Vol. I and II, The MIT Press, Cambridge MA, 1996. B. Alberts, D. Bray, J. Lewis, M. Raff, K. Roberts and J.D. Watson: Molecular Biology of the Cell, Garland, New York, 1994. R.B. Gennis: Biomembranes, Springer, Berlin, 1989.

C.R. Cantor and P.R. Schimmel: Biophysical Chemistry Vol. I and III, W.H. Freeman, New York , 1980. G. Cevc and D. Marsh: Phospholipid Bilayers, Wiley-Interscience, New York, 1987. A.M. Gotto (Ed.): Plasma Lipoproteins, Elsevier, Amsterdam, 1987.
SUPPLEMENTARY LITERATURE: in the library of Physics and Biophysics department in Medical School P.W. Atkins: Molecular Quantum Mechanics, Second edition, Oxford University Press, Oxford, 1993. K. Sneppen and G. Zocchi: Physics in Molecular Biology, Cambridge University Press, Cambridge, 2005. R. Cotterill: Biophysics, An Introduction: J. Wiley & Sons, Chichester, 2002.
EXAMINATION PROCEDURE: oral exam

Postgraduate Doctoral Study of Physics
COURSE: General biophysics
AUTHOR(S) OF COURSE PROGRAMME: Jasminka Brnjas-Kraljević, PhD, Associate Professor and Dubravka Krilov, PhD, Associate Professor, University of Zagreb Medical School
TEACHING TECHNIQUES: 20 hours of lectures + 10 hours of seminars
ECTS: 10
COURSE ACHIEVEMENTS: To get acquainted the student with the intermolecular interactions and their role in building the specific structure of biological macromolecules and supramolecular associations. Student has to understand the physical processes that are the basis of the dynamics, conformational changes and mutual interactions of biological macromolecules, their bonding to larger structures, and signal transfer in biological systems. Student has to get the knowledge about the theory of experimental biophysical methods for the research of the structure and dynamics of biological macromolecules, as well as the special techniques for novel area of single molecule biophysics.
COURSE PROGRAMME: Intermolecular interactions: Van der Waals's forces, hydrogen bond, hydrophobic interactions, ionic bridges. Structure of biological macromolecules. Physics of water and hydration layer. The role of intermolecular interactions and thermodynamics in building the tertiary and quaternary structure of biological macromolecules. Dynamic of biological macromolecules: conformational changes, phase transitions, mutual interactions of biological macromolecules, bonding with ligands, receptors, substrates, signal transfer. Physical description of supramolecular associations of proteins, nucleic acids, lipids and polysaccharides. Molecular interactions that are the basis for the investigation of structure and dynamics of biological macromolecules. Novel methods for the manipulation with single molecules. Molecular motors.
STUDENTS' ACTIVITIES AND THEIR EVALUATION: It is expected that the students independently elaborate and present one seminar at their choice from the list of topics; there will be a short written quiz after each topic; the grades from quizzes and seminar and the activity at the seminars will be taken into account for the final grade of the course.
OBLIGATORY LITERATURE: In the library of Physics and Biophysics department in Medical School: T.F. Weiss: Cellular Biophysics Vol. I and II, The MIT Press, Cambridge MA, 1996. B. Alberts, D. Bray, J. Lewis, M. Raff, K. Roberts and J.D. Watson: Molecular Biology of the Cell, Garland, New York, 1994. C.R. Cantor and P.R. Schimmel: Biophysical Chemistry Vol. I and III, W.H. Freeman, New York , 1980. P.W. Atkins: Molecular Quantum Mechanics, Second edition, Oxford University Press,

Oxford, 1993. R. Glaser: Biophysics, Springer, New York, 2004.
SUPPLEMENTARY LITERATURE: in the library of Physics and Biophysics department in Medical School K. Sneppen and G. Zocchi: Physics in Molecular Biology, Cambridge University Press, Cambridge, 2005. R. Cotterill: Biophysics, An Introduction: J. Wiley & Sons, Chichester, 2002. W. Hoppe, W. Lohmann, H. Markl, H. Ziegler, "Biophysics" ed., Springer Verlag, Berlin, 1983
EXAMINATION PROCEDURE: oral exam

Postgraduate Doctoral Study of Physics
COURSE: MAGNETIC TOMOGRAPHY
AUTHOR(S) OF COURSE PROGRAMME: prof.dr.sc. Jasminka Brnjas-Kraljević; University of Zagreb, School of Medicine
TEACHING TECHNIQUES:lectures: 15 + seminars: 15
ECTS: 6
COURSE ACHIEVEMENTS: Magnetic resonance as the diagnostic method is very complex in medical application and even more in understanding and interpretation of the results. Therefore in medical teams there should be always present a physicist who is expert in MR principles and can search for optimal measurement conditions. He should be trained to discuss the MR images with physicians.
COURSE PROGRAMME: Basic principals of magnetic spectroscopy. Energy levels and resonance conditions for the nucleus with spin in steady magnetic field. Chemical shift, parameter for molecular architecture differentiation. Relaxation processes and the dynamics of the molecules. Bloch relations. Characteristic relaxation times: T1 and T2. Magnetic properties of tissues – foundation for magnetic measurements application in biology. Chemical shift and relaxation times as parameters for tissue differentiation. Tomographic shooting – field gradient, how to chose the tom. Magnetic field gradients for determination of phase and frequency differences in resonance and relaxation processes. Time diagram of pulse sequences for different imaging methods: spin echo, IR (inverse recovery). Resolution methods and the contrast on the image. Exercises in signal processing.
STUDENTS' ACTIVITIES AND THEIR EVALUATION: Each student is expected to prepare and give a seminar talk in front of broad audience; as to be exposed to various questions.
OBLIGATORY LITERATURE: 1. Joseph P. Hornak, 1996-2006. http://www.cis.rit.edu/htbooks/mri/index.html 2. M.A.Foster: Magnetic Resonance in Medicine and Biology; Pergamon Press Ltd. Headington Hill Hall Oxford OX3 0BW, England, 3rd ed. 2000, 3. D.G.Gadian: NMR and its Applications to living Systems; Oxford University Press, Walton Street, Oxford OX2 6DP Oxford, NY, Tokyo 1996 4. K.K.Shung, M.B. Smith, B.M.W. Tsui: Principles of Medical Imaging; Academic Press Inc. San Diego, NY, Boston... 1992
SUPPLEMENTARY LITERATURE: The original papers will be handed to the students for their seminars and homework.
EXAMINATION PROCEDURE: the oral exam; seminar is included

Postgraduate Doctoral Study of Physics
COURSE: Bioinformatics, Biophysics and Bioenergetics of Membrane Proteins
AUTHOR OF COURSE PROGRAMME: Davor Juretić, University of Split, full professor
TEACHING TECHNIQUES: Lectures: 20 hours; Seminars: 5 hours; Numerical exercises: 10 hours; Preparations for lectures, seminars, computer exercises and for exam: 80 hours
ECTS: 8 ECTS
COURSE ACHIEVEMENTS: After finishing this course students should be able to recognize structure-function connection in integral membrane proteins of major importance for higher life forms.
COURSE PROGRAMME: Diversity and importance of membrane proteins. Practical approach to bioinformatics of membrane proteins. SPLIT and GARLIC as examples. Predicting two-dimensional topology of integral membrane proteins. How to use evolutionary information to improve 2D and 3D prediction. Examples of structural motifs important for membrane protein function. Using Terrel Hill's diagram method to model catalytic cycling of membrane channels and transporters. Information entropy, entropy production and efficiency associated with steady state kinetics of membrane proteins acting as molecular motors (nanomachines). Examples how membrane proteins are creating and using proton-motive force during photosynthesis, respiration, and cell-cell communication. Expression in different organs and interaction with drugs. Membrane proteins and genetic diseases.
STUDENTS' ACTIVITIES AND THEIR EVALUATION: Lectures, seminars, exercises and computer exercises.
OBLIGATORY LITERATURE: Juretić, D.: "Bioenergetika – rad membranskih proteina." Informator. Zagreb, 1997. Glaser, R. "Biophysics". Springer-Verlag, Berlin, 2001. D.C. Nicholls i S.J. Ferguson, "Bioenergetics3", Academic Press, Amsterdam 2001. Lesk Arthur, M.: "Introduction to Bioinformatics", Oxford Univ. Press. 2002.
SUPPLEMENTARY LITERATURE: F. M. Ashcroft: Ion Channels and Disease. Channelopathies". Acad. Press, London, 2000. Hill, T.L. Free "Energy Transduction in Biology", Academic Press, New York 1977.
EXAMINATION PROCEDURE: Oral and written exam.

Postgraduate Doctoral Study of Physics
COURSE: Introduction to physics of soft and biological systems
AUTHOR(S) OF COURSE PROGRAMME: Ana Smith
TEACHING TECHNIQUES: Lectures 30 hours, exercises 10 hours, seminars 5 hours
ECTS : 10
COURSE ACHIEVEMENTS: This course provides an overview of theoretical concepts used to study biologically relevant systems. However, strong connection with experimental science is provided. Students should have a background in statistical and quantum mechanics. Familiarity with biological concepts beyond the high school level is not assumed.
COURSE PROGRAMME: Introduction. Models for diluted systems: Pair interactions. Van der Waals equation of state. Phase diagrams for hard spheres and Lennard-Jonnes fluids. Colloid suspensions. Polymers as flexible strings. Semiflexible polymers: DNA and actin filaments. Polymer networks: examples of the extracellular matrix and the cytoskeleton. Fluid membranes as flexible surfaces. Vesicles as cell models. Interfaces under tension. Adsorption, adhesion and wetting phenomena. Hydrodynamics: Life at low Reynolds-number. Directed transport: Molecular motors. Stochastic dynamics in biology Practical sections of the course will involve (i) exercise classes where the main calculation methods will be demostrated, (ii) discussions on relevant experimental techniques to measure different phenomena.
STUDENTS' ACTIVITIES AND THEIR EVALUATION: Oral examination and presentation of a seminar Lecturer:
OBLIGATORY LITERATURE: 1. F. Reif: Fundamentals of statistical and thermal physics, McGraw Hill, Boston 2. P. G. de Gennes: Scaling concepts in polymer physics, Cornell University Press, Cornell 3. R. Lipowsky and E. Sackmann, Eds.: Structure and Dynamics of Membranes, Elsavier, Amsterdam 4. S. A. Safran: Statistical thermodynamics of surfaces, interfaces and membranes, Addison-Wesley, Reading 5. D.F. Evans and H. Wennerstroem: The colloidal domain: where physics, chemistry and biology meet, 2nd edition, Wiley.
SUPPLEMENTARY LITERATURE: During the course, and especially for seminar work by students original scientific papers will be usedtoo.
EXAMINATION PROCEDURE: Oral and written exam.

6. MEDICAL PHYSICS

Postgraduate Doctoral Study of Physics
COURSE: Physics of Nuclear Medicine
AUTHOR(S) OF COURSE PROGRAMME: Srećko Lončarić, Ph.D. Associate professor at Faculty of Natural Sciences, Scientific collaborator at Medical School. Head of Polyclinical Section of Biophysics in Clinical Department of Nuclear Medicine and Radiation Protection of Medical School and KBC-Zagreb.
TEACHING TECHNIQUES: 30 + 15 + 0
ECTS: 7
COURSE ACHIEVEMENTS: The aim of the course is to deliver to the student the thorough knowledge and understanding of the principles, procedures and instruments used in the field of nuclear medicine. After the course completion the student should be familiar to and be able to use nuclear medicine instruments, understand and perform their quality control, and analyze and interpret the data obtained with this diagnostic modality.
COURSE PROGRAMME: Diagnostic process in nuclear medicine: markers, radiopharmaceuticals, and isotope production. Detector systems: for external measurements, for liquid sample measurements, for imaging of radioisotope distributions (scanner, gamma camera, emission computerized tomography, etc.), whole body counters and semiconductor detectors. Quality control: of instruments, of radiopharmaceuticals and of procedures. Imaging of various organs: thyroid, liver, spleen, heart, brain, kidneys, bones, etc. Analysis of kinetics of biological systems: mathematic modeling of the physiological processes within the human body, methods of compartmental analysis, circulations, deconvolution, clearance, etc. Data analysis in nuclear medicine: in vitro and in vivo (quantitative imaging in nuclear medicine), numerical image processing, image filtering, analysis of compound spectra and quantification of internal contamination.
STUDENTS' ACTIVITIES AND THEIR EVALUATION: Several visits to a nuclear medicine department will be organized in order to show the students practical work with gamma cameras and other instruments, as well as clinical patient data analysis.
OBLIGATORY LITERATURE: Cherry S.R., Sorenson J.A., Phelps M.E.: Physics in Nuclear Medicine, Saunders, 3rd, 2003.
SUPPLEMENTARY LITERATURE: Bushberg J.T., Seibert J.A., Leidholdt E.M.Jr., Boone J.M.: The Essential Physics of Medical Imaging. Williams & Wilkins, Baltimore, 1994. Chandra, Introductory Physics in Nuclear Medicine. Lea & Febinger, Philadephia, 1992. Freeman, L.M. (editor), Freeman and Johnson's Clinical Radionuclide Imaging (Vol 1-3).

Grune & Straton, New York, 1986.
EXAMINATION PROCEDURE: Oral exam.

Postgraduate Doctoral Study of Physics
COURSE: Physics of radiology, radiotherapy and dosimetry
AUTHOR OF COURSE PROGRAMME : Prof. dr. sc. Mladen Vrtar, Associate professor and Head of the Postgaduate Doctoral Study of Medical Physics at Physics department of the Faculty of Natural Sciences. Head of the Radiophysics department, Clinic of oncology, Univ. Hospital Center Zagreb.
TEACHING TECHNIQUES: lectures + practice , 30+15+0
ECTS: 7 ECTS
COURSE ACHIEVEMENTS The aim of the course is to accept the specific knowledge and competitions in specialized techniques of radiology and radiotherapy, like dosimetry, irradiation planning and taking care of irradiation equipment parameters in the frame of EFOMPO, ESTRO and IAEA recommendations. It is expected that the candidate should be able to take the responsibility and act individually in the field of application of physics in radiology and radiotherapy.
COURSE PROGRAMME Production and properties of ionising radiation. Interaction of matter and radiation: photon beam, kerm, energy fluence, attenuation coefficient, energy transfer coefficient, energy absorption coefficient, bremsstrahlung, exposure, absorbed dose. Units in dosimetry and radiation protection. Clinical radiation generators: diagnostic x-ray tube, radio nuclides in nuclear medicine, kilovoltage units for radiotherapy, superficial, ortovoltage and supervoltage therapy, x and electron beam radiotherapy, linear accelerator, betatron, telecobalt unit, radio nuclide therapy, application of heavy particle beams in therapy: neutron generators, proton and heavy ions generators, quality of x-rays, measurement of radiation and detectors, Bragg-Grey cavity theory, ionization chamber theory, dosimetric protocols in absorbed dose determination (IAEA, AAMP), dosimetry and calibration of photon and electron beams, treatment planning, measurement of radiation in phantoms and system of dosimetric calculation for patients, empirical dosimetric functions, isodose curves and carts, obliquity and tissue inhomogeneity corrections, standard and total body irradiation dosimetry, electron beams in radiotherapy, brachytherapy, quality assurance in diagnostic and radiotherapy.
STUDENTS' ACTIVITIES AND THEIR EVALUATION: Class attendance, seminars, demonstrations of measurements and specialized irradiation techniques in clinical hospitals.
OBLIGATORY LITERATURE : For subjects: Physics in radiology and radiotherapy Dosimetry and radiation protection in medical physics _____ — 1. M. Vrtar : Temeljni principi dozimetrije (skripta) 2. Ervin B. Podgoršak: Review of Radiation Oncology Physics: A Handbook for Teachers and StudentsEducational reports series (May 1, 2003) IAEA Vienna, Austria, May 2003 Adresa na web-u: http://www-naweb.iaea.org/nahu/dmrp/pdf_files/ToC.pdf

/Chapter1.pdf " /Chapter2.pdf Radiološka i radioterapijska fizika " /Chapter6.pdf Dozimetrija i ZAŠTITA OD ZRAČENJA /Chapter16.pdf (vidi predmet pod tim naslovom) 3. Technical Reports Series No. 398 (IAEA): Absorbed Dose Determination in External Beam Radiotherapy IAEA, Vienna, Austria, 2000 http://www-pub.iaea.org/MTCD/publications/PDF/TRS398_scr.pdf
SUPPLEMENTARY LITERATURE : Ervin B. Podgoršak: Review of Radiation Oncology Physics (other chapters not included in obligatory literature, see above) F.M. KHAN: The Physics of Radiation Therapy Williams & Wilkins, Baltimore, Maryland, USA, 1994.
EXAMINATION PROCEDURE: oral

Postgraduate Doctoral Study of Physics

COURSE: Physics and technology of medical ultrasound

AUTHOR(S) OF COURSE PROGRAMME:
Branko Breyer, Ph.D., research adviser in retirement, University of Zagreb
Gordana Žauhar, Ph.D., assistant professor, School of Medicine, University of Rijeka

TEACHING TECHNIQUES: lectures + practice

ECTS: 7

COURSE ACHIEVEMENTS: Aim of the course is to give a comprehensive overview of techniques and physical principles which are used in medical application of ultrasound. To develop understanding of medical ultrasound methods and analyses of data obtained in measurements and development of ability to perform calculations of simple numerical problems in acoustic.

COURSE PROGRAMME: Ultrasound waves, plane wave, spherical wave, ultrasound beam. Reflection, scattering, refraction in media and their boundaries. Intensity and energy of ultrasound waves. Amplitude and phase spectra of ultrasound pulses. Forces in media and upon reflectors. Radiation impedance. Generation of ultrasound waves, piezoelectric effect, composite transducers and arrays. Echoscopes; function, resolution. Ultrasound marking, transponders. Doppler effect for plane wave and for beams. Velocity measurement using Doppler effect. Sampling theorem and consequences for measurement accuracy. Non-Doppler velocity measurement. Therapy ultrasound, high intensities and their application. Measurement of ultrasound fields, hydrophones, ultrasound balances, safety of ultrasound.

STUDENTS' ACTIVITIES AND THEIR EVALUATION: The student is required to perform calculations of one numerical problems of acoustic and his written report is evaluated before he could applies for exam.

OBLIGATORY LITERATURE :

82. B. Breyer, Medicinski dijagnostički ultrazvuk, Školska knjiga, Zagreb, 1991.
83. C.R. Hill, Physical Principles of Medical Ultrasonics, John Wiley & Sons, Chichester, 2004.
84. W. W. Seto, Theory and problems of acoustics, Mc Graw Hill, 1971.

SUPPLEMENTARY LITERATURE:

85. P. Fish, Physics and Instrumentation of Diagnostic Medical Ultrasound, Wiley & Sons, John, Incorpotrated, 1996.
86. J. F. Greenleaf, Tissue Characterization with Ultrasound, Vol.1: Methods CRC Press, 1986
87. Shung, K. Kirk, Ultrasonic Scattering in Biological Tissues, CRC Press, 1992
88. J. A. Zagzebski, Essentials of Ultrsound Physics Churchill Livingstone, 1993
89. C. M. Ziskin & P. A. Levin, Ultrasonic Exposimetry, CRC Press, 1992
90. P. M. Morse, Theoretical acoustics, Mc Graw Hill, 1968
91. Duck F.A., Physical Properties of Tissue (a comprehensive reference book), Academic Press, 1990
92. T.F. Hueter and R.H.Bolt: Sonics, John Wiley & Sons, New York, 1955.
93. Suslick K.S. (Ed.), Ultrasound, Its Chemical, Physical and Biological Effects, VCH

Publishers, Inc., 1988
94. F.A. Duck, A.C. Baker, H.C.Starritt, Ultrasound in Medicine, IOP Publishing Ltd, 1998

EXAMINATION PROCEDURE:
Knowledge of course Physics and technology of medical ultrasound is checked by oral examination.

Postgraduate Doctoral Study of Physics
COURSE: Methods of Tomographic Reconstruction in Medicine
AUTHOR(S) OF COURSE PROGRAMME: Srećko Lončarić, Ph.D. Associate professor at Faculty of Natural Sciences, Scientific collaborator at Medical School. Head of Polyclinical Section of Biophysics in Clinical Department of Nuclear Medicine and Radiation Protection of Medical School and KBC-Zagreb.
TEACHING TECHNIQUES: 20 + 15 + 0
ECTS: 5
COURSE ACHIEVEMENTS: The aim of the course is to deliver to the student the thorough knowledge and understanding of the principles, procedures and instruments used in the field of computed tomography. After the course completion the student should be familiar to and be able to use SPECT and PET instruments, understand and perform their quality control, and analyze and interpret the data obtained with this diagnostic modality. Students should be able to understand and develop their own reconstruction programs.
Course Programme: Introductory and historical overview of tomographic applications in medicine, science and technology. (radio-astronomy, longitudinal tomography, electron microscopy, ECT, SPECT, PET, NMR, ultrasound, light-source, coded-aperture, etc.) Artifacts and physical factors affecting image quality: attenuation and scattering of radiation, depth dependent resolution. Basics of signal theory and discrete Fourier transformation. Convolution and deconvolution. Basic theorems. Radon transform. Methods of tomographic reconstruction: analytical, algebraic/iterative, statistical. Filtered backprojection algorithm for various geometries: parallel-beam, fan-beam, cone-beam. Characteristics and selection of various reconstruction filters. Methods of attenuation correction and resolution recovery. Application and importance of computer simulations of tomographic acquisitions. Analytical and anthropomorphic phantoms. Maximum-likelihood iterative reconstruction.
STUDENTS' ACTIVITIES AND THEIR EVALUATION: Several visits to a nuclear medicine department will be organized in order to show the students practical work with SPECT and PET gamma cameras, tomographic reconstruction and attenuation correction, as well as clinical patient data analysis.
Obligatory Literature: Kak A.C. and Slaney M.: Principles of Computerized Tomographic Imaging. IEEE Press, New York, 1988.
Supplementary Literature: Cherry S.R., Sorenson J.A., Phelps M.E.: Physics in Nuclear Medicine, Saunders, 3rd, 2003. Bracewell R.N.: The Fourier Transform and Its Applications. Mcgraw-Hill, New York, 1986. Bushberg J.T., Seibert J.A., Leidholdt E.M.Jr., Boone J.M.: The Essential Physics of Medical Imaging. Williams & Wilkins, Baltimore, 1994. Herman G.T. (Editor): Image Reconstruction from Projections. Springer-Verlag, Berlin, 1979.

Brooks R.A. and DiChiro G.: Principles of Computer Assisted Tomography (CAT) in Radiographic and Radioisotope Imaging. Phys. Med. Biol., 21, 689, 1976.
EXAMINATION PROCEDURE: Oral exam.

Postgraduate Doctoral Study of Physics
COURSE: Biomedical Electronics and Instrumentation
AUTHOR(S) OF COURSE PROGRAM: Prof. Dr. Sc. S. Tonković, full professor, Department of Electrical Engineering and Computing, University of Zagreb
TEACHING TECHNIQUES: Lectures combined with some laboratory presentations and consultations.
ECTS: 5 ECTS units
COURSE ACHIEVEMENTS: The aim is tp get the students acquainted with the principles of work medical electronic instrumentation for diagnosis establishment and about quantities which are measured, their origin and location. Also the equipments with two-dimensional display will be described.
COURSE PROGRAMME: Measuring channel. The main parameters of measuring amplifiers. Differential and floating amplifiers in rejection of common-mode voltages. Indicators. Liquid crystal display (LCD). Analog to digital conversion. Multiplexers. Bioelectrical signals. Action potentials. Waveforms and voltage parameter measurements of: heart, brain, muscles and eyes. Electrodes. Equipment for biopotential measurements: EKG (electrocardiograph), EEG (elektroencephalograph), EMG (electromyograph), ENG (electronystagmograph) and polygraphs. Devices for measurement bioimpedance's, impedance plethysmography. Measurements of evoked potentials. Biopotential averaging. Equipotential mapping. Measurement of nonelectrical quantities: blood pressure and flow, respiration. Electrical stimulation of: heart, skeletal muscles, nerves, urinary bladder. Heart electrostimulators (pacemakers). Defibrillators. Description of equipment's for computerized tomography (CT), nuclear magnetic resonance (NMR), single photon emission computerized tomography (SPECT), positron emission tomography (PET), impedance tomography (EIT). Scanners and gamma cameras. Infrared thermography.
STUDENTS' ACTIVITIES AND THEIR EVALUATION: Obligatory class attendance, consultations and some homework if will be necessary.
OBLIGATORY LITERATURE: 1. Ante Šantić: "Biomedicinska elektronika." Školska knjiga. Zagreb. 1995. pp. 382. 2. Ante Šantić: "Elektronička instrumentacija." Školska knjiga. Zagreb. 1993. 3rd. extended edition. pp. 432.
SUPPLEMENTARY LITERATURE : 1. J. G. Webster: "Medical Instrumentation. Application and Design." 1998. Copyright. John Wiley & Sons. Inc. pp. 691. 2. Steve Webb: "The Physics of Medical Imaging." Institut of Physics Publishing. Bristol and Philadelphia. Reprinted 1998. pp. 631. 3. C-N CHen and D.I.Hoult: "Biomedical Magnetic Resonance Technology". Adam Higler. Bristol, New York 1989. pp. 340.
EXAMINATION PROCEDURE: Oral examination

Postgraduate Doctoral Study of Physics

COURSE: Radiological anatomy

AUTHOR(S) OF COURSE PROGRAMME:
Ranka Štern Padovan, MD, PhD, Radiologist, Head of the Department of Diagnostic and Interventional Radiology, University Hospital Center Zagreb, Associate Professor at Medical School, University of Zagreb, Kispaticeva 12, 10000 Zagreb, Croatia

TEACHING TECHNIQUES: lectures 15 Hr/Yr, practice 15 Hr/Yr

ECTS: 3

COURSE ACHIEVEMENTS:
Aim of the course is gaining knowledge base and skills in radiological morphology as well as topographic and functional anatomy. Special emphasis will be put on advanced imaging techniques (ultrasound, computed tomography, magnetic resonance imaging, positron emission tomography) and image postprocessing. Comparison of anatomic details on different imaging modalities will be exercised.

COURSE PROGRAMME:

23. Basic physics and operational principals of conventional and advanced imaging techniques (ultrasound, computed tomography, magnetic resonance imaging, positron emission tomography)
24. General radiological anatomy
25. Topographic anatomy
26. Modality specific radiological anatomy
27. Functional imaging
28. Principals and methods of image postprocessing
29. Comparison of radiological anatomy on different imaging modalities
30. Basic physiologic and pathologic conditions on different imaging modalities

STUDENTS' ACTIVITIES AND THEIR EVALUATION:
class attendance, exercises in image interpretation, seminars, written assay

OBLIGATORY LITERATURE:

95. Weir J. Imaging Atlas of Human Anatomy (3rd edition), Mosby 2003.
96. Haaga JR. CT and MR Imaging of the Whole Body (Vol I-II, 4th edition), Mosby 2002.
97. Sutton D. A Text book of Radiology and Imaging (Vol I-II, 7th edition), Churchill - Livingston 2004.

SUPPLEMENTARY LITERATURE:

98. Bilić i sur., Ultrazvuk u gastroenterologiji, Medicinska knjiga, Zagreb, 1997.
99. Krmpotić-Nemanić J. Anatomija čovjeka, Medicinska naklada, Zagreb 1977.

EXAMINATION PROCEDURE:
Written assay on topic of choice and discussion

Postgraduate Doctoral Study of Physics

COURSE: MATHEMATICAL MODELING AND NUMERICAL METHODS

AUTHOR(S) OF COURSE PROGRAMME: Prof. dr. sc. Dario Vretenar, Faculty of Natural Sciences and Mathematics, University of Zagreb, Zagreb, Croatia

TEACHING TECHNIQUES : lectures +exercises +seminars

ECTS: 7

COURSE ACHIEVEMENTS:

The goal is to instruct students how to effectively use numerical techniques and computers in modeling various physical systems. The emphasis is on a series of projects that the student should be able to carry out with minimal help from the instructor. Each project consists in modeling and solving numerically on a computer a physical problem that the student had already encountered in courses on classical mechanics, quantum physics, and statistical physics. This should also lead to a better understanding of the various physical concepts introduced in specialized graduate courses.

COURSE PROGRAMME:

Basic mathematical operations (root finding, numerical derivatives and integration of functions).
Ordinary differential equations (Adams method, Runge-Kutta methods, program packages for integration of ordinary differential equations: RKSUIT i VODE).
Boundary value problems (the 'shooting' method, relaxation methods).
Gaussian quadratures and special functions (Gaussian quadrature and orthogonal polynomials, Bessel functions, modified Bessel functions, spherical Bessel functions, spherical harmonics).
Matrices and vectors (solution of systems of equations, eigenvalue problems).
Elliptic and parabolic partial differential equations (boundary value problems, initial value problems).
Monte Carlo methods.
Minimization or maximization of functions (minimum and/or maximum of a function of one or more variables, program packages: MINUIT).
Fourier transforms (Fast Fourier transform, spectral applications).
Mathematical modeling as a process of creating a mathematical representation of some physical phenomenon. (Identification of the problem, variables and parameters. Basic assumptions. Mathematical representation. Simple models. Veryfing and refining a model.)

STUDENTS' ACTIVITIES AND THEIR EVALUATION:
homework assignments and projects.

OBLIGATORY LITERATURE :

J. Stoer, R. Bulirsch: Introduction to Numerical Analysis, Springer-Verlag, 2002.
W.H. Press, S.A. Teukolsky, W.T. Vetterling, B.P. Flannery: Numerical Recipes, The Art of Scientific Computing, Cambridge University Press, 2002.
S.S.M. Wong: Computational Methods in Physics and Engineering, World Scientific, 1997.

4. N. Gershenfel: The Nature of Mathematical Modeling, Cambridge University Press, 2001.
SUPPLEMENTARY LITERATURE: Neil Gershenfeld, "The Nature of Mathematical Modelling", Cambridge Univ. Press.
EXAMINATION PROCEDURE: Several projects must be carried out (modeling a given physical problem, numerical solution, implementation in a computer code, evaluation of results). Homework problems and projects are graded.

Postgraduate Doctoral Study of Physics
COURSE: Radiation protection in medical physics
AUTHOR(S) OF COURSE PROGRAMME Prof. Dr. sc. Mladen Vrtar, (see the details of subject : Physics of Radiology and Radiotherapy) Doc. Dr. sc. Srećko Lončarić (see the details of subject: Physics of Nuclear Medicine)
TEACHING TECHNIQUES (lectures+practice+seminar): 20+15+0
ECTS: 5
COURSE ACHIEVEMENTS: (see the aim of the course and development of general and specific competitions of subjects: Physics of Radiology and Radiotherapy and Physics of Nuclear Medicine)
COURSE PROGRAMME: Different types of interaction of ionizing radiation and matter. Exposure of ionizing radiation. Irradiation quality. Half value layer. Types of detectors: ionization chamber, thermoluminescent detector, semiconductor detector, chemical and film detector. Calibration of detectors. Dosimetric protocols. Radiation field analysis by phantoms. Radiological units and dose calculation of external x and electron radiation. Range of the heavy ionizing particles. The calculation of protective barriers for different types of primary and scattered radiation. The biological effects of radiation. Maximal permissible doses for professional workers and public. Quality control in dosimetry. Principles and methods of internal dosimetry. Dose assessment in applications of open radiation sources – MIRD methods and models. Methods of biological dosimetry – cytogenetic and hematologic techniques for dose assessment. Nuclear spectroscopy. Computer programs for calculation of absorbed doses delivered by radionuclide intake. Nuclear accidents. External contamination and methods of decontamination. Internal contamination and methods of decontamination. Medical procedures for radionuclide decorporation from the human body. Late effects of ionizing radiation. Intervention levels for medical actions. Radiation injuries. Acute radiation syndrome (ARS). Medical procedures for patient handling. Instrumentation for internal dose assessment (well counters, portal monitors, whole body counters). Radiation protection of personnel and patients on clinical ward.
STUDENTS' ACTIVITIES AND THEIR EVALUATION : (see the conditions of subjects: Physics of Radiology and Radiotherapy and Physics of Nuclear Medicine
OBLIGATORY LITERATURE : (see the literature of subjects: Physics of Radiology and Radiotherapy and Physics of Nuclear Medicine)
SUPPLEMENTARY LITERATURE (see the literature of subjects: Physics of Radiology and Radiotherapy and Physics of Nuclear Medicine)
EXAMINATION PROCEDURE: oral exam

Postgraduate Doctoral Study of Physics

COURSE: MAGNETIC TOMOGRAPHY

AUTHOR(S) OF COURSE PROGRAMME:
prof.dr.sc. Jasminka Brnjas-Kraljević; University of Zagreb, School of Medicine

TEACHING TECHNIQUES:
lectures: 15 + seminars: 15

ECTS: 3

COURSE ACHIEVEMENTS:
Magnetic resonance as the diagnostic method is very complex in medical application and even more in understanding and interpretation of the results. Therefore in medical teams there should be always present a physicist who is expert in MR principles and can search for optimal measurement conditions. He should be trained to discuss the MR images with physicians.

COURSE PROGRAMME:

Basic principles of magnetic spectroscopy. Energy levels and resonance conditions for the nucleus with spin in steady magnetic field. Chemical shift, parameter for molecular architecture differentiation. Relaxation processes and the dynamics of the molecules. Bloch relations. Characteristic relaxation times: T1 and T2. Magnetic properties of tissues – foundation for magnetic measurements application in biology. Chemical shift and relaxation times as parameters for tissue differentiation. Tomographic shooting – field gradient, how to chose the tom. Magnetic field gradients for determination of phase and frequency differences in resonance and relaxation processes. Time diagram of pulse sequences for different imaging methods: spin echo, IR (inverse recovery). Resolution methods and the contrast on the image. Exercises in signal processing.

STUDENTS' ACTIVITIES AND THEIR EVALUATION:
Each student is expected to prepare and give a seminar talk in front of broad audience; as to be exposed to various questions.

OBLIGATORY LITERATURE:

100. Joseph P. Hornak, 1996-2006. http://www.cis.rit.edu/htbooks/mri/index.html
101. M.A.Foster: Magnetic Resonance in Medicine and Biology; Pergamon Press Ltd. Headington Hill Hall Oxford OX3 0BW, England, 3rd ed. 2000,
102. D.G.Gadian: NMR and its Applications to living Systems; Oxford University Press, Walton Street, Oxford OX2 6DP Oxford, NY, Tokyo 1996
103. K.K.Shung, M.B. Smith, B.M.W. Tsui: Principles of Medical Imaging; Academic Press Inc. San Diego, NY, Boston 1992

SUPPLEMENTARY LITERATURE:
The original papers will be handed to the students for their seminars and homework.

EXAMINATION PROCEDURE: the oral exam; seminar is included

Postgraduate Doctoral Study of Physics
COURSE: Application of laser in medicine
AUTHOR(S) OF COURSE PROGRAMME : Roller-Lutz, dr.sc. Zvjezdana, full proffessor, pročelnik Department of Physics of Medical faculty, proffessor at Philosophical Faculty
TEACHING TECHNIQUES : lectures + seminar
ECTS: 3
COURSE ACHIEVEMENTS : Goal of the subject is to give a description of the physical background of potential interaction mechanisms between laser light and biological tissue, to give a review of medical laser apllications and laser safety.
COURSE PROGRAMME : Light and matter: reflection, absorption, scattering, turbid media, optical tissue properties. Principles of lasers, types of lasers. Interaction mechanisms: photochemical interactions (biostimulation, photodynamical therapy), thermal interactions (heat generation and transport, heat effects), photoablation, plasma-induced ablation, photodisruption. Medical application of lasers. Lasers safety.
STUDENTS' ACTIVITIES AND THEIR EVALUATION : class attendance and seminar
OBLIGATORY LITERATURE : 104. Markolf H. Niemz: Laser-Tissue Interactions, Fundamentals and Applications, Springer-Verlag Berlin Heildelberg 2002 105. J. Eichler, T. Seiler: Lasertechnik in der Medizin, Springer-Verlag Berlin Heildelberg 1991
SUPPLEMENTARY LITERATURE : 106. Z. Simunovic et al.: Laser in Medicine and Dentristry, Vitagraf d.o.o., Rijeka, 2000. 107. internet
EXAMINATION PROCEDURE: Oral examination

Postgraduate Doctoral Study of Physics
COURSE: Selected chapters on human physiology and pathophysiology
LECTURER: Professor Zeljko Reiner MD,PhD, FESC
AFFILIATION: School of Medicine, University of Zagreb and University Hospital Center Zagreb
ECTS: 3
COURSE ACHIEVEMENTS The student should get the basic knowledge on the normal physiological mechanisms and the origin of some diseases, particularly those caused by physical agents such as ionizing and non-ionizing radiation, electricity, ultrasound, noise, heat, cold, vibrations etc.
COURSE PROGRAMME The relationship between health and disease – general mechanisms of disease development, the effects of ionizing radiation on organic macromolecules and anorganic molecules, inactivation of enzymes by radiation, characteristics of the biologic effects of radiation – radiation reactions, acute and chronic radiation injuries (acute radiation syndromes, the cerebral syndrome, the gastrointestinal syndrome, the hematopoietic syndrome, acute radiation sickness, intermediate delayed effects, late somatic effects), radiation injuries of specific tissues and organs, teratogenic effects of radiation, carcinogenic effects of radiation, injuries of genes by radiation, the effects of non-ionizing radiation on human body, the effects of other physical agents on human body (electricity, ultrasound, noise, heat, cold, vibrations etc.). Normal and disturbed immunological mechanisms, normal and disturbed metabolism of vitamins, minerals, water and acid-base balance, normal and disturbed metabolism of proteins, carbohydrates and lipids, the effects of biologic agents on human body, the effects of chemical agents on human body, physiology and pathophysiology of the blood, normal and disturbed function of the lungs, normal and disturbed function of the gastrointestinal system, normal and disturbed function of the urinary system, normal and disturbed function of the cardiovascular system.
STUDENTS' ACTIVITIES AND THEIR EVALUATION The students will have homeworks and will be expected to prepare certain topics and their knowledge will be examined during the term.
OBLIGATORY LITERATURE Patofiziologija (ur. S. Gamulin, M. Marušić, Z. Kovač), Medicinska naklada, Zagreb, 2005. – selected chapters
SUPPLEMENTARY LITERATURE Fiziologija (ur. Berna R.M., Levy M.N.), Medicinska naklada, Zagreb, 1993., - selected chapters
EXAMINATION PROCEDURE: Oral exam

Postgraduate Doctoral Study of Physics

COURSE: Selected chapters of oncology and radiotherapy

AUTHOR(S) OF COURSE PROGRAMME
Prof. dr. sc. Zdenko Krajina, Medicinski fakultet Sveučilišta J.J.Strossmayer Osijek

TEACHING TECHNIQUES (lectures+practice): 15 + 15

ECTS: 3

COURSE ACHIEVEMENTS
Goals of teaching course
To inform students about basis of clinical oncology, types of tumors according to locations and modalities of treatments.
General knowledge and skills in oncology: physical examination, recognition of the most important clinical conditions and symptoms (vena cava superior syndrome, impending fracture, bleeding, spinal cord compression, leukopenia, anemia, trombocytopenia, febrile neutropenia, vomiting, diarrhea, cerebral edema, weight loss, cachexia, ascites, hematuria). Specific knowledge and skills: types of radiotherapy, radiotherapy treatment planning, treatment delivery, adverse effects, combining of radiotherapy with other modalities of specific oncology treatments. Types of anticancer agents, mechanisms of action, treatments with combinations of anticancer agents, routes of application of chemotherapy, adverse effects, combining of anticancer agents with other forms of specific oncology treatments.

COURSE PROGRAMME
Contents of teaching course:
Malignant tumors as a special problem of health care system, the importance of cancer prevention and early diagnose, social support network, as well as newer researches and radiotherapy delivery alone and in combination with chemotherapy. Definition and working area of oncology science. Biology of tumor growth: molecular-genetic basis of cancer, cell cycle and proliferation, immunologic recognition of malignant cell, metastasis formation and angiogenesis. Epidemiology and prevention of malignant tumors. Approaching to oncology patient. Basis of chemotherapy, radiotherapy and hormonotherapy. Radiobiologic aspect of radiotherapy: normal-tissue effects, effects on tumors, fractionation, radiobiology effect. Chemotherapy and radiotherapy interaction. Hyperthermia. The role of radiotherapy and its application (telegamma, X-rays, electron beams, neutrons, protons, brachytherapy) in treating of head and neck tumors, breast cancer, lung cancer, malignant lymphomas, gastrointestinal tumors, genitourinary system tumors, skin, bone and soft tissue tumors and central nervous system tumors.

STUDENTS' ACTIVITIES AND THEIR EVALUATION :
Seminars, lecture attendance

OBLIGATORY LITERATURE

108. C. A. Perez, L. W. Brady: Principles and practice of radiation oncology. Second Edition. J. B. Lippincott Co. Philadelphia 1992.
109. M. Šamija, Z. Krajina, A.Purišić.: Radioterapija. Nakladni zavod Globus 1996.
110. M. Šamija, E. Vrdoljak, Z. Krajina: Klinička onkologija, Zagreb, Medicinska naknada, 2006.

SUPPLEMENTARY LITERATURE
EXAMINATION PROCEDURE: oral exam

7. GEOPHYSICS

Postgraduate Doctoral Study of Physics
BRANCH: GEOPHYSICS

COURSE: Data Analysis in Geophysics

AUTHOR(S) OF COURSE PROGRAMME: Dr. Zoran Pasarić, assistant professor, Department of Geophysics, Faculty of Science, University of Zagreb

TEACHING TECHNIQUE: lectures+practice (30+15)

ECTS: 12

COURSE ACHIEVEMENTS:
To become familiar with ideas and problems related to time series and spatial fields. To develop a skill for the time domain vs. frequency domain and space domain vs. wave number domain reasoning. To become able to apply various methods for analyzing time series or spatial fields in practice and interpret obtained results.

COURSE PROGRAMME:
Auxiliary results from linear algebra: matrices, eigen values, reduction to diagonal form, singular value decomposition, method of least squares. Multiple linear regression and correlation. Empirical orthogonal functions (EOF). Objective analysis: polynomial fitting, objective interpolation. Time series, spatial fields: a) deterministic theory: linear systems, Fourier transform, discrete sampling, aliasing, digital filters; b) stochastic theory in frequency domain as well as in the domain of wave numbers: linear systems with stochastic input, power spectra and cross-spectra of stationary stochastic processes, linear model with noise; d) wavelets.
Exercises will comprise the implementation of various methods on computer. These will be used to analyze real or artificial (computer generated) data.

STUDENTS' ACTIVITIES AND THEIR EVALUATION:
Attendance of lectures and exercises.

OBLIGATORY LITERATURE:

1. Bendat, S. J., Piersol, G. A. (2000): Random Data Analysis and Measurement Procedures. John Wiley & Sons, Inc., New York.

SUPPLEMENTARY LITERATURE:

1. Emery, W. J., Thomson, E. R. (1998): Data Analysis Methods in Physical Oceanography. Pergamon, Elsevier Science Ltd., Oxford.
2. Hamming, R. W. (1977): Digital Filters. Prentice-Hall, Englewood Cliffs, N.J.
3. Koopmans, H. L. (1995): The Spectral Analysis of Time Series. Academic Press, San Diego.
4. Papoulis, A. (1977): Signal Analysis. McGraw-Hill, Auckland.
5. Papoulis, A. (1984): Probability, Random Variables, and Stochastic Processes. McGraw-Hill, Auckland.
6. Press, H. W., Teukolsky, A. S., Vetterling, T. W., Flannery, P. B. (2001): Numerical Recipes in Fortran 77, Cambridge University Press, Cambridge.
7. Priestly, M. B. (1981): Spectral Analysis of Time Series, Academic Press, London.

EXAMINATION PROCEDURE:
The exam consists of a) writing a computer program and applying it to some real data and b) oral part.

Postgraduate Doctoral Study of Physics **BRANCH: GEOPHYSICS**
COURSE: Seminar in Geophysics I
AUTHOR(S) OF COURSE PROGRAMME: Dr. Davorka Herak, associate professor, Dr. Branko Grisogono, full professor, Department of Geophysics, Faculty of Science, University of Zagreb
TEACHING TECHNIQUES: seminars (30)
ECTS: 20
COURSE ACHIEVEMENTS: Understanding of nature, theory, observations and modeling of geophysical processes. Presentations of various relevant scientific results and research.
COURSE PROGRAMME: Choices of geophysical research topics, selection of relevant literature, following geophysical seminars of other scientists and presentations of own seminars.
STUDENTS' ACTIVITIES AND THEIR EVALUATION: Selection of research area, extended discussions, preparations of own seminars. Setting up scientific hypotheses, methods and data analyses.
OBLIGATORY LITERATURE: In accordance with the student and supervisor.
SUPPLEMENTARY LITERATURE: About 10 scientifically relevant papers. Numerous web-sites.
EXAMINATION PROCEDURE: Active attendance to the seminars. Presentation of own seminar.

Postgraduate Doctoral Study of Physics **BRANCH: GEOPHYSICS**
COURSE: Seminar in Geophysics II
AUTHOR(S) OF COURSE PROGRAMME: Dr. Marijan Herak, full professor, Dr. Mirko Orlić, full professor, Department of Geophysics, Faculty of Science, University of Zagreb
TEACHING TECHNIQUES: seminars (60)
ECTS: 40
COURSE ACHIEVEMENTS: Understanding of nature, theory, observations and modeling of geophysical processes. Presentations of various relevant scientific results and research.
COURSE PROGRAMME: Choices of geophysical research topics, selection of relevant literature, following geophysical seminars of other scientists and presentations of own seminars.
STUDENTS' ACTIVITIES AND THEIR EVALUATION: Selection of research area, extended discussions, preparations of own seminars. Setting up scientific hypotheses, methods and data analyses.
OBLIGATORY LITERATURE: In accordance with the student and supervisor.
SUPPLEMENTARY LITERATURE: About 20 scientifically relevant papers. Numerous web-sites.
EXAMINATION PROCEDURE: Active attendance to the seminars. Presentation of own seminar.

Postgraduate Doctoral Study of Physics
BRANCH: GEOPHYSICS

COURSE: Atmospheric Modeling

AUTHOR(S) OF COURSE PROGRAMME:
Dr. Darko Koračin, research professor, Division of Atmospheric Sciences, Desert Research Institute, 2215 Raggio Parkway, Reno, NV 89512, USA

TEACHING TECHNIQUES: lectures+practice (45+30)

ECTS: 12

COURSE ACHIEVEMENTS:
The main goal of the course is to educate students in the area of atmospheric and dispersion modeling and prepare them for independent development, modification, and application of computer programs and models.

COURSE PROGRAMME:
The main objective of the course is to present the basic concepts of Atmospheric and Dispersion Modeling on a variety of spatial scales (microscale, mesoscale, regional, and large-scale domains). Mathematical formalism of the model, physical parameterizations, and numerical solutions of the model equations is elaborated on. Predictability and chaos as well as stochastic processes of the modeling systems are discussed during the course. Topics also include descriptions of dispersion models of different complexities and their use in basic research and applications.

STUDENTS' ACTIVITIES AND THEIR EVALUATION:
Students are obligated to attend classes, submit assigned homeworks, attend seminars, and work on an assigned term project. For the term project, students are required to work in teams.

OBLIGATORY LITERATURE:

1. R. Pielke (2001): Mesoscale Meteorological Modeling. Academic Press, 2nd Edition.
2. R. Stull (1997): Introduction to Boundary Layer Meteorology, Kluwer Academic Publishers, 2nd Edition.
1. 3. H.C. Rodean (1996): Stochastic Lagrangian Models of Turbulent Diffusion, Meteorological Monographs, American Meteorological Society, Boston.

EXAMINATION PROCEDURE:
The last class before the examination includes a review session to guide students in the preparation for the final examination. The examination consists of written and oral components. For the oral part, students are required to prepare and give a presentation on an assigned topic.

Postgraduate Doctoral Study of Physics
BRANCH: GEOPHYSICS

COURSE: Selected Lectures in Atmospheric Physics

AUTHOR(S) OF COURSE PROGRAMME:
Dr. Zvjezdana Bencetić Klaić, associate professor, Department of Geophysics, Faculty of Science, University of Zagreb

TEACHING TECHNIQUES: lectures+seminar (30+15)

ECTS: 9

COURSE ACHIEVEMENTS:
To attain knowledge in the dynamics of the upper troposphere and stratosphere. To recognize stratosphere-troposphere interactions and their consequences.

COURSE PROGRAMME:
Advances in the understanding of extratropical cyclones. The role of the cyclone-scale eddies in the general circulation of the atmosphere. Blocking. Processes contributing to the rapid development of extratropical cyclones. Orographic cyclogenesis. Upper-level fronts, jet streams, and the tropopause. Stratosphere-troposphere exchange, stratospheric intrusion.

STUDENTS' ACTIVITIES AND THEIR EVALUATION:
Active class attendance; individual presentations (seminars) of scientific papers on the recent research of the dynamics of the upper troposphere/stratosphere and their interactions.

OBLIGATORY LITERATURE:

111. Newton C. E., Holopainen E. O. (1990): Extratropical cyclones. The Eric Palmen memorial volume. American Meteorological Society, Boston.
112. Bluestein, H. B. (1993): Synoptic-dynamic meteorology in midlatitudes. Vol. II, Observations and theory of weather systems. Oxford University Press, Oxford.
113. Holton, J. R. (1995): Stratosphere-troposphere exchange. Rew. Geophys., 33, pp 403-439.
114. Cox, B. D., Bithell, M., Gray, L. J. (1995): A general circulation model study of a tropopause-folding event at middle latitudes. Q. J. R. Meteorol. Soc., 121, pp 883-910.

SUPPLEMENTARY LITERATURE:
Recent scientific papers on the upper troposphere/stratosphere dynamics and their interactions.

EXAMINATION PROCEDURE:
Observation of the level of the student's interest and activity during the course duration; oral exam and successful presentation of the assigned scientific paper.

Postgraduate Doctoral Study of Physics
BRANCH: GEOPHYSICS

COURSE: Selected Chapters in Atmospheric Turbulence

AUTHOR(S) OF COURSE PROGRAMME:
Dr. Branko Grisogono, full professor, Department of Geophysics, Faculty of Science, University of Zagreb

TEACHING TECHNIQUES: lectures+practice+seminar (30+10+5)

ECTS: 9

COURSE ACHIEVEMENTS:
Understanding of nature, theory and modeling of atmospheric turbulence. Extending knowledge about mesoscale and microscale dynamics. Analytical and numerical modeling of turbulent processes in geophysical flows.

COURSE PROGRAMME:
Flow micro-scale instabilities. Small-scale circulations and vorticity. Atmospheric boundary layers. Turbulence and closure problems. Turbulent kinetic and potential energy prediction. Monin-Obukhov length scale modifications. Spectral aspects of turbulent flows. Reynolds stress tensor prediction. Modeling transport, dispersion and diffusion in the atmosphere. Local circulations revisited. Atmospheric dynamics and parameterizations of micro-scale processes in NWP & climate models. Improved Prandtl model for inclined boundary layers.

STUDENTS' ACTIVITIES AND THEIR EVALUATION:
Extended discussions in class. Homework assignments and reading scientific papers. Group work and reports. Follow up and discussion of current mesoscale and local weather phenomena (TV, www, etc.). Choice of students' area of expertise possibly leading toward final exam topic.
-Anonymous course evaluation after ~1/3 of the course time has passed.

OBLIGATORY LITERATURE:
1. Stull, R.B. (1988): An Introduction to Boundary Layer Meteorology, Kluwer, Dordrecht, 666 pp.
2. Baklanov, A. and B. Grisogono (Eds.) (2007): Atmospheric Boundary Layers Nature, Theory and Applications to Environmental Modelling and Security. Springer, 241 pp.

SUPPLEMENTARY LITERATURE:
1. Kundu, P.K. and I.M. Cohen (2002): Fluid Mechanics. Academic Press, 2nd ed.
2. Lesieur, M. (1997): Turbulence in Fluids. Kluwer (3rd edition), Dordrecht.
3. Pedlosky, J. (1987): Geophysical Fluid Dynamics. Springer-Verlag, New York.
4. -About 10 scientifically relevant papers pertaining to the course subject.
5. -Numerous web-sites.

EXAMINATION PROCEDURE:
Written home assignments, successfully presented written and oral reports (seminars) and final oral examination (possibly specialized toward the student's particular interest).

Postgraduate Doctoral Study of Physics
BRANCH: GEOPHYSICS

COURSE: Mesoscale Meteorology

AUTHOR(S) OF COURSE PROGRAMME:
Dr. Vanda Grubišić, full professor, Department of Meteorology and Geophysics, Faculty of Geosciences, Geography and Astronomy, University of Vienna

TEACHING TECHNIQUES: lectures+practice (30+15)

ECTS: 9

COURSE ACHIEVEMENTS:
Gaining knowledge of atmospheric mesoscale processes, their dynamic structure, observational methods and techniques, numerical modeling and predictability.

COURSE PROGRAMME:
Orographically induced mesoscale processes. Internal gravity waves. Mountain waves. Linear approximation and nonlinear processes. Windward airflow deformation. Orographic precipitation. Lee side circulations. Lee side cyclogenesis. Thermal circulation in complex terrain.
Mesoscale precipitation systems.
Mesoscale observations. Satellites, radars, lidars, surface mesonetworks. Aircraft observations. Data analysis.
Numerical modeling of mesoscale processes. Predictability.

STUDENTS' ACTIVITIES AND THEIR EVALUATION:
Class attendance, homework, seminar and a class project.

OBLIGATORY LITERATURE:
1. Baines, P.G. (1995): Topographic Effects in Stratified Flows. Cambridge University Press, New York.
2. Blumen, W. (editor) (1990): Atmospheric Processes over Complex Terrain. Amer. Meteor. Soc.
3. Bougeault, P., R.A. Houze, Jr., R. Rotunno, and H. Volkert (editors) (2003): Special MAP issue of the Quartertly Journal of the Royal Meteorological Society.
4. Houze, R. A. (1993): Cloud Dynamics. Academic Press, San Diego.

SUPPLEMENTARY LITERATURE:
1. Gill, A.E. (1982): Atmosphere-Ocean Dynamics. Academic Press, New York.
2. Grubišić, V., and co-authors (2008): Terran-induced Rotor Experiment, Bulletin of the American Meteorological Society, 89, 1513-1533.
3. Smith, R. B. (1979): The influence of mountains on the atmosphere. Adv. Geophys., 21 87-230.
4. Volkert, H., C. Schär, and R. B. Smith (2007): MAP Findings, Quarterly Journal of the Royal Meteorological Society, 133, 809-967.

EXAMINATION PROCEDURE: Written + Oral Exam

Postgraduate Doctoral Study of Physics
BRANCH: GEOPHYSICS

COURSE: Dynamical Oceanography

AUTHOR OF COURSE PROGRAMME:
Dr. Mirko Orlić, full professor, Department of Geophysics, Faculty of Science, University of Zagreb

TEACHING TECHNIQUES: lectures+practice (45+15)

ECTS: 12

COURSE ACHIEVEMENTS:
Geophysical investigations include empirical, theoretical and modeling approach. The present course aims at improving an understanding of physical processes in the sea based on theoretical methods, and it builds on the similar undergraduate and graduate courses.

COURSE PROGRAMME:
Quasi-steady currents. Elementary current system. Wind-driven currents in the ocean (Sverdrup, Stommel, Munk). Wind-driven currents in inland seas (Weenink, Felzenbaum, Welander). Thermohaline circulation – inside inland basins and between the inland and open seas (estuarine circulation, inverse estuarine circulation).
Free waves. General case of oscillations in rotating stratified fluid. High-frequency surface waves. Low-frequency shallow-water waves. Internal waves. Topographic effects.
Forced waves. Analytical solutions for schematised oceans and inland seas: tides, response of the sea to the atmospheric forcing, seasonal variability. Resonant forcing of the sea.

STUDENTS' ACTIVITIES AND THEIR EVALUATION:
Attending the classes, solving the problems posed.

OBLIGATORY LITERATURE:

31. Bowden K. F. (1983): Physical Oceanography of Coastal Waters. Ellis Horwood Ltd., Chichester.
32. Gill A. E. (1982): Atmosphere-Ocean Dynamics. Academic Press, New York.
33. Pedlosky J. (1987): Geophysical Fluid Dynamics (Second Edition). Springer Verlag, New York.
34. Warren B. A. and C. Wunsch (Eds) (1981): Evolution of Physical Oceanography - Scientific Surveys in Honour of Henry Stommel. MIT Press, Cambridge, Ma.

SUPPLEMENTARY LITERATURE:

115. Csanady G. T. (1982): Circulation in the Coastal Ocean. D. Reidel, Dordrecht.
116. LeBlond P. H. and L. A. Mysak (1978): Waves in the Ocean. Elsevier, Amsterdam.
117. Pedlosky J. (1996): Ocean Circulation Theory. Springer, Berlin.
118. Philander S. G. (1990): El Nino, La Nina, and the Southern Oscillation. Academic Press, San Diego.
119. Siedler G., J. Church and J. Gould (2001): Ocean Circulation and Climate. Academic Press, San Diego.
120. Simons T. J. (1980): Circulation models of lakes and inland seas. Canadian Bulletins of Fisheries and Aquatic Sciences, 203, pp. 1-146.

EXAMINATION PROCEDURE: Written and oral.

Postgraduate Doctoral Study of Physics
BRANCH: GEOPHYSICS

COURSE: Physical and Chemical Properties of Seawater

AUTHOR(S) OF COURSE PROGRAMME:
Dr. Danilo Degobbis, research adviser and Dr. Robert Precali, senior research associate, "Ruđer Bošković" Institute, Center for Marine Research (CMR), Rovinj

TEACHING TECHNIQUES: lectures+practice (30+15)

ECTS: 9

COURSE ACHIEVEMENTS:

Introduction to mechanisms of undesirable phenomena in the sea (anthropogenic eutrophication, mucilage events) due to composition changes of some chemical constituents of the seawater combined with meteorological, climatic and physical oceanographic fluctuations.
The intention is to encourage students to develop a broad approach designing hypotheses and aims of research, and, consequently to be qualified to participate in multidisciplinary research projects, that generally have a priority for financial support. In fact, in the framework of this course it will highlight the synergistic effect of changes in some chemical and physical processes to favour biological phenomena that threat the marine ecosystem equilibrium.

COURSE PROGRAMME:

Lectures: Geochemical model of the seawater composition, major constituents and Dittmar's rule, definitions of salinity and measuring methods, salinity distributions in ocean and estuarine areas.
Density of seawater calculated from temperature and salinity data, processes of stratification of seawater column and their role in vertical transport of matter.
Gases, carbon systems, role of CO2 exchange between atmosphere and ocean in the global warming process.
Minor elements, organic matter, pollutants, pollution and contamination of the Adriatic Sea.
Nutrient cycles and their role in the eutrophication process and excessive mucous aggregations (mucilage phenomenon), mechanisms of eutrophication and mucilage events in the northern Adriatic.
Practice: Research vessel - cruise planning, station positioning, sampling and sample storage, in situ measure of physical parameters, determination of physical and chemical parameters in the aboard laboratory.
Land laboratory - data bases, import of data into the base, statistical and graphical analysis in ODV and other programs.

STUDENTS' ACTIVITIES AND THEIR EVALUATION:
The teachers will be at disposal for additional consultations and will attend to the student activity by means of personal contacts.

OBLIGATORY LITERATURE:
1. Lalli, C. M., Parsons T. R. (1997): Biological Oceanography – An Introduction, 2nd

ed., Butterworth-Heinemann, Oxford, GB.

2. Millero, F. J. (1996): Chemical Oceanography, 2nd ed., CRC Press, Boca Raton (there is a new edition in 2005., although without significance changes in the topics of interest).
3. Pilson, M. E. Q. (1998): An Introduction to the Chemistry of the Sea, Prentice Hall, Upper Sadle River, NJ.(The books are available in the IRB library in Zagreb or Rovinj. The students will get detailed instruction how to use them.)
4. Degobbis, D., Precali, R., Ivančić, I., Smodlaka, N., Fuks, D., Kveder, S. (2000): Long-term changes in the northern Adriatic ecosystem related to anthropogenic eutrophication. Int. J. Envir. Poll., 13(1-6), 495-533 (available in electronic form).

SUPPLEMENTARY LITERATURE:

The most recent scientific publication (books, technical reports, papers) according to the student preferences and interest.

EXAMINATION PROCEDURE: Oral in Rovinj or Zagreb.

Postgraduate Doctoral Study of Physics
BRANCH: GEOPHYSICS

COURSE: Selected Topics in Physical Oceanography

AUTHOR(S) OF COURSE PROGRAMME: Dr. Zoran Pasarić, assistant professor, Department of Geophysics, Faculty of Science, University of Zagreb and Dr. Gordana Beg Paklar, assistant professor, Institute of Oceanography and Fisheries, Split.

TEACHING TECHNIQUES: lectures+practice (30+15)

ECTS: 9

COURSE ACHIEVEMENTS:
By analyzing numerical solutions of the shallow water equations, students will get a feeling for related problems and limitations, as well as for interplay between "physics" and "numerics". Through the basic characteristics, possibilities and limitations of one of the most widely used oceanographic model – Princeton Ocean Model (POM), students will get a background of the numerical modeling techniques. Application examples will provide an insight into the standard requirements and problems during model setup and simulations, as well as a background of the methods used for verification and presentation of the model results.

COURSE PROGRAMME:
Numerical modeling of the sea dynamics. Basic equations, discretization, finite differences, convergence, stability, analysis of numerical schemes for the shallow water equations. Typical approximations, boundary conditions, classification of the models. Princeton Ocean Model (POM). Verification of the model through comparison with analytical solutions. Application of the POM to the whole Adriatic and to the selected coastal area. Investigation of the relationship between wind- and buoyancy-driven dynamics.

STUDENTS' ACTIVITIES AND THEIR EVALUATION:
Class attendance. Students will perform numerical simulations with POM for simple examples in idealized basins with schematized forcing.

OBLIGATORY LITERATURE:

121. Mesinger F. (1976): Dinamička meteorologija. Građevinska knjiga, Beograd.
122. Mellor G. L. (1996): Introduction to Physical Oceanography. Springer, New York.
123. Mellor G. L. (1998): User Guide for a Three-dimensional, Primitive Equation, Numerical Ocean Model. Princeton University, Princeton.
124. Mellor G. L. and T. Yamada (1982): Development of a turbulence closure model for geophysical fluid problems. Reviews of Geophysics and Space Physics, 20, pp. 851-875.

SUPPLEMENTARY LITERATURE:

125. Griffies S. (2004): Fundamentals of ocean climate models. Princeton University Press, Princeton, USA.
126. Chassignet E. P. and J. Verron (1998): Ocean Modeling and Parametrization, NATO Science Series C: Mathematical and Physical Science – Vol. 516, Kluwer Academic Publisher, Cambridge.
127. Ramming H. G. and Z. Kowalik (1980): Numerical Modelling of Marine Hydrodynamics. Elsevier Oceanography Series 26. Elsevier, Amsterdam.

EXAMINATION PROCEDURE: Oral exam and successfully completed simulation with POM model in an idealized basin with simple forcing.

Postgraduate Doctoral Study of Physics
BRANCH: GEOPHYSICS

COURSE: Physics of the Earth's Interior

AUTHOR(S) OF COURSE PROGRAMME:
Dr. Davorka Herak, associate professor, Department of Geophysics, Faculty of Science, University of Zagreb

TEACHING TECHNIQUES: lectures and practice (45+15)

ECTS: 15

COURSE ACHIEVEMENTS:
Understanding of propagation of volume waves in the heterogeneous medium. Realisation of influence of scattering and attenuation on propagation of volume waves and generation of coda waves. Realisation of influence of anisotropy on propagation of volume waves. Understanding of generation of free oscillations of a layered sphere.

COURSE PROGRAMME:
Propagation of volume waves in the heterogeneous medium. Scattering and attenuation of volume waves. Coda waves. Anisotropy in the Earth. Free oscillations of a layered sphere.

STUDENTS' ACTIVITIES AND THEIR EVALUATION:
class attendance, project

OBLIGATORY LITERATURE:

1. Aki, K. And Richards, P. G. (2002): Quantitative seismology, University Science Books, Sausalito, 700 pp.
2. Lapwood, E.R. and Usami, T. (1981): Free oscillations of the Earth, Cambridge University Press. Cambridge, 243 pp.
3. Sato, H. and M. C. Fehler (1998): Seismic wave propagation and scattering in the heterogeneous Earth, Springer-Verlag, New York, 308 pp.
4. Stein, S. and Wysession, M. (2003): An introduction to seismology, earthquakes, and Earth structure, Blackwell Publishing, 498 pp.
5. Lowrie, W. (2007): Fundamentals of Geophysics, Cambridge University Press, 381 pp.

SUPPLEMENTARY LITERATURE:

1. Fowler, C.M.R. (2009): The Solid Earth, Cambridge University Press, 685 pp.

EXAMINATION PROCEDURE:
oral exam.

Postgraduate Doctoral Study of Physics
BRANCH: GEOPHYSICS

COURSE: Physics of the Earthquake Source

AUTHOR(S) OF COURSE PROGRAMME:
Dr. Marijan Herak, full professor, Department of Geophysics, Faculty of Science, University of Zagreb

TEACHING TECHNIQUES: lectures + practice (45+15)

ECTS: 15

COURSE ACHIEVEMENTS:
Student gains knowledge on kinematics and dynamics of seismic sources, and ability to estimate basic source parameters (static seismic moment, corner frequency, stress-drop, high-frequency asymptotes…) using spectral analyses of seismograms.

COURSE PROGRAMME:
Elastic rebound theory. Energy of deformation prior to the earthquake. Faults and fractures. Representation of the seismic source. Simple example of slip on the fault. Analyses of displacement discontinuity. Kinematics of seismic source (far-filed). Seismic spectrum at low frequencies. Dynamics of rupture. Seismic moment. Seismic moment tensor. Estimation of seismic moment. Volumetric sources. Basic theory and examples. Far-field kinematics. Inhomogeneous isotropic media. Unilateral fracture. Nucleation, spreading, and stoppage of fracture. Near-field source kinematics.

STUDENTS' ACTIVITIES AND THEIR EVALUATION: class attendance, seminar

OBLIGATORY LITERATURE:

128. Aki, K., Richards, P. G. (2002): Quantitative seismology (2nd Ed.), University Science Books, Sausalito.
129. Pujol, J. (2003): Elastic Wave Propagation and Generation in Seismology, Cambridge University Press, Cambridge.
130. Ben Menahem, A., Singh, B. A. (1981): Seismic Waves and Sources. Springer-Verlag, New York.
131. Brune, J. N. (1970): Tectonic stress and the spectra of seismic shear waves from earthguakes. Journal of Geophysical Research, Vo1. 75, 4997-5009.

SUPPLEMENTARY LITERATURE:

132. Stein, S., Wysession, M. (2003): An introduction to Seismology, Earthquakes and Earth Structure, Blackwell publishing.
133. Bullen, K. E., Bolt, B. A. (1985): An introduction to the theory of seismology. Cambridge University Press.
134. Jost, M. L., Herrmann, R. B. (1989): A student's guide to and review of moment tensors. Seismological Research Letters, Vo1. 60, No. 2, 37-57.
135. Fowler, C.M.R. (2009): The Solid Earth, Cambridge University Press, 685 pp.

EXAMINATION PROCEDURE: Seminar work, oral exam.

Postgraduate Doctoral Study of Physics
BRANCH: GEOPHYSICS

COURSE: Seismotectonic Parameters and Earthquake Magnitude

AUTHOR(S) OF COURSE PROGRAMME:
Dr. Bruno Tomljenović, associate professor, Faculty of Mining, Geology and Petroleum Engineering, University of Zagreb

TEACHING TECHNIQUES: lectures + practice (30+15)

ECTS: 9

COURSE ACHIEVEMENTS:
Student gains knowledge on existing relationships between seismotectonic parameters and earthquake magnitude published in textbooks and scientific publications.

COURSE PROGRAMME:
Earthquake cycle: "classical" and alternative models. What controls ruptures: asperities, barriers and characteristic earthquakes. Displacement variations along a fault, fault growth and fault segmentation. Relations between fault length, tectonic activity and maximal earthquake magnitude. Presentation of keynote examples from Croatia, circum-Mediterranean area and worldwide.

STUDENTS' ACTIVITIES AND THEIR EVALUATION: class attendance, seminar

OBLIGATORY LITERATURE:

1. Stein, S., Wysession, M. (2003): An introduction to Seismology, Earthquakes and Earth Structure, Blackwell publishing.
2. Wells, D.L. & Coppersmith, K.J. (1994): New empirical Relationships among Magnitude, Rupture Length, Rupture Width, Rupture Area, and Surface Displacement.- Bull. Seismol. Soc. Am., Vol. 84, No. 4, 974-1002.
3. Burbank, D.W & Anderson, R.S. (2001): Tectonic Geomorphology.- Blackwell Publishing.

EXAMINATION PROCEDURE: oral exam.

Postgraduate Doctoral Study of Physics
BRANCH: GEOPHYSICS

COURSE: Selected Chapters of Seismology

AUTHOR(S) OF COURSE PROGRAMME:
Dr. Marijan Herak, full professor, Department of Geophysics, Faculty of Science, University of Zagreb

TEACHING TECHNIQUES: lectures + practice (30+15)

ECTS: 9

COURSE ACHIEVEMENTS:
Student gains competence and skills related to selected problems of seismology. The problems are chosen in agreement with the lecturer according to the student's preferences and scientific interests.

COURSE PROGRAMME:
The programme is defined on the basis of chosen subjects. Some of the themes are: propagation of elastic waves in anisotropic media, inverse problems in seismology, surface waves and free oscillations of the Earth, earthquake statistics, etc. Current literature is used along with obligatory literature as listed below.

STUDENTS' ACTIVITIES AND THEIR EVALUATION: class attendance, seminar

OBLIGATORY LITERATURE:

136. Lay, T., Walace, T. C. (1995): Modern global seismology, Academic Press, San-Diego – London
137. Aki, K., Richards, P. G. (2002): Quantitative seismology (2nd Ed.), University Science Books, Sausalito.
138. Pujol, J. (2003): Elastic Wave Propagation and Generation in Seismology, Cambridge University Press, Cambridge.
139. Stein, S., Wysession, M. (2003): An introduction to Seismology, Earthquakes and Earth Structure, Blackwell publishing.
140. Menke, W. (1989): Geophysical data analysis: Discrete inverse theory, Academic Press.
141. Bath, M. (1984): Mathematical aspects of seismology, Geophysical Press, London.

SUPPLEMENTARY LITERATURE:

142. Menke, W. (1989): Geophysical data analysis: Discrete inverse theory, Academic Press.
143. Bath, M. (1984): Mathematical aspects of seismology, Geophysical Press, London.

EXAMINATION PROCEDURE: Seminar work, oral exam.

Postgraduate Doctoral Study of Physics
BRANCH: GEOPHYSICS

COURSE: Selected Chapters of Geophysical Exploration

AUTHOR(S) OF COURSE PROGRAMME:
Dr. Franjo Šumanovac, full professor, Faculty of Mining, Geology and Petroleum Engineering, University of Zagreb

TEACHING TECHNIQUES: lectures, practice, and seminar (30+15)

ECTS: 9

COURSE ACHIEVEMENTS: Getting of knowledge from advanced geophysical methods and their applications. Analyses of the geophysical results and synthesis in complex explorations.

COURSE PROGRAMME:
The high resolution seismic reflection method (the HRS method) in near surface investigations: theoretical bases, instruments and equipment, data acquisition, data processing, processing software, interpretation. Seismic down-hole and cross-hole explorations. Three-dimensional (3D) seismic reflection explorations. Seismic tomography. Application of the seismic methods.
Electrical methods. Vertical and horizontal resolution of the methods. Surface electrical tomography: theoretical bases, multi-electrode systems, survey geometry, projecting of field measurements, two-dimensional (2D) and three-dimensional (3D) explorations, data processing, interpretation, case histories. Dual gradient mapping and TUBEL method. Magnetotelluric method. Electromagnetic method. Georadar investigations. Potentials of the electrical methods in karst explorations.
Remote sensing gravity. Microgravity explorations. Gravity explorations of underground cavities. Aeromagnetic explorations. Complex geophysical explorations.

STUDENTS' ACTIVITIES AND THEIR EVALUATION: Seminar papers

OBLIGATORY LITERATURE:

1. Parasnis, D.S. (1997): Principles of Applied Geophysics, Chapman and Hall, New York.
2. Šumanovac, F. (2008): Geofizička istraživanja podzemnih voda, Rudarsko-geološko-naftni fakultet i Tiskara Pauk, Zagreb.
3. Ward, S.H. (1990): Geotehnical and Environmental Geophysics, Investigations in Geophysics No. 5, Society of Exploration Geophysicists, Tulsa, Oklahoma.

SUPPLEMENTARY LITERATURE:

1. Sheriff, R.E., and Geldart, L.P. (1995): Exploration Seismology, Cambridge University Press, USA.
2. Kearey, P. & Brooks, M. (1992): An Introduction to Geophysical Exploration, Blackwell Scientific Publications, Oxford.

EXAMINATION PROCEDURE: Orally.

Postgraduate Doctoral Study of Physics
BRANCH: GEOPHYSICS

COURSE: Planetary Magnetism

AUTHOR(S) OF COURSE PROGRAMME: Dr. Giuliana Verbanac, assistant professor, Department of Geophysics, Faculty of Science, University of Zagreb

TEACHING TECHNIQUE: lectures+practice (20+20)

ECTS: 9

COURSE ACHIEVEMENTS:
The main goal of the course is to attain knowledge about sources, maintaining and evolution of planetary magnetic fields.
Understanding magnetic field differences among planets in the Solar System and their interactions with the Solar wind.
Familiarising with the newest space missions and instruments related to the studying of planetary magnetic fields.
Preparing students for magnetic field modelling on different scales.

COURSE PROGRAMME:
Planetary magnetic fields, physical principle of generation mechanism, maintaining and evolution of the magnetic field. Planetary magnetospheres, induced magnetospheres, interrelationship between Solar wind and planetary magnetospheres as well as atmospheres. Magnetic field modelling: main and external field, both on global and regional scales.

STUDENTS' ACTIVITIES AND THEIR EVALUATION:
Active class attendance; work on projects; individual presentations of the results obtained by working on projects; preparation of seminars related to newest scientific results in the field of planetary magnetism.

OBLIGATORY LITERATURE:

1. De Pater, J. Lissauer (2001). Planetary Sciences. Cambridge University Press. ISBN 0521482194, 9780521482196.
2. J. K. Beatty, C. C. Petersen, A. Chaikin (1999): New Solar System. Cambridge University Press. ISBN-13: 9780521645874
3. A. Hanselmeier (2007): The Sun und Space weather. Springer, Netherlands. ISBN-10:1-4020-5603-6 121, pp 883-910.

SUPPLEMENTARY LITERATURE:

1. A.F. Nagy, A. Balogh, T.E. Cravens, M. Mendillo, I. Müller-Wodarg (Eds.) (2009). Comparative aeronomy. ISBN 978-0-387-87824-9. Reprinted from Space Science Reviews Volume 139, No. 1-4, 2008.
2. W. Baumjohann, R. Treumann (2006). Basic space plasma physics. Imperial College Press. London. ISBN 1-86094-079-x.
3. W. Baumjohann, R. Treumann (2006). Advanced space plasma physics. Imperial College Press. London. ISBN 1-86094-026-9.
4. R. Prinja (2006). Wonders of planets. Vision of our solar system in 21 century. Octupus Publishing Group. ISBN-13:9-781845332440.
5. Recent scientific papers and literatures according to the student preferences and interest.
6. Numerous web-sites.

EXAMINATION PROCEDURE:
Observation of level of the student's interest and activity during the course duration;
Written and oral reports of the assigned individual project results, seminar presentation, final oral exam comprises successful presentation and discussion of project results.

Curriculum vitae

1. ELEMENTARY PARTICLES AND FIELDS

LECTURER: Dr.Bene Nizic
AFFILIATION: Theoretical Physics Division, Insitute Ruđer Boškovic, Zagreb
E-MAIL AND WEB ADDRESS :nizic@thphys.irb.hr
BIOGRAPHY: Bene Nižić was born on April 3, 1953. He graduated Physics at the University of Zagreb, Croatia. In 1979 he enters Cornell University, Ithaca (NY), USA, and obtained his M.Sc. degree in 1982, and Ph.D. in 1985. He returned to Croatia in 1985 and took position at Theoretical Phyisics Division. His field of interest are applications of the Perturbative Quantum Chromodynamics on Exclusive Hadronic Reactions at Large Momentum Transfer.
LIST OF PUBLICATIONS IN THE LAST FIVE YEARS: - G. Duplancic, B. Nizic Reduction method for dimensionally regulated one-loop N-point Feynman integrals Eur.Phys.J. C35 (2004) 105-118 -B. Melic, B. Nizic, K. Passek, A note on the factorization scale dependence of the PQCD predictions for exclusive processes Eur.Phys.J. C36 (2004) 453-458 -Blazenka Melic, Bene Nizic, Kornelija Passek BLM scale for the pion transition form factor Phys.Rev. D65 (2002) 053020 G. Duplancic , HYPERLINK "http://www.slac.stanford.edu/spires/find/wwwhepau/wwwscan?rawcmd=fin+"Nizic, B."" B. Nizic (HYPERLINK "http://www.slac.stanford.edu/spires/find/inst/www?icncp=Boskovic+Inst.,+Zagreb" Boskovic Inst., Zagreb) Dimensionally regulated one loop box scalar integrals with massless internal lines. Eur.Phys.J.C20:357-370,2001 HYPERLINK "http://www.slac.stanford.edu/spires/find/wwwhepau/wwwscan?rawcmd=fin+"Duplancic, G."" G. Duplancic, HYPERLINK "http://www.slac.stanford.edu/spires/find/wwwhepau/wwwscan?rawcmd=fin+"Nizic, B."" B. Nizic On the one-loop massless scalar box integral with off-shell external lines Eur.Phys.J.C20:357, 2002
PUBLICATIONS QULIFYING FOR LECTURSHIP: G. Duplancic , HYPERLINK "http://arxiv.org/find/hep-ph/1/au:+Nizic_B/0/1/0/all/0/1" B. Nizic Reduction method for dimensionally regulated one-loop N-point Feynman integrals Eur.Phys.J. C35 (2004) 105-118 -B. Melic, B. Nizic, K. Passek, A note on the factorization scale dependence of the PQCD predictions for exclusive processes Eur.Phys.J. C36 (2004) 453-458 Blazenka Melic , HYPERLINK "http://arxiv.org/find/hep-ph/1/au:+Nizic_B/0/1/0/all/0/1" Bene Nizic, HYPERLINK "http://arxiv.org/find/hep-ph/1/au:+Passek_K/0/1/0/all/0/1" Kornelija Passek BLM scale for the pion transition form factor Phys.Rev. D65 (2002) 053020 -G. Duplancic, B. Nizic Dimensionally regulated one-loop box scalar integrals with massless internal lines Comments: 14 pages, 2 figures included, SVJour, journal version

Eur.Phys.J. C20 (2001) 357-370
B. Melic , HYPERLINK "http://www.slac.stanford.edu/spires/find/wwwhepau/wwwscan?rawcmd=fin+"Nizic, B."" B. Nizic, HYPERLINK "http://www.slac.stanford.edu/spires/find/wwwhepau/wwwscan?rawcmd=fin+"Passek,K."" K. Passek Complete next-to-leading order perturbative QCD prediction for the pion form-factor. Phys.Rev.D60:074004,1999
Andreas S. Kronfeld (HYPERLINK "http://www.slac.stanford.edu/spires/find/inst/www?icncp=Fermilab" Fermilab) , HYPERLINK "http://www.slac.stanford.edu/spires/find/wwwhepau/wwwscan?rawcmd=fin+"Nizic,B."" B. Nizic (HYPERLINK "http://www.slac.stanford.edu/spires/find/inst/www?icncp=Boskovic+Inst.,+Zagreb" Boskovic Inst., Zagreb) Nucleon Compton scattering in perturbative QCD.Phys.Rev.D44:3445-3465,1991,
T. Kinoshita , HYPERLINK "http://www.slac.stanford.edu/spires/find/wwwhepau/wwwscan?rawcmd=fin+"Nizic, B."" B. Nizic, HYPERLINK "http://www.slac.stanford.edu/spires/find/wwwhepau/wwwscan?rawcmd=fin+"Okamoto, Y."" Y. Okamoto (HYPERLINK "http://www.slac.stanford.edu/spires/find/inst/www?icncp=Cornell+U.,+LNS" Cornell U., LNS) Eighth order QED contribution to the anomalous magnetic moment of the muon.Phys.Rev.D41:593-610,1990
B. Nizic (HYPERLINK "http://www.slac.stanford.edu/spires/find/inst/www?icncp=Cornell+U.,+LNS" Cornell U., LNS) . 1987.Beyond Leading Order Perturbative Qcd Corrections To Gamma Gamma ---> M+ M- (M = Pi, K). Phys.Rev.D35:80-101,1987.
T. Kinoshita , HYPERLINK "http://www.slac.stanford.edu/spires/find/wwwhepau/wwwscan?rawcmd=fin+"Nizic, B."" B. Nizic, HYPERLINK "http://www.slac.stanford.edu/spires/find/wwwhepau/wwwscan?rawcmd=fin+"Okamoto, Y."" Y. Okamoto (HYPERLINK "http://www.slac.stanford.edu/spires/find/inst/www?icncp=Cornell+U.,+LNS" Cornell U., LNS) Hadronic Contributions To The Anomalous Magnetic Moment Of The Muon. Phys.Rev.D31:2108,1985
T. Kinoshita , HYPERLINK "http://www.slac.stanford.edu/spires/find/wwwhepau/wwwscan?rawcmd=fin+"Nizic, B."" B. Nizic, HYPERLINK "http://www.slac.stanford.edu/spires/find/wwwhepau/wwwscan?rawcmd=fin+"Okamoto, Y."" Y. Okamoto (HYPERLINK "http://www.slac.stanford.edu/spires/find/inst/www?icncp=Cornell+U.,+LNS" Cornell U., LNS) Improved Theory Of The Muon Anomalous Magnetic Moment. Phys.Rev.Lett.52:717,1984

DATE OF THE LAST PROMOTION: 15.07.2004

LECTURER: doc. dr. Predrag Prester
AFFILIATION: Physics Department, Faculty of Science, University of Zagreb
E-MAIL AND WEB ADDRESS: pprester@phy.hr ; http://www.phy.hr/~pprester/
BIOGRAPHY: Born on April 5, 1968 in Šibenik (Croatia). Obtained B.Sc. in 1994, Mr.Sc. in 1998 and PhD in 1999, all in theoretical physics on Faculty of Science, University of Zagreb. From 1995 employed on Theoretical Physics Department (Faculty of Science, University of Zagreb) where he became assistant professor in 2003. He was in charge for seminars and exercises for different courses on the undergraduate studies, and gave lectures in Symbolic languages (Mathematica). Currently giving lectures in courses Differential equations – dynamical systems and Seminar in statistical physics. As a guest scientist he spent some time on ICTP (Trieste), SISSA (Trieste), CERN (Geneve), Dipartimento di Fisica Teorica, Universita degli Studi di Torino, and, as a Alexander von Humboldt Research Fellow, from 2004-2006 on Max Planck Institut fűr Gravitationsphysik (Albert Einstein Institut) in Golm (Potsdam). His research was mainly in the field of theoretical elementary particle physics: low-dimensional models, conformal field theory, black holes in generalised theories of gravity, and string (field) theory. Currently his main interests are quantum gravity and string theory. He published 25 research papers (16 in CC journals) and is a peer reviewer for CC journals Physical Review Letters, Physical Review D and Physical Review B. He participated in a large number of scientific meetings, on some of which giving invited lectures.
LIST OF PUBLICATIONS IN THE LAST FIVE YEARS: 144. P. Prester, Lovelock type gravity and small black holes in heterotic string theory, JHEP 0602 (2006) 039. 145. L. Bonora, C. Maccaferri, P. Prester, Perturbative spectrum of the dressed sliver, Phys. Rev. D 71 (2005) 026003. 146. M. Cvitan, S. Pallua and P. Prester, Conformal entropy as a consequence of the properties of stationary Killing horizons, Phys. Rev. D 70 (2004) 084043. 147. L. Bonora, C. Maccaferri, P. Prester, Dressed sliver solutions in vacuum string field theory, JHEP 0401 (2004) 038. 148. M. Cvitan, S. Pallua and P. Prester, Higher curvature Lagrangians, conformal symmetry and microscopic entropy of Killing horizons, Phys. Lett. B571 (2003) 217. 149. M. Kolanović, S. Pallua and P. Prester, Reply to ``Comment on `Properties of the massive Thirring model from the XYZ spin chain' '', Phys. Rev. D 68 (2003) 068702. 150. M. Cvitan, S. Pallua and P. Prester, Entropy of Killing horizons from Virasoro algebra in D-dimensional extended Gauss-Bonnet gravity, Phys. Lett. B555 (2003) 248. 151. M. Cvitan, S. Pallua and P. Prester, Horizon conformal entropy in Gauss-Bonnet gravity, Phys. Lett. B546 (2002) 119. 152. H. B. Nielsen, S. Pallua and P. Prester, SUSY: a consequence of smoothness?, Int. J. Mod. Phys. A 17 (2002) 2073.
PUBLICATIONS QULIFYING FOR LECTURSHIP: 153. M. Cvitan, S. Pallua and P. Prester, Conformal entropy and stationary Killing horizons, J. Phys.: Conf. Ser. 33 (2006) 440-444, Proceedings of 4. Meeting on

Constrained Dynamics and Quantum Gravity, Cala Gonone (Sardinia, Italy), September 12-16, 2005.

154. M. Cvitan, S. Pallua and P. Prester, Stationary Killing horizons and conformal entropy in higher order gravity theories, AIP Conf. Proc. 861 (2006) 308, Proceedings of Albert Einstein International Century Conference, Paris (France), 18-22 July, 2005.

155. P. Prester, Vacuum string field theory, to be published in Proceedings of the II Southeastern European Workshop on Challenges Beyond the Standard Model, Vrnjacka Banja (Serbia and Montenegro), 19-23 May, 2005.

156. L. Bonora, C. Maccaferri, P. Prester, R.J. Scherer Santos, D.D.Tolla, Recent results in vacuum string field theory, to be published in Proceedings of the Second International Conference on Fundamental Interactions, Pedra Azul, Espirito Santo (Brazil), 6-12 June 2004.

157. M. Cvitan, S. Pallua, P. Prester, Microscopic interpretation of black hole entropy, Particle Physics and the Universe, Proceedings of the 9th Adriatic meeting, Dubrovnik (Croatia), 4-14 September 2003, Springer Proceedings in Physics, Vol. 98, p. 125-139 (Springer Verlag).

158. L. Bonora, C. Maccaferri, P. Prester, The dressed sliver in vacuum string field theory, Particle Physics and the Universe, Proceedings of the 9th Adriatic meeting, Dubrovnik (Croatia), 4-14 September 2003, Springer Proceedings in Physics, Vol. 98, p. 233-242 (Springer Verlag).

DATE OF THE LAST PROMOTION: 9.10.2003 (assistant professor)

LECTURER: Amon Ilakovac
AFFILIATION: Faculty of Science of University of Zagreb (PMF)
E-MAIL AND WEB ADDRESS: ailakov@phy.hr
BIOGRAPHY Born : March 11, 1960 Married Graduated : 1981 PMF (Faculty of Science of U. of Zagreb) Master degree : 1895 PMF (supervisor prof. Tadić) PhD : 1988 PMF (supervisor prof. Tadić) Employment : 1893 assistant PMF 1998 assistant professor PMF 2003 associate professor PMF Visitor scientist 1992-1994 visitor scientist in group of prof Juergen Koerner on Johannes Gutenberg University in Mainz, Germany Publications, invited talks: published 23 papers in journals with international recension published 12 papers in conference proceedings with international recension 12 invited talks on international conferences or workshops
LIST OF PUBLICATIONS IN THE LAST FIVE YEARS: 1) Lepton flavor violating leptonic/semileptonic decays of charged leptons in the minimal supersymmetric standard model. Takeshi Fukuyama (Ritsumeikan U., Kusatsu), Amon Ilakovac (Zagreb U.) , Tatsuru Kikuchi (Ritsumeikan U., Kusatsu) . Jun 2005. 36pp. e-Print Archive: hep-ph/0506295 2) Neutrino oscillations in a supersymmetric SO(10) model with Type-III see-saw mechanism. Takeshi Fukuyama (Ritsumeikan U., Kusatsu) , Amon Ilakovac (Zagreb U.) , Tatsuru Kikuchi (Ritsumeikan U., Kusatsu) , Koichi Matsuda (Osaka U.) . Mar 2005. 13pp. Published in JHEP 0506:016,2005. e-Print Archive: hep-ph/0503114 3) Higgs masses in the minimal SUSY SO(10) GUT. Takeshi Fukuyama (Ritsumeikan U., Kusatsu) , Amon Ilakovac (Zagreb U.) , Tatsuru Kikuchi (Ritsumeikan U., Kusatsu) , Stjepan Meljanac (Boskovic Inst., Zagreb) , Nobuchika Okada (KEK, Tsukuba) . Dec 2004. 4pp. Published in Phys.Rev.D72:051701,2005. e-Print Archive: hep-ph/0412348 4) Lepton flavour violation in the minimal SO(10) GUT model and in the standard model with additional heavy Dirac neutrinos. Takeshi Fukuyama (Ritsumeikan U., Kusatsu) , Amon Ilakovac (Zagreb U.) , Tatsuru Kikuchi (Ritsumeikan U., Kusatsu) , Stjepan Meljanac (Boskovic Inst., Zagreb) . Nov 2004. 6pp. Invited talk at 8th International Workshop on Tau Lepton Physics (Tau 04), Nara, Japan, 14-17 Sep 2004. Published in Nucl.Phys.Proc.Suppl.144:143-148,2005. Also in *Nara 2004, Tau lepton physics* 143-148 e-Print Archive: hep-ph/0411282 5) Detailed analysis of proton decay rate in the minimal supersymmetric SO(10)model. Takeshi Fukuyama (Ritsumeikan U., Kusatsu) , Amon Ilakovac (Zagreb U.) , Tatsuru

Kikuchi (Ritsumeikan U., Kusatsu) , Stjepan Meljanac (Boskovic Inst., Zagreb) , Nobuchika Okada (KEK, Tsukuba) . KEK-TH-961, Jun 2004. 15pp. Published in JHEP 0409:052,2004. e-Print Archive: hep-ph/0406068
6) SO(10) group theory for the unified model building.Takeshi Fukuyama (Ritsumeikan U., Kusatsu) , Amon Ilakovac (Zagreb U.) , Tatsuru Kikuchi (Ritsumeikan U., Kusatsu) , Stjepan Meljanac (Boskovic Inst., Zagreb) , Nobuchika Okada (KEK, Tsukuba) . KEK-TH-960, May 2004. 62pp. We comment on results of hep-ph/0402122 and hep-ph/0405074. Published in J.Math.Phys.46:033505,2005. e-Print Archive: hep-ph/0405300

7) General formulation for proton decay rate in minimal supersymmetric SO(10) GUT. Takeshi Fukuyama (Ritsumeikan U., Kusatsu) , Stjepan Meljanac (Boskovic Inst., Zagreb) , Nobuchika Okada (KEK, Tsukuba) . KEK-TH-937, Jan 2004. 28pp. Published in Eur.Phys.J.C42:191-203,2005. Takeshi Fukuyama e-Print Archive: hep-ph/0401213

8) Production and polarization effects in some tau lepton decays.Amon Ilakovac (Zagreb U.) . TAU-2002-WE02, Oct 2002. 6pp. Invited talk at 7th International Workshop on Tau Lepton Physics (TAU 02), Santa Cruz, California, 10-13 Sep 2002. Published in eConf C0209101:WE02,2002, Nucl.Phys.Proc.Suppl.123:129-134,2003. Also in *Santa Cruz 2002, Tau lepton physics* 129-134 e-Print Archive: hep-ph/0210228

PUBLICATIONS QULIFYING FOR LECTURSHIP:
All above papers are relevant for lectureship.

DATE OF THE LAST PROMOTION:
November 1, 2003

LECTURER: Dr. Branko Guberina, Senior Scientist

AFFILIATION: Theoretical Physics Division, Rudjer Bošković Institute, Zagreb, Croatia

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BIOGRAPHY:

LIST OF PUBLICATIONS IN THE LAST FIVE YEARS:

1. B. Guberina, R. Horvat, H. Nikolic, "Dynamical dark energy with a constant vacuum energy density", Phys. Lett. B 636 (2006) 80-85
2. B. Guberina, R. Horvat, H. Nikolic, "Generalized holographic dark energy and the IR cutoff problem", Phys. Rev. D 72 (2005) 125011
3. B. Guberina, R. Horvat, H. Stefancic, "Hint for Quintessence-like Scalars from Holographic Dark Energy", JCAP 0505 (2005) 001
4. A. Babic, B. Guberina, R. Horvat, H. Stefancic, "Renormalization-group running cosmologies: A scale-setting procedure", Phys. Rev. D 71 (2005) 124041
5. A. Babic, B. Guberina, B. Melic, H. Stefancic, "Cabibbo-suppressed decays of the Omega_c^0 - feedback to the Xi_c^+ lifetime", Phys. Rev. D 70 (2004) 117501
6. B. Guberina, R. Horvat, H. Stefancic, "Renormalization-group running of the cosmological constant and the fate of the universe", Phys. Rev. D67 (2003) 08301
7. B. Guberina, H. Stefancic, "Cabibbo suppressed decays and the Xi_{c}^{+} lifetime", Phys. Rev. D 65 (2002) 114004
8. A. Babic, B. Guberina, R. Horvat, H. Stefancic, "Renormalization-group running of the cosmological constant and its implication for the Higgs boson mass in the Standard Model" , Phys. Rev. D 65 (2002) 085002

PUBLICATIONS QUALIFYING FOR LECTURSHIP:

1. B. Guberina, R. Horvat, H. Nikolic, "Dynamical dark energy with a constant vacuum energy density", Phys. Lett. B 636 (2006) 80-85
2. B. Guberina, R. Horvat, H. Stefancic, "Hint for Quintessence-like Scalars from Holographic Dark Energy", JCAP 0505 (2005) 001
3. A. Babic, B. Guberina, R. Horvat, H. Stefancic, "Renormalization-group running cosmologies: A scale-setting procedure", Phys. Rev. D 71 (2005) 124041.
4. B. Guberina, R. Horvat, H. Stefancic, "Renormalization-group running of the cosmological constant and the fate of the universe", Phys. Rev. D67 (2003) 08301.
5. A. Babic, B. Guberina, R. Horvat, H. Stefancic, "Renormalization-group running of the cosmological constant and its implication for the Higgs boson mass in the Standard Model" , Phys. Rev. D 65 (2002) 085002
6. B. Guberina, B. Melić, H. Štefančić,
"Lifetime-difference pattern of heavy hadrons", Physics Letters B 484 (2000) 43
7. B. Guberina, B. Melić, H. Štefančić, ”Enhancement of preasymptotic effects in inclusive beauty decays”, Phys. Lett. B 469 (1999) 253.
8. B. Guberina, B. Melić, H. Štefančić, «Inclusive decays and lifetimes of doubly charmed baryons», Eur. Phys. J. C9 (2000) 213.
9. B. Guberina, B. Melić, «Inclusive charmed baryon decays and lifetimes”, Eur. Phys. J. C2 (1998) 697.
10. N. Bilić, B. Guberina, J. Trampetić, "Pauli Interference Effect in D+ Lifetime", Nucl. Phys. B 248 (1984) 261.

11 .B. Guberina, R. Rűckl, J. Trampetić, "Charmed Baryon Lifetime Differences", Z. Phys.C33 (1986) 297.
12. B. Guberina, J. H. Kűhn, R. D. Peccei, R. Rűckl, «Rare Decays of the Z˚», Nucl. Phys. B 174 (1980) 317.
13. B. Guberina, S. Nussinov, R. D. Peccei, R. Rűckl, «D Meson Lifetimes and Decays», Phys. Lett. B 89 (1979) 111.
14. B. Guberina, R. D. Peccei, «Quantum Chromodynamic Effects and CP Violation in the Kobayashi-Maskawa Model», Nucl. Phys. B 163 (1980) 289.
15. P. Colić, B. Guberina, Tadić, J. Trampetić, «K(L)-K(S) Mass Difference and Quark Models», Nucl. Phys. B 221 (1983) 141.
16. B. Guberina, R. D. Peccei, R. Rűckl, «Effects of QCD on the Cabibbo Patterns In B Meson Decays», Phys. Lett. B 90 (1980) 169.

DATE OF THE LAST PROMOTION: Senior Scientist, 1992

LECTURER: Ivica Picek

AFFILIATION: Physics Department,
Faculty of Science, University of Zagreb
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BIOGRAPHY: Ph.D. Thesis, University of Zagreb, 1980: «Vector Particles and Parity Violation in Unified Gauge Theories of Weak, Electromagnetic and Strong Interactions».
From 1980 Research Fellow at the Ruđer Bošković Institute, with a continuous engagement in teaching at the Faculty of Science.
From 1992 full Professor at the University of Zagreb.
Mayor research visits:
1981 – 1983: Research Fellow at the Niels Bohr Institute, Copenhagen;
1986 and 1988: Alexander von Humboldt Fellow at the Deutsches Elektronen-Synchroton, DESY, Hamburg;
1990: Scientific Associate at the Theory Division of CERN, Geneva;
April and May 1990: invited lectures at the Universities in USA (Stony Brook, Santa Barbara, UCLA, Berkeley, SLAC);
1991 – 1996 Participation on the EU scientific project CI1-CT91-0893, «Perturbative and nonperturbative aspects of QCD...», with one month/year stay at the University of Bielefeld;
2002: Research Fellow at the Institute of Physics, University of Oslo
The own research reported at numerous International Conferences (Moriond 1985 and 1988, ICHEP 1990 and 1994, Recontres de Blois 1999, CMS and LHC Days in Split 1996, 1998, 2000, 2002, to count some of them). Participated in organizing several international conferences, notably the «7th Adriatic Meeting in Particle Physics (Brijuni 1994)».
Published more than 70 scientific works studying mainly weak nonleptonic and weak radiative decays and CP violating observables testing the Standard Model (SM) from «the inside». The other group of publications goes beyond the SM (the «random dynamics» approach including the «antiunification» and Lorentz non-invariance) and tests the SM from «the outside».
Published 3 books, one among them, «Fizika Elementarnih Čestica», as the first University textbook on the elementary particle physics in Croatian. Lecturing (besides on Elementary Particle Physics) on Physical Cosmology, and leading the Research Seminar in Particle Physics at the Faculty of Science in Zagreb.
From 2000 acting as the leader of the Graduate School in Physics at the university of Zagreb.
Recent research is devoted to a field-theoretical approach to the elementary particle phenomenology, rare processes and CP violation, and the connection of particle physics and cosmology (the principal investigator of the project supported by the Croatian Ministry of Science : «Elementary Particles, Field Theory and Cosmology»).
Winner of the Croatian state award in the field of natural sciences for 2003.

LIST OF PUBLICATIONS IN THE LAST FIVE YEARS:

J. O. Eeg, K. Kumerički and I. Picek, Fizika B10 (2001) 285-306
The Double Radiative Annihilation of the Heavy-Light Fermion Bound States
I. Picek in Proc. of the Symphosiumheld at the Croatian Academy of Sciences and Arts, Zagreb, December 14, 2000, HUNDRED YEARS OF QUANTUM THEORY, ed. D. Tadić,

HAZU, Zagreb, 2002, pp. 67-91 Quantum Physics and Astrophysics
K. Kumerički and I. Picek, in NEUTRINO 2002, Proceedings of the XXth Int. Conf. on Neutrino Physics and Astrophysics, Nuclear Physics B (Proc. Suppl.) 118 (2003) 497 ed. F. von Felitzsch and N. Schmitz , On Selected Radiative Corrections to Nondiagonal Neutrino-Electron Interaction
K. Kumerički and I. Picek, J. Phys G29 (2003) 2335-2342
On distinguishing nonstandard interactions from radiative corrections in neutrino electron scattering
K. Kumerički and I. Picek, in Particle Physics in the New Millenium, Springer Verlag, 2003, 123-129, ed. J. Trampetić, J. Wess , Radiatively Induced Conversions of Massive Neutrinos
J.O. Eeg, K. Kumerički and I. Picek, Phys.Lett. B563 (2003) 87-92
On the Short Distance Part of the QCD Anomaly Contribution to the $b\rightarrow s\eta '$ Amplitude
J.O. Eeg, K. Kumerički and I. Picek in Particle Physics and the Universe, Springer Verlag, 2005, 465-468, ed. J. Trampetić, J. Wess, On the Singlet Penguin in B-->s eta' Decay
J.O. Eeg, K. Kumerički and I. Picek, e-Print Archive: hep-ph/0506152
Soft gluon contributions to the B ---> K eta-prime amplitude in a low energy bosonization model.

PUBLICATIONS QULIFYING FOR LECTURSHIP:
J. O. Eeg and I. Picek, Phys. Lett. 112B (1982) 59-62
Relevance of the 3q-Annihilation and the Radiative Proton Decay
S. Meljanac, D. Palle, I. Picek and D. Tadić, Nucl. Phys. B206 (1982) 298-308
Baryon Poles in Proton Decay Amplitudes
H. B. Nielsen and I. Picek, Nucl. Phys. B211 (1983) 269-296
Lorentz Non-Invariance
J. O. Eeg and I. Picek, Nucl. Phys. B244 (1984) 77-104
Two-Loop Diagrams for the Electric Dipole Moment of the Neutron
J. O. Eeg and I. Picek, Nucl.Phys. B292 (1987) 745-766
$K^0-\overline K^0$ Mixing at Three Loops: Short-Distance Double Penguin-Like Diagrams
J. O. Eeg and I. Picek, Phys.Lett. B196 (1987) 391-394
On Short-Distance CP-Violating Contribution to the $K_(L,S)\rightarrow\gamma\gamma$ Processes
J. O. Eeg and I. Picek, Z.Phys. C-Particles and Fields 39 (1988) 521-524
On the Double Penguin-Like Contributions to the $B^0-\overline B^0$ Mixing
D. L. Bennett, H. B. Nielsen and I. Picek, Phys.Lett. B208 (1988) 275-280
Understanding Fine Structure Constants and Three Generations
J. O. Eeg and I. Picek, Phys.Lett. B214 (1988) 651-656
Short-Distance CP-Violating Contribution to the $K_L \rightarrow\pi^0 e^+ e^-$ Decay
D. Klabučar and I. Picek, Phys. Lett. B231 (1989) 170-174
Baryomagnetic Moment and Strangeness of the Proton in a Topological Chiral Bag Model
A. J. Davies, S. Meljanac and I. Picek, Phys.Lett. B238 (1990) 431-434
Higgs and Top Mass From an Extremality Condition
D. Klabučar and I. Picek, Nucl. Phys. A514 (1990) 689-705
Vector and Axial Strangeness of the Proton in a Topological Chiral Bag Model
J. O. Eeg, B. Nižić and I. Picek, Phys.Lett. B244 (1990) 513-518
Direct CP Violation in $K_(L,S)->\gamma\gamma$ for Large Top Mass

J.O. Eeg, K. Kumerički and I. Picek, Eur. Phys. J C 1 (1998) 531-537 On the dispersive two-photon $K_L\rightarrow \mu^+ \mu^- $ amplitude (Bielefeld preprint BI-TP 96/08, Oslo preprint Oslo-TP-2-96 and Zagreb preprint ZTF-96/03, also hep-ph/9605337) D. Klabučar, K. Kumerički, B. Melić and I. Picek, Eur. Phys. J C 9 (1999) 589-599 On the instanton-induced portion of the nucleon strangeness, (Zagreb preprint ZTF-98/01, also hep-ph/9807357) J.O. Eeg, K. Kumerički and I. Picek, Eur. Phys. J C 17 (2000) 163-168 Bound-state effects in $\mu^+ e^- -->\gamma\gamma$, and $B^0 _s -->\gamma\gamma$ decays
DATE OF THE LAST PROMOTION: 09 December 1997

LECTURER: dr. sc. Kresimir Kumericki
AFFILIATION: Physics Department, University of Zagreb, Bijenicka c. 32, Croatia
E-MAIL AND WEB ADDRESS: kkumer@phy.hr http://www.phy.hr/~kkumer/
BIOGRAPHY: 1988-1993 studied physics at the University of Zagreb 1996 Master's degree at University of Zagreb (title: Electroweak radiative meson decays; advisor: prof. dr. sc. Ivica Picek) 1998 PhD in Physics at University of Zagreb (title: Rare decays of K mesons; advisor: prof. dr. sc. Ivica Picek) worked since 1993 at Theoretical Physics Department of the University of Zagreb as a Research Assistant, and since 2003 as Assistant Professor Research visits: University of Bielefeld (5x1months under EU contract), University of Oslo (3x1month and 1 semester in 2005), University of Regensburg (two semesters 2005-2006) Teaching: Symmetries in Physics, Symbolic programming. Previous teaching: exercises in: Physical Cosmology, Quantum physics and the structure of matter, Introduction to energetics, Relativistic quantum physics. Also, teaching Feynman Diagrams for Beginners" at the international postgraduate summer school Adriatic School on Particle Physics and Physics Informatics, Split, 2001
LIST OF PUBLICATIONS IN THE LAST FIVE YEARS: J. O. Eeg, K. Kumerički and I. Picek, The double radiative annihilation of the heavy-light fermion bound states, Fizika B10 (2001) 4, 285-306 (OSLO-TP-5-01 and ZAGREB-ZTF-00/02), also hep-ph/0203055 J. O. Eeg, K. Kumerički and I. Picek, On the Short Distance Part of the QCD Anomaly Contribution to the b --> s eta' Amplitude, Phys. Lett. B563 (2003) 87-92, (OSLO-TP 2-03, ZAGREB-ZTF-03-01), also hep-ph/0304274 D. Klabučar, K. Kumerički, D. Mekterović and B. Podobnik, On the instanton-induced portion of the nucleon strangeness II: the MIT model beyond the linearized approximation, Eur. Phys. J. C29 (2003) 71-78, (Zagreb preprint ZTF-03/02, also hep-ph/0304083 K. Kumerički and I. Picek, On Distinguishing Non-Standard Interactions from Radiative Corrections in Neutrino-Electron Scattering, J. Phys. G29 (2003) 2335 - 2342, (ZAGREB-ZTF-03/03), also hep-ph/0204072) J. O. Eeg, K. Kumerički and I. Picek, Soft gluon contributions to the B --> K eta' amplitude in a low energy bosonization model , J. Phys. G32 (2006) 2081 - 2087, (OSLO-TP 2-05, ZAGREB-ZTF-05-01), also hep-ph/0506152 K. Kumerički, D. Müller, K. Passek-Kumerički and A. Schäfer, Deeply virtual Compton scattering beyond next-to-leading order: the flavor singlet case (2006), hep-ph/0605237)
PUBLICATIONS QULIFYING FOR LECTURSHIP: - (same as the above)
DATE OF THE LAST PROMOTION: 1 Dec 2003

LECTURER: Dr Krešo Kadija
AFFILIATION: Rudjer Boskovic Institute
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BIOGRAPHY:

PERSONAL INFORMATION

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E-mail(s), Web address(s)	kadija@joshua.irb.hr
Nationality(-ies)	Croatian
Date of birth	18.09.1954

WORK EXPERIENCE

• Dates (from – to)	From 1.08.1998- present
Name and address of employer	Rudjer Boskovic Institute, Bijenicka 54, HR-10002 Zagreb, Croatia
Type of business or sector	National research institute
Occupation or position held	Senior scientist (from 2004)
Main activities and responsibilities	Science, education- Head of “High energy physics” laboratory
• Dates (from – to)	1.01.2001-1.01.2002
Name and address of employer	CERN, CH-1211 Geneve, Switzerland
Type of business or sector	International laboratory
Occupation or position held	Research associate
Main activities and responsibilities	Experimental high energy physics
• Dates (from – to)	21.08.1992-20.02.1998
Name and address of employer	Max-Planck-Institut fuer Physik und Astrophysik, Foehringer ring 6, Muenchen, Germany
Type of business or sector	National research institute
Occupation or position held	Research associate
Main activities and responsibilities	Experimental high energy physics
• Dates (from – to)	1.01.1980-1.08.1994

LIST OF PUBLICATIONS IN THE LAST FIVE YEARS:

1. C. Alt et al., Phys. Rev. C73 (2006) 044910
2. C. Alt et al., Eur. Phys. J C45 (2006) 343-381
3. C. Alt et al., Phys. Rev. C73 (2006) 034910
4. K. Kadija et al., J. Phys. G30 (2004) S1359-S1362
5. C. Alt et al., Phys. Rev. C71 (2005) 034903
6. C. Alt et al., Phys. Rev. Lett. 94 (2005) 192301
7. C. Alt et al., Phys. Rev. Lett. 94 (2005) 052301
8. C. Alt et al., Phys. Rev. C70 (2004) 064903
9. T. Antičić et al., Phys. Rev. C69 (2004) 024902
10. T. Antičić et al., Phys. Rev. Lett. 93 (2004) 022302
11. T. Antičić et al., Phys. Rev. C70 (2004) 034902
12. C. Alt et al., Phys. Rev. Lett. 92 (2003) 042003
13. D. Cozza et al., Nucl. Instr. Meth. A502 (2003) 101
14. C. Alt et al., J. Phys. G30 (2004) S119-S128
15. C. Alt et al., Phys. Rev. C68 (2003) 034903
16. S. V. Afanasiev et al., Phys. Lett. B557 (2003) 157-166
17. A. Mischke et al., Nucl. Phys. A715 (2003) 453-457
18. C. Blume et al., Nucl. Phys. A715 (2003) 55-64
19. S. V. Afanasiev et al., Nucl. Phys. A715 (2003) 161-170
20. T. Antičić, S. Horvat, K. Kadija and T. Šuša, Fizika B10 (2001) 269-278
21. S. V. Afanasiev et al., Phys. Rev. C66 (2002) 054902
22. S. V. Afanasiev et al., Nucl. Phys. A698 (2002) 104-111
23. S. V. Afanasiev et al., Phys. Lett. B538 (2002) 275-281
24. A. Mischke et al., J. Phys. G28 (2002) 1761-1768
25. K. Kadija , J. Phys. G28 (2002) 1675-1682
26. S. V. Afanasiev, J. Phys. G28 (2002) 1761-1768

PUBLICATIONS QULIFYING FOR LECTURSHIP:

H. Appelshauser et al. (NA49 Collaboration-CERN), Baryon stopping and charge particle distributions in central Pb+Pb collisions at 158-GeV per nucleon, Phys. Rev. Lett. 82 (1999) 2471-2475 (Cited 166 times)

H. Appelshauser et al. (NA49 Collaboration-CERN), Hadronic expansion dynamics in central Pb+Pb collisions at 158-GeV per nucleon,
Eur. Phys. J. C2 (1998) 661-670 (Cited 130 times)

H. Appelshauser et al. (NA49 Collaboration-CERN), Directed and eliptic flow in 158 GeV per nucleon Pb+Pb collisions, Phys. Rev. Lett. 80 (1998) 4136-4140 (Cited 128 times)

T. Alber et al. (NA35 Collaboration-CERN), Strange particle production in nuclear collisions at 200-GeV per nucleon,
Z. Phys. C64 (1994) 195-207 (Cited 117 times)

J. Bartke et al. (NA35 Collaboration-CERN), Neutral strange particle production in sulphur and proton sulphur collisions at 200-GeV/nucleon,
Z. Phys. C48 (1990) 191-200 (Cited 143 times)

M. R. Adams et al. (E665 Collaboration- Fermilab), Diffractive production of rho0(770) mesons in muon- proton interactions at 470- GeV, Z. Phys. C74 (1997) 237-261 (Cited 61 times)

M. R. Adams et al. (E665 Collaboration- Fermilab), Lambda and anti-lambda polarization from deep inelastic muon scattering, Eur. Phys. J. C17 (2000) 263-267 (Cited 34 times)

M. R. Adams et al. (E665 Collaboration- Fermilab), Nuclear shadowing, diffractive

scattering and low momentum protons in mu Xe interactions at 490-GeV, Z. Phys. C65 (1995) 225-244 (Cited 23 times) P. Cortese et al. (ALICE Collaboration-CERN), Addendum to the technical design report of time of flight system (TOF), CERN-LHCC-2002-016, April 2002, 154 pp. D. Cozza et al., The CSI-based RICH detector array for the identification of high momentum particles in ALICE, Nucl. Instrum. Meth. A502 (2003) 101-107
DATE OF THE LAST PROMOTION: Senior Scientist :11.05. 2004

LECTURER: Miroslav Furić

AFFILIATION: Faculty of Sciences and Mathematics, University of Zagreb

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BIOGRAPHY: Born: Davor, Jan. 31, 1941
Education: B.Sc. 1964, Faculty of Sciences and Mathematics (FSM), Zagreb University
Ph.D. 1970, FSM, Zagreb University
Employment/ Experience: Assistant, Institute R. Boskovic (IRB) Zagreb1965/70
Research associate Univ. South. California, L.A. 1971/72
Research associate, Rice Univ. Houston, Texas1972/74
Scientific associate, IRB Zagreb 1975
Scientific associate, CERN, Geneva 1975/1976
Senior research associate, Rice Univ. Houston 1977/79
Higher scientific associate, IRB Zagreb 1979
Associate professor , FSM 1980
Professor of Physics, FSM 1986
During period 1986-1992 was a Chairman of Department while the new building was planned, built and equipped .
Teaching: 1980 : Reactor Physics, Physics of Experimental Methods and Nuclear physics. Presently: Experimental methods of Modern Physics, General Physics 1-4 (similar to Berkeley course of Physics), Experimental methods in High Energy Physics, author of the university textbook.
Research interests: Started with neutron induced nuclear reactions. At L.A. cyclotron: Mechanisms of reactions leading to multiparticle final states,
Studies of nucleon and pion induced processes (LAMPF) Los Alamos
Nucleon-nucleon interactions (Argonne Natl. Lab)
Pion absorption in nuclei (CERN and PSI)
Hypernuclear physics (Brookhaven and CEBAF)
Coauthor of about seventy Current Contents papers
Prizes/recognitions: Croatian scientific prize: R. Boskovic (1987), Croatian Academy prize: J. J. Strossmayer (1992) Fellow of the IOP (UK) since year 2000.

LIST OF PUBLICATIONS IN THE LAST FIVE YEARS:

1)L.Yuan, M. Sarsour,...M.Furić...et al. «Hypernuclear spectroscopy using the (e.e'K+) reaction» Phys. Rev. C73, 044607 (2006)
2)S.N. Nakamura, O.Hashimoto,...M.Furić...et al. «Future hypernuclear program at Jlab
3)M.W. Ahmed, X.Cui,...M.Furić...et al. «Experimental study of the 12C(K-stop,Pi-zero)B12lambda reaction» Phys.Rev. C68, 064004 (2003)
4)T.Miyoshi, M.Sarsour,...M.Furić...et al. «High resolution spectroscopy of the 12(lambda)B hypernucleus produced by the (e,e'K+) Reaction» Phys.Rev. Lett. 90,232502 (2003)
5)M.W.Ahmed, D.Androić,...M.Furić...et al. «The construction and operating characteristics of a cathode strip chamber designed to measure the reaction vertices of a stopping kaon beam» Nucl.Instr.and Meth. in Phys. Res. A469,95-105,2001
6)B.Kotlinski, D.Androić,...M.Furić...et al. «Pion absorption reactions on N,Ar and Xe» The European Physical Journal A9,537-552 (2000)

PUBLICATIONS QUALIFYING FOR LECTURSHIP:
The above publications and those resulting from the experiments at AGS, CERN and ANL

which can be seen at the WEB address given above.
DATE OF THE LAST PROMOTION: Became Tenured Professor of Physics in 1996.

LECTURER: Prof. dr. Mirko Planinić

AFFILIATION: University of Zagreb, Faculty of Science, Departement of Physics

E-MAIL AND WEB ADDRESS: planinic@phy.hr , http://www.phy.hr/~planinic

BIOGRAPHY*:*

date of birth: November 28, 1966

place of birth: Zagreb, Croatia

marital status: married, three children

Education:

Ph.D. Physics, University of Zagreb, Experimental Medium Energy Nuclear Physics, 1997-1999., published in Phys.Rev.C61:054604,2000, "Production mechanisms for deuterons in pion absorption on ^{4}He".

M.S. Physics, University of Zagreb, Experimental Medium Energy Nuclear Physics, 1994-1997, "Two nucleon and three nucleon component of cross section for pion absorption on ^{3}He".

B.S. Physics, University of Zagreb, Experimental Medium Energy Nuclear Physics, 1986-1993, "Calibration of the LADS detector and cross section measurement for the process π^++dp+p"

Appointments :

Associate Professor, University of Zagreb, Zagreb, Croatia (2008-present)

Assistant Professor, University of Zagreb, Zagreb, Croatia (2003 – 2008)

Research Associate, Indiana University Cyclotron Facility, Bloomington, IN, USA (2000-2002)

Professional, research:

CMS experiment, co-worker with Rudjer Boskovic Institute group, 5 collaborators

STAR experiment at Brookhaven National Lab(co-worker), Collaborators in Indiana group ~ 15, group was building Electromagnetic Calorimeter for the STAR detector (2000-2002)

Leader of the University of Zagreb group in the STAR experiment (2003-), we were involved in building and installing of the Forward Meson Spectrometer

LIST OF PUBLICATIONS IN THE LAST FIVE YEARS:

1. "Study of di-boson production with the CMS detector at LHC" , V. Brigljevic et al.
J. Phys. G: Nucl. Part. Phys. 34 N269-N295 (2007)
2. "CMS Physics Technical Design Report, Volume II: Physics Performance" [CMS Collaboration]
J. Phys. G: Nucl. Part. Phys. 34 995-1579 (2007)

3. “Global polarization measurement in Au+Au collisions” B. I. Abelev et al. [STAR Collaboration]
Phys. Rev. C 76, 024915 (2007) [arXiv:0705.1691 [nucl-ex]]
4. “Partonic flow and Phi-meson production in Au + Au collisions at psNN = 200-GeV”
B. I. Abelev et al. [STAR Collaboration]
Phys. Rev. Lett. 99, 112301 (2007) [arXiv:nucl-ex/0703033]
5. “Mass, quark-number, and psNN dependence of the second and fourth flow harmonics in ultrarelativistic
nucleus nucleus collisions” B. I. Abelev et al. [the STAR Collaboration]
Phys. Rev. C 75, 054906 (2007) [arXiv:nucl-ex/0701010]
6. “Neutral kaon interferometry in Au + Au collisions at psNN = 200-GeV”, B. I. Abelev et al.
Phys. Rev. C 74, 054902 (2006) [arXiv:nucl-ex/0608012]
7. “Longitudinal double-spin asymmetry and cross section for inclusive jet production in polarized
proton collisions at ps = 200-GeV” , B. I. Abelev et al. [STAR Collaboration]
Phys. Rev. Lett. 97, 252001 (2006) [arXiv:hep-ex/0608030]
8. “Delta(phi) Delta(eta) correlations in central Au + Au collisions at psNN = 200-GeV”
J. Adams et al. [Star Collaboration]
Phys. Rev. C 75, 034901 (2007) [arXiv:nucl-ex/0607003]
9. “Transverse momentum and centrality dependence of high-pt non-photonic electron suppression
in Au+Au collisions at psNN = 200 GeV”, B. I. Abelev et al. [STAR Collaboration]
Phys. Rev. Lett. 98, 192301 (2007) [arXiv:nucl-ex/0607012]
10. “Strange particle production in p + p collisions at ps = 200-GeV”
B. I. Abelev et al. [STAR Collaboration]
Phys. Rev. C 75, 064901 (2007) [arXiv:nucl-ex/0607033]
11. “Identified baryon and meson distributions at large transverse momenta from Au + Au collisions
at psNN = 200-GeV”, B. I. Abelev et al. [STAR Collaboration]
Phys. Rev. Lett. 97, 152301 (2006) [arXiv:nucl-ex/0606003]
12. “Scaling Properties of Hyperon Production in Au+Au Collisions at psNN = 200 GeV”
J. Adams et al. [STAR Collaboration]
Phys. Rev. Lett. 98, 062301 (2007) [arXiv:nucl-ex/0606014]
13. “The multiplicity dependence of inclusive p(t) spectra from p p collisions at ps = 200-GeV”
J. Adams et al. [STAR Collaboration]
Phys. Rev. D 74, 032006 (2006) [arXiv:nucl-ex/0606028]
14. “The energy dependence of p(t) angular correlations inferred from mean-p(t) fluctuation scale
dependence in heavy ion collisions at the SPS and RHIC”
J. Adams et al. [STAR Collaboration]
J. Phys. G 33, 451 (2007) [arXiv:nucl-ex/0605021]
15. “Direct observation of dijets in central Au + Au collisions at psNN = 200-GeV”
J. Adams et al. [STAR Collaboration]
Phys. Rev. Lett. 97, 162301 (2006) [arXiv:nucl-ex/0604018]
16. “Strange baryon resonance production in psNN = 200-GeV p + p and Au + Au collisions”

J. Adams et al. [STAR Collaboration]
Phys. Rev. Lett. 97, 132301 (2006) [arXiv:nucl-ex/0604019]
17. “Forward neutral pion production in p+p and d+Au collisions at psNN = 200-GeV”
J. Adams et al. [STAR Collaboration]
Phys. Rev. Lett. 97, 152302 (2006) [arXiv:nucl-ex/0602011]
18. “Measurement of the Absolute Differential Cross Section for np Elastic Scattering at 194 MeV”
M. Sarsour et al.
Phys. Rev. C 74, 044003 (2006) [arXiv:nucl-ex/0602017]
19. “Identified hadron spectra at large transverse momentum in p + p and d + Au collisions at psNN
= 200-GeV”, J. Adams et al. [STAR Collaboration]
Phys. Lett. B 637, 161 (2006) [arXiv:nucl-ex/0601033]
20. “Proton Lambda correlations in central Au + Au collisions at psNN = 200-GeV”
J. Adams et al. [STAR Collaboration]
Phys. Rev. C 74, 064906 (2006) [arXiv:nucl-ex/0511003]
21. “Multiplicity and pseudorapidity distributions of charged particles and photons at forward pseudorapidity
in Au + Au collisions at psNN = 62.4-GeV”
J. Adams et al. [STAR Collaboration]
Phys. Rev. C 73, 034906 (2006) [arXiv:nucl-ex/0511026]
22. “Strangelet search at RHIC”
V. Abelev et al. [STAR Collaboration]
Phys. Rev. C 76, 011901 (2007) [arXiv:nucl-ex/0511047]
23. “Directed flow in Au + Au collisions at psNN = 62-GeV”
J. Adams et al. [STAR Collaboration]
Phys. Rev. C 73, 034903 (2006) [arXiv:nucl-ex/0510053]
24. “Transverse-momentum p(t) correlations on (eta,Phi) from mean-p(t) fluctuations in Au - Au
collisions at psNN = 200-GeV”, J. Adams et al. [STAR Collaboration]
J. Phys. G 32, L37 (2006) [arXiv:nucl-ex/0509030]
25. “Multi-strange baryon elliptic flow in Au + Au collisions at psNN = 200-GeV”
J. Adams et al. [STAR Collaboration]
Phys. Rev. Lett. 95, 122301 (2005) [arXiv:nucl-ex/0504022]
26. “Incident energy dependence of p(t) correlations at RHIC”, J. Adams et al. [STAR Collaboration]
Phys. Rev. C 72, 044902 (2005) [arXiv:nucl-ex/0504031]
27. “Multiplicity and pseudorapidity distributions of photons in Au + Au collisions at psNN = 62.4-
GeV” , J. Adams et al. [STAR Collaboration]
Phys. Rev. Lett. 95, 062301 (2005) [arXiv:nucl-ex/0502008]
28. “Experimental and theoretical challenges in the search for the quark gluon plasma: The STAR
collaboration’s critical assessment of the evidence from RHIC collisions”
J. Adams et al. [STAR Collaboration]
Nucl. Phys. A 757, 102 (2005) [arXiv:nucl-ex/0501009]
29. “Distributions of charged hadrons associated with high transverse momentum particles in p p and

Au + Au collisions at psNN = 200-GeV"
J. Adams et al. [STAR Collaboration]
Phys. Rev. Lett. 95, 152301 (2005) [arXiv:nucl-ex/0501016]

30. "K*(892) resonance production in Au + Au and p + p collisions at psNN = 200-GeV at STAR"
J. Adams et al. [STAR Collaboration]
Phys. Rev. C 71, 064902 (2005) [arXiv:nucl-ex/0412019]

31. "Measurement of the Absolute np Scattering Differential Cross Section at 194 MeV"
M. Sarsour et al.,
Phys. Rev. Lett. 94, 082303 (2005) [arXiv:nucl-ex/0412026]

PUBLICATIONS QULIFYING FOR LECTURSHIP:

1. "Study of di-boson production with the CMS detector at LHC"
V. Brigljevic et al. J. Phys. G: Nucl. Part. Phys. 34 N269-N295 (2007)
2. "CMS Physics Technical Design Report, Volume II: Physics Performance"
[CMS Collaboration] J. Phys. G: Nucl. Part. Phys. 34 995-1579 (2007)
3. "Longitudinal double-spin asymmetry and cross section for inclusive jet production in polarized proton collisions at sqrt(s) = 200-GeV" B. I. Abelev et al. [STAR Collaboration]
Phys. Rev. Lett. 97, 252001 (2006)
4. "Cross sections and transverse single-spin asymmetries in forward neutral pion production
from proton collisions at sqrt(s) = 200-GeV" J. Adams et al. [STAR Collaboration]
Phys. Rev. Lett. 92, 171801 (2004)
5. "The STAR endcap electromagnetic calorimeter" C. E. Allgower et al.
Nucl. Instrum. Meth. A 499, 740 (2003)
6. "The STAR barrel electromagnetic calorimeter" M. Beddo et al.
Nucl. Instrum. Meth. A 499, 725 (2003)

DATE OF THE LAST PROMOTION: 1. 9. 2008. (associate professor)

LECTURER: Alfred Švarc

AFFILIATION: Ruđer Bošković Institute

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BIOGRAPHY:
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Nationality(-ies) Croatian
Date of birth 15.11.1952.
Identification number from Records of Scientific Workers 48716

LIST OF PUBLICATIONS IN THE LAST FIVE YEARS:

159. Ceci S.; Švarc, A.; Zauner, B. : The importance of the eta exchange in pp → ppη process to T_lab = 4.5 GeV, Physica Scripta 73 (2006) 663-671.

160. Ceci, S.; Švarc, A.; Zauner, B.: The re-analysis of the 1700 MeV structure of the P11 partial wave using the $\pi N \rightarrow K \Lambda$ production data, prihvaćeno za objavljivanje u Few Body Systems (2006).

161. Tippens, W.B.;… Švarc, A….: Measurement of charge symmetry breaking by the comparison of π +d --> pp η with π -d -→ n n η , Phys .Rev.D. 63 (2001) 052001.

162. Švarc, A.; Ceci, S. and Zauner B, The importance of inelastic channels in eliminating continuum ambiguities in pion-nucleon partial wave analyses, Plenary talk at International Workshop on the Physics of Excited Baryons (NSTAR 05), Tallahassee, Florida, 10-15 Oct 2005., hep-ph/0601033

163. Zauner, B., Ceci, S, Švarc, A; Zauner, The importance of Pl N ---> K Λ process for the pole structure of the P11 partial wave T-matrix in the coupled channel pion-nucleon partial wave analysis, Talk given at International Workshop on the Physics of Excited Baryons (NSTAR 05), Tallahassee, Florida, 10-15 Oct 2005. hep-ph/0601035

164. Ceci, S; Švarc, A; Zauner, B., The re-analysis of the 1700-MEV structure of the P11partial wave using the pi N --> K Λ production data , hep-ph/0512337

165. Ceci, S; Švarc, A; Zauner B., Presence of Extra P11 Resonances in Zagreb Analysis Since 1995, Brag 2204 Workshop, Grenoble, France, 23 Mar 2004., nucl-th/0406058

166. Ceci, S; Švarc, A; Zaune, B., Nucleon resonances and processes involving strange particles, Workshop on the Physics of Excited Nucleons (NSTAR 2004), Grenoble, France, 24-27 Mar 2004.nucl-th/0406057

167. Ceci, S; Švarc, A; Zauner, B., The N(1710)P11 state is confirmed in the re-analysis of the pi N --> K Lambda production; it is a good candidate for a non-strange pentaquark, nucl-th/0406055

168. Ceci, S; Švarc, A; Zauner, B.,The detailed mechanism of the eta production

in pp scattering up to the Tlab = 4.5 GeV, nucl-th/0402040

169. Ceci, S; Švarc, A; Eta Production in the pp Scattering, 18th European Conference on Few-Body Problems in Physics, Bled, Slovenia, 8-14 Sep 2002., nucl-th/0301036

170. Švarc, A., Ceci, S., Test of multiresonance coupled channel PW T- matrices in three body processes, NSTAR 2002 Workshop on the Physics of Excited Nucleons, Pittsburgh, Pennsylvania, 9-12 Oct 2002.

171. Ceci, S; Švarc, A; Detailed analysis of eta production in proton-proton collisions, Physics of Excited Nucleons (NSTAR 2001), Mainz, Germany, 7-10 Mar 2001, nucl-th/0105004

172. Ceci, S; Švarc, A; Zauner, B., The importance of the nucleon-nucleon correlations for the eta alpha S-wave scattering length, and the pi-eta mixing angle in the low-energy eta alpha scattering length model, nucl-th/0104038

PUBLICATIONS QULIFYING FOR LECTURSHIP:

DATE OF THE LAST PROMOTION: senior scientist II 12. 05. 2004.

LECTURER: Prof. dr. sc. Dubravko Klabučar

AFFILIATION: Physics Department, Faculty of Science (PMF), University of Zagreb

E-MAIL AND WEB ADDRESS: klabucar@phy.hr , http://www.phy.hr/~klabucar/

BIOGRAPHY:

Dubravko Klabučar was born 21. of September 1958. in Slavonski Brod, Croatia. He graduated physics in Zagreb in 1981. His interest in the substructure of hadrons prompted him to continue his postgraduate physics studies at State University of New York at Stony Brook, USA, which he completed in 1986 with the doctoral thesis "Interplay of quark and meson degrees of freedom in some models of hadrons". This approach to hadrons as relativistic bound states of quarks was further pursued during his postdoctoral fellowship 1986/87 at Max-Planck-Institut für Kernphysik in Heidelberg, Germany, where he studied the method of discretized light cone quantization, and later, after his return in 1987 to Croatia (to Ruđer Bošković Institute in Zagreb), when application of Dyson-Schwinger approach to mesons and their processes gradually became his main interest to this day.
In 1992, D. Klabučar became an assistant professor at Physics Department of Faculty of Science of University of Zagreb. In 1997, the Faculty of Science Council elected him an associate professor, and in 2002 a full professor. In 2004, he was appointed a Senior Associate of Abdus Salam International Centre for Theoretical Physics in Trieste, Italy. Among undergraduate courses at the Physics Department, he has been teaching "Quantum Physics and the Structure of Matter", "Electromagnetic Waves and Optics", and supervising "Seminary on the Structure of Matter". Among the postgraduate courses, he introduced and has been teaching the course "Hadronic Physics".

LIST OF PUBLICATIONS IN THE LAST FIVE YEARS:

D. Kekez and D. Klabučar, "eta and eta' mesons and dimension 2 gluon condensate", Phys. Rev. D 73 (2006) 036002 [arXiv: hep-ph/0512064] .
D. Kekez, D. Klabučar and M. D. Scadron, "Bypassing the axial anomalies", Int. J. Mod. Phys. A 20 (2005) 6189 [arXiv: hep-ph/0512123].
D. Kekez and D. Klabučar, "Pseudoscalar q-antiq mesons and effective QCD coupling enhanced by A^2 condensate", Phys. Rev. D 71 (2005) 014004 [arXiv: hep-ph/0307110].
D. Kekez and D. Klabučar, "A Bethe-Salpeter-equation study with the A^2-enhanced effective QCD coupling", Fizika B 13 (2004) 461.
D. Klabučar, K. Kumerički, D. Mekterović and B. Podobnik:``On the instanton-induced portion of the nucleon strangeness. II: The MIT model beyond the linearized approximation", Eur. Phys. J. C 29 (2003) 71 [arXiv: hep-ph/0304083].
D. Kekez and D. Klabučar: "eta'-eta in a coupled Schwinger-Dyson and Bethe-Salpeter approach. II. The gamma^* gamma transition form factors", Phys. Rev. D 65 (2002) 057901 [arXiv: hep-ph/0110019].
D. Kekez, D. Klabučar and M. Scadron: ``Dynamical SU(3) linear sigma model and the mixing of eta'-eta and sigma-f_0 mesons", J. Phys. G: Nucl. Part. Phys. {\bf 27} (2001) 1775-1784 [arXiv: hep-ph/0101324].

PUBLICATIONS QUALIFYING FOR LECTURSHIP:

D. Kekez and D. Klabučar, "eta and eta' mesons and dimension 2 gluon condensate", Phys. Rev. D 73 (2006) 036002 [arXiv: hep-ph/0512064] .
D. Kekez, D. Klabučar and M. D. Scadron, "Bypassing the axial anomalies", Int. J. Mod. Phys. A 20 (2005) 6189 [arXiv: hep-ph/0512123].

D. Kekez and D. Klabučar, “Pseudoscalar q-antiq mesons and effective QCD coupling enhanced by A^2 condensate”, Phys. Rev. D 71 (2005) 014004 [arXiv: hep-ph/0307110].
D. Kekez, D. Klabučar, M. Scadron: “Revisiting the U_A(1) problems”, J. Phys. G: Nucl. Part. Phys. 26 (2000) 1335-1354 [arXiv:hep-ph/0003234].
B. Bistrović and D. Klabučar: “Anomalous gamma --> 3 pi amplitude in a bound-state approach”, Phys. Lett. B 478 (2000) 127-136.
B. Bistrović and D. Klabučar: “Quark loop calculation of the gamma -->3 pi form factor”, Phys. Rev. D 61 (2000) 033006-1 – 033006-6.
D. Kekez and D. Klabučar: “gamma^*gamma --> pi^0 transition and asymptotics of gamma^*gamma and gamma^*gamma^* transitions of unflavored pseudoscalar mesons”, Phys. Lett. B457 (1999) 359-367.
D. Kekez, B. Bistrović and D. Klabučar: “Application of Jain and Munczek's bound--state approach to gamma gamma - processes of pi^0, eta_c and eta_b”, Int. J. Mod. Phys. A 14 (1999) 161-194.
D. Klabučar and D. Kekez: “eta and eta' in a coupled Schwinger-Dyson and Bethe-Salpeter approach”, Phys. Rev. D 58 (1998) 096003-1 – 096003-16.
D. Klabučar: “Instantons and baryon mass splittings in the MIT bag model”, Phys. Rev. D 49 (1994) 1506-1512.
T.H. Hansson, D. Klabučar and I. Zahed: “Dynamical Pions and Kaons in the Glueball Condensate Vacuum”, Phys. Rev. D 36 (1987) 233-241.
D. Klabučar and G.E. Brown: “Two-Phase Model with Vector-Meson Stabilisation”, Nucl. Phys. A 454 (1986) 589-605.

DATE OF THE LAST PROMOTION: 9. of May 2002.

LECTURER: Stjepan Meljanac

AFFILIATION: Ruđer Bošković Institute

E-MAIL AND WEB ADDRESS: meljanac@irb.hr http://thphys.irb.hr/Djelat/meljanac.htm

BIOGRAPHY:
Date and place of birth: 5 January 1952- Osijek, Croatia
Graduation: University of Zagreb, Croatia, 1976
M. Sc., University of Zagreb, 1979
Ph. D., University of Zagreb, 1982
Languages: Croatian, English
Family status: married, two children
POST HELD
1979/80 Istituto "Guglielmo Marconi", Rome, Italia
1984-1986 Alexander von Humboldt fellow at the Institut fuer Theoretische Physik, Universitaet Dortmund, Germany
1987 DIAS Institute, Dublin, Ireland
1987/88 School of Physics, University of Melbourne, Australia
Research Positions
1981-1984 Research Assistant
1984-1988 Research Associate (corresponds to Assistant Professor at University) at the Rudjer Boskovic Institute, University of Zagreb
1988-1998 Senior Research Associate (corresponds Associate Professor at University) at the Rudjer Boskovic Institute, Universtiy of Zagreb
1998- Senior Scientist (corresponds to Full Professor at University) at the Rudjer Boskovic Institute, Universtiy of Zagreb
2003- Senior Scientist (corresponds to Full Professor at University) at the Rudjer Boskovic Institute, Universtiy of Zagreb, reelection

LIST OF PUBLICATIONS IN THE LAST FIVE YEARS:
Meljanac, Stjepan; Samsarov, Anđelo. Matrix oscillator and Laughlin Hall states. // Phys. Lett. A 351 (2006) 246-253.
Bardek, Velimir; Meljanac, Stjepan.Comment on "Solitons and excitations in the duality-based matrix model". // Journal of High Energy Physics. 12 (2005) 040
Bardek, Velimir; Meljanac, Stjepan.Solitons in the Calogero model for distinguishable particles. // Europhysics Letters. 72 (2005) ; 14
Fukuyama, Takeshi; Ilakovac, Amon; Kikuchi, Tatsuru; Meljanac, Stjepan; Okada, Nobuchika.SO(10) group theory for the unified model building. // Journal of Mathematical Physics. 46 (2005) ; 033505
Fukuyama, Takeshi; Ilakovac, Amon; Kikuchi, Tatsuru; Meljanac, Stjepan; Okada, Nobuchika.General formulation for proton decay rate in minimal supersymmetric SO(10) gut. // European Physical Journal C-Particles & Fields. 42 (2005) , 2; 191-203
Fukuyama, Takeshi; Ilakovac, Amon; Kikuchi, Tatsuru; Meljanac, Stjepan; Okada, Nobuchika.Higgs masses in the minimal SUSY SO(10) GUT. // Physical Review D. 72 (2005) ; 051701
Meljanac, Stjepan; Samsarov, Anđelo.Universal properties of conformal quantum many-body systems. // Physics Letters B. 613 (2005) , 3-4; 221-225

Dadić, Ivan; Jonke, Larisa; Meljanac, Stjepan.Harmonic oscillator on noncommutative spaces. // Acta Physica Slovaca. 55 (2005) ; 149-164
Fukuyama, Takeshi; Ilakovac, Amon; Kikuchi, Tatsuru; Meljanac, Stjepan; Okada, Nobuchika.Detailed Analysis of Proton Decay Rate in Minimal Supersymmetric SO(10) model. // Journal of High Energy Physics. 0409 (2004) , 09; 052
Meljanac, Stjepan; Samsarov, Anđelo.Matrix oscillator and Calogero-type models. // Physics Letters B. 600 (2004) , 1; 179-184
Meljanac, Stjepan; Mileković, Marijan; Samsarov, Anđelo.Generalized Calogero model in arbitrary dimensions. // Physics Letters B. 594 (2004) , 1-2; 241-246
Meljanac, Stjepan; Mileković, Marijan; Samsarov, Anđelo; Stojić, Marko.Interacting families of Calogero-type particles and SU(1, 1) algebra. // Modern Physics Letters B. 18 (2004) , 12-13; 603-613
Meljanac, Stjepan; Mileković, Marijan; Samsarov, Anđelo.A multispecies Calogero model. // Physics Letters B. 573 (2003) , 1-4; 202-208
Dadić, Ivan; Jonke, Larisa; Meljanac, Stjepan.Harmonic oscillator with minimal length uncertainty relations and ladder operators. // Physical Review D. 67 (2003) ; 087701-087704
Jonke, Larisa; Meljanac, Stjepan.Representations of noncommutative quantum mechanics and symmetries. // European Physical Journal C. 29 (2003) ; 433-439
Meljanac, Stjepan; Perica, Ante; Svrtan, Dragutin.The energy operator for a model with a multiparametric infinite statistics. // Journal of Physics A. 36 (2003) ; 6337-6349
Bardek, Velimir; Jonke, Larisa; Meljanac, Stjepan; Mileković, Marijan.Calogero model, deformed oscillators and the collapse. // Physics Letters B. 531 (2002),3-4; 311-315
Bardek, Velimir; Meljanac, Stjepan.Analytical results for trapped weakly interacting bosons in two dimensions. // Physical Review A. 65 (2002) , 1; 013602
Jonke, Larisa; Meljanac, Stjepan.Finite Chern-Simons matrix model - algebraic approach. // Journal of High Energy Physics. 01 (2002) , 1; 008
Meljanac, Stjepan; Mileković, Marijan; Stojić, Marko.Permutation Invariant Algebras, a Fock Space Realization and the Calogero Model. // European Physical Journal C. 24 (2002) , 2; 331-343
Jonke, Larisa; Meljanac, Stjepan.Algebra of the observables in the Calogero model and in the Chern-Simons matrix model. // Physical Review B. 66 (2002) , 20; 205313
Jonke, Larisa; Meljanac, Stjepan.Bosonic realisation of algebras in the Calogero model. // Physics Letters B. 526 (2002) , 1-2; 149-156
Bardek, Velimir; Jonke, Larisa; Meljanac, Stjepan.Perturbative spectrum of trapped weakly interacting bosons in two dimensions. // Physical Review A. 64 (2001) , 1; 015603
Jonke, Larisa; Meljanac, Stjepan.Dynamical symmetry algebra of the Calogero model. // Physics Letters B. 511 (2001) , 2-4; 276-284

PUBLICATIONS QULIFYING FOR LECTURSHIP:
T. Huebsch, S. Meljanac, S. Pallua: "Symmetry Breaking of SU(n) Gauge Theories to Maximal Regular Subgroups and Fourth-Rank Tensors", Phys. Rev. D31 (1985) 352-363.
T. Huebsch, S. Meljanac, S. Pallua, G. G. Ross: "The Missing Multiplet Mechanism and 75 Breaking of Supersymmetric SU(5)", Phys. Lett. 161B (1985) 122-126.
S. Meljanac: "Origin of Counter-Examples to Michel's Conjecture", Phys. Lett. 168B (1986) 371-375.
J. Basecq, S. Meljanac, D. Pottinger: "Stable Absolute Minima of Higgs Potentials with High Rank Representations", Nucl. Phys. B292 (1987) 222-236.
J. Basecq, S. Meljanac, L. O'Raifeartaigh: "Stability of Spontaneous Symmetra Breaking in a Class of SO(10) Models", Phys. Rev. D39 (1989) 3110-3120.

S. Meljanac, M. Milekovic, S. Pallua: "Deformed SU(2) Heisenberg Chain", J. Phys. A: Math. Gen. 24 (1991) 581-591.
X.G. He , HYPERLINK "http://www.slac.stanford.edu/spires/find/wwwhepau/wwwscan?rawcmd=fin+"Meljanac,S."" S. Meljanac: Symmetry breaking and mass spectra in supersymmetric SO(10) models . Phys.Rev.D41:1620-1629,1990.
Takeshi Fukuyama , HYPERLINK "http://www.slac.stanford.edu/spires/find/wwwhepau/wwwscan?rawcmd=fin+"Ilakovac,Amon"" Amon Ilakovac, HYPERLINK "http://www.slac.stanford.edu/spires/find/wwwhepau/wwwscan?rawcmd=fin+"Kikuchi,Tatsuru"" Tatsuru Kikuchi, HYPERLINK "http://www.slac.stanford.edu/spires/find/wwwhepau/wwwscan?rawcmd=fin+"Meljanac,Stjepan"" Stjepan Meljanac, HYPERLINK "http://www.slac.stanford.edu/spires/find/wwwhepau/wwwscan?rawcmd=fin+"Okada,Nobuchika"" Nobuchika Okada : SO(10) group theory for the unified model building J.Math.Phys.46:033505,2005.
Takeshi Fukuyama , HYPERLINK "http://www.slac.stanford.edu/spires/find/wwwhepau/wwwscan?rawcmd=fin+"Ilakovac,Amon"" Amon Ilakovac, HYPERLINK "http://www.slac.stanford.edu/spires/find/wwwhepau/wwwscan?rawcmd=fin+"Kikuchi,Tatsuru"" Tatsuru Kikuchi, HYPERLINK "http://www.slac.stanford.edu/spires/find/wwwhepau/wwwscan?rawcmd=fin+"Meljanac,Stjepan"" Stjepan Meljanac, HYPERLINK "http://www.slac.stanford.edu/spires/find/wwwhepau/wwwscan?rawcmd=fin+"Okada,Nobuchika"" Nobuchika Okada: Detailed analysis of proton decay rate in the minimal supersymmetric SO(10) model JHEP 0409:052,2004

DATE OF THE LAST PROMOTION: reelected senior scientist 2003

LECTURER: MARIJAN MILEKOVIĆ

AFFILIATION: University of Zagreb,
Faculty of Science,
Physics Department / Department of Theoretical Physics

E-MAIL AND WEB ADDRESS: marijan@phy.hr www.phy.hr

BIOGRAPHY:
- Date of birth: 29.10.1959. in Sisak, Croatia
- Croatian citizenship
- Ph.D. in theoretical physics at University of Zagreb (1991.). Title of the thesis: "Classical and quantum group symmetries in preon models and spin systems".
- Assistant Professor at Physics Department/Department of Theoretical Physics, University of Zagreb (1998. – 2004.)
- Associate Professor at Physics Department/Department of Theoretical Physics, University of Zagreb (2004. -)
- Co-founder of "Southeastern European Network in Mathematical and Theoretical Physics" (SEENET-MTP) and member of its Executive and Representative Committee (see URL: http://seenet-mtp.pmf.ni.ac.yu)
- Member of Organizing Committee of several international conferences/schools: (BW2005 Workshop "II Southeastern European Workshop: Challenges Beyond the Standard Model, Vrnjacka Banja; SEENET-MTP workshop QM2005, Nis; International School on Modern Trends in Mathematical Physics 2006, Sofia; etc…)
- Speaker and invited speaker at several international conferences and workshops (Dubrovnik, Kazan, Prague, Kiev, Dubna…)
- For several years M.M. has held a course on "Group theory in physics" for the third year undergraduates at Physics Department, University of Zagreb.

LIST OF PUBLICATIONS IN THE LAST FIVE YEARS:
1. M. Mileković, S. Meljanac and A. Samsarov: "Calogero model(s) and deformed oscillators",
SIGMA 2 (2006) 035.
2. M.Mileković, S.Meljanac, A.Samsarov and M.Stojić: "Fun and frustration with Calogero model", Czech. J. Phys. 55 (2005) 1487.
3. S. Meljanac, M.Mileković and A. Samsarov: "Aspects of generalized Calogero models", Czech. J. Phys. 54 (2004) 1359.
4. S.Meljanac, M.Mileković, A.Samsarov and M.Stojić: "Interacting families of Calogero-type particles and SU(1,1) algebra", Mod.Phys.Lett.B 18 (2004) 603.
5. S. Meljanac, M.Mileković and A. Samsarov: "Generalized Calogero model in arbitrary dimensions", Phys.Lett. B594 (2004) 241.
6. S. Meljanac, M.Mileković and A. Samsarov: "A multispecies Calogero model", Phys.Lett. B573 (2003) 202.
7. S.Meljanac, M.Mileković and M.Stojić: "Permutation invariant algebras, a Fock space realization and the Calogero model", Eur.Phys.J. C24 (2002) 331.
8. V.Bardek, L.Jonke, S.Meljanac and M.Mileković: "Calogero model, deformed oscillators and the collapse", Phys. Lett. B 531 (2002) 311.

PUBLICATIONS QULIFYING FOR LECTURSHIP:
In addition to items listed in the previous list, the following older papers also involve some group-theoretical analysis:

1. S.Meljanac and M.Milekovi: “On the new algebra related to the non-standard R-matrix”, J.Phys. A26 (1993) L897.
2. S.Meljanac and M.Milekovi: “On the Clebsch-Gordan coefficients for the two-parameter quantum algebra SU(2)_{p,q}”, J.Phys. A26 (1993) 5177.
3. S.Meljanac and M.Milekovi: “Covariant-tensor method for quantum groups and applications I: SU(2)_q”, J.Phys. A26 (1993) 4595.
4. S.Meljanac and M.Milekovi: “ On two-parameter deformations of SU(1,1) algebra and associated spin chains”, Fizika B2 (1993) 99.
5. S.Meljanac, M.Milekovi and S.Pallua: “Deformed SU(2) Heisenberg chain”, J.Phys. A24 (1991) 581.
6. S.Fajfer, M.Milekovi and D.Tadi: “Restrictions on the class of strong coupling unified SUSY models”, Fizika 22 (1990) 447.
7. S.Fajfer, M.Milekovi and D.Tadi: “Flipped version of the supersymmetric strongly coupled preon model”, Phys.Rev.D40 (1989) 3770.
8. M.Drees, S.Meljanac, M.Milekovi and S.Pallua: “ Breaking of supersymmetric degeneracy by trilinear soft terms”, Phys. Lett. B 178 (1986) 226.

DATE OF THE LAST PROMOTION: 20.02.2004. (Associate Professor)

LECTURER: Prof.dr.sc. Dragutin Svrtan

AFFILIATION: Department of Mathematics, University of Zagreb

E-MAIL AND WEB ADDRESS: dsvrtan@math.hr

BIOGRAPHY: Dragutin Svrtan was born on June 9.1950. in Kraljevec gornji, Republic of Croatia. Elementary school he went in Budinšćina, and high school in Zabok. From 1968 to 1971. he studied at the Department of Mathematics ,University of Zagreb, where he graduated Theoretical mathematics with diploma work: Fundamentals of Morse Theory. Postgraduate studies he finished in 1979. with Master thesis: Surgery on differentiable manifolds. PhD thesis :Contributions to the theory of Symmetric Functions with Applications to the Chern Character he defended in 1982.
Academic year 1982/83. he spent as a Fulbrightov scholar at Department of Mathematics, University of California, Berkeley, USA. In 2001. he was a visiting scientist at Theoretical Physics Department of Ludwig Maximilian University in Munich (15.1. - 15.4.2001.). From 1985. he held position of an Assistant Proffessor, from 1990. to 1997. a position of an Associate Professor, from 1997. a Full Professor. On undergraduate level he held courses in Linear Algebra, Differential Geometry, Concrete Mathematics .
On postgraduate level he introduced two seminars: Seminar in Combinatorial and Discrete Mathematics and Seminar in Differential geometry. So far he he lectured 16 different graduate courses. He is a coorganizer of an International Course and Conference MATH/CHEM/COMP in Interuniversity Center in Dubrovnik. From 1999. he participated in an initiative Scientists in global responsibility (WiGV) started by a Prof. J. Wess. From 1996. – to 2000. he was a Cochair for Science of Mathematics Department, University of Zagreb.
Research interests of D. Svrtan are differential geometry (Riemannian geometry, theory of characteristic classes, quantum groups) and combinatorial theory (enumerative and lattice combinatorics, formal languages and algebraic combinatorics includig symbolic computations). In his research papers he has solved several conjectures – Scott's conjecture on permanents, Korbaš conjecture on Stiefel-Whitney classes of Grassmann manifolds, disproved some conjectures of Zagier on oneparametric quon algebras (with a generalization to the multiparameter case), solved some casses of Atiyah-Sutcliffe conjectures and posed several related new conjectures on symmetric functions. Recently he has solved a D.Robbins problem for circumradius equations of cyclic heptagons and octagons by using intricate eliminations and symbolic computations.

LIST OF PUBLICATIONS IN THE LAST FIVE YEARS:

1.Došlić, Tomislav; Svrtan, Dragutin; Veljan, Darko:Enumerative aspects of secondary structures.Discrete Math. 285, No.1-3, 67-82 (2004).
2.Meljanac, Stjepan; Perica, Ante; Svrtan, Dragutin: The energy operator for a model with a multiparametric infinite statistics. J. Phys. A, Math. Gen. 36, No.23, 6337-6349 (2003)
3.Svrtan, Dragutin; Šterc, Davor; Urbiha, Igor: On cyclic characterizations of regular pentagons and heptagons: Two approaches.Math. Commun. 7, No.1, 71-89 (2002).
4.Svrtan, Dragutin; Urbiha, Igor: Atiyah-Sutcliffe Conjectures for Almost Collinear Configurations and Some New Conjectures for Symmetric Functions, math.AG/0406386
5. Svrtan, Dragutin, Darko Veljan,Volenec,Vladimir: Geometry of pentagons: from Gauss to Robbins . math.MG/0403503.

PUBLICATIONS QULIFYING FOR LECTURSHIP: 1.Meljanac, Stjepan; Perica, Ante; Svrtan, Dragutin: The energy operator for a model with a multiparametric infinite statistics J. Phys. A, Math. Gen. 36, No.23, 6337-6349 (2003). 2.Svrtan, Dragutin; Urbiha, Igor: Atiyah-Sutcliffe Conjectures for Almost Collinear Configurations and Some New Conjectures for Symmetric Functions, math.AG/0406386.
DATE OF THE LAST PROMOTION: march 1.2003 Full Proffesor

LECTURER: Silvio Pallua,
AFFILIATION: Division of Theoretical Physics,Department of Physics,Faculty of Science,University of Zagreb
E-MAIL AND WEB ADDRESS: pallua@phy.hr

BIOGRAPHY:
Personal data,education ,employment
Born in Zagreb 17.12.1940 .B.Sc. 1964,M.Sc 1967,Ph.D 1970 in theoretical physics at Faculty of Science ,University of Zagreb.Assistant from 1964 and Scientific Associate at Institute"Rudjer Boskovic"Zagreb.From 1981 assistant professor at Division of Theoretical Physics ,Department of Physics,Faculty of Science,University of Zagreb,from 1985 higher scientific associate,from 1987assistant professor,from 1999 full professor
Predoctoral and postdoctoral experience in various scientific and academic institutions:
International Centre for Theoretical Physics(ICTP)-Trieste,Italy(twenty months from 1968-1970),
II.Institute der Theoretische Physik,University of Hamburg as Alexander von Humboldt fellow(72/73),European Center for Nuclear Research(CE RN) 6 months.
Visiting scientist,visiting professor
Cern(74/75-year) and (84/85 6 months) paid scientific associate.INFN position atUniversity of Padova nine month in 93.Visits of several months to various institutions like Universities at Rome
Bonn,Milano,ICTP.Short visits with seminars to at least 20 various scientific and academic institutions.
Research activity
Field of research is theoretical physics and theory of gravity.
In particular these have been following fields:
A)Investigating strong interactions by weak probes and deep inelastic scattering of electrons on adrons.B)Exact solutions of classical field equations.C)Masses and mixing angles of various generationsD)Symmetry breaking problems in unifed theories.E) Solving the twodimensional field theories on lattice and incontinuumF)Supersymmetric quantum mechanics G)Gravity theory with emphasis on microscopic interpretation of black hole entropy
Research students
Introduced in research seven young scientists.
Teaching
Undergraduate Courses:Classical Electrodynamics.Elementary Particles ,Astrophysics and Cosmology etc.
Graduate courses:Elementary Particles,Gravity and Cosmology,Special Topics in Black Hole physics.
Coautor of graduate school curricula.
Scientific projects and organisation of conferences
Prinicipal investigator in various national and international scientific projects.Participated in organization of many international conferences and cofounder of the series" Adriatic Meeting".
Administrative positions
Member of scientific boards of Institute"Rudjer Boskovic" and of Faculty of Science ,University of Zagreb.Member of European Physical Science Committee:Physics and Society(1981),cordinator of Elemntary Particles Sector of Graduate School, Head of Physics Department of Faculty of Science University of Zagreb(1999-2001). Ordinary member of European Physical Society

LIST OF PUBLICATIONS IN THE LAST FIVE YEARS:
1) M. Cvitan, S. Pallua ,Conformal entropy for generalised gravity theories as a consequence of horizon properties, Phys.Rev. D71 (2005) 104032

2. M. Cvitan, S. Pallua, P. Prester ,Conformal entropy as a consequence of the properties of stationary Killing horizons ,Phys.Rev. D70 (2004) 084043
3. M. Kolanovic, S. Pallua, P. Prester ,Reply to ``Comment on `Properties of the massive Thirring model from the XYZ spin chain' '',Phys.Rev. D68 (2003) 068702
4. M. Cvitan, S. Pallua, P. Prester
Higher curvature Lagrangians, conformal symmetry and microscopic entropy of Killing horizons,Phys.Lett. B571 (2003) 217-222
5.M. Cvitan, S. Pallua, P. Prester
Entropy of Killing horizons from Virasoro algebra in D-dimensional extended Gauss-Bonnet gravity,Phys.Lett. B555 (2003) 248-254
6. M. Cvitan, S. Pallua, P. Prester
Horizon conformal entropy in Gauss-Bonnet gravity,Phys.Lett. B546 (2002) 119-125
7. H. B. Nielsen, S. Pallua, P. Prester , SUSY a consequence of smoothness?
Int.J.Mod.Phys. A17 (2002) 2073-2094
8)Marko Kolanovic, Silvio Pallua, Predrag Prester
Properties of the massive Thirring model from the XYZ spin chain
Phys.Rev. D62 (2000) 025021

PUBLICATIONS QUALIFYING FOR LECTURSHIP:
1) M. Cvitan, S. Pallua ,Conformal entropy for generalised gravity theories as a consequence of horizon properties, Phys.Rev. D71 (2005) 104032
2. M. Cvitan, S. Pallua, P. Prester ,Conformal entropy as a consequence of the properties of stationary Killing horizons ,Phys.Rev. D70 (2004) 084043
3. M. Kolanovic, S. Pallua, P. Prester ,Reply to ``Comment on `Properties of the massive Thirring model from the XYZ spin chain' '',Phys.Rev. D68 (2003) 068702
4. M. Cvitan, S. Pallua, P. Prester
Higher curvature Lagrangians, conformal symmetry and microscopic entropy of Killing horizons,Phys.Lett. B571 (2003) 217-222
5.M. Cvitan, S. Pallua, P. Prester
Entropy of Killing horizons from Virasoro algebra in D-dimensional extended Gauss-Bonnet gravity,Phys.Lett. B555 (2003) 248-254
6. M. Cvitan, S. Pallua, P. Prester Horizon conformal entropy in Gauss-Bonnet gravity,Phys.Lett. B546 (2002) 119-125

DATE OF THE LAST PROMOTION: 2004(full professor in tenured status)

LECTURER: Tomislav Prokopec

AFFILIATION:
Spinoza Institute and Institute for Theoretical Physics, Utrecht University, Leuvenlaan 4, Utrecht 3584 CE, the Netherlands

E-MAIL AND WEB ADDRESS:
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http://www.phys.uu.nl/~prokopec/

BIOGRAPHY:
BS in EE (1987), FER, University of Zagreb, Croatia
MS (1990), Brown University, Providence RI, USA
Ph.D. in physics (1993), Brown University, Providence RI, USA
Postdoc (1992-1994), Princeton University, Princeton NJ, USA
Postdoc (1995-1997), Cornell University, Ithaca NY, USA
Postdoc (1997-1999), Niels Bohr Institute, Copenhagen, Denmark
Postdoc (2000-2003), Universität Heidelberg, Heidelberg, Germany
Associate Professor (2004 - present) Utrecht University, Utrecht, the Netherlands

LIST OF PUBLICATIONS IN THE LAST FIVE YEARS:

1. Tomas Janssen and Tomislav Prokopec, Instabilities in the nonsymmetric theory of
6. Thomas Konstandin, Tomislav Prokopec, Micahel G. Schmidt and Marcos Seco, ``MSSM electroweak baryogenesis and flavour mixing in transport equations," Nucl. Phys. B 738 (2006) 1 [arXiv:hep-ph/0505103].
7. Tomislav Prokopec and Wessel Valkenburg, ``The cosmology of the nonsymmetric theory of gravitation", Phys. Lett. B 636 (2006) 1-4 [arXiv:astro-ph/0503289]
8. Thomas Konstandin, Tomislav Prokopec, Michael G. Schmidt, ``Kinetic description of fermion flavor mixing and CP-violating sources for baryogenesis," Nucl. Phys. {\bf B} 716 (2005) 373-400 [arXiv:hep-ph/0410135]
9. Björn Garbrecht and Tomislav Prokopec, ``Energy density in expanding universes as seen by Unruh's detector," Phys. Rev. D 70 (2004) 083529 [arXiv:gr-qc/0406114].
10. Tomislav Prokopec, Michael G. Schmidt and Steffen Weinstock, Transport equations for chiral fermions to order h-bar and electroweak baryogenesis: Part II, Annals Phys. 314/2(2004) 267-320 [arXiv:hep-ph/0406140].
11. Björn Garbrecht and Tomislav Prokopec, ``Unruh response functions for scalar fields in de Sitter space," Class. Quant. Grav. 21 (2004) 4993-5004 [arXiv:gr-qc/0404058].
12. Tomislav Prokopec and Ewald Puchwein, ``Nearly minimal magnetogenesis," Phys. Rev. D 70 (2004) 043040 [arXiv:astro-ph/0403335].
13. Tomislav Prokopec and Ewald Puchwein, Photon mass generation during inflation: de Sitter invariant case, JCAP 0404 (2004) 007 [arXiv:astro-ph/0312274].
14. Tomislav Prokopec, Michael G. Schmidt and Steffen Weinstock, Transport equations for chiral fermions to order h-bar and electroweak baryogenesis: Part I, Annals Phys. 314/1 (2004) 208-265 [arXiv:hep-ph/0312110].
14. Tomislav Prokopec and Richard P. Woodard, Dynamics of super-horizon photons during inflation with vacuum polarization, Annals Phys. {\bf 312} (2004) 1-16 [arXiv:gr-qc/0310056].
15. Thomas Konstandin, Tomislav Prokopec and Michael G. Schmidt, Axial currents from CKM matrix CP violation and electroweak baryogenesis, Nucl. Phys. B 679 (2004) 246-260 [arXiv:hep-ph/0309291].
16. Tomislav Prokopec and Richard P. Woodard, Production of massless fermions during

inflation, JHEP 0310 (2003) 059 [arXiv:astro-ph/0309593].
17. Björn Garbrecht, Tomislav Prokopec and Michael G. Schmidt, Coherent baryogenesis, Phys. Rev. Lett. 92 (2004) 061303 [arxiv:hep-ph/0304088].
18. Tomislav Prokopec and Richard P. Woodard, Vacuum Polarization and photon mass in inflation, American Journal of Physics 72 (2004) 60-72 [arXiv:astro-ph/0303358].
19. Björn Garbrecht, Tomislav Prokopec and Michael G. Schmidt, Particle number in kinetic theory}, Eur. Phys. J. C 38 (2004) 135 [arXiv:hep-th/0211219].
20. Tomislav Prokopec, Ola N. Törnkvist and Richard P. Woodard, One Loop Vacuum Polarization in a Locally de Sitter Background, Annals Phys. 303, 251-274 (2003) [arXiv:gr-qc/0205130].
21. Tomislav Prokopec, Ola N. Törnkvist and Richard P. Woodard, Photon mass from inflation, Phys. Rev. Lett. 89, 101301 (2002) [arXiv:astro-ph/0205331].
22. Kimmo Kainulainen, Tomislav Prokopec, Michael G. Schmidt and Steffen Weinstock, Semiclassical force for electroweak baryogenesis: Three-dimensional derivation, Phys. Rev. D66: 043502 (2002) [arXiv:hep-ph/0202177].
23. Konstantinos Dimopoulos, Tomislav Prokopec, Ola N. Törnkvist and Anne-Christine Davis, Natural Magnetogenesis from Inflation, Phys. Rev. D65:063505 (2002) [astro-ph/0108093].

PUBLICATIONS QULIFYING FOR LECTURSHIP:
1. Tomislav Prokopec, A solution to the cosmological constant problem, arXiv:gr-qc/0603088.
2. Björn Garbrecht and Tomislav Prokopec, ``Fermion mass generation in de Sitter space,'' Phys. Rev. D 73 (2006) 064036 [arXiv:gr-qc/0602011].
3. Thomas Konstandin, Tomislav Prokopec, Micahel G. Schmidt and Marcos Seco, ``MSSM electroweak baryogenesis and flavour mixing in transport equations,'' Nucl. Phys. B 738 (2006) 1 [arXiv:hep-ph/0505103].
4. Thomas Konstandin, Tomislav Prokopec, Michael G. Schmidt, ``Kinetic description of fermion flavor mixing and CP-violating sources for baryogenesis,'' Nucl. Phys. B 716 (2005) 373-400 [arXiv:hep-ph/0410135]
5. Tomislav Prokopec, Michael G. Schmidt and Steffen Weinstock, Transport equations for chiral fermions to order h-bar and electroweak baryogenesis: Part II, Annals Phys. 314/2 (2004) 267-320 [arXiv:hep-ph/0406140].
6. Tomislav Prokopec and Ewald Puchwein, Photon mass generation during inflation: de Sitter invariant case, JCAP 0404 (2004) 007 [arXiv:astro-ph/0312274].
7. Tomislav Prokopec, Michael G. Schmidt and Steffen Weinstock, Transport equations for chiral fermions to order h-bar and electroweak baryogenesis: Part I, Annals Phys. 314/1 (2004) 208-265 [arXiv:hep-ph/0312110].
8. Tomislav Prokopec and Richard P. Woodard, Dynamics of super-horizon photons during inflation with vacuum polarization, Annals Phys. 312 (2004) 1-16 [arXiv:gr-qc/0310056].
9. Thomas Konstandin, Tomislav Prokopec and Michael G. Schmidt, Axial currents from CKM matrix CP violation and electroweak baryogenesis, Nucl. Phys. B 679 (2004) 246-260 [arXiv:hep-ph/0309291].
10. Tomislav Prokopec and Richard P. Woodard, Production of massless fermions during inflation, JHEP 0310 (2003) 059 [arXiv:astro-ph/0309593].
11. Tomislav Prokopec and Richard P. Woodard, Vacuum Polarization and photon mass in inflation, American Journal of Physics 72 (2004) 60-72 [arXiv:astro-ph/0303358].
12. Tomislav Prokopec, Ola N. Törnkvist and Richard P. Woodard, One Loop Vacuum Polarization in a Locally de Sitter Background, Annals Phys. 303, 251-274 (2003)

[arXiv:gr-qc/0205130].
13. Tomislav Prokopec, Ola N. Törnkvist and Richard P. Woodard, Photon mass from inflation, Phys. Rev. Lett. 89, 101301 (2002) [arXiv:astro-ph/0205331].
14. Guy D. Moore and Tomislav Prokopec, {\it How fast can the wall move? A study of the electroweak phase transition dynamics, Phys. Rev. D 52, 7182 (1995) [hep-ph/9506475].
15. Guy D. Moore and Tomislav Prokopec, Bubble wall velocity in a first order electroweak phase transition, Phys. Rev. Lett. 75, 777 (1995) [hep-ph/9503296].

DATE OF THE LAST PROMOTION:
01 Sep 2004: Associate Professor

LECTURER: Loriano Bonora

AFFILIATION: International School for Advanced Studies (ISAS/SISSA),
Via Beirut 2-4, 34014
Trieste, Italy

E-MAIL AND WEB ADDRESS: bonora@sissa.it

BIOGRAPHY:
NAME: Loriano BONORA
DATE OF BIRTH: July 1, 1945
NATIONALITY: Italian
FAMILY STATUS: Married. One daughter

ACADEMIC CURRICULUM:
March 1969: Degree in Physics (University of Padova)
Jan 1970-Dec 1970: C.N.R. Fellowship (University of Padova)
Jan 1971-Oct 1987: INFN Researcher (Sezione di Padova)
Nov 1987-Present: Full Professor of Theoretical Physics (SISSA, Trieste)

LONG TERM VISITS ABROAD:
Oct 1980-Mar 1981: University of Massachusetts (Boston, USA).
Apr 1981-Apr 1982: Center for Theoretical Physics, MIT, (Boston, USA).
Aug 1982-Mar 1983: CERN (Geneva, Switzerland).
Jan 1987-Oct 1987: CERN (Geneva, Switzerland).
May 1989: LPTHE, Parigi (France)
Apr 1992-May 1982: IFT, Sao Paulo (Brasil)
Sept 1995: RIMS, Kyoto (Japan)
Nov 1995-Dec 1995: LPTHE, Paris (France)

TEACHING ACTIVITY in SISSA:
From 1987 till 1989: annual course on "Group Theory" at SISSA
From 1990 till 1995: annual course on "2D Physics" at SISSA
From 1996 till today: annual course on "Superstring Theory" at SISSA
From 2005: annual course in "Introduction to Brane Cosmology".
EXTRA-RESEARCH ACTIVITY:

1989--1991: Coordinator of the Elementary Particle Sector at SISSA.

1992--1998: SISSA Vice-director.

since 1992: in charge of the Electronic Preprint Archive in SISSA.

since 1994: Editor of Journal of Geometry and Physics.

2000-2005: Director of SISSA Telematica, publishing JHEP,JCAP and JSTAT.

PAST RESEARCH TOPICS:

Conformal field theories and OPE in 4D. Multiperipheral models of particle

scattering. Geometry of gauge theories. The BRST symmetry in gauge theories. Anomalies in gauge and gravity theories, in supersymmetric theories, in superstring theories and their cancellation. Effective field theories of the superstring in 10D. Conformal covariance and conformal field theories over Riemann surfaces. Toda field theories and exchange algebra. Integrability and conformal invariance: conformal affine Toda field theories. 2D gravity matrix models and integrable hierarchies. Topological field theories. Supersymmetric integrable hierarchies. Anomalies in theories with branes. Matrix string theories. Noncommutative field theories and strings.

PRESENT RESEARCH INTERESTS:

Strings, branes and dualities. String field theory and tachyon condensation. Matrix models and topological strings. Cosmological models from string theory.

LIST OF PUBLICATIONS IN THE LAST FIVE YEARS:

1) L.Bonora, A.Sorin, "Chiral anomalies in noncommutative gauge theories", Phys.Lett. B521 (2001) 421-428, hepth/0109204.
2) L.Bonora, D.Mamone, M.Salizzoni, "B field and squeezed states in Vacuum String Field Theory", Nucl.Phys.B 630 (2002) 163; hepth/0201060.
3) L.Bonora, D.Mamone, M.Salizzoni, "Vacuum String Field Theory with B field", JHEP 0204(2002)020; hepth/0203188.
4) L.Bonora, D.Mamone, M.Salizzoni, "Vacuum String Field Theory ancestors of the GMS solitons", JHEP 0301 (2003)013, hepth/0207044
5) L.Bonora, A.Sorin, "Integrable Structure in String Field Theory", Phys.Lett.B553 (2003) 317-324, hepth/0211283 .
6) L.Bonora, C.Maccaferri, P.Prester, "Dressed Sliver solutions in Vacuum String Field Theory", JHEP 0401:038,2004. hep-th/0311198
7) L.Bonora, C.Maccaferri, P.Prester, THE PERTURBATIVE SPECTRUM OF THE DRESSED SLIVER, Phys.Rev.D71:026003,2005. hep-th/0404154
8) L. Bonora, C. Maccaferri, R.J. Scherer Santos, D.D. Tolla, EXACT TIME-LOCALIZED SOLUTIONS IN VACUUM STRING FIELD THEORY. Nucl.Phys. B715 (2005) 413-439, hep-th/0409063
9) L. Bonora, C. Maccaferri, R.J. Scherer Santos, D.D. Tolla, FUNDAMENTAL STRINGS IN SFT. Phys.Lett.B619 (2005) 359; hep-th/0501111.
10) G.Bonelli, L. Bonora, A.Ricco, "Conifold geometries, topological strings and multi--matrix models", Phys.Rev. D72 (2005) 086001; hep-th/0507224.
L. Bonora, R.J. Scherer Santos, A.S.Sorin, D.D. Tolla, "Light-cone Superstring Field Theory, pp-wave background and integrability properties" Class.Quant.Grav. 23 (2006) 799-816, hep-th/0511006 .
L.Bonora, A.Bytsenko, "Fluxes, Brane Charges and Chern Morphisms of Hyperbolic Geometry", hep-th/0602162.
G.Bonelli, L. Bonora, A.Ricco, "Flavour from partially resolved singularities" hep-th/0603083.
L. Bonora, C. Maccaferri, R.J. Scherer Santos, D.D. Tolla, "Bubbling AdS and Vacuum String Field Theory", hep-th/0602162

PUBLICATIONS QUALIFYING FOR LECTURSHIP:
Lectures Notes:
L.Bonora, "Anomalies and cohomology" Lectures given at the Ferrara School on "Anomalies, Phases, Defects..." June 1989, at the University of Geneva, April 1985, at IFT, Sao Paulo (Brasil).
L.Bonora, "Toda theories, integrability and conformal invariance", lectures given at Karpacz (Poland) 1991.
L.Bonora, "Two--matrix models, W algebras and 2D gravity", Varenna 1994.
L.Bonora, "String Interactions from Matrices" Tbilisi Sept. 98, Warwick Nov. 98
L.Bonora, C.Maccaferri, D.Mamone, M.Salizzoni, "Topics in String Field Theory", hep-th/030427, lectures given at Kopaonik (Serbia) 2002, Dubna (Russia) 2003, Pedra Azul (Brasil) 2004.

DATE OF THE LAST PROMOTION: 1987

LECTURER: Dr. BLAŽENKA MELIĆ

AFFILIATION: Rudjer Bošković Institute, Zagreb, Croatia

E-MAIL AND WEB ADDRESS: melic@thphys.irb.hr
http://thphys.irb.hr/thphys.irb.hr/Djelat/melic.htm

BIOGRAPHY:

Higher education:

10/1986 - 1/1991 study of theoretical physics at the University of Zagreb, Croatia

22.01.1991 University of Zagreb, award of degree Dipl.Ing., graduate thesis: "Neutrino Physics", supervisor: Prof. D. Tadic

1/1991 - 6/1992 postgraduate study of theoretical particle physics at the University of Zagreb

12/1992 - 12/1994 postgraduate study at the Institut fuer Theoretische Teilchenphysik, Universitaet Karlsruhe, Germany

04. 11. 1994 Ph.D. from Universitaet Karlsruhe, Germany, award of degree Dr. rer. nat., thesis: "Relativistic Two-Particle Equations in a Magnetic Field", supervisor: Prof. H. Pilkuhn

Appointments:

4/1991 - 12/1994 assistant -postdoc position at the "Rudjer Boskovic" Institute, Theoretical Physics Division, Zagreb

12/1994 - 12/2002 senior assistant -postdoc position at the "Rudjer Boskovic" Institute, Theoretical Physics Division, Zagreb

12/2002 – research associate (equivalent to assistant professor) at the "Rudjer Boskovic" Institute, Theoretical Physics Division, Zagreb

from 5/2006- scientific degree: senior research associate (equivalent to associate professor)

Visits to foreign institutions:

1/1999 - 3/1999 visit to Institut fuer Physik, Johannes Gutenberg Universitaet Mainz, Germany

5/2001 - 10/2002 Alexander von Humboldt fellow at Institut fuer Physik, Universitaet Mainz and Institut fuer Theoretische Physik und Astrophysik, Universitaet Wuerzburg, Germany

11/2002 - 5/2003 visit to Institut fuer Theoretische Teilchenphysik, Universitaet Karlsruhe, Germany

2004/2005 shorter visits to Institut fuer Theoretische Teilchenphysik, Universitaet Siegen, Germany

Research projects:

Principal investigator on the research project "QCD sum rules for exclusive decays of heavy hadrons" promoted by the Alexander von Humboldt foundation; together with Prof.dr. Th. Mannel, Universitaet Siegen.

Investigator on the research project "Fundamental interactions in elementary particle physics and cosmology" 0098002, as well as on the bilateral research projects

"Hard exclusive photo- and electroproduction of heavy quarkonium" with University of Graz, Austria and

"Physics of heavy hadrons in the standard model and beyond" with Jozef Stefan Institute, Slovenia.

Refereeing and editing in scientific journals:

-frequently refereeing for the following journals:
"Physical Review Letters",
"Physical Review D",
"European Physical Journal C",
"Journal of Physics G: Nuclear and Particle Physics"
-associate editor of the croatian physical journal "Fizika B"

Teaching:
-undergraduate course "Elementary particle physics" at University of Zagreb
-postgraduate course "Introduction into the heavy quark physics" at University of Zagreb

LIST OF PUBLICATIONS IN THE LAST FIVE YEARS:

1. B.Melic, B.Nizic and K.Passek: BLM scale setting for the pion transition form factor, Phys. Rev. D 65 (2002) 053020.
2. B. Melic: Nonfactorizable contributions to B -> J/psi K, Phys. Rev. D 68 (2003) 034004.
3. B.Melic, D.Mueller and K.Passek-Kumericki: Next-to-next-to-leading prediction for the photon-to-pion transition form factor, Phys. Rev. D 68 (2003) 014013.
4. A.Khodjamirian, Th. Mannel and B. Melic: QCD Light-Cone Sum Rule Estimate of Charming Penguin Contributions in B -> pi pi, Phys. Lett. B. 571 (2003) 75-84, Phys.Lett.B 572 (2003) 171-180 (published twice in journal).
5. B.Melic: LCSR analysis of exclusive two body B decay into charmonium, Phys. Lett. B 591 (2004) 91..
6. B.Melic, B.Nizic and K.Passek: A note on the factorization scale independence of the PQCD prediction for exclusive processes, Eur. Phys. J. C 36 (2004) 453-458.\
7. A.Babic, B.Guberina, B.Melic and H.Stefancic: Cabibbo-suppressed decays of the Omega_c^0 - feedback to the Xi_c^+ lifetime, Phys. Rev. D 70 (2004) 117501.
8. B.Melic, K.Passek-Kumericki, J.Trampetic, P.Schupp and M. Wohlgenannt,The Standard model on non-commutative space-time: electroweak currents and Higgs sector, Eur. Phys. J. C 42 (2005) 483-497.
9. B.Melic, K.Passek-Kumericki, J.Trampetic, P.Schupp and M. Wohlgenannt:The Standard model on non-commutative space-time: strong interactions included, Eur. Phys. J. C 42 (2005) 499-504.
10. B.Melic, K. Passek-Kumericki and J. Trampetic: Quarkonia decays into two photons induced by the space-time non-commutativity, Phys. Rev. D 72 (2005) 054004.
11. B.Melic, K.Passek-Kumericki and J.Trampetic: K -> pi gamma decays and space-time noncommutativity, Phys. Rev. D 72 (2005) 057502.
12. A.Khodjamirian, Th.Mannel, M.Melcher and B.Melic: Annihilation effects in B -> pi pi from QCD light-cone sum rules, Phys. Rev. D 72 (2005) 094012.

PUBLICATIONS QULIFYING FOR LECTURSHIP:

J.G.Koerner and B. Melic: Exclusive-inclusive ratio of semileptonic Lambda_b-decays, Phys. Rev. D 62 (2000) 74008.
B.Melic, B.Nizic and K.Passek: BLM scale setting for the pion transition form factor, Phys.

Rev. D 65 (2002) 053020. B. Melic: Nonfactorizable contributions to B -> J/psi K, Phys. Rev. D 68 (2003) 034004 A.Khodjamirian, Th. Mannel and B. Melic: QCD Light-Cone Sum Rule Estimate of Charming Penguin Contributions in B -> pi pi, Phys. Lett. B. 571 (2003) 75-84, Phys.Lett.B 572 (2003) 171-180 (published twice in journal).
DATE OF THE LAST PROMOTION: 12.05.2006 scientific degree: senior research associate (equivalent to associate professor)

LECTURER: Dr. sc. Vuko Brigljević

AFFILIATION:

Ruđer Bošković Institute, Bijenička 54, 10000 Zagreb, Croatia

E-MAIL AND WEB ADDRESS:

vuko.brigljevic@irb.hr

http://cern.ch/vuko

BIOGRAPHY:

- Born on April 15, 1968 in Dubrovnik, Croatia.
- November 1993: Diploma in Physics at the Swiss Federal Institute of Technology in Zurich (ETH Zurich)
- 1994-1999: Graduate student at the Institute for Particle Physics at ETH Zurich, working on the L3 Experiment at LEP.
- May 1999: Ph.D. in Physics from ETH Zurich.
- 1999-2002: Postdoctoral Research Associate in the Nuclear and Particle Physics Division at Lawrence Livermore National Laboratory (Livermore, USA), working on the BABAR experiment at the Stanford Linear Accelerator Center.
- 2002-2003: Research Fellow at CERN (Geneva, Switzerland), joined the CMS Experiment.
- 2003: Chosen as Research Associate at the Ruđer Bošković Institute (RBI), joined the Laboratory for High Energy Physics in the Experimental Physics Department of RBI, kept working on the CMS Experiment and started a CMS group at RBI (RBI officially accepted in the CMS Collaboration in December 2005).
- 2008: Promoted to Senior Research Associate.
- Since 2005 regularly teaching at the Physics Department of the Faculty of Science at Zagreb University (Introduction to Computer Networks, Seminar and Problems in Particle Physics)

LIST OF PUBLICATIONS IN THE LAST FIVE YEARS:

1) Study of di-boson production with the CMS detector at LHC.
V. Brigljevic *et al.*, J.Phys.G34:N269-N295,2007.

2) CMS technical design report, volume II: Physics performance.
By CMS Collaboration (G.L. Bayatian *et al.*), J.Phys.G34:995-1579,2007.

3) Measurement of diboson production with CMS.
V. Brigljevic, Prepared for Physics at LHC, Cracow, Poland, 3-8 Jul 2006.
Published in Acta Phys.Polon.B38:401-408,2007.

4) CMS physics technical design report: Addendum on high density QCD with heavy ions.
By CMS Collaboration (David G. d'Enterria, (Ed.) *et al.*), J.Phys.G34:2307-2455,2007.

5) The CMS high level trigger. By CMS Trigger and Data Acquisition Group (W. Adam *et al.*), Eur.Phys.J.C46:605-667,2006.

6) Feasibility study of a XML-based software environment to manage data acquisition hardware devices.
R. Arcidiacono *et al.* 2005. Prepared for 6th International Workshop on Radiation Imaging Detectors (IWORID 2005), Glasgow, Scotland, 25-29 Jul 2004, Nucl.Instrum.Meth.A546:324-329,2005.

7) Study of high momentum eta-prime production in B ---> eta-prime X(s).
By BABAR Collaboration (B. Aubert *et al.*), Phys.Rev.Lett.93:061801,2004.

8) Search for the rare leptonic decay B+ ---> mu+ nu(mu).
By BABAR Collaboration (B. Aubert *et al.*), Phys.Rev.Lett.92:221803,2004.

9) Measurements of branching fractions and CP violating asymmetries in B meson decays to charmless two body states containing a K0.
By BABAR Collaboration (B. Aubert *et al.*), Phys.Rev.Lett.92:201802,2004.

10) Measurement of the branching fraction for B- ---> D0 K*-.
By BABAR Collaboration (B. Aubert *et al.*), Phys.Rev.D69:051101,2004.

11) Measurement of branching fractions and charge asymmetries in B+- ---> rho+- pi0 and B+- ---> rho0 pi+- decays and search for B0 ---> rho0 pi0.
By BABAR Collaboration (B. Aubert *et al.*), Phys.Rev.Lett.93:051802,2004.

12) Measurements of the mass and width of the eta(c) meson and of an eta(c)(2S) candidate.
By BABAR Collaboration (B. Aubert *et al.*), Phys.Rev.Lett.92:142002,2004.

13) Limits on the decay rate difference of neutral B mesons and on CP, T, and CPT violation in B0 anti-B0 oscillations.
By BABAR Collaboration (B. Aubert *et al.*), Phys.Rev.Lett.92:181801,2004.

14) Measurement of the branching fractions and CP asymmetry of B- ---> D0(CP) K- decays with the BABAR detector.
By BABAR Collaboration (B. Aubert *et al.*), Phys.Rev.Lett.92:202002,2004.

15) Observation of the decay B0 ---> rho+ rho- and measurement of the branching fraction and polarization.
By BABAR Collaboration (B. Aubert *et al.*), Phys.Rev.D69:031102,2004.

16) Observation of B0 ---> omega K0, B+ ---> eta pi+, and B+ ---> eta K+ and study of related decays.

By BABAR Collaboration (B. Aubert *et al.*), Phys.Rev.Lett.92:061801,2004.

17) Measurement of the average phi multiplicity in B meson decay.
By BABAR Collaboration (B. Aubert *et al.*), Phys.Rev.D69:052005,2004.

PUBLICATIONS QUALIFYING FOR LECTURSHIP:

DATE OF THE LAST PROMOTION:

January 2008: promoted to Senior Research Associate at Ruđer Bošković Institute

2. NUCLEAR PHYSICS

LECTURER: Prof. dr. sc. Dario Vretenar

AFFILIATION: Faculty of Natural Sciences and Mathematics, University of Zagreb, Zagreb, Croatia

E-MAIL AND WEB ADDRESS: vretenar@phy.hr

BIOGRAPHY:

Dario Vretenar, 29 October 1958, Pula, Croatia. Education: Faculty of Mathematics and Natural Sciences, University of Zagreb, Croatia; B.Sc. in Physics (1982), M. Sc. in Physics, University of Zagreb(1985), Ph. D. in Physics, University of Zagreb (1988). Postdoc positions at the University of Bologna (Italy) and Yale University (USA) (1989-1991). Alexander von Humboldt Fellow at the Physics Department of the Technical University Munich (Germany) (1991-1993).

Assistant Professor at the Physics Department, Faculty of Sciences, University of Zagreb (1993), Associate Professor 1997, Professor 2001. Visiting Professor at the University of Bologna, and DFG Visiting Professor at the Technical University Munich (1999-2000).

Research interests in theoretical nuclear physics: relativistic nuclear density functional theory and applications in the description of the structure of exotic nuclei far from stability, nuclear effective field theory, nuclear astrophysics, algebraic models of nuclear structure and physics of high-angular momentum states in atomic nuclei. Author or co-author of more than 120 research papers and 50 conference contributions.

Courses at the Physics Department, Faculty of Sciences, University of Zagreb: Nuclear Physics, Mathematical modeling and Numerical Methods.

Awards: Croatian Academy of Science and Arts - 2002 Award for Science and Mathematics, Croatian National Award for Science 2003.

LIST OF PUBLICATIONS IN THE LAST FIVE YEARS:

1) D. Vretenar, N. Paar, P. Ring, T. Nikšić: Toroidal dipole resonances in the relativistic random phase approximation, Phys. Rev. C 65, (2002) 021301(R).
2) D. Vretenar, T. Nikšić, P. Ring: Beyond the relativistic Hartree mean-field approximation: Energy dependent effective mass, Phys. Rev. C 65, (2002) 024321.
3) Z.-Y. Ma, A. Wandelt, N. Van Giai, D. Vretenar, P. Ring, and L.-G. Cao: Collective multipole excitations in a microscopic relativistic approach, Nucl. Phys. A 703, (2002) 222-239.
4) P. Ring, G.A. Lalazissis, D. Vretenar: Relativistic description of medium-heavy nuclei far from stability, Nucl. Phys. A 701, (2002) 503-508.
5) T. Nikšić, D. Vretenar, P. Ring, G.A. Lalazissis: Shape coexistence in the relativistic Hartree-Bogoliubov approach, Phys. Rev. C 65, (2002) 054320.
6) T. Nikšić, D. Vretenar, P. Finelli, P. Ring: Relativistic Hartree-Bogoliubov model with density-dependent meson-nucleon couplings, Phys. Rev. C 66, (2002) 024306.
7) C.M. Petrache, G. Lo Bianco, P.G. Bizzeti, A.M. Bizzeti-Sona, D. Bazzacco, S. Lunardi , M. Nespolo, G. de Angelis, P. Spolaore, N. Blasi, S. Brant, V. Krstić, D. Vretenar:

Spectroscopy of the deformed 125Ce nucleus, Eur. Phys. J. A 14, (2002) 439-449.
8) T. Nikšić, D. Vretenar, P. Ring: Relativistic random-phase approximation with density-dependent meson-nucleon couplings, Phys. Rev. C 66, (2002) 064302.
9) G.A. Lalazissis, D. Vretenar, P. Ring: The proton drip line between Z=31 and Z=49, Prog. Theor. Phys. Suppl. 146 (2002), 583-584.
10) R. Pezer, A. Ventura, D. Vretenar: Combinatorial level densities from a relativistic structure model, Nucl. Phys. A 717, (2003) 21-43.
11) C.M. Petrache, G. Lo Bianco, P.G. Bizzeti, A.M. Bizzeti-Sona, D. Bazzacco, S. Lunardi , M. Nespolo, G. de Angelis, D.R. Napoli, N. Blasi, S. Brant, D. Vretenar: Spectroscopy of the deformed 126Ce nucleus, Eur. Phys. J. A 16, (2003) 337-346.
12) N. Paar, P. Ring, T. Nikšić, and D. Vretenar: Quasiparticle random phase approximation based on the relativistic Hartree-Bogoliubov model, Phys. Rev. C 67, (2003) 034312.
13) G.A. Lalazissis, D. Vretenar, N. Paar, P. Ring: Relativistic description of regular and chaotic dynamics in the giant monopole resonances, Chaos, Solitons and Fractals 17, (2003), 585-590.
14) G.A. Lalazissis, D. Vretenar, P. Ring: Mapping the proton drip line, Nucl. Phys. A 719, (2003) 209-212.
15) P. Ring, N. Paar, T. Nikšić, D. Vretenar: Collective excitations far from the valley of stability, Nucl. Phys. A 722, (2003) 372C-378C.
16) D. Vretenar, T. Nikšić, P. Ring: A microscopic estimate of the nuclear matter compressibility and symmetry energy in relativistic mean-field models, Phys. Rev. C 68, (2003) 024310.
17) P. Finelli, N. Kaiser, D. Vretenar, W. Weise: Nuclear many-body dynamics constrained by QCD and chiral symmetry, Eur. Phys. J. A 17, (2003) 573-578.
18) D. Vretenar, N. Paar, T. Nikšić, P. Ring: Spin-isospin resonances and the neutron skin of nuclei, Phys. Rev. Lett. 91, (2003) 262502.
19) G.A. Lalazissis, D. Vretenar, and P. Ring: Mapping the proton drip line in the suburanium region and for superheavy elements, Phys. Rev. C 69, (2004) 017301.
20) S. Brant, D. Vretenar, and A. Ventura: Interacting boson fermion-fermion model calculation of the h11/2 h11/2 doublet bands in 134Pr, Phys. Rev. C 69, (2004) 017304.
21) D. Vretenar, T. Nikšić, N. Paar, and P. Ring: Relativistic QRPA description of low-lying dipole strength in neutron-rich nuclei, Nucl. Phys. A 731, (2004) 281-288.
22) P. Finelli, N. Kaiser, D. Vretenar, W. Weise: Relativistic nuclear model with point-couplings constrained by QCD and chiral symmetry, Nucl. Phys. A 735, (2004) 449-481.
23) D. Vretenar, T. Nikšić, P. Ring, N. Paar, G.A. Lalazissis, P. Finelli: Relativistic Hartree-Bogoliubov and QRPA description of exotic nuclear structure, Eur. Phys. J. A 20, (2004) 75-80.
24) T. Nikšić, D. Vretenar, G.A. Lalazissis, P. Ring: Ground-state properties of rare-earth nuclei in the relativistic Hartree-Bogoliubov model with density-dependent meson-nucleon couplings, Phys. Rev. C 69, (2004) 047301.
25) N. Paar, T. Nikšić, D. Vretenar, P. Ring: Quasiparticle random phase approximation based on the relativistic Hartree-Bogoliubov model. II. Nuclear spin and isospin excitations, Phys. Rev. C 69, (2004) 054303.
26) G.A. Lalazissis, D. Vretenar, P. Ring: Relativistic Hartree-Bogoliubov description of deformed light nuclei, Eur. Phys. J. A 22, (2004) 37-45.
27) T. Nikšić, T. Marketin, D. Vretenar, N. Paar, P. Ring: beta-decay rates of r-process nuclei in the relativistic quasiparticle random phase approximation,

Phys. Rev. C 71, (2005) 014308.
28) G.A. Lalazissis, T. Nikšić, D. Vretenar, P. Ring: New relativistic mean-field interaction with density-dependent meson-nucleon couplings, Phys. Rev. C 71, (2005) 024312.
29) N. Paar, T. Nikšić, D. Vretenar, P. Ring: Isotopic dependence of the pygmy dipole resonance, Phys. Lett. B 606, (2005) 288-294.
30) D. Vretenar, A.V. Afanasjev, G.A. Lalazissis, P. Ring: Relativistic Hartree-Bogoliubov Theory: Static and Dynamic Aspects of Exotic Nuclear Structure, Phys. Rep. 409, (2005) 101-259.
31) D. Vretenar: Nuclear structure far from stability, Nucl. Phys.A 751, (2005) 264-281.
32) N. Paar, T. Nikšić, D. Vretenar, P. Ring: Relativistic description of exotic collective excitation phenomena in atomic nuclei, Int. J. Mod. Phys. 14, (2005) 29-37.
33) T. Nikšić, D. Vretenar, P. Ring: Renormalized relativistic Hartree-Bogoliubov equations with a zero-range pairing interaction, Phys. Rev. C 71, (2005) 044320.
34) N. Paar, D. Vretenar, P. Ring: Proton Electric Pygmy Dipole Resonance, Phys. Rev. Lett. 94, (2005) 182501.
35) T. Nikšić, D. Vretenar, P. Ring: Random-phase approximation based on relativistic point-coupling models, Phys. Rev. C 72, (2005) 014312.
36) N. Kaiser, T. Nikšić, D. Vretenar: Nuclear pairing from chiral pion-nucleon dynamics, Eur. Phys. J. A 25, (2005) 257-261.
37) T. Nikšić, D. Vretenar, P. Ring: Beyond the relativistic mean-field approximation: Configuration mixing of angular-momentum-projected wave functions, Phys. Rev. C 73, (2006) 034308.
38)P. Finelli, N. Kaiser, D. Vretenar, W. Weise: Relativistic nuclear energy density functional constrained by low-energy QCD, Nucl. Phys. A 770, (2006) 1-31.
39) N. Paar, D. Vretenar, T. Nikšić, P. Ring: Relativistic quasiparticle random-phase approximation description of isoscalar compression modes in open-shell nuclei in the A60 mass region, Phys. Rev. C 74, 037303 (2006).
40) T. Nikšić, D. Vretenar, P. Ring: Beyond the relativistic mean-field approximation II: Configuration mixing of mean-field wave functions projected on angular momentum and particle number, Phys. Rev. C 74, 064309 (2006).

PROCEEDINGS:

41) The nuclear many-body problem 2001, Editors: W. Nazarewicz, D. Vretenar, NATO Science Series, II. Mathematics, Physics and Chemistry - Vol.53, Kluwer Academic Publishers, 2002.
42) Extended Density Functionals in Nuclear Structure Physics, Editors: G.A. Lalazissis, P. Ring, D. Vretenar, Lecture Notes in Physics 641, Springer-Verlag, 2004.

PUBLICATIONS QUALIFYING FOR LECTURSHIP: all the publications listed above.

DATE OF THE LAST PROMOTION: 2006

LECTURER: Dr. Damir Bosnar, Associated Professor

AFFILIATION: Physics Department, Faculty of Science, University of Zagreb, Croatia

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BIOGRAPHY:
Born on 20. 01. 1961.
1986 BSc in Physics, Department of Physics, Faculty of Science, Zagreb
1990 PhD in Physics, Department of Physics, Faculty of Science, Zagreb
1986-1998 assistant at Department of Physics, Faculty of Science, Zagreb
1998-2003 assistant professor at Department of Physics, Faculty of Science, Zagreb
2003- associate professor at Department of Physics, Faculty of Science, Zagreb.
Projects:
1998.-2000. scientific project for Young Scientists of Ministry of Science.
2002.-2006. scientific project of Ministry of Science and Technology " Many-body structure
of hadrons"
2003-2004. IAEA TC project "Upgrading the Training Laboratory for Nuclear Science"
2004.-2006. Technological project of Ministry of Science and Technology " System for Polarization and Transport of 3He"
2005.-2007. IAEA TC project "Upgrading the Training Laboratory for Nuclear Science, Phase II"
2007.-2009. IAEA TC project "Positron Emission Tomography Demonstration Set-up for Teaching Purposes"
2007.- scientific project of Ministry of Science, Education and Sport " QCD and Nuclei; Nuclear Methods in Material Research, Medicine and Environment"
Since 1998 leader of Zagreb group in A1 collaboration at MAMI, Mainz.

LIST OF PUBLICATIONS IN THE LAST FIVE YEARS:

2006.

D. Elsner, A. Suele, P. Barneo, P. Bartsch, D. Baumann, J. Bermuth, R. Boehm, D. Bosnar, M. Ding, M. Distler, D. Drechsel, I. Ewald, J. Friedrich, J.M. Friedrich, S. Groezinger, P. Jennewein, S. Kamalov, F. H. Klein, M. Kohl, K.W. Krygier, H. Merkel, P. Merle, U. Mueller, R. Neuhausen, Th. Pospischil, M. Potokar, G. Rosner, H. Schmieden, M. Seimetz O. Straehle, L. Tiator, Th. Walcher, M. Weis

Measurement of the LT-asymmetry in $\pi 0$ electroproduction at the energy of the $\Delta(1232)$ resonance

Eur. Phys. J. A27:91-97. 2006.

2005.

P. Achenbach, D. Baumann, R. Boehm, B. Boillat, D. Bosnar, C. Carasco, M. Ding, M. O. Distler, J. Friedrich, W. Gloeckle, J. Golak, Y. Goussev, P. Grabmayr, W. Heil, A. Huegli, P. Jennewein, G. Jover Manas, J. Jourdan, H. Kamada, T. Klechneva, B. Krusche, K. W.

Krygier, J. G. Llongo, M. Lloyd, M. Makek, H. Merkel, C. Micheli, U. Mueller, A. Nogga, R. Neuhausen, Ch. Normand, L.Nungesser, A. Ott, E. Otten, F. Parpan, R. Perez Benito, M. Potokar, D. Rohe, D. Rudersdorf, J.Schmiedeskamp, M. Seimetz, I. Sick, S. Sirca, R. Skibinski, S. Stave, G. Testa, R. Trojer, Th. Walcher, M. Weis, H. Witala, H. Woehrle
Measurement of the Asymmetries in 3He(e,e'p)d and 3He(e,e'p)np
Eur. Phys. J. A25:177-183,2005

D.I. Glazier, M. Seimetz, J.R.M. Annand, H. Arenhoevel, M. Ases Antelo, C. Ayerbe, P. Bartsch, D. Baumann, J. Bermuth, R. Boehm, D. Bosnar, M. Ding, M.O. Distler, D. Elsner, J. Friedrich, S. Hedicke, P. Jennewein, G. Jover Ma.as, F.H. Klein, F. Klein, M. Kohl, K.W. Krygier, K. Livingston, I.J.D. MacGregor, M. Makek, H. Merkel, P. Merle, D. Middleton, U. Mueller, R. Neuhausen, L. Nungesser, M. Ostrick, R. Pérez Benito, J. Pochodzalla, Th. Pospischil, M. Potokar, A. Reiter, G. Rosner, J. Sanner, H. Schmieden, A. Suele, Th. Walcher, D. Watts, M. Weis
Measurement of the Electric Form Factor of the Neutron at Q2 = 0.3-0.8 (GeV/c)2
Eur. Phys. J. A24:101-109,2005

2004.
D.Bosnar, M. Makek
Modifications of Delta in Nuclear Medium
Fizika B13:507-512(2004)

2003.
J. Bermuth, P. Merle, C. Carasco, D. Baumann, D. Bohm, D. Bosnar, M. Ding, M.O. Distler, J. Friedrich, J.M. Friedrich, J. Golak, W. Glockle, M. Hauger, W Heil, P. Jennewein, J. Jourdan, H. Kamada, A. Klein, M. Kohl, B. Krusche, K.W. Krygier, H. Merkel, U. Muller, R. Neuhausen, A. Nogga, C. Normand, E. Otten, T. Pospischil, M. Potokar, D. Rohe, H. Schmieden, J. Schmiedeskamp, M. Seimetz, I. Sick, S. Sirca, R. Skibinski, G. Testa, T. Walcher, G. Warren, M. Weis, H. Witala, H. Wohrle, M. Zeier
The neutron charge form-factor and target analyzing powers from polarized-3He(polarized-e,e'N) scattering
Phys.Lett B564 (2003)199

M. Kohl, M. Ases Antelo, C. Ayerbe, D. Baumann, R. Bohm, D. Bosnar, M. Ding, M.O. Distler, J. Friedrich, J. Garca Llongo, P. Jennewein, G. Jover Manas, H. Merkel, P. Merle, U. Muller, R. Neuhausen, L. Nungesser, R. Perez Benito, J. Pochodzalla, M. Potokar, C. Rangacharyulu, A.Richter, G. Schrieder, M. Seimetz, T. Walcher, M. Weis
Search for narrow nucleon resonances below pion treshold in the H(e,e′ π+)X and D(e,e' p)X reactions
Phys. Rev. C67:065204,2003

C. Carasco, J. Bermuth, P. Merle, P. Bartsch, D. Baumann, R. Bohm, D. Bosnar, M. Ding, M.O.Distler, J. Friedrich, J.M. Friedrich, J. Golak, W. Glockle, M. Hauger, W. Heil, P. Jennewein, J. Jourdan, H. Kamada, A. Klein, M. Kohl, K.W. Krygier, H. Merkel, U. Muller, R. Neuhausen, A. Nogga, C. Normand, E. Otten, T. Pospischil, M. Potokar, D. Rohe, H. Schmieden, J. Schmiedeskamp, M. Seimetz, I. Sick, S. Sirca, R. Skibinski, G. Testa, T. Walcher, G. Warren, M. Weis, H. Witala, H. Wohrle
Final state interaction effects in 3He_pol(e_pol,e'p)

Phys.Lett.B559 (2003) 41

2002.

P. Bartsch, D. Baumann, J. Bermuth, R. Bohm, K. Bohinc, D. Bosnar, M. Ding, M. Distler, D. Drechsel, D. Elsner, I. Ewald, J. Friedrich, J.M.Friedrich, S. Grozinger, S. Hedicke, P. Jennewein, M. Kahrau, S.S. Kamalov, F. Klein, K.W. Krygier, A. Liesenfeld, H. Merkel, P. Merle, U. Muller, R. Neuhausen, T. Pospischil, M. Potokar, G. Rosner, H. Schmieden, M. Seimetz, A. Sule, L. Tiator, A. Wagner, T. Walcher, M. Weis
Measurement of the beam helicity asymmetry in the p(e_pol),e' p) π0 reaction at the energy of
Δ(1232) resonance
Phys.Rev.Lett.88 (2002) 142001

PUBLICATIONS QULIFYING FOR LECTURSHIP:
Same as above.

DATE OF THE LAST PROMOTION: 2003.

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AFFILIATION: Department of Physics, Faculty of Science, University of Zagreb
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BIOGRAPHY: - Graduated experimental physics in 1995. at Faculty of Science at University of Zagreb. Worked at «Institute for physics» 1995-1997, «Ruđer Bošković Institute» 1997-2006, and from 2006. on at Faculty of Science at University of Zagreb. Master thesis defended in 2000. and PhD thesis in 2003. under subject «Nuclear reactions induced by 6He radioactive beam at lithium targets» - Guest researcher at Hahn-Meitner-Institut and Freie Univeristaet, Berlin (February 2001 – February 2002) - Area of scientific interest: experimental study of structure of light nuclei and reactions between them; nuclear astrophysics - Participated in more than 30 experiments at different European nuclear facilities (Zagreb, Catania, Louvan-la-Neuve, Berlin, Muenchen, CERN) some of which also proposed and organised - Teaching activity: «Nuclear physics lab» (2006-); assistant in «Astronomy and astrophysics» (1995-99), «Physics of stars» (1995-99), «Nuclear physics lab» (1996-97), «Nuclear physics» (2005-), «General physics» (2006-); all at Faculty of Science, University of Zagreb
LIST OF PUBLICATIONS IN THE LAST FIVE YEARS: 1. Freer, M.; Casarejos, E.; Achouri, L.; Angulo, C.; Ashwood, N. I.; Curtis, N.; Demaret, P.; Harlin, C.; Laurent, B.; Milin, Matko; Orr, N. A.; Price, D.; Raabe, R.; Soić, Neven; Ziman, V. A.: «alpha:2n:alpha Molecular Band in 10Be», Physical Review Letters 96 (2006) 042501 2. Milin, Matko; Cherubini, S.; Davinson, T.; Di Pietro, A.; Figuera, P.; Miljanić, Đuro; Musumarra, A; Ninane, A.; Ostrowski, A.N.; Pellegriti, M.G.; Shotter, A.C.; Soić, Neven; Spitaleri, C.; Zadro, Mile: «Transfer, sequential decay, and quasi-free reactions induced by 18-MeV 6He beam on 6Li, 7Li, and 12C», Physics of Atomic Nuclei 69 (2006) 1360 3. Miljanić, Đuro; Milin, Matko; Cherubini, S.; Davinson, T.; Di Pietro, A.; Figuera, P.; Musumarra, A.; Ninane, A.; Ostrowski, A.N.; Pellegriti, M.G.; Shotter, A.C.; Soić, Neven; Spitaleri, C.; Zadro, Mile: «6He quasi-free scattering off clusters in 6Li», Europhysics Letters 76 (2006) 801 4. Kokalova, Tz.; Oertzen, W. von; Torilov, S.; Thummerer, S.; Milin, Matko; Tumino, A.; Angelis, G. de; Farnea, E.; Gadea, A.; Napoli, D.R.; Kroell, Th.; Marginean, N.; Martinez, T.; Axiotis, M.; Lenzi, S.M.; Ur, C.; Papka, P.; Rousseau, M.: «Emission of unbound 8Be- and 12C(0_2+)- clusters in compound nucleus reactions» European Physical Journal A 23 (2005) 19 5. Milin, Matko; Zadro, Mile; Cherubini, S.; Davinson, T.; Di Pietro, A.; Figuera, P.; Miljanić, Đuro; Musumarra, A.; Ninane, A.; Ostrowski, A.N.; Pellegriti, M.G.; Shotter, A.C.; Soić, Neven; Spitaleri, C: «Sequential decay reactions induced by a 18 MeV 6He beam on 6Li and 7Li», Nuclear Physics A 753 (2005) 263 6. Bohlen, H.G.; Kalpakchieva, R.; von Oertzen, W.; Massey, T.N.; Gebauer, B.; Grimes, S.M.; Kokalova, T.; Lenz, A.; Milin, Matko; Shultz, Ch.; Thummerer, S.; Torilov, S.;

Tumino, A.: «Particle-hole structures of neutron-rich Be- and C-isotopes» Nuclear Physics A 734 (2004) 345c
7. Di Pietro, A.; Figuera, P.; Amorini, F.; Angulo, C.; Cardella, G.; Cherubini, S.; Davinson, T.; Leanza, D.; Lu, J.; Mahmud, H.; Milin, Matko; Musumarra, A.; Ninane, A.; Papa, M.; Pellegriti, M. G.; Raabe, R.; Rizzo, F.; Ruiz, C.; Shotter, A. C.; Soić, Neven; Tudisco, S.; Weissman, L.: «Reactions induced by the halo nucleus 6He at energies around the Coulomb barrier», Physical Review C 69 (2004) 044613
8. Milin, Matko; Cherubini, S.; Davinson, T.; Di Pietro, A.; Figuera, P.; Miljanić, Đuro; Musumarra, A; Ninane, A.; Ostrowski, A.N.; Pellegriti, M.G.; Shotter, A.C.; Soić, Neven; Spitaleri, C.; Zadro, Mile: «The 6He scattering and reactions on 12C and cluster states of 14C», Nuclear Physics A 730 (2004) 285
9. Milin, Matko; Cherubini, S.; Davinson, T.; Di Pietro, A.; Figuera, P.; Miljanić, Đuro; Musumarra, A.; Ninane, A.; Ostrowski, A.N.; Pellegriti, M.G.; Shotter, A.C.; Soić, Neven; Spitaleri, C.; Zadro, Mile: «Reactions induced by 18 MeV 6He beam on 6Li, 7Li and 12C», Nuclear Physics A 746 (2004) 183
10. Milin, Matko; Miljanić, Đuro; Aliotta, M.; Cherubini, S.; Davinson, T.; Di Pietro, A.; Figuera, P.; Musumarra, A; Ninane, A.; Ostrowski, A.N.; Pellegriti, M.G.; Shotter, A.C.; Soić, Neven; Spitaleri, C.; Zadro, Mile: «Two-proton pickup reaction (6He, 8Be) on 12C, 16O, and 19F», Physical Review C 70 (2004) 044603
11. von Oertzen, W.; Bohlen, H.G.; Milin, Matko; Kokalova, Tz.; Thummerer, S.; Tumino, A.; Kalpakchieva, R.; Massey, T.N.; Eisermann, Y.; Graw, G.; Faestermann, T.; Hertenberger, R.; Wirth, H.-F.: «Search for Cluster Structure of Excited States in 14C», European Physical Journal A 21 (2004) 193
12. Bohlen, H.G.; Kalpakchieva, R.; Gebauer, B.; Grimes, S.M.; Lenske, H.; Lieb, K.P.; Massey, T.N.; Milin, Matko; von Oertzen, W.; Schulz, Ch.; Kokalova, T.; Torilov, S.; Thummerer, S.: «Spectroscopy of particle-hole states of 16C», Physical Review C. 68 (2003) 054606
13. Bohlen, H.G.; Kalpakchieva, R.; von Oertzen, W.; Massey, T.N.; Gebauer, B.; Grimes, S.M.; Kokalova, T.; Lenske, H.; Lenz, A.; Milin, Matko; Shultz, Ch.; Thummerer, S.; Torilov, S.; Tumino, A.: «Structure studies of neutron-rich Beryllium and Carbon isotopes», Nuclear Physics A 722 (2003) 3c
14. Bohlen, H.G.; von Oertzen, W.; Kalpakchieva, R.; Gebauer, B.; Grimes, S.M.; Lenz, A.; Massey, T.N.; Milin, Matko; Schulz, Ch.; Kokalova, T.; Torilov, S.; Thummerer, S.: «Structure of Neutron-rich Be and C Isotopes», Physics of Atomic Nuclei 66 (2003) 1494
15. Bohlen, H.G.; von Oertzen, W.; Kalpakchieva, R.; Gebauer, B.; Grimes, S.M.; Massey, T.N.; Lenske, H.; Lenz, A.; Milin, Matko; Schulz, Ch.; Kokalova, T.; Torilov, S.; Thummerer, S.: «Structure Studies of Neutron-Rich Beryllium and Carbon Isotopes», Acta Physica Hungarica New Series - Heavy Ion Physics 18 (2003) 176
16. Di Pietro, A.; Figuera, P.; Amorini, F.; Angulo, C.; Cardella, G.; Cherubini, S.; Davinson, T.; Lu, J.; Mahmud, H.; Milin, Matko; Musumarra, A.; Ninane, A.; Papa, M.; Pellegriti, M. G.; Raabe, R.; Rizzo, F.; Ruiz, C.; Shotter, A. C.; Soić, Neven; Tudisco, S.: «Light particle emission in the reaction 6He+64Zn around the Coulomb barrier», Europhysics Letters 64 (2003) 309
17. Milin, Matko; von Oertzen, W.: «Molecular States and Complete Spectroscopy of 13C», Acta Physica Hungarica New Series - Heavy Ion Physics 18 (2003) 168
18. Milin, Matko; von Oertzen, W.: «Search for molecular bands in 13C», European Physical Journal A 14 (2002) 295
19. Szilner, Suzana; von Oertzen, W.; Basrak, Zoran; Haas, F.; Milin, Matko: «Elastic

alpha-transfer in the elastic scattering of 16O+12C», European Physical Journal A. 13 (2002) 273
PUBLICATIONS QULIFYING FOR LECTURSHIP: 1. Musumarra, A.; Pizzone, R.G.; Blagus, Saša; Bogovac, Mladen; Figuera, P.; Lattuada, M.; Milin, Matko; Miljanić, Đuro; Pellegriti, M.G.; Rendić, Dubravko; Rolfs, C.; Soić, Neven; Spitaleri, C.; Typel, S.; Wolter, H.H.; Zadro, Mile: «Improved information on the 2H(6Li,alpha)4He reaction extracted via the "Trojan horse" method», Physical Review C 64 (2001) 068801 2. Spitaleri, C.; Typel, S.; Pizzone, R.G.; Aliotta, M.; Blagus, Saša; Bogavac, Mladen; Cherubini, S.; Figuera, P.; Lattuada, M.; Milin, Matko; Miljanić, Đuro; Musumarra, A.; Pellegriti, M.G.; Rendić, Dubravko; Rolfs, C.; Romano, S.; Soić, Neven; Tumino, A.; Wolter, H.H.; Zadro, Mile: «Trojan horse method applied to 2H(6Li,alpha)4He at astrophysical energies», Physical Review C 63 (2001) 055801
DATE OF THE LAST PROMOTION: October 2003. – research associate («Ruđer Bošković» Institute, Zagreb) February 2006. – assistant professor (Faculty of Science, University of Zagreb)

LECTURER: Dr. Milko Jakšić

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Head of Laboratory for ion beam interactions, Department of experimental physics,
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BIOGRAPHY:

- 1982 Dipl. ing. Graduated physics at Faculty for natural sciences and mathematics of the Zagreb University. Since than employed at Ruđer Bošković Institute, Department of experimenatl physics. 1986, Master thesis, University of Zagreb, Detection of muon component of cosmic ray showers. 1989, PhD thesis, Measurement of elemental distriubutions using PIXE spectroscopy.
- 1990, one year EU postdoctoral schollarship, Department of physics, Oxford University, Oxford, UK.
- 1991, R. Bošković Institute, leader of instalation of new nuclear microprobe facility at the Tandem accelerator. Head of laboratory for ion beam interactions since 1995. In 2004 elected to the highest degree at Institute, research advisor. The main subject of research are studies of processes of interaction of ion beams and matter as well as their applications to materials analysis and modification.
- Since 1992 IAEA expert at number of missions in Iran, Mexico, Ghana, Lebanon, Slovenia, Nigeria and bangladesh. Principal investigator of many projets funded by IAEA, UNESCO and NATO. Author and co-autor of more than 100 scientific papers in 'Current Contents' journals. Chairman of the 9th International Conference on Nuclear Microprobe Technology and Applications, Dubrovniku, 2004.

LIST OF PUBLICATIONS IN THE LAST FIVE YEARS:

5. I. Bogdanović Radović, Z. Medunić, M. Jakšić, Z. Siketić and N. Skukan: Ion-induced electron emission ERDA with a nuclear microprobe, Nucl. Instr. And Meth. B 231 (2005) 123
6. Z. Medunić, Ž. Pastuović, M. Jakšić and N. Skukan: Studying of trap levels by the use of focused ion beams, Nucl. Instr. And Meth. B 231 (2005) 486
7. M. Jakšić, Z. Medunić, M. Bogovac and N. Skukan: Radiation damage microstructures in silicon and application in position sensitive charged particle detection, Nucl. Instr. And Meth. B 231 (2005) 502
8. Ž. Pastuović, S. Fazinić, M. Jakšić, D. Krstić and D. Mudronja: The use of the RBI nuclear microprobe in conservation process studies of a church portal, Nucl. Instr. And Meth. B 231 (2005) 546
9. X.Q. Feng, S.L. Feng, Y. Sha and M. Jakšić: Study on the provenance and elemental distribution in the glaze of Tang Sancai by proton microprobe, Nucl. Instr. And Meth. B 231 (2005) 553
10. Z. Siketić, I. Bogdanović Radović, H. Muto and M. Jakšić: H recoil cross-sections for 7Li ions at 30° and 45° in the energy interval from 2.28 to 5.70 MeV, Nucl. Instr. And Meth. B 229 (2005) 180
11. N.P. Barradas, N. Added, W.M. Arnoldbik, I. Bogdanović-Radović, W. Bohne, S. Cardoso, C. Danner, N. Dytlewski, P.P. Freitas, M. Jakšić et al.: A round robin characterisation of the thickness and composition of thin to ultra-thin AlNO films, Nucl.

Instr. And Meth. B 227 (2005) 397
12. M. Jakšić, Z. Medunić, N. Skukan: On the use of pulsed microbeam in IBIC. Nucl. Instr. And Meth. B 210 (2003) 176-180
13. Z. Medunić, M. Jakšić, Ž. Pastuović, N. Skukan: Temperature dependent TRIBIC in CZT detectors. Nucl. Instr. And Meth. B 210 (2003) 237-242
14. C. Manfredotti, F. Fizzotti, A. Lo Giudice, M. Jakšić, Ž. Pastuović, C. Paolini, P. Olivero, E. Vittone: Time-resolved ion beam-induced charge collection measurement of minority carrier lifetime in semiconductor power devices by using Gunn's theorem. Materials Science & Engineering B-Solid State Materials for Advanced Technology. 102(2003) 193-197
15. D. Gracin, P. Dubček, M. Jakšić, S. Bernstorff: Nanostructural properties of amorphous silicon carbide by GISAXS and optical spectroscopy. Thin Solid Films. 433(2003)88-91
16. D. Gracin, M. Jakšić, P. Dubček, Z. Medunić: Investigation of the nano-structural properties of amorphous silicon carbon alloys by IBA technique, optical spectroscopy and GISAXS. Vacuum. 71(2003)47-51
17. V. Borjanović, M. Jakšić, Ž. Pastuović, B. Pivac, E. Katz: IBIC Studies of structural defect activity in different polycrystalline silicon material. Vacuum. 71(2003)117-122
18. I. Bogdanović Radović, M. Jakšić, O. Benka, A.F. Gurbich, Helium elastic scattering from carbon for 30 degrees to 150 degrees in the energy region from 2 to 4.8 MeV, Nucl. Instr. and Meth. B190(2002)100-106
19. Z. Medunic, D. Gracin, I. Bogdanovic Radovic, M. Jaksic, Characterisation of amorphous silicon solar cells by IBA methods, Nucl. Instr. and Meth. B190(2002)611-614
20. M. Blaauw, J.L. Campbell, S. Fazinic, M. Jaksic, I. Orlic, P. Van Espen, The 2000 IAEA intercomparison of PIXE spectrum, Nucl. Instr. and Meth. B189(2002)113-122
21. M. Jaksic, Z. Bosnjak, D. Gracin, Z. Medunic, Z. Pastuovic, E. Vittone, F. Nava, Characterisation of SiC by IBIC and other IBA techniques, Nucl. Instr. and Meth. B188(2002)130-134
22. V. Borjanovic, M. Jaksic, Z. Pastuovic, B.Pivac, B. Vlahovic, J. Dutta, R. Jecmenica, Defects in polycrystalline silicon studied by IBICC, Solar Energy Materials & Solar Cells. 72(2002)487-494
23. B. Grzeta, E. Tkalcec, C. Goebbert, M. Takeda, M. Takahashi M., K. Nomura, M. Jaksic, Structural studies of nanocrystalline SnO2 doped with antimony: XRD and Mossbauer spectroscopy, Journal of Physics & Chemistry of Solids 63(2002)765-772
24. E. Vittone, C. Manfredotti, F. Fizzotti, A. Lo Giudice, A. Lorenzi, S. Galassini, M. Jaksic, Measurements of charge collection profiles in virgin and strongly irradiated silicon diodes by means of the micro-IBICC technique, Nucl. Instr. and Meth. A476(2002)607-613

PUBLICATIONS QUALIFYING FOR LECTURSHIP:

Since the PhD thesis in 1989, experience in leading the operation of large experimental facility (accelerators, detectors) and complete reserach acitivity of the Laboratory for ion beam interactions since 1996. Mentor of about ten diploma and master thesis. Supervisor of more than ten IAEA trainees. Lecturer on several IAEA training courses and summer schools. Co-autor of IAEA TECDOC Series No. 1190, Instrumentation for PIXE and RBS.

DATE OF THE LAST PROMOTION:
Research associate, R. Bošković Institute, 2004

LECTURER: doc.dr.sc. Tamara Nikšić

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BIOGRAPHY: Tamara Nikšić, 27 December 1976, Zagreb, Croatia. Education: Faculty of Mathematics and Natural Sciences, University of Zagreb, Croatia; B.Sc. in Physics (2000), Ph. D. in Physics, University of Zagreb (2004). Alexander von Humboldt Fellow at the Physics Department of the Technical University Munich (Germany) (2005-2006).

Assistant Professor at the Physics Department, Faculty of Sciences, University of Zagreb (2006). Visiting scientist at the Technical University Munich and Institute for Nuclear Theory, Seattle, USA.

Research interests in theoretical nuclear physics: relativistic nuclear density functional theory and applications in the description of the structure of exotic nuclei far from stability, correlations originating from the symmetry breaking mean-field and quadrupole fluctuations.

Courses at the Physics Department, Faculty of Sciences, University of Zagreb: Classical Mechanics, Quantum Physics of Finite Systems, Introduction to Programming.

LIST OF PUBLICATIONS IN THE LAST FIVE YEARS:

1) D. Vretenar, N. Paar, P. Ring, T. Nikšić: Toroidal dipole resonances in the relativistic
7) P. Ring, N. Paar, T. Nikšić, D. Vretenar: Collective excitations far from the valley of stability, Nucl. Phys. A 722, (2003) 372C-378C.
8) D. Vretenar, T. Nikšić, P. Ring: A microscopic estimate of the nuclear matter compressibility and symmetry energy in relativistic mean-field models, Phys. Rev. C 68, (2003) 024310.
9) D. Vretenar, N. Paar, T. Nikšić, P. Ring: Spin-isospin resonances and the neutron skin of nuclei, Phys. Rev. Lett. 91, (2003) 262502.
10) D. Vretenar, T. Nikšić, N. Paar, and P. Ring: Relativistic QRPA description of low-lying dipole strength in neutron-rich nuclei, Nucl. Phys. A 731, (2004) 281-288.
11) D. Vretenar, T. Nikšić, P. Ring, N. Paar, G.A. Lalazissis, P. Finelli: Relativistic Hartree-Bogoliubov and QRPA description of exotic nuclear structure, Eur. Phys. J. A 20, (2004) 75-80.
12) T. Nikšić, D. Vretenar, G.A. Lalazissis, P. Ring: Ground-state properties of rare-earth nuclei in the relativistic Hartree-Bogoliubov model with density-dependent meson-nucleon couplings, Phys. Rev. C 69, (2004) 047301.
13) N. Paar, T. Nikšić, D. Vretenar, P. Ring: Quasiparticle random phase approximation based on the relativistic Hartree-Bogoliubov model. II. Nuclear spin and isospin excitations, Phys. Rev. C 69, (2004) 054303.
14) T. Nikšić, T. Marketin, D. Vretenar, N. Paar, P. Ring: beta-decay rates of r-process nuclei in the relativistic quasiparticle random phase approximation, Phys. Rev. C 71, (2005) 014308.
15) G.A. Lalazissis, T. Nikšić, D. Vretenar, P. Ring: New relativistic mean-field interaction with density-dependent meson-nucleon couplings, Phys. Rev. C 71, (2005) 024312.
16) N. Paar, T. Nikšić, D. Vretenar, P. Ring: Isotopic dependence of the pygmy dipole

resonance, Phys. Lett. B 606, (2005) 288-294.
17) N. Paar, T. Nikšić, D. Vretenar, P. Ring: Relativistic description of exotic collective excitation phenomena in atomic nuclei, Int. J. Mod. Phys. 14, (2005) 29-37.
18) T. Nikšić, D. Vretenar, P. Ring: Renormalized relativistic Hartree-Bogoliubov equations with a zero-range pairing interaction, Phys. Rev. C 71, (2005) 044320.
19) T. Nikšić, D. Vretenar, P. Ring: Random-phase approximation based on relativistic point-coupling models, Phys. Rev. C 72, (2005) 014312.
20) N. Kaiser, T. Nikšić, D. Vretenar: Nuclear pairing from chiral pion-nucleon dynamics, Eur. Phys. J. A 25, (2005) 257-261.
21) T. Nikšić, D. Vretenar, P. Ring: Beyond the relativistic mean-field approximation: Configuration mixing of angular-momentum-projected wave functions, Phys. Rev. C 73, (2006) 034308.
22) N. Paar, D. Vretenar, T. Nikšić, P. Ring: Relativistic quasiparticle random-phase approximation description of isoscalar compression modes in open-shell nuclei in the A60 mass region, Phys. Rev. C 74, 037303 (2006).
23) T. Nikšić, D. Vretenar, P. Ring: Beyond the relativistic mean-field approximation II: Configuration mixing of mean-field wave functions projected on angular momentum and particle number, Phys. Rev. C 74, 064309 (2006).

PUBLICATIONS QUALIFYING FOR LECTURSHIP:
All the publications listed above.

DATE OF THE LAST PROMOTION: 2006.

LECTURER: doc. dr. sc. Nils Paar

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BIOGRAPHY:
Date of birth: 28. 12. 1972, Zagreb, Croatia

EDUCATION:

30. 9. 1998. - Diploma in physics (Dipl. ing. phys.) at University of Zagreb; diploma work: "Nonlinear dynamics of collective vibrations in nuclei in the time-dependent relativistic mean-field model", supervised by Prof. Dr. Dario Vretenar
25. 6. 2003. - Doctorate degree in natural sciences (Dr. rer. nat.) at Technische Universitaet Muenchen; doctoral thesis: "Relativistic mean-field description of exotic excitations in finite nuclei", supervised by Prof. Dr. Peter Ring

EMPLOYMENT:
2/2000.-6/2003. Research assistant at Physik Department, Technische Universitaet Muenchen, Germany
6/2003.-10/2003. Postdoctoral research associate at Physik Department, Technische Universitaet Muenchen, Germany
10/2003.-9/2006. Postdoctoral research associate at Institut fuer Kernphysik, Technische Universitaet Darmstadt, Germany
12/2003. - ... Docent at Faculty of science, University of Zagreb (14.10.2003 promoted as docent).

VISITS:
8/2003. Visiting fellow at Oak Ridge National laboratory, SAD
17. 9.-11. 10. 2004. Visiting fellow at Institute for Nuclear Theory, University of Washington, USA
25. 9. – 26. 10. 2005. Visiting fellow at Institute for Nuclear Theory, University of Washington, USA

10/1998-8/1999, military service, Croatia

INTERNATIONAL EXPERIENCE:
Participated at international conferences, workshops and seminars: 4 invited talks, 1 invited seminar, 17 talks, 6 posters: Kopenhagen/Denmark (1995), Coimbra/Portugal (1998), Bologna/Italy (2000), Brijuni/Croatia (2001), Schleching/Germany (2002), Thessaloniki/Greece (2002), Bad Honnef/Germany (2003), Pariz/France (2003), Kemer/Turkey (2003), Oak Ridge/USA (2003), Hirschegg /Austria (2004,2006), Istanbul/Turkey (2004), Pine Mountain/USA (2004), Seattle/USA (2004,2005), Berlin/Germany (2005), St. Petersburg/Russia (2005), Kos/Greece (2005), Kazimierz Dolny/Poland (2005), Brasov/Romania (2006), Tokyo/Japan(2006), Zagreb/Croatia(2006)

TEACHING EXPERIENCE:
2000-2006 exercises in undergraduate courses of theoretical physics at Technische Universitaet Muenchen, and Technische Universitaet Darmstadt, Germany

2006/2007 lectures and exercises in Introductory computational science at University of Zagreb

PROFESSIONAL ACTIVITIES:
2005-, Referee for Physical Review and European Journal of Physics

PROFICIENCY IN LANGUAGES:
Croatian (fluent), English (fluent), German (basic)

PROGRAMMING KNOWLEDGE:
Operative systems: Windows, Linux
Languages: C++, Fortran, Mathematica, html, LaTex

MEMBERSHIP:
Croatian Physical Society
Deutsche Physikalische Gesellschaft
RIA Theory Group
GSI Users Group
European Nuclear Theory group NT*

LIST OF PUBLICATIONS IN THE LAST FIVE YEARS:

173. D. Vretenar, N. Paar, P. Ring and G. A. Lalazissis, "Pygmy dipole resonances in relativistic random phase approximation", Phys. Rev. C 63, 047301 (2001).
174. D. Vretenar, N. Paar, P. Ring and G. A. Lalazissis, "Collectivity of the low-lying dipole strength in relativistic random phase approximation", Nucl. Phys. A, 692 (3-4) 496-517 (2001).
175. D. Vretenar, N. Paar, P. Ring, and T. Niksic "Toroidal dipole resonances in the relativistic random phase approximation ", Phys. Rev. C 65, 021301(R), (2002).
176. G. A. Lalazissis, D. Vretenar, N. Paar, and P. Ring "Relativistic description of regular and chaotic dynamics in the giant monopole resonances ", Chaos, Solitons & Fractals. 17, 585-590 (2003).
177. N. Paar, T. Niksic, D. Vretenar and P. Ring "Quasiparticle random phase approximation based on the relativistic Hartree-Bogoliubov model" , Phys. Rev. C 67, 034312 (2003).
178. P. Ring, N. Paar, T. Niksic and D. Vretenar "Collective excitations far from the valley of stability" , Nucl. Phys. A 722, 372c (2003).
179. D. Vretenar, N. Paar, T. Niksic, and P. Ring, "Spin-Isospin Resonances and Neutron Skin of Nuclei", Phys. Rev. Lett. 91, 262502 (2003).
180. D. Vretenar, T. Niksic, N. Paar, and P. Ring, "Relativistic QRPA description of low-lying dipole strength in neutron-rich nuclei", Nucl. Phys. A 731, 281 (2004).
181. D. Vretenar, T. Niksic, P. Ring, N. Paar, G. A. Lalazissis, and P. Finelli, "Relativistic Hartree-Bogoliubov and QRPA description of exotic nuclear structure", Eur. Phys. J. A 20, 75 (2004).
182. N. Paar, T. Niksic, D. Vretenar and P. Ring, "Quasiparticle random phase approximation based on the relativistic Hartree-Bogoliubov model II: Nuclear spin and isospin excitations", Phys. Rev. C 69, 054303 (2004).
183. N. Paar, T. Niksic, D. Vretenar and P. Ring, "Isotopic dependence of the pygmy

dipole resonance", Phys. Lett. B 606, 288 (2005).

184. N. Paar, T. Niksic, D. Vretenar and P. Ring, "Relativistic description of exotic collective excitation phenomena in atomic nuclei", Int. J. Mod. Phys. E 14, 1 (2005).

185. T. Niksic, T. Marketin, D. Vretenar, N. Paar, and P. Ring, "Beta-decay rates of r-process nuclei in the relativistic quasiparticle random phase approximation", Phys. Rev. C 71, 014308 (2005).

186. N. Paar, D. Vretenar, and P. Ring, "Proton electric pygmy dipole resonance", Phys. Rev. Lett. 94, 182501 (2005).

187. N. Paar, P. Papakonstantinou, V. Yu. Ponomarev, and J. Wambach, "Low-energy dipole excitations towards the proton drip-line: doubly magic 48Ni", Phys. Lett. B 624, 195 (2005).

188. N. Paar, T. Niksic, D. Vretenar, T. Marketin, and P. Ring, "Self-consistent relativistic QRPA studies of soft modes and spin-isospin resonances in unstable nuclei", Eur. Phys. J. A 25 Suppl. 1, 531 (2005).

189. N. Paar, P. Papakonstantinou, H. Hergert, and R. Roth, "Collective excitations in the Unitary Correlation Operator Method and relativistic QRPA studies of exotic nuclei", Physics of Atomic Nuclei 69, 1345 (2006).

190. R. Roth, P. Papakonstantinou, N. Paar, H. Hergert, T. Neff, and H. Feldmeier, "Hartree-Fock and Many-Body Perturbation Theory with Correlated Realistic NN-Interactions", Phys. Rev. C 73, 044312 (2006).

191. N. Paar, P. Papakonstantinou, R. Roth, and H. Hergert, "Self-consistent description of collective excitations in the unitary correlation operator model", Int. J. Mod. Phys. E 15, 346 (2006).

192. N. Paar, P. Papakonstantinou, H. Hergert, and R. Roth, "Collective multipole excitations based on correlated realistic nucleon-nucleon interactions", Phys. Rev. C 74, 014318 (2006).

193. N. Paar, D. Vretenar, T. Niksic, and P. Ring, "Relativistic quasiparticle random-phase approximation description of isoscalar compression modes in open-shell nuclei in the A=60 mass region ", Phys. Rev. C 74, 037303 (2006).

PUBLICATIONS OUALIFYING FOR LECTURESHIP:

194. N. Paar, T. Niksic, D. Vretenar and P. Ring, "Quasiparticle random phase approximation based on the relativistic Hartree-Bogoliubov model II: Nuclear spin

195. N. Paar, T. Niksic, D. Vretenar and P. Ring, "Isotopic dependence of the pygmy dipole resonance", Phys. Lett. B 606, 288 (2005).

196. N. Paar, T. Niksic, D. Vretenar and P. Ring, "Relativistic description of exotic collective excitation phenomena in atomic nuclei", Int. J. Mod. Phys. E 14, 1 (2005).

197. N. Paar, D. Vretenar, and P. Ring, "Proton electric pygmy dipole resonance", Phys. Rev. Lett. 94, 182501 (2005).

198. N. Paar, P. Papakonstantinou, V. Yu. Ponomarev, and J. Wambach, "Low-energy dipole excitations towards the proton drip-line: doubly magic 48Ni", Phys. Lett. B 624, 195 (2005).

199. N. Paar, P. Papakonstantinou, R. Roth, and H. Hergert, "Self-consistent description of collective excitations in the unitary correlation operator model", Int. J. Mod. Phys. E 15, 346 (2006).

200. N. Paar, P. Papakonstantinou, H. Hergert, and R. Roth, "Collective multipole

excitations based on correlated realistic nucleon-nucleon interactions", Phys. Rev. C 74, 014318 (2006).
DATE OF THE LAST PROMOTION: 14. 10. 2003.

3. CONDENSED MATTER PHYSICS

LECTURER: Prof. dr. sc. Aleksa Bjeliš

AFFILIATION:
Faculty of Science, Department of Physics, Zagreb

E-MAIL ADDRESS: bjelis@phy.hr

BIOGRAPHY:
Born 2 february 1947 in Rijeka, Croatia. Elementary and secondary schools attended in Varaždin and Zagreb. Baccalaureate at VII Gymnasium in Zagreb 1965. >From 1965 to 1970 studied physics at faculty of Science, University of Zagreb, where he did the final diploma examination in the group of engineering physics. From 1872 to 1974 he attended the graduate study at the University of
Zagreb, the program of Physics of Condensed Matter, which he finished by defending the magister work "Dynamical properties of quasi-one-dimensional electron-phonon systems (supervised by S. Barišić). Doctoral thesis "Sructural instabilities in one-dimensional conductors" (supervised by S. Barišić) defended 1978 at the Faculty of Science, University of Zagreb.
>From 1971 to 1988 works at the Institute of Physics of the University of Zagreb; from 1971 to 1974 as the assistant beginner, from 1974 to 1980 as the assistant, from 1980 to 1988 as the scientific collaborator. In the latter period he was the head of the Department for theoretical physics, and the interim director of the Institute. from 1988 to 1990 assistant professor, from 1990 associate professor, from 1997 full professor at the Chair for Theoretical Physics of the Physical department of the faculty of Science. 2003. elected at the position of permanent full professor.
Scientific work

Until now he published about 70 scientific works, mostly in international open journals. He was invited speaker at about fifteen international conferences, workshops and schools, and he actively participated at more than twenty international meetings.
He was a visiting scientist or professor about twenty times at universities in France, USA, Canada, Italy, Switzerland and Hungary. he supervised six doctoral thesis and four magister thesis. he is the referee for a number of leading international physical journals.

His scientific investigations are of theoretical type and cover various problems of physics of condensed matter, mostly in systems with the reduced dimension. Roughly they can be divided into few themes: (i) electron-phonon and electron-electron correlations in the tight binding approach, (ii) three-dimensional oder of charge density waves inorganic chain compounds, (iii) nonlinear dynamics of charge density waves, (iv) the influence of external magnetic field on the spin and charge density waves, and (v) general considerations of incommensurate-commensurate transitions in orderings of uniaxial type.

He is the member of European Physical Society and Croatian Physical Society.

LIST OF PUBLICATIONS IN LAST FIVE YEARS:
1. D. Zanchi, A. Bjeliš, Europhysics Letters 56, 596 - 602 (2001).
2. P. Županović, A. Bjeliš, Ž. Agić, Fizika A (Zagreb) 10, 203 - 214 (2001).
3. D. Radić, A. Bjeliš, D. Zanchi, J. Phys. IV France 12, 91 (2002).

4. Ž. Agić, P. Županović, A. Bjeliš, J. Phys. IV France 12, pr 9; 53 - 56 (2002).
5. D. Zanchi, A. Bjeliš, D. Radić, Synthetic Metals 137, 1285 (2003).
6. Ž. Agić, P. Županović, A. Bjeliš, J. Phys. IV France 114, 95 (2004).
7. D. Radić, A. Bjeliš, D. Zanchi, J. Phys. IV France 114, 129 (2004).
8. D. Radić, A. Bjeliš, D. Zanchi, Phys. Rev. B69, 014411 (2004).
9. D. Radić, A. Bjeliš, D. Zanchi, J. Phys. IV France 131 281 (2005).
10. Ž. Bonačić Lošić, P. Županović, A. Bjeliš, J. Phys. Cond. Matter 18, 3655 (2006).
11. A. Bjeliš, D. Zanchi, ed. A. Lebed, Springer Verlag, Berlin, Heidelberg, New York, to be published (2006).

PUBLICATIONS QULIFAYING FOR LECTURSHIP:

In teaching activities A. Bjeliš lectures the courses of Classical Mechanics and Nonlinear phenomena in Physics at the under-graduated level, and courses Solid State Physics and Nonlinear Continua at the graduate level. 1999 he taught the course on Charge and Spin Density Waves at the Troisième cycle de la physique en Suise Romande in Lausanne.

IN the period from 1980 to 1987 he was active in the popularization of physics in elementary and secondary schools, as the president of the committee for competitions in physics of the Society of mathematician and physicists of Croatia, as one of the organizers of the International Olympiad in physics in Portorož 1985, and one of the founders of the Summer school for young physicists, permanently active from 1984.

In the period from 1997 to 2003 he represented University of Zagreb in EUPEN (European University Physics Education Network) programme of the European Union.

DATE OF THE LAST PROMOTION:
2003. he was promoted into the permanent full professor position at the Faculty of Science, University of Zagreb

LECTURER: Prof. dr. sc. Marijan Šunjić

AFFILIATION:
Faculty of Science, Department of Physics, Zagreb

E-MAIL ADDRESS: msunjic@phy.hr

BIOGRAPHY:

ACADEMIC DEGREES:
Classical Gymnasium, Zagreb, 1958
B.Sc. (Ing. Phys.), Faculty of Science, University of Zagreb, 1963
M.Sc. in Theoretical Solid State Physics, Faculty of Science, University of Zagreb, 1966
Ph.D. in Theoretical Solid State Physics, Imperial College of Science and Technology, University of London, 1970

ACADEMIC POSITIONS:
Institute "Ruđer Bošković", Zagreb:
Research Assistant to Associate Professor (1963-1978)

Faculty of Science, University of Zagreb:
Associate Professor (1978-1981); Full Professor (1981-)
Chairman of the Physics Department (1980-1982)
Centre for Post-graduate Studies: Lecturer (1970-1993)
Dean of Postgraduate Studies in Physics (1983-1989)

University of Zagreb:
Chairman, Foreign Relations Committee (1988-1991)
Rector (1991-1998)
Croatian Rectors' Conference: President (1991-1996)
European Rectors' Conference (CRE): Member of the Permanent Committee (1991-1998)
Danube Rectors' Conference: Chairman of the Permanent Committee (1994-1995); President (1995-1998); Vice-President (1998-2000); Head, Center for Academic Development and Cooperation (CADAC) (1997-)

VISITING POSITIONS:
International Centre for Theoretical Physics, Trieste: Consultant (1972-1975)
Chalmers University of Technology, Göteborg: NORDITA Visiting Professor (1975-1977)
Institut für Theoretische Physik, Universität Hamburg: Guest Professor (1977-1978)
Advanced School of Physics, University of Trieste: Guest Professor (1978-1979)
Department of Physics, University of Pennsylvania: Visiting Professor (1982)
Fritz Haber Institut der MPG, Berlin: Visiting Scientist (1982-1990)

GOVERNMENT POSITIONS:
Ministry of Science, Technology and Informatics, Republic of Croatia: Deputy Minister (1990-1991) Ministry of Foreign Affairs: Ambassador Extraordinary and Plenipotentiary of the Republic of Croatia to the Holy See (1998-2000)

LIST OF PUBLICATIONS IN LAST FIVE YEARS: 1. J. Stepanić, M. Šunjić, Physica Scripta 69, 74-77 (2004). 2. V. Despoja, L. Marušić, M. Šunjić, Fizika A 14, 207-218 (2005). 3. L. Marušić, V. Despoja, M. Šunjić, J. Phys.: Condens. Matter 18, 4253-4263 (2006). 4. V. Despoja, L. Marušić, M. Šunjić, Solid State Commun. 140, 270-275 (2006). 5. V. Despoja, L. Marušić, M. Šunjić, J. Phys.: Condens. Matter 18, 8217-8228 (2006). 6. V. Despoja, M. Šunjić, L. Marušić, Phys. Rev. B 75, 045422-1 - 045422-8 (2007).
PUBLICATIONS QULIFAYING FOR LECTURSHIP: Theoretical solid state physics (many-body processes and dynamics, surface physics, photoemission, electron spectroscopy). More than 100 publications in scientific journals.
DATE OF THE LAST PROMOTION: 1996. the permanent full professor position at the Faculty of Science, University of Zagreb

LECTURER: Prof. dr. sc. Emil Babić

AFFILIATION:
Faculty of Science, Department of Physics, Zagreb

E-MAIL AND WEB ADDRESS: ebabic@phy.hr, http://www.phy.hr/ ~ebabic

BIOGRAPHY

Born 15.05.1942 in Hvar, Croatia.

Education

PhD (Sci), University of Zagreb/Physics, Solid State Physics, 1974, "Some electronic properties of concentrated Al-3d alloys"
Dipl. Eng. Phys., University of Zagreb/Physics, Nuclear Physics, 1966, "The Mössbauer effect"

Appointments

1985 – current, University of Zagreb, Faculty of Science, Full Professor
1979 – 1985. University of Zagreb, Faculty of Science, Associated Professor
1974 – 1979. University of Zagreb, Faculty of Science, Senior Lecturer (Docent)
1972 – 1974. University of Zagreb, Faculty of Science, Assistant Lecturer
1966 – 1972. Institute of Physics (Zagreb), Research Assistant

Professional, research, academic experience and achievements

E. Babić was authored and coauthored about 200 scientific journal papers, 4 invited book chapters, 80 conference papers and 2 books. His work has been cited over 1500 times in scientific journals. He co-organized 2 international conferences and was invited speaker and session chair at 5 conferences. E. Babić is a member of the editorial board of journal FIZIKA A and referee for AIP and IOP scientific journals. He teaches three courses at undergraduate and two doctoral studies at the Faculty of Science, Zagreb. E. Babić was a mentor for 22 Phd/M.sci. theses. As a visiting fellow/professor he worked for extended time periods at several universities (Genova, London, Strasbourg, Nancy, Paris) and institutions (CSIRO, ISEM, EPFL). He was also head of Department of Physics in Zagreb and served/serves in several professional committees in Croatia and abroad.
E. Babić has been involved in research in solid state physics for nearly 4o years.
He was a leader of about 10 scientific projects in Croatia and two international projects. His main interest is in electronic transport and thermodynamic properties of matallic (including supersaturated alloys, metallic glasses and nanostructured alloys) and ceramic systems(mostly high temperature superconductors(HTS) and MgB2), as well as the development of the experimental techniques. Some achivments of this work are:
the evidence for localised spin fluctuations in concetrated Al-3d alloys, observation of magnetic contribution to electrical resistivity of amorphous ferromagnets, the evidence for strong ferromagnetism in amorphous Fe-Co-Ni base alloys, the correlation between the electronic structure and electronic and thermodynamic properties in amorphous Zr-3d alloys and phenomenological model for magnetization of soft ferromagnetic ribbons. For superconductors, he introduced a two-phase description of electromagnetic properties of ceramic HTS, percollative description of their critical currents, explained the influence of sheating on resistivity and I-V curves of superconducting wires, proposed, verified and

explained enhancement of electromagnetic properties of HTS and MgB2 composite wires upon introduction of nanoscopic defects (fission tracks/nanoprecipitates). He was aworded „Ruđer Bošković“ prize for scientific achievement in 1974.

LIST OF PUBLICATIONS IN LAST FIVE YEARS:

1. D.Pajić,K. Zadro,R.Ristić,Ž. Skoko,E.Babić, J. Phys. Cond. Matt. 19 (2007) 296207.
2. S.Sabolek, E.Babić, D.Posedel, M.Šušak, Physica status solidi (a) 202 (2005) 1161.
3. S.Sabolek, E.Babić, D.Posedel, M.Šušak, , Sensors and actuators a-physical 106 (2003) 65.
4. R.Ristić, E.Babić, Mat. Sci. Eng.A 449-451 (2007) 569.
5. S.Sabolek, E.Babić, D.Posedel, M.Šušak, IEEE Trans. on Magn. 40 (2004) 3352.
6. Kušević, I.; Babić, E.; Husnjak, O.; Soltanian, S.; Wang, X.L.; Dou, Shi Xue, Solid State Commun. 132 (2004) 761-765..
7. Kušević, Ivica; Babić, Emil; Marinaro, Damian; Dou, Shi Xue; Weinstein, Roy, PHYSICA C. 408-410 (2004) 524-525.
8. Kušević, Ivica; Babić, Emil; Marinaro, D.; Dou, Shi Xue; Weinstein, R., PHYSICA C. 408-410 (2004) 643-644.
9. Sabolek, Stjepan; Babić, Emil; Popović, Stanko; Marohnić, Željko, J. Mag. Mag. Materials. 261 (2003) 269-276.
10. Bakonyi, Imre; Babić, Emil; Miljak, Marko; Lück, R.; Bahle, J.; Hasegawa, R.; Kollár, J., Physical Review B. 6510 (2002) 4423.
11. Kušević, Ivica; Marohnić, Željko; Babić, Emil; Drobac, Đuro; Wang, X.L.; Dou, Shi Xue, Solid State Commun. 122 (2002) 347-350.
12. Marinaro, Damian G.; Horvat, Jože; Dou, Shi Xue; Kušević, Ivica; Babić, Emil; Weinstein, Roy; Gandini, A., Superconductor Science and Technology. 15 (2002) , 11; 1596-1599
13. Babić, Emil; Kušević, Ivica; Marinaro, Damien; Dou, Shi Xue; Boldeman, J.; Weinstein, R.. Solid State Commun. 118 (2001) 607-610
14. Soltanian, S.; Wang, X. L.; Kušević, Ivica; Babić, Emil; Li, A. H.; Qin, M. J.; Horvat, Jože; Liu, H. K.; Collings, E. W.; Lee, E.; Sumption, M. D.; Dou, Shi Xue.. Physica C. 361 (2001) 84-90.
15. Sabolek, Stjepan; Babić, Emil; Kušević, Ivica; Šušak, Marko; Stanić, Denis, FIZIKA A. 15 (2006.) 1-16.
16. Kušević, Ivica; Babić, Emil, FIZIKA A. 14 (2005) 75-88.
17. Ristić, Ramir; Babić, Emil, Fizika A. 14 (2005) 97-106.
18. Ristić, Ramir; Marohnić, Željko; Babić, Emil, FIZIKA A. 12 (2003) 2; 89-96.
19. Babić, Emil; Kušević, Ivica; Husnjak, Ozren; Soltanian, Saeid; Wang, Xiao Lin; Dou, Shi Xue, Physica C. (2007) Published online 15. April.
20. Husnjak, Ozren; Kušević, Ivica; Babić, Emil; Soltanian, Saeid; Wang, Xiao Lin; Dou, Shi Xue, Physica C. (2007) Published online 15. April.
21. S.X. Dou, O. Shcherbakova, W.K. Yeoh, J.H. Kim, S. Soltanian, X.L. Wang, C. Senatore, R. Flukiger, M. Dhalle, O. Husnjak, E. Babic, Phys. Rev. Lett. 98 (2007) 097002.

PUBLICATIONS QULIFAYING FOR LECTURSHIP:

Experimental Investigation in Solid State Physics :

All publications.

Field Theory

All publications concerning amorphous alloys and ceramic superconductors.

DATE OF THE LAST PROMOTION:
1998. full professor (permanent position), Faculty of Science, Department of Physics, University of Zagreb

LECTURER: Prof. dr. sc. Anđelka Tonejc

AFFILIATION:
Faculty of Science, Department of Physics, Zagreb

E-MAIL AND WEB ADDRESS: andelka@phy.hr, http://www.phy.hr/~andelka/

BIOGRAPHY
Place of Birth: Ilok, Croatia
Merital Status: Married (children: Jasmina and Andrej)

Education & Qualifications:
1965. University of Zagreb, Faculty of Science, Department of Physics, B. S.. Physics
1969. University of Zagreb, Faculty of Science, Department of Physics, M. S. Physics (Atomic Physics)
1980. University of Zagreb, Faculty of Science, Department of Physics, Ph. D. Physics (Solid State Physics) Thesis: "An Investigation of Ag-based and Al-based Alloys Rapidly Quenched from the Melt, by Means of X-ray and Electron Diffraction Techniques"

Appointments: 28 Aug - 12 Sep, 1993: JEOL Tokyo, Japan - Advanced Course in High Resolution Electron Microscopy (HREM) and Electron Diffraction ; JEOL certificate No. 93213/1993.
15 - 22 Jun, 1995, Department of Chemistry, Stockholm University, Sweden: Electron Crystallography School (main topic: HREM image processing using CRISP program.
9 to 20 June 2004. Ettore Majorana Foundation and Centre for Scientific Culture, International school of Crystallography, ELECTRON CRYSTALLOGRAPHY, Novel Approaches for Structure Determination of Nanosized Materials, the 36th international crystallographic course, Erice-Sicily,2004.

Specialized study leave:
1974 -1976. Faculty of Science, Laboratory of Solid State Physics, Orsay, Paris, France (Head of Department: Prof. Dr. A. Guinier)
Special teaching commitments:
1996. Postgraduate study at Physics Department, Autonomous University of Barcelona, Bellaterra. (Electron Microscopy in Materials Science)
1965 - Department of Physics, Faculty of Science, University of Zagreb
Present position: Professor of Physics at Department of Physics and Head of Physics Department (2001- 2003),(2003-2005).
Depute Head of Physics Department (1997-2001).
Present teaching commitments: a) Undergraduate study - General Physics (1st year course), Physics Laboratory 5 (3rd year course), b) Postgraduate study- Electron Microscopy and Electron Diffraction (Chemistry and Geology);Experimental studies in Solid State Physics (Selected Subjects on Electron Microscopy) (Physics postgraduate study);Present scientific commitments:
Responsible for Electron Microscopy and Electron Microscope, Investigation at Department of Physics,Major component of present scientific investigation: Microstructural and structural investigations of nanocrystalline materials by HRTEM, ED and XRD.
Number of papers in journals : 95 ,Number of communications to scientific meetings : 76 (international) and 40 (domestic), Chapter in monographs: 5,

Membership:Croatian Crystallographic Association, Croatian Society of Electron Microscopy (Depute of President), European Society of Electron Microscopy, European Crystallographic Association,Croatian Physics Society. Referee of international and domestic journals.Representative of Croatia in Special Interest Group (SIG) on Electron Crystallography,Representative of Croatia in Woman in Physics at International Union of Pure and Applied Physics (IUPAP).

LIST OF PUBLICATIONS IN LAST FIVE YEARS:

Scientific publication with referee system:

201. A. M. TONEJC, I. Đerđ, A. Tonejc, Fizika 10 (2001) 177-190.
202. V. Lopac, A. M. TONEJC and N. Pećina, The Past and Present of Physics in Croatia: Differences in Graduation Statistics and Textbook Illustrations, in "Woman in Physics", IUPAP , International Conference on Woman in Physics, Eds. B.K. Hartline and Dongqi Li, Paris, France, (2002) 149-150. American Institute of Physics, Melville, New York,2002. AIP Conference Proceedings, Vol 628.
203. M. Ivanda, A. M. TONEJC, I. Djerdj, M. Gotić, S. Musić, G. Mariotto, and M. Montagna, Determination of nanosize particle distribution by low frequency Raman scattering: comparison to electron microscopy in "Springer Lecture Notes in Physics: Nanoscale Spectroscopy and Its Application to Semiconductor Research", Eds: Y. Watanabe, S. Heun, G. Salviati, N. Yamamoto, Springer, 2002, 24-36. (poglavlje u knjizi)
204. I. Djerdj, A. M. TONEJC, A. Tonejc and N. Radić, , submitted to Fizika A (2004).
205. Anđelka M. Tonejc " HRTEM Investigation of Nanocrystalline Materials" in "Electron Crystallography – A Novel Approaches for Structure Determination of Nanosized Materials", eds. T.E. Weirich, J. Labar and X.D. Zou, *Nato ASI Series C,* Springer, Dordrecht, (2004), The Nederlands, pp.443-453.(poglavlje u knjizi)
206. I. Djerdj, Anđelka M. Tonejc, A. Tonejc, Structural investigations of nanocrystalline TiO_2 samples in *Electron Crystallography: Novel Approaches for Structure Determination of Nanosized Materials*, eds. T.E. Weirich, J. Labar and X.D. Zou, *Nato ASI Series C, Mathematics, Physics, and Chemistry , Vol 211.*, Springer, Dordrecht, (2004), The Netherlands. pp. 443-453.
207. M. Ivanda, A. M. Tonejc I. Djerdj, M. Montagna, M. Schmitt W. Kiefer Raman scattering determination of size distribution of CdS_xSe_{1-x} nanoparticles embedded in glass matrix, accepted for publication in Asian Journal of Spectroscopy (2005).
208. V. Lopac, B. Hamzić and A.M. Tonejc, Status of Women in Physics in Croatia, Women in Physics, 2nd IUPAP International Conference on Women in Physics Rio de Janeiro Brazil, May 23-25,2005. p. 109-110. AIP Conference Proceedings, vol 795, Melville New York 2005; Eds. Beverly Karplus Hartline and Ariel Michelman- Ribeiro, ISBN 0-7354-0278-7; ISSN 0094-243-x.

CC publications :

209. A. Bilušic, S. Gradečak, A. Tonejc, A. M. TONEJC, J.C. Lasajunias, A. Smontara, Synthetic Metals 121 (2001) 1121-1122.

210. A. M. TONEJC, I. Đerđ, A. Tonejc,, Mater. Sci. Engng.C 19 (2001) 85-89.
211. A. Smontara, A. M. TONEJC, S. Gradečak, A. Tonejc, A. Bilušic, J.C. Lasajunias, Mater. Sci. Engng. C 19 (2001) 21-25.
212. A. M. TONEJC, I. Djerdj, A. Tonejc, Mater. Sci. Eng. B 85 (2001) 55-63.
213. J.C. Lasajunias, M. Saint-Paul, A. Bilušić, A. Smontara, S. Gradečak, A. M. TONEJC, A.Tonejc, N. Kitamura, Phys. Rev. B 66 (2002) 1-12.
214. A. Smontara, A. Bilušić, J. C. Lasjaunias, M. Saint-Paul, S. Gradečak, A. M. TONEJC, A. Tonejc, N. Kitamura, S. Bennington, Strojarstvo 44 (2002) 195-200.
215. I. Djerdj, A. M. TONEJC, A. Tonejc and N. Radić, Vacuum 80 (2005) 151-158.
216. I. Djerdj, A. M. TONEJC, M. Bijelić V. Vraneša, A. Turković, Vacuum 80 (2005) 371-378.
217. Djerdj, I., Tonejc, A. M., Bijelić, M., Buljan, M., Desnica, U. V., and Kalish, R., Mat. Sci. Eng. C 26 (2006) 1202- 1206.
218. I. Djerdj, A. M. TONEJC, Journal of Alloys and Compounds, 413(2006) 159-174.
219. Gajović, A., Djerdj, I., Furić, K., Tonejc, A., Tonejc A. M, Su, D., Schlögel, R., Musić S., Jornal of American Ceramic Society 89 (2006) 2196-2205.
220. N. Radić, P. Dubček, S. Bernstorff, I. Djerdj, A. M. TONEJC, accepted for publication in J. Appl. Crystallography (2007)
221. M. Ivanda, A. M. Tonejc, I. Djerdj, M. Montagna, M. Ferrari, M. Schmitt, and W. Kiefer, Asian Journal of Spectroscopy (2007), in print.
222. M. Ivanda, K. Furic , S. Music , M. Ristic , M. Gotic , D. Ristic , A.M. Tonejc, I. Djerdj, M. Mattarelli, M. Montagna, F. Rossi, M. Ferrari, A. Chiasera, Y. Jestin, G. C. Righini, W. Kiefer, R.R. Gonçalves,"Low Wavenumber Raman Scattering of Nanoparticles and Nanocomposite Materials" , Journal of Raman Spectroscopy 38 (2007) pp 647-659. pregledni rad pozvan za "Special Issue: Raman Spectroscopy on Nanomaterials"

Proceedings of international conferences:

223. A. M. TONEJC, I. Đerđ, A. Tonejc, HRTEM image processing analysis on nanocrystalline iron-itanium powders, Proceedings of 12th European Congress on Electron Microscopy, Brno, Czech Republic, Vol II (2000) 303-304.
224. Anđelka Tonejc, Planinka Pećina and Vjera Lopac, About Past and Present of Physics at the University of Zagreb, Croatia, (Female population among students and teaching staff), Reports from Participating Teams, Book of reports, IUPAP International Conference on Woman in Physics March 7-9,2002, Paris, France.
225. . Ž. Skoko, S. Popović, I. Djerdj and A. M. Tonejc, Microstructure of Al-Zn alloys, Proceedings of 6th Multinational Congress on Microscopy-European Extension,1.-5. 6. 2003. Pula, Croatia, p.468,. eds. O. Milat and D. Ježek, Croatian Society for Electron Microscopy, Zagreb, Croatia.
226. A. M. Tonejc and I. Djerdj, HRTEM image processing investigation of nanocrystalline materials, Proceedings of 6th Multinational Congress on Microscopy-European Extension, 1.-5. 6. 2003. Pula, Croatia p. 213-214. eds. O. Milat and D. Ježek. Croatian Society for Electron Microscopy, Zagreb, Croatia.
227. I. Djerdj, A. M. Tonejc and A. Tonejc, The calculation of the average grain

size of nanocrystalline titania by means of electron microscopy and XRD, Proceedings of 6th Multinational Congress on Microscopy-European Extension,1.-5. 6. 2003., Pula, Croatia.p. 221-222, .eds. O. Milat and D. Ježek, Croatian Society for Electron Microscopy, Zagreb, Croatia.

228. I. Djerdj, A. M. Tonejc, A. Tonejc, N. Radić, XRD analysis of tungsten thin films, Proceedings of 10th Joint Vacuum Conference, 28. 09.-02. 10. 2004., Portorož, Slovenia . Book of abstracts

229. M. Ivanda, S. Musić, M. Gotić, M. Ristić, A. Turković, A. M. TONEJC, I. Đerđ, M. Montagna, M. Ferrari, Z. Crnjak-Orel, W. Kiefer, Raman Technique in Determination of Size Distribution Semiconductor Nanoparticles, Proceedings of 7th International Conference on Nanostructural Materials, June 20- 24, 2004. Wiesbaden, Germany.

230. M. Ivanda, K. Furić, S. Musić, M. Gotić, M. Ristić, A. Turković, A. M. Tonejc, I. Đerđ, Z. Crnjak Orel, M. Montagna, M. Ferrari, M. Schmitt, K. Babocsi, W. Kiefer, *Application Of Raman Scattering Technique In Determination Of Size Distribution Of Different Type Of Nanoparticles* Proc. XIXth Intern. Conf. Raman Spectroscopy, Eds. P. M. Fredericks, R. L. Frost and L. Rintoul, CSIRO Publishing, Australien (2004), p. 615-616.

231. M. Ivanda, K. Furić, S. Musić, M. Gotić, M. Ristić, A. Turković, A. M. Tonejc, I. Đerđ, Z. Crnjak Orel, M. Montagna, M. Ferrari, M. Schmitt, K. Babocsi, W. Kiefer, *Raman Technique in Determination of Size Distribution of Oxide and Semiconductor Nanoparticles* Proceedings of International Conference on Optoelectronics and Spectroscopy of Nano-Structured Thin films and Materials, Edited by Yan Fang, Kina, pp. 47-48 (2004).

232. . Djerdj, I., Tonejc, A. M., Bijelić, M., Vraneša, V. and Turković, A. (2004): Transmission electron microscopy studies of nanostructured TiO_2 films on different substrates, Proceedings of 10th Joint Vacuum Conference, Portorož, Slovenia, September 2004.

233. Djerdj, I., Tonejc, A. M., Bijelić, M., Buljan, M., Desnica, U. V., Saguy, C., Kalish, R. (2005): Transmission electron microscopy study of different carbon nanophases produced by ion beam implantation, Proceedings of E-MRS 2005 Spring Meeting, Strasbourg, France, June 2005.

234. Djerdj, I., Tonejc, A. M., Tonejc, A., Bijelić, M., Buljan, M., Desnica, U. V., Kalish, R. (2005): TEM study of carbon nanophases grown in carbon-ion implanted quartz, 14th Croatian-Slovenian crystallographic meeting, Vrsar, Croatia, June 2005.

235. . Ivanda, M., Musić, S., Gotić, M., Ristić, M., Turković, A., Tonejc, A. M., Đerđ, I., Montagna, M., Ferrari, M., Crnjak Orel, Z., Kiefer, W., Determination of Size Distribution of Oxide and Semiconductor Nanoparticles by HRTEM and Raman Spectroscopy, Book of abstracts, XXVII European Congress on Molecular Spectroscopy (XXVII EUCMOS)/Handke, Miroslaw; Hasik, Magdalena (ur.). Krakow: Paluszkiewicz, Czeslawa, 2004. p. 60.

236. Djerdj, I., Tonejc, A. M. Turković, A., Ivanda, M., Tonejc, A., Evidence on the structural parameters of different nanocrystalline materials obtained by the

refinement of SAED patterns, 7th Multinational Congress on Microscopy, ISBN-961-6303-69-4, Portorož, Slovenia, June, 2005.

237. Tonejc A. M., Djerdj, I., Tonejc A., Bijelić, M., Buljan, M., Desnica, U. V., and Kalish, R., TEM study of Carbon Nanophases Grown in Carbon-Ion Implanted Quartz, Book of Abstracts of The Microscopy Conference 2005, 6. Dreiländertagung, Davos, Switzerland, September 2005., p. 289.

238. A. M. Tonejc, I. Djerdj, A. Tonejc and N. Radić, "HRTEM and XRD line profile analysis of tungsten thin films", 2nd Croatian Congress on Microscopy (with international participation), Topusko, (2006) 140-141.

239. A. Turković, A.M. Tonejc, I.Djerdj , M. Bijelić, V. Vraneša, Transmission electron microscopy studies of nanostructured TiO_2 films on various substrates, 2nd Croatian Congress on Microscopy (with international participation), Topusko, (2006) 120-121.

240. Tonejc A. M., Djerdj, I., Tonejc A., Bijelić, M., Buljan, M., Desnica, U. V., and Kalish, R., TEM study of Carbon Nanophases Grown in Carbon-Ion Implanted Quartz, 2nd Croatian Congress on Microscopy (with international participation), Topusko, (2006) 258-259.

241. A. M. Tonejc I. Djerdj, A. Tonejc. M. Bijelić and N. Radić "HRTEM and XRD line profile analysis of tungsten thin films", 15th Croatian-Slovenian crystallographic meeting, Jezersko, Slovenia, June 2006. Book of Abstracts

242. A.M.Tonejc. M.Ivanda and A.Tonejc, TEM and Raman scattering determination of nanocrystalline distributions of CdS_xSe_{1-x} nanoparticles embedded in glass matrix, Proceedings of 8th Multi national Congress on Microscopy, Prag, June 17 -21, 2007., Eds. J. Nebesarova and Pavel Hozak

PUBLICATIONS QULIFAYING FOR LECTURSHIP:
All the papers on Electron microscopy in Materials science cited under"List of publication in last five year".

DATE OF THE LAST PROMOTION:
2005. full professor (permanent position), Faculty of Science, Department of Physics, University of Zagreb

AUTHOR: Slaven Barišić, Professor of Physics

AFFILIATION:
Faculty of Science, Department of Physics, Zagreb

E-MAIL AND WEB ADDRESS: sbarisic@phy.hr

BIOGRAPHY

Date and place of birth : 26th January 1942, Pleternica, Croatia

Education: 1960: High school diploma, Zagreb
1964: B.-Sc. Theoretical Physics, Faculty of Science, University of Zagreb
1968: Doctorat de 3e Cycle, Faculté des Sciences, Université Paris-Sud
1971: Doctorat ès Sciences, Faculté des Sciences, Université Paris-Sud

Career/Employment:
research assistant, Institute of Physics of the University, Zagreb
researcher at Centre National de la Recherche Scientifique, France
researcher, Institute of Physics of the University, Zagreb
associate professor, Faculty of Science, University of Zagreb
1979- full professor, Faculty of Science, University of Zagreb
adviser to the President of the Republic of Croatia
adviser to the President of the Republic of Croatia
2007- full professor (5 years extension), Faculty of Science, University of Zagreb:

LIST OF PUBLICATIONS IN LAST FIVE YEARS:

Journal papers:

243. I.Mrkonjić, S.Barišić, Singular Band Behavior of the Extended Emery Model with O-O hopping for High-Tc Superconductors, Europ. Phys. Journal B. 34, 69, (2003);
244. I.Mrkonjić, S.Barišić, The Luttinger Sum Rule in the Slave-Particle Theories, Europ. Phys. Journal B, 34, 441 (2003);
245. I.Mrkonjić, S.Barišić, Comment on Strain and High Temperature Superconductivity: Unexpected Results from Direct Electronic Structure Measurements in Thin Films, Phys. Rev. Letters. 92; 129701/1-1, (2004).
246. I.Kupčić, S.Barišić; Optical properties of the Q1D multiband models - the transverse equation of motion approach,Fizika A. 14; 47, (2005);
247. O.Barišić, S.Barišić, Polarons by translationally invariant diagrammatic perturbation theory, Fizika A. 14, 153, (2005);
248. D.K.Sunko, S.Barišić, Central peak in the pseudo gap of high Tc superconductors, Europ. Phys. Journal B. 46, 269 (2005);
249. O. Barišić, S. Barišić, Quantum adiabatic polarons by translationally invariant perturbation theory, Europ. Phys. Journal B. 54, 1, (2006);
250. D.K. Sunko, S. Barišić, The electronic pseudo gap in optimally doped NCCO, Phys. Rev. B 75 0605061, (2007);
251. I. Kupčić, S. Barišić, Electronic Raman scattering in a multiband model for cuprate superconductors, Phys. Rev. B 75, 094598-18, (2007);

In addition there are 6 publications, including the CC ones, which correspond to invited and contributed talks at international conferences.

PUBLICATIONS QULIFAYING FOR LECTURSHIP:

Theory of Phase Transitions:

The author's permanent scientific interest is in problems of classic and quantum phase transitions. The emphasis is on quantum phase transitions in strongly-correlated low-dimensional metals (see the full author's bibliography on www.phy.hr) but the author was also one of the pioneers in the Landau-Wilson-like treatment of the classic phase transitions in low dimensional systems, starting with S.Barišić and K.Uzelac, Crossover and Scaling in One Dimension, J.Physique, 36, 1267 (1975). This was followed by a number of papers which dealt with the properties of the ground state and of the nonlinear, solitonic excitations for Landau functionals.

High Tc Superconductivity:

From his Ph.D. under the mentorship of J. Friedel the author's permanent scientific interest is in quantum phase transitions for strongly correlated low dimensional metals (see the author's full bibliography on www.phy.hr), with the emphasis on high Tc materials. This started with J.Labbé, S.Barišić and J.Friedel, Strong-Coupling Superconductivity in V3X Type Compounds, Phy.Rev.Letters, 19, 1039 (1967) and S.Barišić and P.G. de Gennes, Upper Critical Field of Weakly Coupled Linear Chains Sol.St.Comm., 6, 281 (1968). Those works were followed by the number of papers which dealt with the properties of the quasi one-dimensional inorganic and organic conductors, among which are the pioneering works on the direct transition from the Mott insulating state to the superconducting state. The author is currently interested in superconducting cuprates and studies the limit of large repulsive interaction on copper, using the Emery tight-binding model.

DATE OF THE LAST PROMOTION:

1996. full professor (permanent position), Faculty of Science, Department of Physics, University of Zagreb

LECTURER: Dr. sc. Hrvoje Buljan

AFFILIATION:
Faculty of Science, Department of Physics, Zagreb

E-MAIL ADDRESS: hbuljan@phy.hr

BIOGRAPHY:
DATE OF BIRTH: October 17th 1972

POSITIONS

Assistant professor; Department of Physics, University of Zagreb, Croatia, (2004-)
Postdoctoral Fellow; Technion, Israel Institute of Technology, Israel, (2002-2004)

EDUCATION

University of Zagreb, Croatia , Ph.D. in Physics, (August, 2002);
PhD thesis title: "Topological properties and measures of chaotic maps with the restricted domain";
Supervisor: Prof. V. Paar
University of Zagreb, Croatia, undergraduate education;
Thesis title: "Application of Base with a Core in the Interacting Boson-Fermion Model";
Supervisor: Prof. V. Paar
High-school:
Senior year: South Lyon High, South Lyon, Michigan, USA
Freshmen-Junior: MIOC, Zagreb, Croatia

AWARDS

Lady Davis Foundation Fellow (2003)
Rector's award; awarded by the Rector of the University of Zagreb for the best student work entitled "Principles of quantum mechanics in double barrier resonant tunnelling" (1995)

LIST OF PUBLICATIONS IN LAST FIVE YEARS:
(in reversed chronological order):
(25) R. Pezer and H. Buljan, Phys. Rev. Lett. 98, 240403 (2007).
(24) M. Jablan, H. Buljan, O. Manela, G. Bartal, and M. Segev ,Optics Express 15, 4623 (2007).
(23) H. Buljan, O. Manela, R. Pezer, A. Vardi, and M. Segev, Phys. Rev. A 74, 043610 (2006).
(22) O. Manela, G. Bartal, M. Segev, and H. Buljan, Opt. Lett. 31, 2320 (2006).
(21) R. Pezer, H. Buljan, G. Bartal, M. Segev, and J.W. Fleischer, Phys. Rev. E 73, 056608 (2006).
(20) O. Cohen, H. Buljan, T. Schwartz, J.W. Fleischer, and M. Segev, Phys. Rev. E 73, 015601(R), (2006).
(19) G. Bartal, O. Cohen, O. Manela, M. Segev, J.W. Fleischer, R. Pezer, and H. Buljan,

Opt. Lett. 31, 483 (2006).
(18) H. Buljan, M. Segev, and A. Vardi, Phys. Rev. Lett. 95, 180401 (2005).
(17) R. Pezer, H. Buljan, J.W. Fleischer, G. Bartal, O. Cohen, M. Segev, Optics Express 13, 5013 (2005).
(16) H. Buljan, G. Bartal, O. Cohen, T. Schwartz, O. Manela, T. Carmon, M. Segev, J.W. Fleischer, D.N. Christodoulides, Stud. Appl. Math. 115, 173 (2005).
(15) G. Bartal, O. Cohen, H. Buljan, J.W. Fleischer, O. Manela, M. Segev, Phys. Rev. Lett. 94, 163902 (2005).
(14) J.W. Fleischer, G. Bartal, O. Cohen, T. Schwartz, O. Manela, B. Freedman, M. Segev, H. Buljan, N.K. Efremidis, Optics Express 13, 1780 (2005).
(13) O. Cohen, G. Bartal, H. Buljan, T. Carmon, J.W. Fleischer, M. Segev, and D.N. Christodoulides, Nature (London) 433, 500 (2005).
(12) T. Schwartz, T. Carmon, H. Buljan, and M. Segev, Phys. Rev. Lett. 93, 223901 (2004).
(11) T. Schwartz, J.W. Fleischer, O. Cohen, T. Carmon, H. Buljan, and M. Segev, J. Opt. Soc. Am. B 21, 2197 (2004).
(10) T. Carmon, H. Buljan, and M. Segev, Opt. Express 12, 3481 (2004).
(9) H. Buljan, O. Cohen, J.W. Fleischer, T. Schwartz, M. Segev, Z.H. Musslimani, N.K. Efremidis, and D.N. Christodoulides, Phys. Rev. Lett. 92, 223901 (2004).
(8) H. Buljan, T. Schwartz, M. Segev, M. Soljačić, D.N. Christodoulides, J. Opt. Soc. Am. B 21, 397 (2004).
(7) H. Buljan, A. Šiber, M. Soljačić, T. Schwartz, M. Segev, and D.N. Christodoulides, Phys. Rev. E 68, 036607 (2003)
(6) H. Buljan, M. Soljačić, T. Carmon, and M. Segev, Phys. Rev. E 68, 016616 (2003)
(5) H. Buljan, M. Segev, M. Soljačić, N.K. Efremidis, D.N. Christodoulides, Opt. Lett. 28, 1239 (2003).
(4) H. Buljan and V. Paar, Physica D 172, 111 (2002).
(3) H. Buljan, A. Šiber, M. Soljačić, M. Segev, Phys. Rev. E 66, R035601 (2002).
(2) A. Šiber and H. Buljan, Phys. Rev. B 66, 075415 (2002).
(1) H. Buljan and V. Paar, Phys. Rev. E 65, 036218 (2002).

PUBLICATIONS QULIFAYING FOR LECTURSHIP:

Teaching experience. I was a TA for four years while working on a PhD thesis at the University of Zagreb. I have taught groups of 10-30 undergraduate students in physics classes (Classical Mechanics, Introductory Quantum Mechanics, Nonlinear Phenomena). I supervised the students and graded their work

DATE OF THE LAST PROMOTION:

2004. Assistant professor

LECTURER: Dr. sc. Dinko Babić

AFFILIATION:
Faculty of Science, Department of Physics, Zagreb

E-MAIL ADDRESS: dbabić@phy.hr

BIOGRAPHY:
Date and place of birth : December 8th 1965, Zagreb, Croatia

Education:
1990: B.-Sc. Physics, University of Zagreb, Croatia
1994: M. Sc. Physics, University of Zagreb, Croatia
1996: Ph. D. Physics, University of Zagreb

Career/Employment:
1990 – 2002. Department of Physics, Faculty of Science, University of Zagreb
2002.- Assistant professor; Department of Physics, Faculty of Science, University of Zagreb

1998 – 2001. Postdoctoral researcher, University of Basel
Guest scientist, University of Regensburg, 2002, 2003, 2004.

LIST OF PUBLICATIONS IN LAST FIVE YEARS:

252. C. Terrier, D. Babić, C. Strunk, T. Nussbaumer and C. Schoenenberger, Europhys. Lett. 59, 437 (2002).
253. D. Babić, T. Nussbaumer, C. Strunk, C. Schoeneneberger and C. Suergers, Phys. Rev B. 66, 014537 (2002).
254. D. Babić, J. Bentner, C. Suergers and C. Strunk Phys. Rev. B 69, 092510 (2004).
255. J. Bentner, D. Babić, Suergers and C. Strunk, Phys. Rev. B. 70, 184516 (2004). Virtual journal of nanoscale science & technology, 29. 11. 2004.; Virtual journal of applications of superconductivity, 1. 12. 2004.
256. D. Babić, J. Bentner, C. Suergers and C. Strunk, Physica C 432, 223 (2005).
257. Helzel. I. Kokanović, D. Babić, L. V. Litvin, F. Rohlfing, F. Otto, C. Suergers and C. Strunk, Phys. Rev. B 74, 220510(R) (2006)); Virtual Journal of Applications of Superconductivity, 1. 1. 2007.
258. D. Babić, Amorphous Nb-Ge Thin Films as a Model System for Experiments on Fundamental Properties of Vortex Transport, u New Frontiers in Superconductivity Research, urednik Barry S. Martins, (Nova Science Publishers, Hauppauge NY, 2006), pp. 107-143.

PUBLICATIONS QULIFAYING FOR LECTURSHIP:
All publications.

DATE OF THE LAST PROMOTION:
2002. Assistant professor, Faculty of Science, Department of Physics, Zagreb

LECTURER: Eduard Tutiš

AFFILIATION:
Institute of Physics, Zagreb

E-MAIL AND WEB ADDRESS: edo@ifs.hr

BIOGRAPHY
Education:
1982. B.-Sc. Physics, Faculty of Science, University of Zagreb
1989. M. Sc. Physics, Faculty of Science, University of Zagreb
1994. Ph. D. Physics, Faculty of Science, University of Zagreb

Employment:
1983 - Institute of Physics, Zagreb

Research associate at the Institute of Physics, Zagreb. The scientific activity in the condensed matter physics encompasses theoretical investigations of the electronic and vibrational properties in systems of reduced dimensionality, particularly in strongly correlated electronic systems including high-Tc superconductors. The last ten years he also works on the problems of electric transport in the disordered organic conductors, on the interfaces between metal and organic molecular material and on processes of conduction, recombination and absorption in organic electronic structures (organic light emitting diodes, photovoltaic devices , organic memories). He is the author of 37 scientific publications in international journals and books. He was an invited lecturer and guest scientist at EPF Lausanne (2000 i 2006) and Université Paris XIII (2007).

LIST OF PUBLICATIONS IN LAST FIVE YEARS:

Journal papers:

1. E. Tutiš, D. Berner, L. Zuppiroli, *Internal electric field and charge distribution in multilayer organiclight-emitting diodes,*J. Appl. Phys 93 (2003) 4594-4602
2. H. Houili, E. Tutiš, H. Lutjens, M.N. Bussac, L. Zuppiroli, *MOLED: Simulation of Multilayer Organic Light Emitting Diode,* Computer Physics Communications 156 (2003) 108-122
3. D. Berner; F. Nueesch, E. Tutiš, C. Ma, X. Wang, B. Zhang, L. Zuppiroli, *Splitting of the recombination zone in organic light emitting diodes by dye doping.* J. Appl. Phys. 95 (2004) 7, 3749-3753
4. E. Tutiš, I. Batistić, D. Berner, *Injection and strong current channeling in organic disordered media,* Phys. Rev. B. 70 (2004) *Rapid Communications*, 161202(R)-161204
5. F. Nueesch, D. Berner, E. Tutiš, M. Schaer, C. Ma, X. Wang, B. Zhang,, L. Zuppiroli, *Doping-induced charge trapping in organic light-emitting devices*. Advanced Functional Materials 15 (2005); 323-330
6. E. Tutiš, I. Batistić, *Current filamentation and degradation in electronic devices based on amorphous organic layers*. Fizika A. 14 (2005) ; 167-178
7. H. Houili, E. Tutiš, I. Batistić, L. Zuppiroli, *Investigation of the charge transport through disordered organic molecular heterojunctions,* J. Appl. Phys. 100 (2006), 33702
8. F. A. Castro, H. Benmansour, C.F.O. Graeff, F. Nueesch, E. Tutiš, R. Hany, *Nanostructured organic layers via polymer demixing for interface-enhanced photovoltaic cells,* Chemistry of Materials (2006),) , 23; 5504 – 5509
9. H. Houili, E. Tutiš, L. Zuppiroli, *Charge transport across organic-organic interfaces in organic*

light-emitting diodes, Synthetic Metals 156 (2006) 1256-1261

10. Akrap, Ana; Tutiš, Eduard; Kazakov, S.M.; Zhigadlo, N.D.; Forro, Laszlo *Appearance of transport features in the density of states of single crystal KOs* $_2O_6$ *superconductors under pressure*, Phys. Rev. B. 75 (2007) 172501-4

Conference papers:

1. Houili, Hocine; Tutiš, Eduard; Zuppiroli, Libero. *Investigation of the organic/organic interface in OLEDs by a Monte Carlo simulation*. Europhysics Conference abstracts 28, Part D, (2004) 106-107
2. Berner Detlef; Tutiš Eduard; Zuppiroli Libero. *New Insight into the Electric Field Distribution in OLEDs*, Proceedings of the 11th International Workshop on Inorganic and Organic Electroluminescence, and 2002 International Conference on the Science and Technology of Emissive Displays and Lighting , K. Neyts, P. De Visschere, D. Poelman (ur.). Ghent, Belgium : Academia Press, ISBN 90 382 0417 5, 2002.
3. Berner, Detlef; Nüesch, Frank; Tutiš, Eduard; Ma, C; Wang, X.; Zhang, B.; Zuppiroli, Libero. *Conditions of recombination zone splitting in organic light-emitting diodes*, Proceedings of SPIE, vol 5465 Organic Photoelectronics and Photonics, (ISBN 0-8194-5387-0, ISSN 0277-786X)
   P.L. Heremans, M. Muccini, H.Hofstraat (ur.). Bellingham, WA, USA : SPIE, 2004. 72-82
4. Berner, Detlef; Tutiš, Eduard; Nuesch, Frank; Zuppiroli, Libero, *New insights into the functioning of dye-doped OLED's from model simulations,* Proceedings on International Conference on the Science and technology of Emissive Displays and Lighting, Toronto, 2004. 69-72
5. Tutiš, Eduard E.; Berner, Detlef; Zuppiroli, Libero. *The mechanism of lifetime extension due to CuPc layer in organic light emitting diodes*, // Proceedings of SPIE, vol 5465 Organic Photoelectronics and Photonics / P.L. Heremans, M. Muccini, H.Hofstraat (ur.). Bellingham, WA, US : SPIE, 2004. 330-336
6. Houili, Hocine; Tutiš, Eduard; Zuppiroli, Libero, *Monte Carlo simulation of organic-organic interface in OLEDs*, Conference on Computational Physics, CCP2004. Genova, 2005. 106-108 (2005)
7. Houili, Hocine; Berner, Detlef; Tutis, Eduard; Bussac, Marie-Noelle; Zuppiroli, Libero, *MOLED, a simulation model for multilayer organic light-emitting diodes,* EUROMAT 2005: European Congress on Advanced Materials ans Processies, Prague, 5-8 September (2005)
8. Jurić, Ivan; Tutiš, Eduard; Batistić, Ivo, *Hopping conduction at high field in disordered molecular system*, MECO 31: International Conference in statistical physics, 23-26 April Primošten, Croatia (2006)
9. H. Houili, E. Tutis, R. Izquierdo, *Modeling organic bistable devices and photo-addressed organic diodes,* Second Organic & Nano Electronics Workshop, (2007) Montreal, 17-18 May
10. H. Houili, E. Tutis, M.N. Bussac, L. Zuppiroli, *Charge transport in organic electronic devices* Second Organic & Nano Electronics Workshop, (2007) Montreal, 17-18 May

PUBLICATIONS QULIFAYING FOR LECTURSHIP:
All articles.

DATE OF THE LAST PROMOTION:
2004. higher scientific associate, Institute of Physics, Zagreb

LECTURER: Prof. dr. sc. Antun Tonejc

AFFILIATION:
Faculty of Science, Department of Physics, Zagreb

E-MAIL AND WEB ADDRESS: atonejc@phy.hr ; http://www.phy.hr/~atonejc/

BIOGRAPHY (education, working experience):
Date and place of birth : Februray 8th, 1942, Varazdin, Croatia
Education (degrees, dates, universities):

1965: B.- Sc. Physics (Department of Physics, Faculty of Science and Mathematics, University of Zagreb)
1969: M. Sc. Physics (Department of Physics, Faculty of Science and Mathematics, University of Zagreb)
1972: Ph. D. Physics (Department of Physics, Faculty of Science and Mathematics, University of Zagreb), Major componets of thesis: Structural investigations of phase transformation of some metastable alloys rapidly quenched from the liquid state

Career/Employment (employers, positions and dates):

1965-1966 Institute of Physics University of Zagreb
1966- Department of Physics, Faculty of Science and Mathematics, University of Zagreb

Present position:

· Professor of Physics at the Department of Physics of Faculty of Science and Mathematics, University of Zagreb
· Responsible for the Microstructural Investigations Laboratory

Present teaching commitments:

· Solid State Physics (4th year course)
· Physics of Metals and Alloys (4th year course)

Specialized study leave: 1973-1975 S.R.M.P., CEA Saclay, France
(major component of investigation: superplasticity of metals and alloys)

Specialization

(i) main field:
Physical Metallurgy
(2) current research interests:
microstructure of nanocrystalline materials (metals, alloys, ceramics),
metal glasses, thin films

(3) main instrumental technique:
X-ray powder diffraction

LIST OF PUBLICATIONS IN LAST FIVE YEARS:

1. A. Tonejc, Acta Chim. Slov. 49 (2002) 1-28.
2. J.C. Lasajunias, M. Saint-Paul, A. Bilusić, A. Smontara, S. Gradečak, A. M. Tonejc, A.Tonejc, N. Kitamura, Phys. Rev. B 66 (2002) 1-12.

3. M. Metikoš-Hušković, N. Radić, Z. Grubač, A. Tonejc, Electrochimica Acta 47 (2002) 2387-2393.
4. A. Smontara, A. Bilusić, J.C. Lasajunias, M. Saint-Paul, S. Gradećak, A. M. Tonejc, A.Tonejc, N. Kimura, S. Bennigton, Strojarstvo 44 (2002) 195-200.
5. N. Radić, T. Car, A. Tonejc, J. Ivkov, M. Stubičar, M. Metikoš-Huković, Al-W Amorphous Thin Films, Proc. Inter. Workoshop of Thin Films 2003, Teheran, Iran, World Scientific, London (2003) 101-118.
6. J. Ivkov, N. Radić, A. Tonejc and T. Car, J. Non-Cryst. Solids 319 (2003) 232-240.
7. I. Djerdj, A. M. Tonejc, A. Tonejc, Proceedings of 6th multinational congress on microscopy, Eds. O. Milat, D. Ježek, Zagreb, Croatian Society for Electron Microscopy, 2003, 221-222.
8. I. Kokanović, B. Leontić, J. Lukatela, A.Tonejc, Materials Science and Engineering A 375-377 (2004) 688-692.
9. N. Radić, A. Tonejc, J. Ivkov, P. Dubček, S. Bernstorff, Z. Medunić, Surface and Coatings Technology 180-181 (2004) 66-70.
10. N. Stubičar, A. Tonejc, M. Stubičar, Alloys and Compounds 370 (2004) 296-301.
11. J. Ivkov, N. Radić, A. Tonejc, Solid State Commun. 129 (2004) 369-373.
12. I. Kokanović, A. Tonejc, Materials Science and Engineering A 373 (2004) 26-32.
13. I. Kokanović, A. Tonejc, Journal of Alloys and Compounds 377 (2004) 141-149.
14. D. Djurek, Z. Medunić, M. Paljević, A. Tonejc, Physica Status Solidi-Applied Research 201 (2004) 544-549.
15. T. Car, J. Ivkov, N. Radić, A. Tonejc, Applied Physics A: Materials and processing 80 (2005) 1087-1092.
16. I. Kokanović, A. Tonejc, in Properties and Application of Nanocrystalline Alloys from Amorphous Percursors , NATO Science Series II Mathematics, Physics and Chemistry, Vol. 184, Kluwer, London (2005), pp 353-362.
17. I. Djerdj, A. M. Tonejc, A. Tonejc, N. Radić, Vacuum 80 (2005) 151-158.
18. I. Djerdj, A. M. Tonejc, A. Turković, M. Ivanda, A. Tonejc, Proceedings of 7th Multinational Congress on microscopy, Eds. M. Čeh, G. Dražić, S. Fidler, Slovene Society for Microscopy, 2005, 161-162.
19. I. Djerdj, I., A. M. Tonejc, A. Tonejc, in Electron Crystallography: Novel Approaches for Structure Determination of Nanosized Materials, NATO Science Series II: Mathematics, Physics and Chemistry, Vol. 211, Eds, T. Weirich, J. S. Labar, X. Zou, Springer (2006) 497-501.
20. I. Djerdj, A. M. Tonejc, A. Tonejc, N. Radić, Fizika A 15 (2006) 35-50.
21. A. Gajović, I. Djerdj, K. Furić, A. Tonejc, A.M. Tonejc, D. Su, R. Schlögel, J. Am. Ceram. Soc. 89 (2006) 2196-2205.
22. M. Metikoš-Hušković, Z. Grubač, N. Radić, A. Tonejc, Journal of Molecular Catalysis A: Chemical 249 (2006) 172-180.

PUBLICATIONS QULIFAYING FOR LECTURSHIP:
1. A. Tonejc, Acta Chim. Slov. 49 (2002) 1-28.
2. J.C. Lasajunias, M. Saint-Paul, A. Bilusić, A. Smontara, S. Gradečak, A. M. Tonejc, A.Tonejc, N. Kitamura, Phys. Rew. B 66 (2002) 1-12.
3. M. Metikoš-Hušković, N. Radić, Z. Grubač, A. Tonejc, Electrochimica Acta 47 (2002) 2387-2393.
4. A. Smontara, A. Bilusić, J.C. Lasajunias, M. Saint-Paul, S. Gradećak, A. M. Tonejc, A.Tonejc, N. Kimura, S. Bennigton, Strojarstvo 44 (2002) 195-200.
5. N. Radić, T. Car, A. Tonejc, J. Ivkov, M. Stubičar, M. Metikoš-Huković, Proc. Inter.

Workoshop of Thin Films 2003, Teheran, Iran, World Scientific, London (2003) 101-118.
6. J. Ivkov, N. Radić, A. Tonejc and T. Car, J. Non-Cryst. Solids 319 (2003) 232-240.
7. I. Djerdj, A. M. Tonejc, A. Tonejc, ‘’Proceedings of 6th multinational congress on microscopy’’, Eds. O. Milat, D. Ježek, Zagreb, Croatian Society for Electron Microscopy, 2003, 221-222.
8. I. Kokanović, B. Leontić, J. Lukatela, A.Tonejc, Materials Science and Engineering A 375-377 (2004) 688-692.
9.N. Radić, A. Tonejc, J. Ivkov, P. Dubček, S. Bernstorff, Z. Medunić, Surface and Coatings Technology 180-181 (2004) 66-70.
10. N. Stubičar, A. Tonejc, M. Stubičar, Alloys and Compounds 370 (2004) 296-301.
11. J. Ivkov, N. Radić, A. Tonejc, Solid State Communications 129 (2004) 369-373.
12. I. Kokanović, A. Tonejc, Materials Science and Engineering A 373 (2004) 26-32.
13. I. Kokanović, A. Tonejc, Journal of Alloys and Compounds 377 (2004) 141-149.
14. D. Djurek, Z. Medunić, M. Paljević, A. Tonejc, Physica Status Solidi-Applied Research 201 (2004) 544-549.
15.T. Car, J. Ivkov, N. Radić, A. Tonejc, Applied Physics A: Materials and processing 80 (2005) 1087-1092.
16. I. Kokanović, A. Tonejc, in "Properties and Application of Nanocrystalline Alloys from Amorphous Percursors" , NATO Science Series II Mathematics, Physics and Chemistry, Vol. 184, Kluwer, London (2005), pp 353-362.
17. I. Djerdj, A. M. Tonejc, A. Tonejc, N. Radić, Vacuum 80 (2005) 151-158.
18. I. Djerdj, A. M. Tonejc, A. Turković, M. Ivanda, A. Tonejc, ‘’Proceedings of 7th Multinational Congress on microscopy’’, Eds. M. Čeh, G. Dražić, S. Fidler, Slovene Society for Microscopy, 2005, 161-162.
19. I. Djerdj, I., A. M. Tonejc, A. Tonejc, in Electron Crystallography: Novel Approaches for Structure Determination of Nanosized Materials, NATO Science Series II: Mathematics, Physics and Chemistry, Vol. 211, Eds, T. Weirich, J. S. Labar, X. Zou, Springer (2006) 497-501.
20. I. Djerdj, A. M. Tonejc, A. Tonejc, N. Radić, Fizika A 15 (2006) 35-50.
21. A. Gajović, I. Djerdj, K. Furić, A. Tonejc, A.M. Tonejc, D. Su, R. Schlögel, R, J. Am. Ceram. Soc. 89 (2006) 2196-2205.
22. M. Metikoš-Hušković, Z. Grubač, N. Radić, A. Tonejc, , Journal of Molecular Catalysis A: Chemical 249 (2006) 172-180.

DATE OF THE LAST PROMOTION:
2004. the permanent full professor position at the Faculty of Science, University of Zagreb

LECTURER: Prof. dr. sc. Amir Hamzić

AFFILIATION: Faculty of Science, Department of Physics, Zagreb

E-MAIL AND WEB ADDRESS: hamzic@phy.hr

BIOGRAPHY

Date and place of birth : March 14th, 1949, Zagreb, Croatia

Education:

1972: B.- Sc. Physics (Faculty of Science, University of Zagreb)

1976: M. Sc. Physics (University of Zagreb)

1980: Doctorat d'Etat es-Sciences Physiques, Université Paris XI; France

Career/Employment:

1972 - 1980. Institute of Physics University of Zagreb

1981.- Department of Physics, Faculty of Science, University of Zagreb

Professor of Physics (full professor- permanent position). Scientific activity (within the condensed matter physics): experimental investigations of transport and magnetic properties of metal alloys, systems with strong electron correlations, multilayered and chain systems with reduced dimensionality, which are characterized with the collective order (magnetism, superconductivity, spin density waves). Published 94 scientific papers in international journals, 5 invited papers (with co-authors), has over 50 papers on international conferences. Total citation around 1000 (period 1976. – 2006.; source SCI).

LIST OF PUBLICATIONS IN LAST FIVE YEARS:

Journal papers:

259. M.Požek, A.Dulčić, D.Paar, A. Hamzić, M. Basletić, E. Tafra, G.V.M.Williams and S.Krämer; Phys.Rev.B 65 174514 (2002)

260. A.Barthélémy, A. Fert, J-P. Contour, M. Bowen, V. Cros, J.M. De Teresa, A. Hamzić, G. Faini, J.M. George, J. Grollier, F. Montaigne, F. Pailloux, F. Petroff and C. Vouille; J. Magn. Magn. Mat. 242 68 (2002)

261. J. Grollier, D. Lacour, V. Cros, A. Hamzić, A. Vaures, A. Fert, D. Adam and G. Faini; J.Appl.Phys. 92 4825 (2002)

262. B. Korin-Hamzić, E. Tafra, M.Basletić, A. Hamzić, G. Untereiner and M. Dressel; Phys.Rev B67 014513 (2003)

263. J. Grollier, V. Cros, H. Jaffres, A. Hamzić, J.M. George, G. Faini, J. Ben Youssef, H. Le Gall and A. Fert; Phys.Rev.B67 174402 (2003)

264. B. Korin-Hamzić, E. Tafra, M.Basletić, A. Hamzić, G. Untereiner and M. Dressel; Synthetic Metals 137 1323 (2003)

265. J. Grollier, P. Boulenc, V. Cros, A. Hamzić, A. Vaures, A. Fert, and G. Faini; Appl.Phys.Lett. 83 509 (2003)

266. A.Fert. V. Cros J.-M. George, J. Grollier, H. Jaffres, A. Hamzić, A. Vaures, G. Faini , J. Ben Youssef , H. Le Gall; J.Magn.Magn.Mat. 272 1706 (2004)

267. M.Basletić, B. Korin-Hamzić, A. Hamzić and K. Maki; Synthetic Metals 141 99 (2004)

268. B. Korin-Hamzić, E. Tafra, M. Basletić, A. Hamzić, L.K. Montgomery and M. Dressel; J.Phys.(France) 114 73 (2004)

269. J. Grollier, P. Boulenc, V. Cros, A. Hamzić, A. Vaures, A. Fert, and G. Faini;

J.Appl.Phys. 95 6777 (2004) V. Cros, O. Boulle, J. Grollier, A. Hamzić, M. Munoz, L.G.Pereira, F. Petroff; C.R. Physique 6 956 (2005)

270. B. Korin-Hamzić, E. Tafra, M.Basletić, A. Hamzić and M.Dressel; Phys.Rev. B73 115102 (2006)

271. G. Herranz, R. Ranchal, M. Bibes, H. Jaffres, E. Jacquet, J.-L. Maurice, K. Bouzehouane, F. Wzcyisk, E. Tafra,. M. Basletić, A. Hamzić, C. Colliex, J.-P. Contour, A.Barthélémy and A. Fert; Phys. Rev. Lett. 96 027207 (2006)

272. G. Herranz, M. Basletić, M. Bibes, R. Ranchal, A. Hamzić, E. Tafra, K. Bouzehouane, E. Jacquet, J.-P. Contour, A.Barthélémy and A. Fert; Phys. Rev. B 73 064403 (2006)

273. G. Herranz, M. Basletić, M. Bibes, R. Ranchal, A. Hamzić, H. Jaffrès, E. Tafra, K. Bouzehouane, E. Jacquet, J.P. Contour, A. Barthélémy and A. Fert; J. Magn. Magn. Mat. 311 2111 (2007)

274. G. Herranz, M. Basletić, M. Bibes, C. Carrétero, E. Tafra, E. Jacquet, K. Bouzehouane, C. Deranlot, A. Hamzić, J.-M. Broto, A. Barthélémy and A. Fert; Phys. Rev. Lett. 98 216803 (2007)

275. S. Laribi, V. Cros, J. Grollier, E. Martínez, L. López-Díaz, M. Muñoz Sanchez, A. Hamzić, C. Deranlot, A. Fert, , L. Vila, G. Faini, S. Zoll and R. Fournel; Apl. Phys. Lett 90 232505 (2007)

276. M. Požek, A. Dulčić, A. Hamzić, M. Basletić, E. Tafra, G.V.M. Williams and S. Kramer; Europ. J.of Phys. B57 1 (2007)

Conference papers:

1. R.Mattana, J.-M. George, H. Jaffres, F. N'Guyen Van Dau, A. Fert, B. Lepine, A Guivarc'h, G Jezequel, A Hamzić, M. Basletić, E. Tafra; The 19th General Conference of the Condensed Matter Division of the European Physical Society (Brighton, G.Britain, 2002.)
2. J. Grollier, V. Cros, H. Jaffrčs, A. Hamzic, J.M. George, G. Faini, J. Ben Youssef, H. Le Gall, A. Fert; Colloque Louis Néel 2002 "Couches Minces et Nanostructures Magnétiques" (Gérardmer, France, 2002.)
3. R. Mattana, J.-M. George, H. Jaffrčs, F. N'Guyen Van Dau, A. Fert, B. Lépine, A.Guivarc'h, G. Jezequel, A. Hamzic, M. Basletic, E. Tafra; Colloque Louis Néel 2002 "Couches Minces et Nanostructures Magnétiques" (Gérardmer, France, 2002.)
4. R. Mattana, J. M. George, H. Jaffres, F. Nguyen Van Dau, A. Fert, B. Lepine, A.Guivar'ch, G. Jezequel, A. Hamzić, M. Basletić et E. Tafra 8éme Journées de la Matiere Condensée - JMC8, SFP, Marseille, France 2002.
5. J. Grollier, D. Lacour, V. Cros, A. Hamzic, A. Vaurčs, A. Fert; D. Adam, G. Faini ; Colloque Louis Néel 2002 "Couches Minces et Nanostructures Magnétiques" (Gérardmer, France, 2002.)
6. J. Grollier, D. Lacour, V. Cros, A. Hamzić, A. Vaures, A. Fert, D. Adam and G. Faini; Int. Conf. "The Science and technology of spin transport in nanostructures", (Trieste, Italia, 2002.)
7. J. Grollier, V. Cros, H. Jaffres, A. Hamzić, J.M. George, G. Faini, J. Ben Youssef , H. Le Gall, A. Fert; 47th Magnetism and Magnetic Materials Conf. (Tampa, USA, 2002)
8. J. Grollier, V. Cros, A. Hamzić, D.Lacour, A. Vaures, A.Fert, D.Adam and G.Faini; 47th Magnetism and Magnetic Materials Conf. (Tampa, USA, 2002)
9. J. M. George, R. Mattana, H. Jaffres, F. Nguyen Van Dau, A. Fert, B. Lepine,

A.Guivar'ch, G. Jezequel, A. Hamzić, M. Basletić, E. Tafra; 2003 MRS Spring meeting-Symposium V, (San Francisco, USA, 2003.)

10. V. Cros, J. Grollier, P. Boulenc, A. Hamzić, A. Vaures, G. Faini, A. Fert ; MMM/Intermag Conference (Anaheim, USA 2004.)
11. V. Cros, J. Grollier, P. Boulenc, M. Muńoz, A. Vaures, A. Hamzić, G. Faini C.K. Lim, T. Devolder, C. Chappert A.Fert; APS March Meeting (Montreal, Canada, 2004.)
12. M. Munoz Sanchez, S. Laribi, V. Cros, J. Grollier, A. Hamzić, A. Vaures, A. Fert, C.K. Lim, T. Devolder, C. Chappert, G. Faini ; IX Journées de la Matiere Condensée, SFP, (Nancy, France 2004.)
13. R. Ranchal, A. Barthelemy, K. Bouzehouane, M. Bibes, S. Guyard, M. Basletić, A. Hamzić, C. Pascanut, P. Berthet, N. Dragoe, E. Jacquet, J.P. Contour, A. Fert; 20th EPS Conference of the Condensed Matter Division, (Prague, Check Republic, 2004.)
14. G. Herranz, R. Ranchal, E. Tafra, M. Basletić, K. Bouzehouane, M. Bibes, S. Guyard, A.Hamzić, C. Pascanut, P. Berthet, N. Dragoe, E. Jacquet, J.L. Maurice,A. Barthélémy, J.P. Contour, A. Fert, Colloque Louis Neel, nanoparticules, nanofils at nanostructures (Dourdan, France, 2005.)
15. G. Herranz , R. Ranchal , E. Tafra , M. Basletić , K. Bouzehouane, M. Bibes, S. Guyard, A. Hamzić, C. Pascanut, P. Berthet, N. Dragoe, E. Jacquet, J.L. Maurice, A. Barthélémy, J.-P. Contour, A. Fert; 3rd THIOX Workshop - "Workshop on Oxides-at-the-Nanoscale (WON)" (Zaragoza, Spain, 2005)
16. S. Laribi, V. Cros, M. Munoz, A. Hamzić, A. Vaures, C. Deranlot, A. Fert, S. Zoll, R. Fournel, L. Vila, G. Faini ; Colloque Louis Neel, Transport tunnel et électronique de spin (Dourdan, France, 2005.)
17. R. Ranchal, M. Basletić, G. Herranz, K. Bouzehouane, M. Bibes, S. Guyard, A. Hamzić, C. Pascanut, P. Berthet, N. Dragoe, E. Jacquet, A. Barthelemy, J.P. Contour, A. Fert, 2nd Workshop on Prospects in Magnetic Oxides (Fontevraud, France, 2005.)
18. G. Herranz, R. Ranchal, E. Tafra, M. Basletić, K. Bouzehouane, M. Bibes, S. Guyard, A. Hamzić, C. Pascanut, P. Berthet, N. Dragoe, E. Jacquet, J.L. Maurice, A. Barthélémy, J.-P. Contour, A. Fert ; 50th Annual Conference on Magnetism and Magnetic Materials MMM (San Jose, USA 2005)
19. G. Herranz, R. Ranchal, E. Tafra, M. Basletić, K. Bouzehouane, M. Bibes, S. Guyard, A. Hamzić, C. Pascanut, P. Berthet, N. Dragoe, E. Jacquet, J.L. Maurice, A. Barthelemy, A. Fert; 2005 MRS Fall Meeting – Symposium II (Boston, USA 2005.)
20. G. Herranz, M. Basletić, M. Bibes, R. Ranchal, H. Jaffres, A. Hamzić, E. Tafra, J.-L. Maurice, C. Colliex, K. Bouzehouane, E. Jacquet, J. P. Contour, A. Barthélémy and A. Fert ; INTERMAG 2006 (San Diego, USA, 2006.)
21. G. Herranz, M. Basletić, M. Bibes, R. Ranchal, H. Jaffres, A. Hamzić, E. Tafra, J.-L. Maurice, C. Colliex, K. Bouzehouane, E. Jacquet, J. P. Contour, A. Barthélémy and A. Fert; *International Conference on Magnetism - ICM* (Kyoto, Japan 2006.)
22. S. Laribi, V. Cros, J. Grollier, M. Munoz, A. Hamzić, C. Deranlot, A. Fert, S.Zoll, R.Fournel, L. Vila,G. Faini, Giancarlo. *International Workshop on Spin Transfer (IWST 2006)* (Nancy, France 2006.)

PUBLICATIONS QULIFAYING FOR LECTURSHIP: Besides several scientific publications in the field of superconductivity (including one Nature paper and, for instance, the papers No. 1 and 19 in the above list), the lecturer has a long practical experience in the field of low temperature physics, cryogenic liquids and superconducting equipment; he was also among the first who started the investigations of the high temperature superconductivity in our country.
DATE OF THE LAST PROMOTION: 2002. full professor (permanent position), Faculty of Science, Department of Physics, University of Zagreb

LECTURER: Dr. Sc. Krešo Zadro, Associate Professor

AFFILIATION:
University of Zagreb, Faculty of Sciences and Mathematics, Department of Physics,

E-MAIL AND WEB ADDRESS: kzadro@phy.hr , www.phy.hr/~kzadro

BIOGRAPHY :
Born March 7, 1957 in Donji Mamići, Bosnia and Herzegovina.
Education:
PhD(Sci), Univ. of Zagreb, Physics, Solid State Physics, 1996, "Development of magnetic inhomogeneity in some amorphous alloys".
M.Sci. Univ. of Zagreb, Physics, Solid State Physics, 1987, "Non-monotonic variation of magnetic susceptibility exponent in amorphous FeNi alloys"
Dipl.Eng.Phys., Univ. of Zagreb, Faculty of Sciences and Mathematics, Physics, Solid State Physics, 1982.
Appointments:
2004-current, Univ. of Zagreb, Faculty of Science and Mathematics, Associate Professor
1998-2004, Univ. of Zagreb, Faculty of Science and Mathematics, Senior Lecturer (Docent)
1989-1998, Univ. of Zagreb, Faculty of Science and Mathematics, Assistant Professor
1983-1989, Univ. of Zagreb, Faculty of Science and Mathematics, Research Assistant
Experience and achievements:
K. Zadro has been involved in research in Solid State Physics for over 20 years. He investigated magnetic phase transition in disordered systems, magnetic properties of paramagnetic amorphous alloys and magnetization of high temperature superconductors. At present, his main interest is in nanomagnets (molecular magnets, magnetic nanoparticles and magnetic clusters). He was leader of several scientific projects in Croatia and abroad. Presently, he is leader of the project "Nanomagnets" with Ministry of Science, Croatia. He published about 40 scientific papers (30 in CC journals), invited book chapter and participated in 10 international conferences.
Currently, he teaches course "Physics" at undergraduate study of Chemistry, and course "Physics of disordered systems" at the study of Physics.
K. Zadro is a member of Croatian Physical Society. Since 2001. he is a member of the international committee for "International Young Physicists Tournament"

LIST OF PUBLICATIONS IN LAST FIVE YEARS:
Invited book chapters
Nedkov, I.; Merodiiska, T.; Slavov, L.; Ghelev, Ch.; Vandenberghe, R.E.; Zadro, Krešo, Surface Deviation in Spherical Nanoparticles of Fe_3O_4, Nanoscale Magnetic Oxides and Bio-World / Nedkov, I. ; Thailhades, Ph. (ur.). Sofia : Heron Press Science Series, 2004. Str. 29-37.
Scientific papers in CC journals

277. Jurić, Marijana; Perić, Berislav; Brničević, Nevenka; Planinić, Pavica; Pajić, Damir; Zadro, Krešo; Giester, Gerald, *Polyhedron*. 26 (2007) , 3; 659-672.

278. Pajić, Damir; Zadro, Krešo; Ristić, Ramir; Živković, Ivica; Skoko, Željko; Babić, Emil, *Journal of Physics: Condensed Matter*. 19 (2007) , 29; 296207-16.

279. Raghavender, A.T.; Pajić, Damir; Zadro, Krešo; Mileković, Tomislav; Rao, P. Venkateshwar; Jadhav, K.M.; Ravinder, D., *Journal of Magnetism and Magnetic Materials*. 316 (2007) , 1; 1-7.

280. Jurić, Marijana; Planinić, Pavica; Brničević, Nevenka; Milić, Dalibor; Matković-Čalogović, Dubravka; Pajić, Damir; Zadro, Krešo, *European Journal of Inorganic Chemistry*. 13 (2006) ; 2701-2710.

281. Madalan, Augustin; Kravtsov, Viktor; Pajić, Damir; Zadro, Krešo; Simonov, Yurii; Stanica, Nicolae; Ouahab, Lahcene; Andruh, Marius, *Inorganica Chimica Acta*. 357 (2004) ; 4151-4164.

282. Pajić, Damir; Zadro, Krešo; Vandenberghe, Robert; Nedkov, Ivan, *Journal of Magnetism and Magnetic Materials*. 281 (2004) ; 353-363.

283. Rakvin, Boris; Žilić, Dijana; Dalal Naresh, S.; North, J.Micah; Cevc, Pavle; Arčon, Denis; Zadro, Krešo, *Spectrochimica Acta Part A*. 60 (2004) ; 1241-1245.

284. Očko, Miroslav; Drobac, Đuro; Park, Je-Geun; Samardžija, Zoran; Zadro, Krešo, *Journal of Physics: Condensed Matter*. 15 (2003) , 26; 4613-4261.

Papers in refereed conference proceedings

285. Nedkov, I.; Kolev, S.; Zadro, Krešo; Krezhov, K.; Merodiiska, T., *Journal of Magnetism and Magnetic Materials*. 272/276 (2004) ; e1175-e1176.

286. Pajić, Damir; Zadro, Krešo; Friščić, Tomislav; Judaš, Nenad; Meštrović, Ernest, *Journal of Magnetism & Magnetic Materials*. 242-245 (2002) , 2; 946-948.

Papers in refereed conference proceedings

Reissner, Michael; Beiter, Johannes; Pajić, Damir; Zadro, Krešo; Hilscher, Gerfried; Steiner, Walter, *AIP Conference Proceedings, vol. 850*, Takano Y., Hershfield S. P., Hill S. O., Hirschfeld P. J., Goldman A. M. (ur.). Springer, 2006. 1135-1136.

PUBLICATIONS QULIFAYING FOR LECTURSHIP:
All publications concerning amorphous alloys and granular superconductors.

DATE OF THE LAST PROMOTION: 2004.

4. ATOMIC, MOLECULAR AND OPTICAL PHYSICS (AMOP) AND ASTROPHYSICS: AMOP MODULE

LECTURER: Zvonimir Maksić

AFFILIATION: Ruđer Bošković Institute and Faculty of Science and Mathematics, University of Zagreb

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BIOGRAPHY*:*

Born:	September 11, 1938	E–mail:	zmaksic@spider.irb.hr
Gender:	Male	Web Page:	http://spider.irb.hr/QOCG/maksic.htm
Marital Status:	Married (Mirjana Eckert)		
Children:	One Son (Zoran)		
Present Address:	Quantum Organic Chemistry Group Ruđer Bošković Institute Bijenička 54, 10002 Zagreb, Croatia		The Physical Chemistry Department Faculty of Natural Sciences and Mathematics, The University of Zagreb Marulićev trg 19, 10000 Zagreb, Croatia
Present Positions:	Distinguished scientist of the Ruđer Bošković Institute, Zagreb, Croatia and Full professor at the Faculty of Science, the University of Zagreb, Croatia		
Education:	B.Sc. in theoretical physics, Faculty of Natural Sciences and Mathematics, Zagreb, 1961. Ph.D. in theoretical chemistry, the University of Zagreb, 1968.		
Specialization and other Positions:	Postdoctoral fellow, The University of Tennessee, Knoxville, U.S.A. (with J. E. Bloor), 1970–71. R. A. Welch postdoctoral fellow, The University of Texas at Austin, Texas, U.S.A. (with M. J. S. Dewar), 1971–72. Alexander von Humboldt–fellow, Universität Heidelberg, Deutschland, 1979–81. Visiting professorship at the Universities of Heidelberg, Münster and Essen (Deutschland) on several occasions. Visiting professorship at the Universidad Autonoma de Madrid, Cantoblanco, Madrid, Spain, 2003.		
Publications:	More than 225 scientific papers in the leading international scientific journals and 23 review articles or chapters in monographs. These papers received about 2700 citations. Two books (in Croatian): Quantum Chemistry, Liber, Zagreb, 1976. and Symmetry of Molecules (together with L. Klasinc and N. Trinajstić), Školska knjiga, Zagreb, 1979. Co-translator of L. Pauling's book (with M. Maksić) "How to Live Longer and Feel Better", W. H. Freeman, N.Y., 1986. Editor of 7 monographs and 12 special thematic issues of Festschrifts of scientific journals. Co-editor of Elsevier's Series Theoretical and Computational Chemistry, which had 16 volumes so far.		
Professional Activities:	Member of the Croatian Chemical, Physical, Biophysical, Crystallographic and Pugwash Societies Alexander von Humboldt–Fellow		

	Fellow of the World Association of the Theoretically Oriented Chemists Fellow of the World Innovation Foundation (J. Karle, Nobel prize winner – president) President of the Croatian Chemical Society 1988–1990. Head of the Department of Chemistry at the "Ruđer Bošković" Institute 1995–1997. Deputy Director General of the "Ruđer Bošković" Institute 1997–1999. Member of the Board of Governors of the "Ruđer Bošković" Institute 1994–1995. Vize–president des Kroatischen Humboldtianer–klubs 1999–2001. Member of the Board of Governors of the „Ruđer Bošković" Institute 2004– Former member of the editorial or advisory boards of Journal of Molecular Structure (Theochem), Structural Chemistry, International Journal of Quantum Chemistry, Croatica Chemica Acta, the Electronic Journal of Theoretical Chemistry and Encyclopedia Moderna. Reviewer for all major chemical journals in the world. Member of the IUPAC Commission on Molecular Structure and Spectroscopy (1.5), 1997–2000.
Promoter:	Ph. D. *honoris causa* of the two–times Nobel prize winner Linus Pauling, the University of Zagreb, 1988.
Awards:	City of Zagreb award for outstanding achievements in scientific research, 1976. National award of the Republic of Croatia for excellence in science, 1987.
Editorships:	Editor or Co–editor of thirteen special issues of several international scientific journals. Editor – Modeling of Structure and Properties of Molecules, Ellis Horwood, Chichester, 1987. Editor of the Springer series of books on Theoretical Models of Chemical Bonding, Vol. 1–4, Springer Verlag, Heidelberg, 1990–91. Co–editor (with M. Eckert–Maksić), Molecules in Natural Science and Medicine – *An Encomium for Linus Pauling*, Ellis Horwood, Chichester, 1991. Co–editor (with P. Politzer) of the ongoing Elsevier Series on Theoretical and Computational Chemistry, Vols. 1–16, Elsevier, Amsterdam, 1994–
Organization of Symposia:	Principal organizer (chair) – "Modeling of Structure and Properties of Molecules and Materials", Zagreb, Croatia, May 29–31, 1986. Principal organizer (chair) – "Electronic Structure of Molecules and Molecular Crystals", Dubrovnik – Cavtat, Croatia, September 1988. Co–chair, "From Physical Theory to Philosophy of Science and Peace" – Zagreb, Croatia, October 1990. Co–chair, "XXth European Congress on Molecular Spectroscopy (EUCMOS XX), Zagreb, Croatia, 1991. (cancelled in the last moment because of aggression of the serbian paramilitary units and Yugoslav Army on Croatia). Member of the Organizing Committee, "International Conference on the Effects of War in the Environment", Zagreb, Croatia, April 15–17, 1993. Principal organizer of the 2nd ACIS–CHEM Meeting, Brioni, Croatia, September 3–6, 2000. Founder and The Member of the Steering Committee, Central European Conferences "Chemistry Towards Biology", 2000–
Teaching:	Undergraduate courses: "Mathematics for Chemists" "Symmetry in Chemistry" Postgraduate courses: "Quantum Theory of Atoms and Molecules" – Physics "Quantum Chemistry" – Chemistry

LIST OF PUBLICATIONS IN THE LAST FIVE YEARS:

172. B. Kovačević, Z. B. Maksić and R. Vianello: "The Proton Affinity of Some Extended –Systems Involving Guanidine and Cyclopropenimine Subunits", *J. Chem. Soc., Perkin Trans. 2*, 886 (2001).
173. Z. B. Maksić, D. M. Smith and D. Barić: "The Additivity of the –Electron Correlation Energy in Planar Heteroatomic Molecules", *Chem. Phys.*, 269, *11* (2001).
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175. D. M. Smith, D. Barić and Z. B. Maksić: On the Correlation Energy Features in Planar Heteroatomic Molecular Systems", *J. Chem. Phys.*, 115, *3474* (2001).
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prediction by the DFT calculations", *Tetrahedron Lett.*, 46, 3711 (2005).

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221. D. Barić, B. Kovačević, Z. B. Maksić and Th. Mueller: "A Novel Approach in Analyzing Aromaticity by Homo– and Isostructural Reactions – An Ab Initio Study of Fluorobenzenes", *J. Phys. Chem. A*, 109, 10594 (2005).
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224. B. Kovačević and Z. B. Maksić: "High Basicity of Phosphorus – Proton Affinity of Tris–(tetramethylguanidinyl)–phosphine and Tris–(hexamethyltriaminophospha-zenyl)–phosphine by the DFT Calculations", *Chem. Commun.*, 14, 1524 (2006).
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PUBLICATIONS QULIFYING FOR LECTURSHIP:

Editor of the series "Theoretical Models of Chemical Bonding", vols. 1-4, Springer-Verlag, Berlin-Heidelberg

Coeditor of the series: "Theoretical and Computational Chemistry", Elsevier, Amsterdam, vols. 1-16.

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BIOGRAPHY*:*

1946. Born in Zagreb, Croatia
1968. Graduated in Theoretical Physics from the University of Zagreb, Faculty of Natural Sciences and Mathematics
1969. SRC Scholarship for Ph. D. at the University of Sussex, UK, under the supervision of Professor J. N. Murrell
1972. Ph. D. received at the University of Sussex. Obtained a two year SRC postdoctoral grant to do research at the University of Bristol, UK.
1974. Research at the R. Boskovic Institute, Zagreb
1977. Obtained a Lady Davis Fellowship to do research at the Hebrew University of Jerusalem, Israel.
1980. Visiting professor at the University of Florida, Gainesville.
1982. One year leave of absence from the R. Boskovic Institute. Visiting: University of Kaiserslautern, Germany; MPI fur Stromungsforschung, Gottingen, Germany; University of Sussex, UK
1984. Professorship at the R. Boskovic Institute, Zagreb.
1997. Croatian state price in science

LIST OF PUBLICATIONS IN THE LAST FIVE YEARS:

S. D. Bosanac, Rigid rotor in phase space, Phys. Rev. A64, 042708, (2001) (http://arXiv.org/abs/quant-ph/0104094)
S. D. Bosanac, The Spin, Fortschr. Phys. 49, 1225 (2001) (http://arXiv.org/abs/quant-ph/0110090
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D. Babic, S. D. Bosanac and N. Doslic: Proton transfer in malonaldehyde: a model three dimensional study, Chem. Phys. Lett. 358, 337 (2002)
D. Bonacci, S. D. Bosanac, N. Doslic: Analytic Pulse Design for Selective Population Transfer in Many-level Quantum Systems.
Phys. Rev., A70 043413-043423 (2004) /
Erratum: Phys. Rev., A71 039905(E) (2005)
S. D. Bosanac: Dynamics of Particles and the Electromagnetic Field, World Scientific, 2005

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S. D. Bosanac: Dynamics of Particles and the Electromagnetic Field, World Scientific, 2005

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LECTURER: Dr. Goran Pichler

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BIOGRAPHY: Dr. Goran Pichler

The date and place of birth: 24. February, 1946. Zagreb, Croatia

Diplom Work (Bachelor of Science) at the Faculty of Mathematical and Natural Sciences of the University of Zagreb, March, 1969. Master Thesis (Master of Sciences) on atomic and Married with Goranka Friganovic-Pichler (born on 10th, August, 1947). Children: Marin Pichler (born on 21st, May, 1969), Srdan Pichler (born on 21st, May, 1969), Lana Pichler (born on 6, March, 1980)

Professional experience

Since 1969 permanently employed at the Institute of Physics of the University of Zagreb, first as an assistant and then over higher scientific levels up to the highest level called: scientific adviser (elected in 1987).

Director of the Institute of Physics of the University of Zagreb from 1980 until 1984.

Head of Division of the Physics of Ionized Gases at the Institute of Physics, 1982-1990.

Election dates for the scientific positions:

scientific coworker (equivalent to assistant professor) 21. April, 1976.

higher scientific coworker (equivalent to associated professor) 27, February, 1982.

scientific adviser (equivalent to full professor) 30. May, 1987.

Project leader of many international and bilateral projects e.g. 1. NIST (Gaithersburg, USA)-IFS (Zagreb, Croatia): Laser spectroscopy of metal vapors, and Spectral line profiles in plasmas, 1979-1989. 2. European Community Project: Intermetallic excimers as candidates for new lasers (Leiden-Göttingen-Zagreb), 1990-1993. 3. New energy sources, first priority project, Zagreb, Croatia, 1982-1983. 4. Laser spectroscopy of excimers and exciplexes, Current project at the Ministry of Science and Technology, Croatia, 1990-1994. 5. Quantum-mechanically Complete Experiments with State-prepared Alakli Atoms, Volkswagen Stiftung, 1994-1995.6. CEEPUS, Central European Exchange Program for University Studies, Austria-Bulgaria-Croatia, 1995-1996. etc.

President of Croatian Physical Society since 2000-2004.

International study visits Alexander von Humboldt fellow, 1973-1974, at the Institut fuer Experimentalphysik der Universitaet Kiel, Federal Republic of Germany. Visiting fellow at the Joint Institute for Laboratory Astrophysics (JILA) at the University of Colorado and the National Bureau of Standards, Boulder, Colorado, USA, 1977-1978. Visiting fellow at the Max-Planck-Institut fuer Stroemungsforschung in Goettingen, Federal Republic of Germany, three months during the period 1980-1982. Guest scientist at the National Bureau of Standards, Gaithersburg, Maryland, USA, 6 weeks in 1984. Visiting professor (Gastwissenschaftler) at MPQ in Garching by Munich Sept. 1990 - Sept. 1993. Visiting professor at the Physics Department, University of Connecticut, Storrs, CT, USA, (February-Marrch, 1995). Gastprofessor at the Universities of Graz, June, July, August

1995. Visiting professor University of Paris-Sud at Orsay, November/December, 1995 and April 2000. Visiting professor at Laboratoire Aime Cotton, CNRS II, F-91405 ORSAY Cedex, 5 month in 1995-2002. Visiting professor na Laboratoire des Physique des Lasers, Universite Paris-Nord, total 10 months 1996-2006.
Educational activity:At the postgraduate level:1. atomic physics 1981-2006.2. quantum electronics 1983-2006.
At the undergraduate level: 1. fundamentals of atomic physics, 2. atomic and molecular physics, 3. plasma physics, 4. experimental methods of atomic physics, 5. atomic physics and optics
Mentor of more than 10 diploma theses, about 15 master theses and 11 PhD theses.
Invited lectures at the conferences at more than 30 domestic and international conferences.
Fluently speaks English, German, Russian and Croatian (mother language), whereas reading and slowly speaking French.

LIST OF PUBLICATIONS IN THE LAST FIVE YEARS:

142. T. Ban, D. Aumiler, H. Skenderović and G. Pichler:
Mapping of the Optical Frequency Comb to the Atom Velocity Comb
Phys. Rev. A, 73, 043407, (2006).

141. M . Pichler, J. Qi, W. C. Stwalley,R. Beuc, and G.Pichler:
Cold Cesium Photoassociation above and below the 7PJ limit (2005)
Rap. Comm. Phys.Rev. A (2006).

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Room temperature phosphorescence and photodegradation of carbazolic molecules in solid matrices
Synthetic Metals (2006).

139. N. Vujičić, H. Skenderović, T. Ban, D. Aumiler, G. Pichler:
Low-density plasma channels generated by the femtosecond pulses
Appl. Phys. B

138. W. Ernst, R. Huber, S. Jiang, R. Beuc, M. Movre, G. Pichler:
Cesium dimer spectroscopy on helium droplets
J. Chem. Phys. 124, 024313 (2006).

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Velocity selective optical pumping of Rb hyperfine lines induced by a train of femtosecond pulses
Phys. Rev. Lett. 95, 233001 (2005).

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Absorption spectrum of Na-K-He mixture: experiment and theory
J. Phys. B: At. Mol. Opt. Phys. 38, 3107 (2005).

135. A . Knežević, Z. Tarle, A. Meniga, J. Šutalo, G. Pichler:
Influence of light intensity from different curing units upon composite temperature rise
Journal of Oral Rehabilitation 32 , 362 (2005).

134 . A . Knežević, N. Demoli, Z. Tarle, A. Meniga, J. Šutalo, G. Pichler:
Measurement of Linear Polymerization Contraction Using Digital Laser Interferometry
Operative Dentistry, 30 , 346-352 (2005).

133. D. Aumiler, T. Ban, G. Pichler:
Femtosecond laser-induced cone emission in dense cesium vapor
Phys. Rev. A 71, 063803 (2005).

132. T. Ban, D. Aumiler, G. Pichler:

Rubidium dimer destruction by a diode laser
Phys. Rev. A 71, 022711 (2005).
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High-resolution measurements of the pressure broadening and shift of the rubidium 5S1/2-6P3/2 line by argon and helium
Phys. Rev. A 70, 032723 (2004).
130. T. Ban, D. Aumiler, R. Beuc, G. Pichler:
Rb2 diffuse band emission excited by diode lasers
Eur. Phys. J. D 30, 57 (2004).
129. T. Ban, R. Beuc, H. Skenderović, G. Pichler:
Rubidium pure long-range ion-pair molecules
Europhys. Lett., 66 485 (2004).
128. M . Pichler, W. C. Stwalley, R. Beuc and G. Pichler:
Formation of ultracold Cs2 molecules through the double minimum Cs2 3 1 S + u state
Physical Review A, 69 (2004) 013403 (-1-5).
127. N. Demoli , A. Knezević, Z. Tarle, A. Meniga, J. Šutalo, G. Pichler
Digital interferometry for measuring of the resin composite thickness variations during blue light polymerization
Optics Communications, 231 (2004) 45-51.
----------2004
126. D. Aumiler, T. Ban, R. Beuc, G. Pichler:
Simultaneous temperature and density determination of rubidium vapor
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Photopolymerization of composite resin with plasma light
Journal of Oral Rehabilitation, 29 (2002) 782-786.
123. Z. Tarle, A. Meniga, A. Knežević, J. Šutalo, M. Ristic, G. Pichler:
Composite conversion and temperature rise using a conventional, plasma arc, and an experimental blue LED curing unit
Journal of Oral Rehabilitation, 29 (2002) 662-667.
122. H. Skenderović, R. Beuc, T. Ban, G. Pichler:
Blue Satellite Bands of KRb Molecule: Intermediate Long-Range States
Eur. Phys. J. D. 19, 49 (2002).
121. C . M. Dion, O. Dulieu, D. Comparat, W. de Souza Melo, N. Vanhaecke, P. Pillet, R. Beuc, S. Milosevic, and G. Pichler:
Photoionization and detection of ultracold Cs2 molecules through diffuse bands
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120. T. Ban, H. Skenderović, R. Beuc, I. Krajcar Bronić, S. Rousseau, A.R. Allouche, M. Aubert-Frécon, G. Pichler:
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119. M.-L. Almazor, F. Masnou-Seeuws, O. Dulieu, R. Beuc and G. Pichler:

Ultracold molecules formation via intermediate long-range molecules
European Physical Journal D, 15, 355 (2001)
118. R. Beuc, H. Skenderović, T. Ban, D. Veža, G. Pichler, W. Meyer:
Cesium satellite band at 875.2 nm stemming from the Cs2 0g+ (6p 2P1/2+6s 2S1/2) state
Eur. Phys. J. D 15, 209 (2001).
117. A . Knežević, Z. Tarle, A. Meniga, J. Šutalo, G. Pichler, M. Ristic:
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Journal of Oral Rehabilitation, 28 586-591, (2001).
116. D. Azinović, S. Milošević and G. Pichler:
Resonance 2s-2p excitation of lithium in the Li-Cd system
Journal of Physics B: Atomic, Molecular and Optical Physics, 34 2715-2724 (2001).
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Photoluminescence of donor-acceptor carbazole chromophores
Synthetic Metals, 122, 59-61 (2001).
114. T. Ban, H. Skenderović, S. Ter-Avetisyan, G. Pichler:
Absorption measurements in dense cesium vapor using UV-violet light emitting diode App. Phys. B 72, 337 (2001).

PUBLICATIONS QULIFYING FOR LECTURSHIP:
Beside many scientific papers there are also many popular-scientific papers in domestic journals and books e.g.
G. Pichler: Nobelova nagrada za fiziku 2005. godine.download .pdf (212 KB)
G. Pichler: Laseri kao posljedica čudesne godine 1905.download .pdf (276 KB)
G. Pichler:Razvoj laserske spektroskopije na Institutu za fiziku Sveučilišta u Zagrebu
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1970 B.Sc. physics, Assistant at R.Boskovic Institute, Zagreb, Croatia.
1973 M.Sc. in physics;
1973 Research Assistant in Molecular Physics Laboratory, IRB,Zagreb, Croatia.
1975-1978 Visits to Departement de Recherches Physiques, Universite P. et M. Curie, Paris, France..
1977 Three months visit to Laboratorio di Spettroscopia Molecolare, Università di Firenze, Firenze, Italy.(Profs. N. Neto and S.Califano).
1979-1992 Collaboration with Professor G.S. Pawley. Regular visits to Department of Physics, University of Edinburgh, Edinburgh, GB.
1980 Ph.D. in physics;
1982 Research Associate, Rudjer Boskovic Institute, Zagreb, Croatia.
1984/85 One year appointment at Department of Physics, Colorado State University, Fort Collins, Colorado 80523, USA
1987 Three month visit (Visiting Research Fellow) at Department of Physics, University of Edinburgh, Edinburgh, UK.
1990 Visiting Senior Scientist(Scientifique de Haut Niveau) at Departement de Recherches Physiques, Université P. et M. Curie, Paris,
1991 Senior Research Associate, Ruder Boskovic Institute,Zagreb,Croatia.
1996-99 Collaboration with Prof. R. M. Pick. Université P. et M.Curie Paris, Raman spectroscopy of molecular glassformers.
1997 One month, visiting professor (Professeur invité) at Groupe de Matiere Condensée et Materiaux, Université de Rennes I, Rennes, France.
1998 Senior scientist, Ruder Boskovic Institute, Zagreb, Croatia.
2004 Senior scientist, (reelected), Ruđer Bošković Institute, Zagreb, Croatia.

LIST OF PUBLICATIONS IN THE LAST FIVE YEARS:

1. T. Ivšic, A. Galović, and D. Kirin: Sand as a compressible fluid, Physica A 277 , 47 (2000).
2. J. Pirnat, Z. Trontelj, J. Lužnik and D. Kirin, Halogen NQR and the Phase Transition in CH3Hg-Halide Family, Z. Naturforsch. 55a , 215 (2000).
3. G. Baranović, L. Bistričić, V. Volovšek and D. Kirin: Molecular vibrations and lattice dynamics of orthoterphenyl, Mol. Phys. 99, 33 (2001).
4. V. Mohaček-Grošev and D. Kirin: The origin of disorder in CH3 HgX (X= Cl,Br,I) crystals investigsted by temperature dependent Raman spectroscopy, Eur. J. Phys. B 20 , 85 (2001).
5. V.Volovšek, D.Kirin, L. Bitričić ,G. Baranović, Low-frequency vibrations of 4, 4' dibromobenzophenone crystal, J. Raman . Spectrosc. 33, 761 (2002).
6. J. Pirnat, J. Lužnik, Selinger J. and D. Kirin, NQR study of of phase transition in CH3HgX, (X= Cl,Br,I, Eur. J. Phys. B 35, 339 (2003).

PUBLICATIONS QULIFYING FOR LECTURSHIP: publications 2to 6 from the previous list

DATE OF THE LAST PROMOTION: April 2004

LECTURER: Dr. Mladen Movre

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Education:
Ph. D.: 1986, University of Zagreb
Master: 1977, University of Zagreb
Bachelor: 1974, Faculty of Sciences, Zagreb
Employment and duties:
2004. Institute of Physics, Scientific Adviser
2001. Institute of Physics, deputy director - Scientific Adviser
1998. Institute of Physics, Scientific Adviser, deputy director
1994. Institute of Physics, Senior Scientific Associate, deputy director
1990. Institute of Physics, Scientific Associate
1986. Institute of Physics, Research Associate
1977. Institute of Physics, Scientific Assistant
Specialisation:
1996. 09.16. -12.15. University of Kaiserslautern, Kaiserslautern, Germany
1990. 05.28. - 09.21. University of Kaiserslautern, Kaiserslautern, Germany
1988. 05.12. - 27.04. Max Planck Institut fuer Quantenoptik, Garching, Germany
1987. 01.01 - 12.23. University of Kaiserslautern, Kaiserslautern, Germany
1977. 05.15. - 06.15. St. Petersburg State University, St. Petersburg, Russia
Membership:
The American Physical Society
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LIST OF PUBLICATIONS IN THE LAST FIVE YEARS:

1. R.Beuc, M.Movre, T.Ban, G.Pichler, M.Aymar, O.Dulieu and W.E.Ernst: *Predictions for the observation of KRb spectra in cold conditions*, J. Phys. B: At. Mol. Opt. Phys. (2006) submitted

2. W.E.Ernst, R.Huber, S.Jiang, R.Beuc, M.Movre, and G.Pichler: *Cesium dimer spectroscopy on helium droplets*, J. Chem. Phys. 124, 024313 (2006)

3. C.Vadla, R.Beuc, V.Horvatic, M.Movre, A.Quentmeier and K.Niemax: *Comparison of theoretical and experimental red and near infrared absorption spectra in overheated potassium vapour*, Eur. Phys. J. D (2005) published online DOI:10.1140/epjd/e2005-00241-3

4. C.Vadla, M.Movre, R.Beuc, J.Franzke, H.-D.Wizemann and K.Niemax: *Optimization of lead metastable production in a low pressure argon discharge*, Spectrochimica Acta B 55, 1759 (2000)

5. M.Movre, C.Vadla and V.Horvatic: *Mixing and quenching of the Cs 5DJ states induced by collisions with caesium ground-state atoms*, J. Phys. B: At. Mol. Opt. Phys. 33, 3001 (2000)

6. M.Movre, L.Thiel, and W.Meyer: *Theoretical investigation of the autoionization process in molecular collision complexes: He*(2 3S) + Li(2 2S) -> He + Li+ + e-*, J.Chem.Phys. 113, 1484 (2000)

PUBLICATIONS QULIFYING FOR LECTURSHIP:

1. R.Beuc, M.Movre, T.Ban, G.Pichler, M.Aymar, O.Dulieu and W.E.Ernst: *Predictions for the observation of KRb spectra in cold conditions*, J. Phys. B: At. Mol. Opt. Phys. (2006) submitted

2. W.E.Ernst, R.Huber, S.Jiang, R.Beuc, M.Movre, and G.Pichler: *Cesium dimer spectroscopy on helium droplets*, J. Chem. Phys. 124, 024313 (2006)

3. M.Movre, L.Thiel, and W.Meyer: *Theoretical investigation of the autoionization process in molecular collision complexes: He*(2 ^{3}S) + Li(2 ^{2}S) -> He + Li+ + e-*, J.Chem.Phys. 113, 1484 (2000)

4. M.Movre and W.Meyer: *Theoretical Investigation of the Autoionization Process in Molecular Collision Complexes: Computational Methods and Aplications to He*(2^{3}S) + H(1^{2}S)*, J.Chem.Phys. 106, 7139 (1997)

5. M.Movre and R.Beuc: *van der Waals interaction in excited alkali-metal dimers*, Phys.Rev.A 31, 2957 (1985)

6. M.Movre and G.Pichler: *Resonance interaction and self-broadening of alkali resonance lines II. Quasi-static wing profiles*, J.Phys.B 13, 697 (1980)

7. M.Movre and G.Pichler: *Resonance interaction and self-broadening of alkali resonance lines I. Adiabatic potential curves*, J.Phys.B 10, 2631 (1977)

DATE OF THE LAST PROMOTION: 2004

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Education

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Name of organisation providing education	University of Zagreb
Title or qualification awarded	M. Sc. in physics
Date	1993
Place of education	Zagreb
Name of organisation providing education	University of Zagreb
Title or qualification awarded	Ph. D. in physics

Work experience

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Type of business or sector 16.01.1985. Assistant
28.12.1993. Research Associate
10.09.1999. Research Associate
22.01.2002. Senior Research Associate
01.09.2005. Deputy Director

Main activities Theoretical atomic and molecular physics

LIST OF PUBLICATIONS IN THE LAST FIVE YEARS:

287. Marin Pichler, Jianbing Qi, William C. Stwalley, Robert Beuc and Goran Pichler: Observation of blue satellite bands and photoassociation at ultracold temperatures, PHYS. REV. A 73, 021403R (2006)

288. W. E. Ernst, R. Huber,S. Jiang, R. Beuc, M. Movre, and G. Pichler: Cesium dimer spectroscopy on helium droplets, J.Chem.Phys.124, 024313 (2006)

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291. Ban T, Beuc R, Skenderović H, et al. Rubidium pure long-range ion-pair molecules EUROPHYS LETT 66 (4): 485-491 (2004)

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295. Aumiler D, Ban T, Beuc R, et al. Simultaneous determination of the temperature and density of rubidium vapor APPL PHYS B-LASERS O 76 (8): 859-867 (2003)

296. Skenderović H, Beuc R, Ban T, et al. Blue satellite bands of KRb molecule: Intermediate long-range states EUR PHYS J D 19 (1): 49-56 (2002)

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299. M.-L. Almazor, 0. Dulieu, F. Masnou-Seeuws, R. Beuc and G. Pichler: Formation of ultracold molecules via photoassociation with blue detuned laser light, Eur. Phys. J. D 15,355-363 (2001)

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302. W. E. Ernst, R. Huber,S. Jiang, R. Beuc, M. Movre, and G. Pichler: Cesium dimer spectroscopy on helium droplets, J.Chem.Phys.124, 024313 (2006)

303. Ban T, Beuc R, Skenderović H, et al. Rubidium pure long-range ion-pair molecules EUROPHYS LETT 66 (4): 485-491 (2004)

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305. Skenderović H, Beuc R, Ban T, et al. Blue satellite bands of KRb molecule: Intermediate long-range states EUR PHYS J D 19 (1): 49-56 (2002)

306. C. M. Dion, O. Dulieu, D. Comparat, W. De Souza Melo, N. Vanhaecke, P. Pillet, R. Beuc, S. Milošević and G. Pichler. Photoionization and detection of ultracold Cs-2 molecules through diffuse bands EUR PHYS J D 18 (3): 365-370 (2002)

307. T. Ban, H. Skenderović, R. Beuc, 1. Krajcar Bronić, S. Rousseau, A. R. Allouche, M. Aubert-Frecon and G. Pichler: Pure long-range ion-pair Cs2 molecules, Chem . Phys.Lett. 345 423-428 (2001)

308. M.-L. Almazor, 0. Dulieu, F. Masnou-Seeuws, R. Beuc and G. Pichler: Formation of ultracold molecules via photoassociation with blue detuned laser light, Eur. Phys. J. D 15,355-363 (2001)

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satellite band at 875.2 nm stemming from the Cs2 Og+(6p 2P1/2 +6s 2S1/2) state, Eur. Phys. J. D 15,
DATE OF THE LAST PROMOTION: 24.2.2006. -Research Adviser

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BIOGRAPHY:
born 16.03.1957, Zagrebu
graduated theoretical physics, Faculty of natural sciences, Zagreb, 1980.
MSc: 1983. (Zagreb, Atomic and nuclear physics)
PhD: 1987. (Zagreb, Astrophysics - Solar physics)
employed at Hvar Observatory, Faculty of Geodesy, University of Zagreb (since 1981)
scientific field: Solar Physics
project leader of national project "Solar Activity and Solar-Terrestrial Physics", and international project "Space Weather: Forecasting the Arrival of Coronal Mass Ejections" (Airforce Laboratories, SAD)
published 169 scientific papers (67 in Current Contents journals), 2 text-books i 3 hand-books, 40 sci.-pop. papers
quoted: >800 times according to ISI; 15 citations in astrophysical monographs
referee of: 21 recenzija znanstvenih članaka za časopise Advances in Space Research, Annale Geophysae, Astronomy & Astrophysics, Astrophysical Journal, Geophysical Research Letter, Journal of Geophysical Research i Solar Physics, 8 za časopis Fizika te veći broj recenzija za Hvar Observatory Bulletin
member of editorial boards of: 'Solar Physics' (Kluwer), 'Central European Astrophysical Bulletin', and sci.-pop. journals 'Čovjek i svemir' and 'Bolid'
member of: International Astronomical Union, European Astronomical Society, American Geophysical Society, Expert team of the Italian Space Agency, Croatian astronomical society, Croatian Physical Society
teaching: Faculty of natural sciences, Physics, undergrad. and PhD studies since 1991; Karl-Franzens Universitaet Graz (guest prof. 2001); mentor of 5 PhD, 4 MSc i 11 BSc theses
collaboration: Airforce Laboratories - Hanscom (USA); Astronomicky ustav Ondrejov; Astrophysikalisches Institut Potsdam; Institut f. Geophyisik, Astrophysik und Meteorologie, Graz; Kipenheuer-Institut f. Sonnenphysik Freiburg; Metsahovi Radio Research Laboratory, Helsinki; NASA; Observatoire de Paris-Meudon; Osservatorio Astronomico di Trieste

LIST OF PUBLICATIONS IN THE LAST FIVE YEARS:
2001-2006 ukupno 86 radova i priopćenja; izdvojeni samo znan. članci u C.C. časopisima:
Spatial distribution and north-south asymmetry of coronal bright points from mid-1998 to mid-1999, Solar Physics, 231 (2005), 1; 29-44
6. Vršnak, Bojan; Magdalenić, Jasmina; Temmer, Manuela; Veronig, Astrid; Warmuth, Alexander; Mann, Gottfried; Aurass, Henry; Otruba, Wolfgang.
Broadband Metric-Range Radio Emission Associated with a Moreton/EIT Wave. Astrophysical Journal. 625 (2005); L67-L70 .
7. Vršnak, Bojan; Skender, Marina.
2.5-dimensional reconnection model and energy release in solar flares. Solar Physics. 226 (2005) , 1; 97-119 .
8. Vršnak, Bojan; Sudar, Davor; Ruždjak, Domagoj.
The CME-flare relationship: Are there really two types of CMEs?. Astronomy and

Astrophysics. 435 (2005); 1149-1157 .
9. Brajša, Roman; Wohl, Hubertus; Vršnak, Bojan; Ruždjak, Vladimir; Clette, Frederic; Hochedez, J.-F.; Roša, Dragan.
Height correction in the measurement of solar differential rotation determined by coronal bright points. Astronomy and Astrophysics. 414 (2004); 707-715 .
10. Maričić, Darije; Vršnak, Bojan; Stanger, Andrew; Veronig, Astrid.
Coronal mass ejection of 15 may 2001: I. evolution of morphological features of the eruption. Solar Physics. 225 (2004); 337-353 .
11. Vršnak, Bojan; Magdalenić, Jasmina; Zlobec, Paolo.
Band-splitting of Coronal and Interplanetary Type II Bursts: III. Physical conditions in the upper corona and interplanetary space. Astronomy and Astrophysics. 413 (2004); 753-763 .
12. Vršnak, Bojan; Maričić, Darije; Stanger, Andrew; Veronig, Astrid.
Coronal mass ejection of 15 may 2001: II. coupling of the CME acceleration and the flare energy release. Solar Physics. 225 (2004); 355-378 .
13. Vršnak, Bojan; Ruždjak, Domagoj; Sudar, Davor; Gopalswamy, Nat.
Kinematics of coronal mass ejections between 2 and 30 solar radii : What can be learned about forces governing the eruption?. Astronomy and Astrophysics. 423 (2004); 717-728 .
14. Warmuth, Alexander; Vršnak, Bojan; Magdalenić, Jasmina; Hanslmeier, Arnold; Otruba, Wolfgang.
A multiwavelength study of solar flare waves - I. Observations and basic properties. Astronomy and Astrophysics. 418 (2004); 1101-1115 .
15. Warmuth, Alexander; Vršnak, Bojan; Magdalenić, Jasmina; Hanslmeier, Arnold; Otruba, Wolfgang.
A multiwavelength study of solar flare waves - II. Perturbation characteristics and physical interpretation. Astronomy and Astrophysics. 418 (2004); 1117-1129 .
16. Skender, Marina; Vršnak, Bojan; Martinis, Mladen.
Solutions of complete jump relations at discontinuities in a two-and-half-dimensional reconnection model. Physical Review E. 68 (2003); 046405 .
17. Vršnak, Bojan; Brajša, Roman; Wöhl, H.; Ruždjak, Vladimir; Clette, F.; Hochedez, J.-F.
Properties of the solar velocity field indicated by motions of coronal bright points. Astronomy and Astrophysics. 404 (2003); 1117-1127 .
18. Vršnak, Bojan; Klein, Karl-Ludwig; Warmuth, Alexander; Otruba, Wolfgang; Skender, Marina.
Vertical dynamics of the energy release process in a simple two-ribbon flare. Solar Physics. 214 (2003); 325-338 .
19. Vršnak, Bojan; Warmuth, Alexander; Maričić, Darije; Otruba, Wolfgang; Ruždjak, Vladimir.
Interaction of an erupting filament with the ambient magnetoplasma and escape of electron beams. Solar Physics. 217 (2003); 187-198 .
20. Aurass, Henry; Vršnak, Bojan; Mann Gottfried.
Shock-excited radio burst from reconnection outflow jet?. Astronomy and Astrophysics. 384 (2002); 273-281 .
21. Brajša, Roman; Vršnak, Bojan; Ruždjak, Domagoj; Sudar, Davor; Roša, Drago; Hržina, Damir.
Differential Rotation of Stable Recurrent Sunspot Groups. Solar Physics. 206 (2002) , 2; 229-241 .
22. Brajša, Roman; Wöhl, Hubertus; Vršnak, Bojan; Ruždjak, Vladimir; Clette, F.; Hochedez, J.-F.

Solar differential rotation determined by tracing coronal bright points in soho-eit images. II results for 1998/99 obtained with interactive and automatic methods. Astronomy and Astrophysics. 392 (2002); 329-334 .
23. Veronig, Astrid; Vršnak, Bojan; Dennis, B. R.; Temmer, Manuela; Hanslmeier, Arnold; Magdalenić, Jasmina.
Investigation of the neupert effect in solar flares. i. statistical properties and the evaporation model. Astronomy and Astrophysics. 392 (2002); 699-712 .
24. Veronig, Astrid; Vršnak, Bojan; Temmer, Manuela; Hanslmeier, Arnold.
Relative timing of solar flares observed at different wavelengths. Solar Physics. 208 (2002); 297-315 .
25. Vršnak, Bojan; Gopalswamy, Nat.
Influence of the aerodynamic drag on the motion of interplanetary ejecta. Journal of Geophysical Research. 107 (2002); SSH2 1-6 .
26. Vršnak, Bojan; Magdalenić, Jasmina; Aurass, H.; Mann, G.
Band-splitting of coronal and interplanetary type II bursts. II. Coronal magnetic field and alfvén velocity. Astronomy and Astrophysics. 396 (2002); 673-682 .
27. Vršnak, Bojan; Warmuth, A.; Brajša, Roman; Hanslmeier, A.
Flare waves observed in helium i 10830 A: a link between ha moreton and EIT waves. Astronomy and astrophysics. 394 (2002); 299-310 .
28. Brajša, Roman; Woehl, Hubertus; Vršnak, Bojan; Ruždjak, Vladimir; Clette, F.; Hochedez, J.F.
Solar differential rotation determined by tracing coronal bright points in SOHO-EIT images. I. Interactive and automatic methods of data reduction. Astronomy and Astrophysics. 374 (2001); 309-315 .
29. Vršnak, Bojan.
Dynamics of solar coronal eruptions. Journal of Geophysical Research. 106 (2001); 25249-25260 .
30. Vršnak, Bojan.
Solar flares and coronal shock waves. Journal of Geophysical Research. 106 (2001); 25291-25300 .
31. Vršnak, Bojan.
Deceleration of Coronal Mass Ejections. Solar Physics. 202 (2001); 173-189 .
32. Vršnak, Bojan; Aurass, Henry; Magdalenić, Jasmina; Gopalswamy, Nat.
Band-splitting of coronal and interplanetary type II bursts. I. Basic properties. Astronomy and Astrophysics. 377 (2001); 321-329 .
33. Vršnak, Bojan; Magdalenić, Jasmina; Aurass, Henry.
Comparative Analysis of Type ii Bursts and of Thermal and non-Thermal Flare Signatures. Solar Physics. 202 (2001); 319-335 .
34. Warmuth, Alexander; Vršnak, Bojan; Aurass, Henry; Hanslmeier, Arnold.
Evolution of two EIT/Ha Moreton waves. Astrophysical Journal. 560 (2001); L105-L109 .

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Vršnak, Bojan; Temmer, Manuela; Veronig, Astrid; Karlicky, Marian; Lin, Jun.
Shrinking and Cooling of Flare Loops in a Two-Ribbon Flare. Solar Physics. 234 (2006); 273-299
Vršnak, Bojan; Skender, Marina: 2.5-dimensional reconnection model and energy release in solar flares. Solar Physics. 226 (2005) , 1; 97-119.
Vršnak, Bojan; Magdalenić, Jasmina; Zlobec, Paolo.
Band-splitting of Coronal and Interplanetary Type II Bursts: III. Physical conditions in the

upper corona and interplanetary space. Astronomy and Astrophysics. 413 (2004); 753-763.
Vršnak, Bojan; Ruždjak, Domagoj; Sudar, Davor; Gopalswamy, Nat.
Kinematics of coronal mass ejections between 2 and 30 solar radii : What can be learned about forces governing the eruption?
Skender, Marina; Vršnak, Bojan; Martinis, Mladen.
Solutions of complete jump relations at discontinuities in a two-and-half-dimensional reconnection model. Physical Review E. 68 (2003); 046405
Vršnak, Bojan; Gopalswamy, Nat.
Influence of the aerodynamic drag on the motion of interplanetary ejecta. Journal of Geophysical Research. 107 (2002); SSH2 1-6.
Vršnak, Bojan.
Dynamics of solar coronal eruptions. Journal of Geophysical Research. 106 (2001); 25249-25260
Vršnak, Bojan.
Solar flares and coronal shock waves. Journal of Geophysical Research. 106 (2001); 25291-25300
Vršnak, Bojan; Lulić, Slaven.
Formation of coronal MHD shock waves- I. The basic mechanism . Solar Physics. 196 (2000) , 1; 157-180.
Vršnak, Bojan; Lulić, Slaven.
Formation of coronal MHD shock waves- II. The pressure pulse mechanism. Solar Physics. 196 (2000) , 1; 181-197.

DATE OF THE LAST PROMOTION: 21.02.2006, scientific advisor

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LIST OF PUBLICATIONS IN THE LAST FIVE YEARS:

12. A. Vesel, M. Mozetič, A. Drenik, S. Milošević, N. Krstulović, M. Balat-Pichelin, I. Poberaj, D. Babić, CLEANING OF POROUS ALUMINIUM TITANATE BY OXYGEN PLASMA, Plasma Chemistry and Plasma Processing in press 2006.
11. N. Krstulović, I. Labazan, S. Milošević, STUDY OF Mn LASER ABLATION IN METHANE ATMOSPHERE, Eur. Phys. D 37 209-215 (2006).
10. N. Glavan, N. Krstulović, N. Čutić, S. Milošević, U. Cvelbar, A. Vesel, A. Drenik in M. Mozetič, PREISKAVA ZNAČILNOSTI NIZKOTLAČNE PLAZME VODNE PARE Z OPTIČNO EMISIJSKO SPEKTROSKOPIJO, Vakuumist 25/4 (2005), 29-33.
09. Labazan, I.; Vrbanek, E.; Milošević, S.; Düren, R. LASER ABLATION OF LITHIUM AND LITHIUM CADMIUM ALLOY STUDIED BY TIME-OF-FLIGHT MASS SPECTROMETRY. Applied Physics A: Materials Science & Processing. Applied Physics A: Materials Science & Processing. 80, 569-574 (2005)
08. A. Vesel, U. Cvelbar, M. Mozetič, N. Krstulović, I. Labazan, S. Milošević, PRIMERJAVA OPTIČNIH EMISIJSKIH SPEKTROV RF PLAZME V DUŠIKU IN ZRAKU. Materiali in tehnologije. 38 (2004) , 3-4; 177-180.
07. N. Krstulović, I. Labazan; S. Milošević, U. Cvelbar, A. Vesel, M. Mozetič OPTIČNI EMISIJSKI SPEKTRI RF KISIKOVE PLAZME, Materiali in tehnologije. 38 (2004) , 1-2; 51-54
06. I. Labazan and S. Milošević, DETERMINATION OF ELECTRON DENSITY IN LASER INDUCED LITHIUM PLUME USING CAVITY RING-DOWN SPECTROSCOPY, J. Phys. D: Appl. Phys. 37 (2004) 2975-2980.
05. I. Labazan, N. Krstulović and S. Milošević, OBSERVATION OF C2 RADICALS FORMED BY LASER ABLATION OF GRAPHITE TARGETS USING CAVITY RING-DOWN SPECTROSCOPY, Journal of Physics D: Applied Physics, 36, issue 20, pages 2465 -2470, 2003.
04. I. Labazan and S. Milošević, LASER VAPORIZED Li2, Na2, K2 and LiNa MOLECULES OBSERVED BY CAVITY RING-DOWN SPECTROSCOPY, Phys. Rev. A 68 032901 (2003).
03. C.M. Dion, O. Dulieu, D. Comparat, W. de Souza Melo, N. Vanhaecke, P. Pillet, R. Beuc, S. Milošević, G. Pichler, PHOTOIONIZATION AND DETECTION OF ULTRACOLD Cs2 MOLECULES THROUGH DIFFUSE BANDS, The European Physical Journal D, 18 (3): 365-370 MAR 2002
02. I. Labazan, S. Milošević, OBSERVATION OF LITHIUM DIMERS IN LASER PRODUCED PLUME BY CAVITY RING-DOWN SPECTROSCOPY, Chem. Phys. Lett. 352 226-233 (2002).
01. D. Azinović, S. Milošević, G. Pichler, RESONANCE 2S-2P EXCITATION OF LITHIUM IN THE LI-CD SYSTEM, J Phys B-At Mol Opt 34 (13): 2715-2724 JUL 14

(2001).

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50. I. Labazan, S. Rudić and S. Milošević, NONLINEAR EFFECTS IN CAVITY RINGDOWN SPECTROSCOPY OF LITHIUM VAPOUR, Chem. Phys. Lett. 320 613-622 (2000).
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DATE OF THE LAST PROMOTION:
2004.

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BIOGRAPHY:
Senior scientific associate at the Institute of Physics, Zagreb. Leader of the Coherent Optics Laboratory. PhD in the field of atomic and kolecular physics and optics, University of Zagreb, 1989. Visits to Humboldt University, Berlin, and Louis Pasteur University, Strasbourg. Research field: coherent optics, holography, interferometry, optical correlation.

LIST OF PUBLICATIONS IN THE LAST FIVE YEARS:
POPIS RADOVA OBJAVLJENIH U POSLJEDNJIH PET GODINA:

1. N. Demoli, Real-time monitoring of vibration fringe patterns by optical reconstruction of digital holograms: mode beating detection, Optics Express 14 (6), 2117-2122 (2006).
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4. N. Demoli, I. Demoli, Dynamic modal characterization of musical instruments using digital holography, Optics Express 13 (13), 4812-4817 (2005).
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6. N. Demoli, K. Šariri, Z. Stanić, V. Maštruko, O. Milat, Toolmarks identification using SEM images in an optoelectronic correlator device, Optik 115 (11), 487-492 (2004).
7. N. Demoli, D. Vukicevic, Detection of hidden stationary deformations of vibrating surfaces by use of time-averaged digital holographic interferometry, Optics Letters 29 (20), 2423-2425 (2004).
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BIOGRAPHY: http://www.phy.hr/~veza/
LIST OF PUBLICATIONS IN THE LAST FIVE YEARS: 1. Veza, D.; Salit, M.L.; Sansonetti, C.J.; Travis, J.C.: Wavenumbers and line-shifts of 198Hg atomic lines measured by Fourier-transform spectroscopy J. Phys. B: At. Mol. Opt. Phys., Vol. 38 (2005) pp 3739-3753 2. Miokovic, Z.; Balković, D., Veza, D.: Shift and broadening of sodium n2S1/2 - 32P1/2;3/2 transitions in high-pressure NaCd and NaHg discharges. FIZIKA A, Vol. 14 (2005) pp 135-152 3. Salit, M.L.; Sansonetti, C.J.; Veza, D.; Travis, J.C.: Investigation of single-factor calibration of the wave-number scale in Fourier-transform spectroscopy J. Opt. Soc. Am. B (JOSA B), Vol. 21 (2004) pp 1543-1550 4. Miokovic, Z.; Veza, D.: The line-shape of sodium n2S1/2 - 32P1/2;3/2 transitions in NaCd high-pressure discharge. FIZIKA A, Vol. 10 (2001) pp 129-140 5. Beuc, R.; Skenderovic, H.; Ban, T.; Veža, D.; Pichler, G.; Meyer, W.: Cesium satellite band at 875.2 nm stemming from the Cs2 0g+ (6p2P1/2 + 6s2S1/2) state Eur. Phys. J. D, Vol. 15 (2001) pp 209-214 6. E. Dumanic, D. Pavicic, M. Pavlovic and D. Veza: Dependence of optogalvanic signal on discharge impedance (submitted)
PUBLICATIONS QULIFYING FOR LECTURSHIP: 1. J. Franzke, D. Veza, M. A. Bratescu, K. Niemax: Pseudosonic wave detection in laser spectrometry, Spectrochimica Acta 53B, str. 613-620 (1998) 2. Salit, M.L.; Sansonetti, C.J.; Veza, D.; Travis, J.C.: Investigation of single-factor calibration of the wave-number scale in Fourier-transform spectroscopy J. Opt. Soc. Am. B (JOSA B), Vol. 21 (2004) pp 1543-1550 3. Veza, D.; Salit, M.L.; Sansonetti, C.J.; Travis, J.C.: Wavenumbers and line-shifts of 198Hg atomic lines measured by Fourier-transform spectroscopy J. Phys. B: At. Mol. Opt. Phys., Vol. 38 (2005) pp 3739-3753 4. E. Dumanic, D. Pavicic, M. Pavlovic and D. Veza: Dependence of optogalvanic signal on discharge impedance (submitted)
DATE OF THE LAST PROMOTION: December, 2006.

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BIOGRAPHY:

I was born in 1947 in Zagreb where I attended the elementary and high school. In autumn 1966 I enrolled in Faculty of Science of the University of Zagreb where I acquired the B.Sci. degree in theoretical physics in spring 1971. After completing the army service and spending one year as intern at the "Institut R. Bošković" I continued my postgraduate studies at Imperial College in London under the supervision of Dr. D.M. Newns. I acquired the Ph.D. degree in 1976 with the thesis "Calculations of the Dynamic Screenig Effects in the Electronic Spectra of Adsorbates" with Prof. D.C. Langreth [Rutgers University (New Jersey,USA) & NORDITA] as external examiner.

Since autumn 1976 I have been permantently employed at the Institute of Physics of the Zagreb University where I have continued the research in surface science. Throughout that period I have lead research projects at the Institute and supervised a number of diploma, M.Sci. and Ph. D. theses in the field of surface science. I served as the president of the Scientific Council of the Institute during two mandates and of the Executive Council in one mandate.

The results of my research activities have been published in over 100 scientific papers in internationally refereed journals. I have also published as author or coauthor four scientific monographs and/or books dealing with the subject of interactions of atomic particles and radiation with surfaces and adsorbates. Since 1979 I have delivered around twenty invited/plenary talks at various international scientific conferences and have served as a member of the advisory boards at a number of international conferences and congresses.

I have served as a member of the Executive Committee of the Surface Science Division of the International Union of Vacuum Science, Tecnology and Applications, and currently am a member of the Board of Surfaces and Interfaces Section of the Condensed Matter Division of the European Physical Society. In the period 1998-2004 I was a member of the International Advisory Board of the journal Surface Science. In the past twenty years I have been serving as a regular referee for the journals Physical Review B, Physical Review Letters and Surface Science.

Since the begining of my work at the Institute of Physics in Zagreb I have spent longer and shorter periods as a visiting scientist or professor at many renown research institutions worldwide: University of Waterloo (Canada), Fritz-Haber-Institut der MPG (Berlin), Universita di Genova (Italy), Rutgers University (New Jersey,USA), Donostia International Physics Center (San Sebastian, Spain), Universidad Autonoma de Madrid (Spain), Universität Bonn (Germany), Technische Universität München (Germany), Universita di Modena (Italy), Max-Planck-Institut für Strömungsforschung (Göttingen, Germany), Catalysis Research Center (Hokkaido University, Japan), and the International Centre for Theoretical Physics (Trieste, Italy), where I was apointed as Visiting Scientist or Research Leader. In that capacity I organized in 1992 the international conference "Inelastic energy transfer in interactions with surfaces and adsorbates".

In the past I have lead several international and bilateral research projects with the International Atomic Energy Agency (Vienna), National Science Foundation (Washington, USA), Forschungszentrum KFA Jülich (Germany), European Science Foundation

(Strasbourg), Universidad Autonoma de Madrid (Spain), Ruhr-Universität Bochum (Germany), and Bavarian Office for Scientific Collaboration (München, Germany).
In 1996 I was awarded by the International Centre for Theoretical Physics in Trieste with the Senior Research Associate Award.
In 2002 I was awarded by the State Award for Science of the Croatian Parliament.

LIST OF PUBLICATIONS IN THE LAST FIVE YEARS:

-A. Šiber, B. Gumhalter, A.P. Graham and J.P. Toennies:
A He-atom scattering and theoretical study of the surface phonons of a simple benchmark system: Xe(111).
Phys. Rev. B 63(2001)115411.

-B. Gumhalter:
Single and multiphonon atom-surface scattering in the quantum regime
Physics Reports, 351(2001)1-159.

-A. Šiber and B. Gumhalter:
Zone edge focused two-phonon processes in He atom scattering from a simple prototype system: Xe(111)
Surf. Sci. 502(2002)422-428.

-A. Šiber, B. Gumhalter and Ch. Woll:
Kinematic effects in the Debye-Waller factor and sticking probabilities in low-energy atom-surface scattering,
J Phys.-Condens. Matt. 14(2002)5913-5932.

-B. Gumhalter:
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-A. Šiber and B. Gumhalter:
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Phys. Rev. Lett. 90(2003)126103.

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-C. Boas, M. Kunat, U. Burghaus, B. Gumhalter and Ch. Woll:
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Progress Surf. Sci. 74(2003)375-388.

-D. K. Sunko and B. Gumhalter:
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Am. J. Phys. 72/2(2004)231-236.

-B. Gumhalter and T. Matsushima:
Energy dissipation during desorption of reaction products: the role of substrate phonons,
Surf. Sci. 561(2004)183-192.

-W. Brenig and B. Gumhalter:

Inelastic atom-surface scattering by phonons: a comparison of different approaches, J. Phys. Chem. B 108(2004)14549-14557. -F. El-Shaer and B. Gumhalter: Entangled and disentangled decoherence of intermediate electron-hole pairs in two-photon photoemission from surface bands: Beyond the adiabatic approximation, Phys. Rev. Lett. 93(2004)236804-4. -A. Šiber and B. Gumhalter: Suppression of inelastic bound state resonance effects by the dimensionality of an atom-surface scattering event, Phys. Rev. B 71 (2005) 081401-4. -B. Gumhalter: Ultrafast dynamics and decoherence of quasiparticles in surface bands: Development of the formalism, Phys. Rev. B 72 (2005) 165406-17. -P. Lazić, Ž. Crljen, R. Brako and B. Gumhalter: Role of van der Waals interactions in adsorption of Xe on Cu(111) and Pt(111), Phys. Rev. B 72 (2005) 245407-5.
PUBLICATIONS QUALIFYING FOR LECTURSHIP: see the above quoted publications and papers accessible in standard databases
DATE OF THE LAST PROMOTION: 1999

4. ATOMIC, MOLECULAR AND OPTICAL PHYSICS (AMOP) AND ASTROPHYSICS: ASTROPHYSICS MODULE

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BIOGRAPHY:
Born in Zagreb, in 1953. Almost from its founding he has worked at Hvar Observatory of the Geodetic faculty, University of Zagreb, as an observed. Ph.D. in Physics obtained at the University of Zagreb with doctoral dissertation on 'Structure and Evolution of the interacting binary stars of W Serpentis type' (supervisor dr. Svatopluk Križ from the Astronomical Institite, Prague). His research interests are in stellar strucure and evolution, in particular of the binary stars. He was appointed to seniro scientist in 1999, and in 2000 as full professor at the Faculty of Sciences, University of Zagreb. He is teaching courses in astronomy and astrophysics. He is autohor of about 100 publications, of which about 45 in the refeered journals. Superivsed number of diploma and 5 master of science thesis. Organized 2 international coinferences. Chairman of Austrian-Croatian Telescope Committee.

LIST OF PUBLICATIONS IN THE LAST FIVE YEARS:

1. Pavlovski K, Holmgren DE, Koubsky P, et al.
Abundances from disentangled component spectra of close binary stars: An observational test of an early mixing in high-mass stars
ASTROPHYSICS AND SPACE SCIENCE 304 (1-4): 329-332 AUG 2006

2. Smolcic V, Ivezic Z, Gacesa M, et al.
The rest-frame optical colours of 99 000 Sloan Digital Sky Survey galaxies
MONTHLY NOTICES OF THE ROYAL ASTRONOMICAL SOCIETY 371 (1): 121-137 SEP 1 2006

3. Pavlovski K, Burki G, Mimica P
Indirect imaging of an accretion disk rim in the long-period interacting binary W Crucis
ASTRONOMY & ASTROPHYSICS 454 (3): 855-862 AUG 2006

4. Netopil M, Paunzen E, Maitzen HM, et al.
CCD-Delta a and BVR photometry of NGC 7296
ASTRONOMISCHE NACHRICHTEN 326 (8): 734-737 2005

5. Pavlovski K, Hensberge H
Abundances from disentangled component spectra: the eclipsing binary V578 Mon
ASTRONOMY & ASTROPHYSICS 439 (1): 309-315 AUG 2005

6. Dominis D, Mimica P, Pavlovski K, et al.
In between beta Lyrae and Algol: The case of V356 Sgr
ASTROPHYSICS AND SPACE SCIENCE 296 (1-4): 189-192 2005

7. Pavlovski K, Burki G, Mimica P
Indirect imaging of the accretion disk rim in W Crucis
ASTROPHYSICS AND SPACE SCIENCE 296 (1-4): 417-420 2005
8. Freyhammer LM, Hensberge H, Sterken C, et al.
The beta Cephei variable in the eclipsing binary HD 92024 - I. Determination of the orbit
ASTRONOMY & ASTROPHYSICS 429 (2): 631-643 JAN 2005
9. Smolcic V, Ivezic Z, Knapp GR, et al.
A second stellar color locus: A bridge from white dwarfs to M stars
ASTROPHYSICAL JOURNAL 615 (2): L141-L144 Part 2 NOV 10 2004

PUBLICATIONS QULIFYING FOR LECTURSHIP:
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DATE OF THE LAST PROMOTION: 2005

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BIOGRAPHY:
Born in Sarajevo in 1965. Graduated both in physics, and engeeiniring at the University of Zagreb in 1990 and 1991, respectively. PhD in astronomy obtained at the University of Kentucky in Lexington with thesis on 'Analysis of Infrared Astronomical Sources' under supervision of Prof. M. Elitzur (1995). Since 2004 he is assistant professor in Astronomy Department, University of Washington in Seattle, USA. He has a broad scientific interest, and in particular on radiative transfer in gasseous and dusty envelopes in different astrophysical situations, from stars to AGN. Almost 6 years he spent at the Princeton University working on Sloand Digital Sky Survey. He is using observations fromn that project in study of asteroids, Milky Way structure, and galaxies and quasars. He is author of about 430 publications, of which about 170 in refeered journals.

LIST OF PUBLICATIONS IN LAST FIVE YEARS:

1. Martinez-Delgado D, Penarrubia J, Juric M, et al. The virgo stellar overdensity: Mapping the infall of the Sagittarius tidal stream onto the Milky Way disk ASTROPHYSICAL JOURNAL 660 (2): 1264-1272 Part 1 MAY 10 2007
2. Kim M, Kim DW, Wilkes BJ, et al. Chandra multiwavelength project X-ray point source catalog ASTROPHYSICAL JOURNAL SUPPLEMENT SERIES 169 (2): 401-429 APR 2007
3. Jiang LH, Fan XH, Ivezic Z, et al. The radio-loud fraction of quasars is a strong function of redshift and optical luminosity ASTROPHYSICAL JOURNAL 656 (2): 680-690 Part 1 FEB 20 2007
4. Tegmark M, Eisenstein DJ, Strauss MA, et al. Cosmological constraints from the SDSS luminous red galaxies PHYSICAL REVIEW D 74 (12): Art. No. 123507 DEC 2006
5. Anderson S, Margon B, Voges W, et al. A large, uniform sample of X-ray-emitting active galactic nuclei from the ROSAT All Sky and Sloan Digital Sky Surveys: The Data Release 5 sample ASTRONOMICAL JOURNAL 133 (1): 313-329 JAN 2007
6. Tucker DL, Kent S, Richmond MW, et al. The Sloan Digital Sky Survey Monitor Telescope Pipeline, ASTRONOMISCHE NACHRICHTEN 327 (9): 821-843 2006
7. Smolcic V, Ivezic Z, Gacesa M, et al.,The rest-frame optical colours of 99 000 Sloan Digital Sky Survey galaxies, MONTHLY NOTICES OF THE ROYAL ASTRONOMICAL SOCIETY 371 (1): 121-137 SEP 1 2006
8. Obric M, Ivezic Z, Best PN, et al. Panchromatic properties of 99 000 galaxies detected by SDSS, and (some by) ROSAT, GALEX, 2MASS, IRAS, GB6, FIRST, NVSS and WENSS surveys, MONTHLY NOTICES OF THE ROYAL ASTRONOMICAL SOCIETY 370 (4): 1677-1698 AUG 21 2006
10. Kim DW, Barkhouse WA, Romero-Colmenero E, et al. Chandra multiwavelength project: Normal galaxies at intermediate redshift, ASTROPHYSICAL JOURNAL 644 (2): 829-842 Part 1 JUN 20 2006
11. Sesar B, Svilkovic D, Ivezic Z, et al. Variable faint optical sources discovered by comparing the POSS and SDSS catalogs, ASTRONOMICAL JOURNAL 131 (6): 2801-2825 JUN 2006
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from the sloan digital sky survey (vol 129, pg 2542, 2005), ASTRONOMICAL JOURNAL 131 (6): 3135-3135 JUN 2006
13. Belokurov V, Zucker DB, Evans NW, et al. The field of streams: Sagittarius and its siblings, ASTROPHYSICAL JOURNAL 642 (2): L137-L140 Part 2 MAY 10 2006
14. McDonald P, Seljak U, Burles S, et al. The Ly alpha forest power spectrum from the Sloan Digital Sky Survey, ASTROPHYSICAL JOURNAL SUPPLEMENT SERIES 163 (1): 80-109 MAR 2006
15. Chang RX, Gallazzi A, Kauffmann G, et al. The colours of elliptical galaxies, MONTHLY NOTICES OF THE ROYAL ASTRONOMICAL SOCIETY 366 (3): 717-726 MAR 1 2006
16. Knapp GR, Tremonti CA, Rockosi CM, et al. Sdss J103913.70+533029.7: A super star cluster in the outskirts of a galaxy merger, ASTRONOMICAL JOURNAL 131 (2): 859-865 FEB 2006
17. Adelman-McCarthy JK, Agueros MA, Allam SS, et al. The Fourth Data Release of the Sloan Digital Sky Survey, ASTROPHYSICAL JOURNAL SUPPLEMENT SERIES 162 (1): 38-48 JAN 2006
18. McDonald P, Seljak U, Cen RY, et al. The linear theory power spectrum from the Ly alpha forest in the Sloan Digital Sky Survey, ASTROPHYSICAL JOURNAL 635 (2): 761-783 Part 1 DEC 20 2005
19. Pourbaix D, Knapp GR, Szkody P, et al.,Candidate spectroscopic binaries in the sloan digital sky survey, ASTRONOMY & ASTROPHYSICS 444 (2): 643-649 DEC 2005
20. Eisenstein DJ, Zehavi I, Hogg DW, et al. Detection of the baryon acoustic peak in the large-scale correlation function of SDSS luminous red galaxies, ASTROPHYSICAL JOURNAL 633 (2): 560-574 Part 1 NOV 10 2005
21. Strateva IV, Strauss MA, Hao L, et al. Double-peaked low-ionization emission lines in active galactic nuclei (vol 126, pg 1720, 2003) , ASTRONOMICAL JOURNAL 130 (4): 1961-1963 OCT 2005
22. Best PN, Kauffmann G, Heckman TM, et al., A sample of radio-loud active galactic nuclei in the Sloan Digital Sky Survey, MONTHLY NOTICES OF THE ROYAL ASTRONOMICAL SOCIETY 362 (1): 9-24 SEP 1 2005
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PUBLICATIONS QULIFYING FOR LECTURSHIP:
List of publications as above

DATE OF THE LAST PROMOTION: 2004

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BIOGRAPHY:

Born in Zagreb, in 1975. Graduated in physics at the University of Zagreb in 1999. PhD in Astronomy obtained in 2004 at the University of Leiden with thesis on 'On the nature of early-type galaxies' under supervision of Prof. P.T. de Zeeuw. Since 2004 postdoc researcher in Department of Physics, University of Oxford, in the group of Prof. Davis. His main reasearch interest is study of galaxies (supermassive black hioles and dark matter in galaxies, observations of different types of galaxies, dinamical modelling early-type galaxies, relations between kinematics, dynamics, and stellar populations in early type galaxies). He is teaching assistant at Christ Church College in Oxford, and supervisor of several master and PhD thesis. He observed on VLT, Gemini, VLA, WHT and WSRT. Author of about 40 publications, of which 24 in refeered journals. He particpiated in 9 international meetings

LIST OF PUBLICATIONS IN LAST FIVE YEARS:

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DATE OF THE LAST PROMOTION: 2007

5. BIOPHYSICS

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BIOGRAPHY*:*

Born at 18. June 1948 in Zagreb, Croatia. There I finished elementary and high school. I enrolled the Department of Physics, Faculty of Science and Mathematics, University of Zagreb in 1967. I graduated in 1971 with Major in Experimental Physics. The experiments for my B.Sc. Thesis were made at Institute Ruđer Bošković.
After graduation I got a temporary job at Institute Ruđer Bošković as PhD student. My graduate study was in Physics, Major in Atomic and Molecular Physics. I finished my M.Sc. Thesis in 1974 and was registered in the List of scientists as scientific assistant.
At 1.2. 2004. I got a job at University of Zagreb Medical School as assistant in Department of Physics and Biophysics.
I continued my research at Institute Ruđer Bošković in Laboratory for magnetic resonances where I made my PhD Thesis in Physics in 1983. My mentor was Prof. Janko N. Herak. I spent a 1984/85 year as postdoc at Department of Chemistry, Louisiana State University, Baton Rouge, Louisiana, USA.
I got a title Research Associate in Physics from Faculty of Science and Mathematics in 1990. In Medical School I got a position as Assistant Professor in 1991, and as Associate Professor in 2000 (re-elected in 2005).
>From 1990 I has given lectures and seminars for the students of Medical School, the course *Physics and Biophysics* in the first year and *Physics for Medical Diagnostics* in the fourth year (starting in 2005). I am the author of electoral course *Rheological disturbances in arterial blood flow* in the second year. I am engaged in the teaching in Graduate School, Graduate Study: Medical Sciences, in the course *Basics of Magnetic Resonance.* From 2004 I has given lectures and seminars for undergraduate study in English at University of Zagreb Medical School, with courses *Physics I (basic physics with biophysics essays)* in the first year and *Physics for Medical Diagnostics* in fourth year. Several years ago I was giving lectures at Medical Schools in Split and Osijek. From 1999 I has given lectures and seminars at Faculty of Dentistry, University of Zagreb for the courses *Physics for Dentistry* in the first year and *Physics for Diagnostics* in the third year (starting in fall 2006). From 1986 to 1996 I was teaching the course *Physics with Electronics* for the students of Physiotherapy at Medical College. In collaboration with prof. J. Herak, I organized the lectures and seminars for the course *Biophysics of membranes and lipoproteins* at Graduate School in Physics at Faculty of Sciences and Mathematics. I was mentor in several B.Sc. Theses dealing with Physics, for the medical students. I was also mentor and member of board for several M.Sc. and PhD Theses at Faculty of Sciences and Mathematics. I had written several textbooks. I published 26 scientific papers in the field of radiation

biophysics and biophysics of lipoproteins and about 40 abstracts at international conferences. I was invited to present several lectures in USA.
I am the member of the Society of teachers of University of Zagreb, Croatian Physical Society, Croatian Biophysical Society and Society for Free Radical Research-European Region.
I am married from 1972 and have two children: the son born in 1975 and the daughter born in 1978.

LIST OF PUBLICATIONS IN THE LAST FIVE YEARS:

J. N. Herak, N. Stojanović and D. Krilov: Probabilistic kinetic model of slow peroxidation of low-density lipoprotein: I. Theory, *Chem. Phys. Lipids* 129, 63-74 (2004).
D. Krilov, N. Stojanović and J. N. Herak: Probabilistic kinetic model of slow peroxidation of low-density lipoprotein: II. Experiments, *Chem. Phys. Lipids* 129, 75-84 (2004).
D. Krilov, M. Žuvić-Butorac, N. Stojanović and J.N. Herak: Oxidation-induced spin probes in low-density lipoprotein, *Croat. Chem. Acta* 77, 307-311 (2004).
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D. Krilov and J.N. Herak: Probabilistic kinetic model of slow oxidation of low-density lipoprotein. 3. Hydroperoxide-free initiation, *J. Chem. Inf. Model.* 45, 1616-1620 (2005)
M. Žuvić-Butorac, C.M. Herak-Kramberger, D. Krilov, I. Sabolić and J.N. Herak: EPR study of lipid phase in renal cortical membrane organelles from intact and cadmium-intoxicated rats, *Biochim. Biophys. Acta*, 1718, 44-52 (2005)
N. Stojanović, D. Krilov and J.N. Herak: Slow oxidation of high density lipoproteins as studied by EPR spectroscopy, *Free Rad. Res.*, 40, 135-140 (2006)

PUBLICATIONS QULIFYING FOR LECTURSHIP:

J. N. Herak, N. Stojanović and D. Krilov: Probabilistic kinetic model of slow peroxidation of low-density lipoprotein: I. Theory, *Chem. Phys. Lipids* 129, 63-74 (2004).
D. Krilov, N. Stojanović and J. N. Herak: Probabilistic kinetic model of slow peroxidation of low-density lipoprotein: II. Experiments, *Chem. Phys. Lipids* 129, 75-84 (2004).
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N. Stojanović, D. Krilov and J.N. Herak: Slow oxidation of high density lipoproteins as studied by EPR spectroscopy, *Free Rad. Res.*, 40, 135-140 (2006)
D. Krilov, M. Žuvić-Butorac, N. Stojanović and J.N. Herak: Oxidation-induced spin probes in low-density lipoprotein, *Croat. Chem. Acta* 77, 307-311 (2004).

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Born in Zagreb in year 1944. B.Sc. in Physics honoured at School of Natural Sciences, University of Zagreb in 1967; M.Sc. in Molecular biology at School of Natural Sciences, University of Zagreb in 1972 and Ph.D. in Physics, at School of Natural Sciences, University of Zagreb in 1982. Married and mother of two sons. The younger son was killed during the War.

Languages: English, German, French (passiv)

Visiting scientist at: Department of Biophysics, Portsmouth Politechnic, Portsmouth, England; Tata Institut, Bombay, India; Institute für Biophysikalische Chemie der J. W. Goethe Universität, Frankfurt, Germany; Institut Elektrohimii A. N. Frumkin, Akademija SSSR, Moskva; Institute für Röntgenfeinstructurforschung der Österreichische Akademie der Wissenschaften, Graz, Austria; Institut für Medizinische Biochemie, Karl-Franzens Universität Graz, Austria.

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domestic:2 invited lectures, 3 short lectures and about 23 posters

international: 1 invited lecture, 5 short lectures and about 30 posters

Scientific Projects – financed by The Ministry of science and technology RH; principal investigator in 4 projects; investigator in 3

- international cooperation; investigator on 5 projects

In Organizing Committee of 10 International Congresses

LIST OF PUBLICATIONS IN THE LAST FIVE YEARS:

Raguž, M. and Brnjas-Kraljević, J. Resolved Fluorescence Emission Spectra of PRODAN in Ethanol/Buffer Solvents J. Chem. Inf. Model. 45 (2005), 1636-1640.

Brnjas-Kraljević, J.; Kveder, M.; Pifat, G.; Pečar, S. and Schara, M. The ESR Kinetic Study of Lipid Phase in HDL Croat. Chem. Acta 74 (2001), 147-160.

PUBLICATIONS QULIFYING FOR LECTURSHIP:

J. Brnjas-Kraljević: Struktura materije i medicinska dijagnostika, Medicinska knjiga Zagreb, 2001

J. Brnjas-Kraljević, S. Maričić, V. Bračika: Self-association of oxyhaemoglobin. A nuclear magnetic relaxation study in H_2O/D_2O solutions, Biophys. Chem. 6, 191-200, 1977

J. Brnjas-Kraljević, S. Maričić: Hydratation and selfasociation of haemoglobin in solution, Biochem. Biophys. Res. Comm. 83, 1048-1054, 1977

J. Brnjas-Kraljević, G. Pifat, S. Maričić: Quaternary Structure, Hydration and Selfassociation of Hemoglobin. A Proton Magnetic Relaxation Study, Physiol. Chem. Phys. 11, 371-376, 1979

DATE OF THE LAST PROMOTION: 2002

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BIOGRAPHY: Greta Pifat-Mrzljak, senior scientist at the Rudjer Boskovic Institute and full professor at the Faculty of Natural Science, University of Zagreb, is the scientist in the field of molecular biophysics oriented towards solving the problems relevant to biomedical field of research.

Her professional experience is connected with Rudjer Boskovic Institute, the top multidisciplinary institution in Croatia, where she leads the research related to atherosclerosis. In her scientific curriculum she has several guest-professor positions in Germany, USA, Spain etc. The activities of Prof. dr. Greta Pifat-Mrzljak are concentrated along four main streamlines:

Scientific research is mostly connected with structure-function relationship of supramolecular assemblies − human lipoproteins studied by spectroscopic methods (NMR, EPR, FTIR, fluorescence) within national and international projects and published in 53 papers. In this framerwork she organized 25 symposia, delivered 61 invited lectures/seminars and edited 20 books. While acting as a Vice Minister of Science and Technology of Republic of Croatia she was initiator and the organizer of the "Referee Pool". 400 scientists of Croatian origin at world universities and institutions have agreed to join the referee pool for evaluation of scientific projects and institutions. In addition, she was organizer and editor-in-chief of the edition: «Scientific Research in Croatia» in which main scientific institutions and projects in Croatia are described.

Educational activities are performed a) at the Faculty of Natural Science, University of Zagreb, and Faculty of Medicine, University of Maribor, Slovenia, with undergraduate and postgraduate courses in Molecular Biophyiscs; b) at Rudjer Boskovic Institute as the mentor of undergraduate, M.Sc. and PhD. diplomas; c) by interantionally established International Summer Schools on Biophysics «Supramolecular Structure and Function» organized each third year in Croatia and sponsored by IUPAB and UNESCO starting from 1981. The Schools are attributed as Master classes of UNESCO with the participation of Nobel prize winners at each School (http:/www.irb.hr/biophysics). The proceedings of the Schools are published as books (8) by international publishers. Her excellent devotion to this field has been recognized and she has been elected in 2005 to the Council of IUPAB and engaged as organizer of IUPAB Task force in Biophysical education.

Promotion and popularization of science by initiating and organizing for the first time in Croatia the exhibition: "Centuries of Natural Sciences in Croatia: Theory and Application" in Muzejski prostor, Zagreb, 1996. where historical overview of Croatian scientists and their achievements, scientific institutions and relevant scientific infrastructure have been given in natural sciences together with medicinal, technical and biotechnical sciences from ancient times to nowadays illustrated with more than 2500 items and in collaboration with about 300 scientists. The exhibition resulted in two catalogues under the same title. First volume includes Croatian sciences from ancient time till 1874. (500 pages) and second volume from 1874. till nowadays (650 pages). She is engaged in the activities of relevant scientific societies, member of editorial boards, editor of Alumni Bulletin of University of Zagreb as well as engaged in many evaluation processes for projects and fellowships, etc.

Social activities of Prof. dr. Pifat-Mrzljak during the war period were very intensive. She

initiated and organized Nobel Laureates signing the Appeal for peace in Croatia. This action signed 127 Nobelist and is described in the book «Nobel Laureates for Peace in Croatia». In addition, she organized the acitivity «Scientists of Rudjer Boskovic Insitute: The Truth about Croatia» described in the book «Scientists against the war in Croatia». As a President of Croatian-Austrian Society, among other activities, she has organized three Crotian-Austrian Science Days based on bilateral scientific cooperation between Croatia and Austria; edited three books, translated from German, and is appointed as Councelor of Institute fuer Donauraum und Mitteleuropa in Vienna, Austria, by dr. E. Busek.

For all her acitivites Prof.dr. Greta Pifat-Mrzljak has been recognized and honored with distinguished awards:

1997 Annual State Award for Popularization and Promotion of Science
1998 Award "European Circle" for science, European Movement - Croatia
1998 State award Red Danice Hrvatske with Ruđer Bošković image for scientific endeveours
2002 Österreichische Ehrenkreuz für Wissenschaft und Kunst I Klasse (Austrian Honorary Award for Science and Culture I Order)
2004 Award of the Ruđer Bošković Institute Director for the 2004 Scientists of the Institute

LIST OF PUBLICATIONS IN THE LAST FIVE YEARS:

R. Chechin, D. Rengel, J.C.G. Milicua, F.M. Goñi, J.L. Arrondo, G. Pifat:
Early Stages of LDL Oxidation: Apolipoprotein B Structural Changes Monitored by Infrared Spectroscopy,
J. Lipid Res. 42, 778-782 (2001)

M. Kveder, G. Pifat, M. Gavella, V. Lipovac:
Effect of Gangliosides on the Cooper-Induced Oxidation of Human LDL,
Biophys. Chem. 104 (2003), 45-54

M. Kveder, A. Kriško, G. Pifat, H.J. Steinhoff:
The Study of Structural Accesibility of Free Thiol Groups in Human LDL,
BBA , 1631 (2003) 239-245

A. Kriško, M. Kveder, S. Pečar, G. Pifat:
The Study of Caffeine Binding to Human Serum Albumin,
CCA 78 (2005) 71-77

A. Kriško, I Piantanida, M. Kveder, G. Pifat:
Analysis of ß-carotene Absorbance for Studying Structural Properties of Human Plasma Low Density Lipoproteins
Analyt. Biochem. 331(2004), 177-182

M. Kveder, R. Rakoš, M. Gavella, V. Lipovac, G. Pifat, S. Pečar, M. Schara:
EPR Investigation of Cell Membrane Fluidity upon External Oxidative Stimulus
Applied Magn. Res. J. 27 (2004), 77-86

A. Kriško, M. Kveder, G. Pifat:
Effect of Caffeine on Oxidation Susceptibility of Human Plasma LDL
Clin. Chim. Acta 355 (2005), 47-53

D. Carić, V. Tomišić, M. Kveder, N. Galić, G. Pifat, V. Magnus, M. Šoškić
Absorption and Fluorescence Spectra of ring-substituted Indole 3-Acetic acids

Biophys.Chem. 111 (2004), 247-257
G. Pifat-Mrzljak, L. Juroš, V. Vizek-Vidović:
Broad Strokes of Recovery: The Case of Croatia,
Higher Education in Europe, UNESCO 29/3 (2004) 373-380
M. Gavella, M. Kveder, V. Lipovac, R. Rakoš, G. Pifat:
Trisaloganglioside GT1b Prevents Increase Sperm Membrane Molecular Ordering Induced by in vitro Lipid Peroxidation,
J. of Andrology, 26 (2005) 1-8
A. Kriško, I. Piantanida, M. Kveder, G. Pifat, A. Lee, J. Greilberger, D. Kipmen-Korgun, G. Jürgens:
The effect of Heparin on Structural and Functional Properties on Low Density Lipoproteins
M. Kveder, Ž. Marinić, A. Kriško, D. Vikić-Topić, G. Pifat:
Lipid-Protein Interaction in Human Plasma LDL Evidenced by Magnetic Resonance,
Chem.Phys. Lipids (2006), accepted
J. L.R. Arrondo, X. Coto, J.C.G. Millicua, M. Kveder, G. Pifat:
Interaction of Alcohols with Serum LDL. An Infrared Study
Chem.Phys.Lipids (2006), accepted

PUBLICATIONS QULIFYING FOR LECTURSHIP:
M. Kveder, G. Pifat, S. Pečar, M. Schara:
The EPR Characterization of Molecular Mobility in the Lipid Surface Layer of Human Serum Lipoproteins,
Chem. Phys. Lipids 70, 101-108 (1994).
S. Bañuelos, J.L. Arrondo, F.M. Goñi, G. Pifat:
Surface-core Relationships in Human Low Density Lipoprotein as Studied by Infrared Spectroscopy,
J. Biol. Chem. 270, 9191-9196 (1995).
M. Kveder, G. Pifat, B. Vukelić, S. Pečar, M. Schara:
Structural Aspects of Thiol-Specific Spin Labeling of Human Plasma LDL, Biopolymers, Biospectroscopy 57, 336-343 (2000).
M. Kveder, Ž. Marinić, A. Kriško, D. Vikić-Topić, G. Pifat:
Lipid-Protein Interaction in Human Plasma LDL Evidenced by Magnetic Resonance, Chem.Phys. Lipids (2006), accepted

DATE OF THE LAST PROMOTION: 1997.

LECTURER: Davor Juretić
AFFILIATION: Faculty of natural sciences, mathematics and kineziology
E-MAIL AND WEB ADDRESS: juretic@pmfst.hr , www.pmfst.hr/~juretic
BIOGRAPHY: I was born October 23, 1944 in Split, Croatia. My B. Sc. from theoretical physics in 1968 is from the University of Zagreb, Croatia, Faculty of natural sciences and mathematics (PMF). My M. Sc. in theoretical solid state physics is also from PMF, Zagreb in 1971. My Ph. D. in biophysics is from the Pennsylvania State University, PA, USA in 1976. From 1977 to 1985 I worked as assistant professor of physics at the University of Rijeka, Croatia. There, I continued with research in biophysics and membrane bioenergetics both experimentally and theoretically. My second period in the USA from 1985 to 1989 I spent working as guest associate scientist mostly at the National Institutes of Health, Bethesda, Washington DC. Research topics were secondary structure prediction for membrane proteins and bioenergetics of cytochrom c oxidase liposomes and rat liver mitochondria. After returning to Croatia I became associate professor of physics at the Faculty of natural sciences, mathematics and education, University of Split. In addition to high teaching load in general physics courses I had developed research topics in structural bioinformatics, bioenergetics, biophysics and thermodynamics of irreversible processes. In the year 1994 I received the „Ruđer Bošković“ national award. Next year I become full professor of physics. In 1996 I received national medal „Danica Hrvatska“ for scientific accomplishments. In 1997 my first book on bioenergetics (in Croat) was published in Zagreb by Informator. In 1998 that book received national award from „Matica Hrvatska“. In the same year, together with Dr. Damir Zucić from the University of Osijek, I created the first Croatian scientific server for the calculations in the field of structural bioinformatics. By the name of my native town of SPLIT this server still serves about 240 universities all over the world and scientists interested in secondary structure predictions for membrane proteins. In addition to general physics I maintain courses in biophysics, bioenergetics and bioinformatics at the University of Split and University of Zagreb both at undergraduate and graduate study programmes. From 2002 I am tenured full professor of physics. In 2004 and 2005 two of my graduate students wrote their masters thesis in biophysics and molecular biology under my supervision. During last several years I made available to students the complete typed text of my general physics lectures and introduced M. Sc. degree study of biophysics, which was not available previously at the University of Split. Currently (2006), I am working on constructing Ph. D. study programme in biophysics as joint undertaking of the University of Split and „Ruđer Bošković“ institute in Zagreb. Together with scientist from Split and from abroad I organized this year (2006) two international conferences in Split, one at the Mediterranean Institute for Life Sciences and another at our Faculty of natural sciences, mathematics and kinesiology. For more than 10 years, until year 2005, I was the member of the National Committee for Physics in Zagreb. I am in the second marriage now and have one son from the previous marriage. Due to childhood polio I have 100% handicap in both legs
LIST OF PUBLICATIONS IN THE LAST FIVE YEARS: D. Juretić, L. Zoranić and D. Zucić: “Basic charge clusters and predictions of membrane protein topology”. J. Chem. Inf. Coput. Sci. 42, 620-632

(2002).
D.Juretić i P. Županović: “Photosynthetic Models with Maximum Entropy Production in Irreversible Charge Transfer Steps”, Computational Biology and Chemistry 27, 541-553 (2003).
P. Županović and D. Juretić: "The chemical cycle kinetics close to the equilibrium state and electrical circuit analogy". Croatica Chemica Acta 77, 561-571 (2004).
P. Županović, D. Juretić and S. Botrić: "Kirchhoff's loop law and the Maximum entropy production principle". Phys. Rev. E70, 056108 (2004).
D. Zucić and D. Juretić: “Precise annotation of transmembrane segments with Garlic – a free molecular visualization program”, Croatica Chemica Acta 77, (2004).
S. Botrić, P. Županović i D. Juretić: “Is the stationary current distribution in a linear planar electric network determined by the principle of maximum entropy production”. Croatica Chemica Acta 78, 181-184 (2005).
D. Juretić, B. Lučić i N. Trinajstić: “Why focusing on bioinformatics?” Periodicum Biologorum 107, 379-383 (2005).
D. Juretić i P. Županović: “The free-energy transduction and entropy production in initial photosynthetic reactions” in Non-equilibrium Thermodynamics and the Production of Entropy, Eds. A. Kleidon i R.D. Lorenz, pp. 161-171, Springer,-Verlag, Berlin 2005.
P. Županović, D. Juretić and S. Botrić: “On the equivalence between Onsager’s principle of the least dissipation of energy and maximum entropy production principle”, FIZIKA A (Zagreb) 14, (2005); pp.89-96.

PUBLICATIONS QULIFYING FOR LECTURSHIP: 58 scientific publications in the CC periodicals that have been cited about
700 times.
1. Published book on bioenergetics (in Croatian):

D. Juretić: Bioenergetics – the work of membrane proteins, Informator, Zagreb, 1997.

DATE OF THE LAST PROMOTION: 2002

LECTURER: Sanja Tomić

AFFILIATION: Ruđer Bošković Institute

E-MAIL AND WEB ADDRESS: sanja.tomic@irb.hr,
http://www.irb.hr/hr/str/zfk/labs/LKBK/zaposlenici/sanja/

BIOGRAPHY:

ACADEMIC DEGREES OBTAINED
1982, B.Sc. Physics, Faculty of Natural Sciences and Mathematics University of Zagreb
1986, M.Sc. Physics, Faculty of Natural Sciences and Mathematics University of Zagreb
1993, Ph.D., Chemistry, University of Zagreb
PROFESSIONAL BACKGROUND
1982.-1986. Postgraduate student, Ruđer Bošković Institute - Laboratory for Nuclear Microanalysis (LNM), Zagreb, Croatia
1986.-1988. Scientific assistant, Ruđer Bošković Institute (LNM) Zagreb, Croatia
1989.-1993. Ph D. student, Ruđer Bošković Institute, X-ray Laboratory, Zagreb, Croatia.
1993.-1999. Higher assistant, Ruđer Bošković Institute, X-ray Laboratory, Zagreb, Croatia.
1999.-2003. Research Associate, Ruđer Bošković Institute, Laboratory for Chemical and Biological Crystallography (LCBC), Zagreb, Croatia
2003.- Higher Research Associate, "Ruđer Bošković Institute, (LCBC), Zagreb, Croatia
PERIODS OF STUDY AND RESEARCH ABROAD
1991./1992, Laboratory of Crystal and Structural Chemistry, Rijkuniversiteit, Utrecht, The Netherlands (NUFFIC fellowship).
1996.-1998. Postdoctoral student (Humboldt fellowship) in Rebecca Wade's group in EMBL-Heidelberg, Germany.

Employment - Ruđer Bošković Institute since 01.09.1982
Teaching activities at postgraduate Faculty of Science, University of Zagreb since 2001.

LIST OF PUBLICATIONS IN THE LAST FIVE YEARS:

Luić M , Tomić S., Leščić I., Ljubović E., Šepac D., Šunjić V., Vitale Lj., Saenger W., and Kojić-Prodić B., Complex of Burkholderia cepacia lipase with transition state analogue of 1-phenoxy-2-acetoxybutane, Eur. J. Biochem. 268 (2001), 3964-3973.
Tomić S., Luić M., Šepac D., Leščić I., Ljubović E., Kojić-Prodić B., Šunjić V., Enantioselectivity of the Pseudomonas cepacia lipase towards 2-methyl-3-(or 4)-arylalkanols: an approach based on stereoelectronic theory and the molecular modeling, In ´Rational Approaches to Drug Design: 13th European Symposium on Quantitative Structure-Activity Relationships' Eds. Holtje, H-D., Sippl,W. (2001), Prous Science S.A., Barcelona, pp69.-73. . ISBN: 84-8124-176-8.
Tomić S., and Kojić-Prodić B., A Quantitative Model for Predicting Enzyme Enantioselectivity: Application to Burkholderia cepacia lipase and 3-(Aryloxy)-1,2-propanediol Derivatives, Journal of Molecular Graphics and Modelling, 21 (2002), 3; 241-252.
Tomić S., Enantioselectivity of Burkholderia cepacia lipase towards primary and secondary alcohols: molecular modelling and 3D QSAR analysis, In "Designing Drugs and Crop Protectants: processes, problems and solutions" Eds. M. Ford, D. Livingstone, J. Dearden,

H. van de Waterbeemd (2003), Blackwell Publishing Ltd. Oxford, UK, pp326-328. ISBN: 1-4051-2516-0.

Bertoša B., Kojić-Prodić B., Ramek M., Piperaki S., Tsantili-Kakoulidou A., Wade R., and Tomić S. A new approach to predict the biological activity of molecules based on similarity of their interaction fields and the logP and logD values: application to auxins, The Journal of Chemical Information Computer Sciences 43 (2003), 1532-1541.

Tomić S., Bertoša B., Kojić-Prodić B. and Kolosvary I., Stereoselectivity of Burkholderia cepacia lipase towards secondary alcohols: molecular modelling and 3D QSAR approach, Tetrahedron: Asymmetry 15 (2004), 1163-1172.

Ramek M., and Tomić S., Ab initio Hartree-Fock investigation of 2-methyl-3-indole acetic acid, Croatica Chemica Acta 77 (2004), 371-376.

Wang T., Tomić S., Gabdouline R. R., Wade C. R., How optimal are the binding energetics of barnase and barstar?, Biophysical J. 87 (2004), 1618-1630.

Tumir L-M., Piantanida I., Juranović I., Meić Z., Tomić S., Žinić M., Recognition of homo-polynucleotides containing adenine by phenanthridinium bis-uracil conjugate in aqueous media, Chem. Comm. 20 (2005), 2561 – 2563.

Tomić S. and Ramek M., Quantum mechanical study of Burholderia cepacia lipase enantioselectivity, Journal of Molecular Catalysis B: Enzymatic, 38 (2006), 139-147.

PUBLICATIONS QULIFYING FOR LECTURSHIP:

See previous section + the following ones:

Luić M , Tomić S., Leščić I., Ljubović E., Šepac D., Šunjić V., Vitale Lj., Saenger W., and Kojić-Prodić B., Complex of Burkholderia cepacia lipase with transition state analogue of 1-phenoxy-2-acetoxybutane, Eur. J. Biochem. 268 (2001), 3964-3973.

Tomić S., and Kojić-Prodić B., A Quantitative Model for Predicting Enzyme Enantioselectivity: Application to Burkholderia cepacia lipase and 3-(Aryloxy)-1,2-propanediol Derivatives, Journal of Molecular Graphics and Modelling, 21 (2002), 3; 241-252.

Tomić S., Enantioselectivity of Burkholderia cepacia lipase towards primary and secondary alcohols: molecular modelling and 3D QSAR analysis, In ”Designing Drugs and Crop Protectants: processes, problems and solutions” Eds. M. Ford, D. Livingstone, J. Dearden, H. van de Waterbeemd (2003), Blackwell Publishing Ltd. Oxford, UK, pp326-328. ISBN: 1-4051-2516-0.

Bertoša B., Kojić-Prodić B., Ramek M., Piperaki S., Tsantili-Kakoulidou A., Wade R., and Tomić S. A new approach to predict the biological activity of molecules based on similarity of their interaction fields and the logP and logD values: application to auxins, The Journal of Chemical Information Computer Sciences 43 (2003), 1532-1541.

Tomić S., Bertoša B., Kojić-Prodić B. and Kolosvary I., Stereoselectivity of Burkholderia cepacia lipase towards secondary alcohols: molecular modelling and 3D QSAR approach, Tetrahedron: Asymmetry 15 (2004), 1163-1172.

Wang T., Tomić S., Gabdouline R. R., Wade C. R., How optimal are the binding energetics of barnase and barstar?, Biophysical J. 87 (2004), 1618-1630.

Tomić S. and Ramek M., Quantum mechanical study of Burholderia cepacia lipase enantioselectivity, Journal of Molecular Catalysis B: Enzymatic, 38 (2006), 139-147.

DATE OF THE LAST PROMOTION: 15.07.2003. higher research associate

NAME: Dr. sc. Selma Supek

ACADEMIC INSTITUTION: Department of Physics, Faculty of Science

E-MAIL: selma@phy.hr

URL: www.phy.hr, www.brain.hr

SHORT CURRICULUM VITAE:

Selma Supek received her undergraduate Diploma and M.Sc. degree in physics at the Department of Physics. In 1993 she defended at the same department her doctoral thesis on the functional organization of the human visual cortex and spatio-temporal resolution of the magnetoencephalography. Thesis research has been done at the Biophysics Group at Los Alamos National Laboratory where she worked for 6 years (NIH/NEI EY08610). After returning back to Zagreb she collaborates with laboratories for functional brain imaging at Los Alamos, Heidelberg, and Helsinki. She is principal investigator of the MZOS project number 0119265. She published 26 scientific papers in journal and proceedings that were cited more than 160 times,55 abstracts at international and national scientific meetings, she is editor of the NFSI-99 Proceedings and the Book of Abstracts, invited speaker at 13 international conferences and courses, she gave 18 seminars and public lectures, chaired *2nd Internatiional Symposium on Noninvasive Functional Source Imaging (NFSI-99)* (www.brain.hr) that was held in Zagreba September 3-7, 1999, she is director of a series of *Internationa course on Mind and Brain* (www.brain.hr) at the InterUniversity Centre in Dubrovnik, reviewer of 8 international journals and book series *IMIA Yearbook of Medical Informatics*, member of the scientific committees at several international meetings, and a member of 9 scientific societies (SFN, IBRO, OHBM, ISBET, HFD, HBD, HDN, HDMBT, ISACM). She coordinated and/or participated at several round tables on biophysics and functional brain imaging. She was a mentor and co-mentor of 20 diploma thesis. Currently she is mentor of two students (MSc and PhD) in the postgraduate program in physics – biophysics. She co-organized and, from 2003 till the end of 2004, co-directed the first University interdisciplinary postgraduate study *"Language Communication and Cognitive Neuroscience*" at the University of Zagreb and was a member of its Coordination committee. She is member of the Managment Board of the MedILS in Split.

LIST OF PUBLICATIONS IN THE LAST FIVE YEARS:

1. Supek, S.: Dynamic imaging of the working human brain, In: R. Magjarevic (ed.) IFMBE Proceedings - MEDICON 2001, IX Mediterranean Conference on Medical and Biological Engineering and Computing, Volume I, pp. 27-30, 2001.
2. Supek, S.: Dynamic MSI: Temporally constrained vs. temporally unconstrained models, Biomedizinische Technik, 46-S2, 233-236, 2001.
3. Supek, S.: Are temporally restricted models advantageous in MSI?, 7th Annual Meeting of the Organization for Human Brain Mapping, June 10-14, 2001, Brighton, UK, NeuroImage, 13, S262, 2001.
4. Supek, S.: Timecourse estimation in magnetoencephalography, Society for Neuroscience 32nd Annual Meeting, Orlando, Florida, November 2-7, 2002
5. Kult, A., Rupp, A., Pressnitzer, D., Scherg, M., and Supek, S.: MEG study on temporal asymmetry processing in the human auditory cortex. NeuroImage,

19(2),2003.

6. Sušac, A., Ilmoniemi, R., and Supek, S.: Faces in the visual oddball paradigm: A possible mismatch negativity. NeuroImage, 19(2), 2003.

7. Sušac A, Ilmoniemi RJ, Pihko E, Supek S. Neurodynamic Studies on Emotional and Inverted Faces in an Oddball Paradigm. Brain Topogr., 16(4):265-68, 2004.

8. Sušac A, Ilmoniemi RJ, Supek S. Early visual responses to upright and inverted faces. Proceedings of the 14th International Conference on Biomagnetism Biomag 2004, Halgren E, Ahlfors S, Hamalainen M, Cohen D. (Eds), Boston, 2004, pp 445-46

9. Susac, A., Ilmoniemi, J. R., Pihko E., Nurminen, J.., Supek, S.: Early dissociation of face and object processing: a magnetoencephalographic study (*NeuroReport., submitted)*

PUBLICATIONS QULIFYING FOR LECTURSHIP:

1. Aine, C.J., George, J.S., Medvick, P.A., Supek, S., Flynn, E.R., Bodis-Wallner, I.: Identification of multiple sources in transient evoked neuromagnetic responses. In: Advances in Biomagnetism, Plenum Press, New York, 1989, pp. 193-196.

2. Supek, S., Aine, C.J.: Simulation studies of multiple dipole neuromagnetic source localization: Model order and limits of source resolution. IEEE Transactions on Biomedical Engineering, 40:529-540, 1993.

3. Aine, C.J., Supek, S., George, J.S.: Temporal dynamics of visual-evoked neuromagnetic sources: Effects of stimulus parameters and selective attention. Intern. J Neuroscience, 80:79-104, 1995.

4. Aine, C.J., Supek, S., George, J.S., Ranken, D., Lewine, J., Sanders, J., Best, E., Tiee, W., Flynn, E.R., and Wood, C.C.: Retinotopic organization of human visual cortex: Departures from the classical model. Cerebral Cortex, 6:354-361, 1996.

5. Supek, S., Aine, C.: Spatio-temporal modeling of neuromagnetic data: I. Multi-source location vs timecourse estimation accuracy, Human Brain Mapping, 5: 139-153, 1997.

6. Supek, S., Aine, C.: Spatio-temporal modeling of neuromagnetic data: II. Multi-source resolvability of a MUSIC-based location estimator, Human Brain Mapping, 5: 154-167, 1997.

7. Supek, S., Aine, C.J.: Temporal dynamics of multiple neuromagnetic sources: Simulation and empirical studies. Biomedizinische Technik, 42-S1: 64-67, 1997.

8. Huang, M., Aine, C.J., Supek, S., Best, E., Ranken, D., Flynn, E.R.: Multi-start Downhill Simplex Method for Spatio-temporal Source Localization in Magnetoencephalography, Electroencephalography and Clinical Neurophysiology - Evoked Potentials, 108/1, 32-44, 1998.

9. Supek, S. (Ed.) The NFSI-99 Proceedings: 2nd International Symposium on Noninvasive Functional Source Imaging within the Human Brain and Heart, September 3-7, 1999, Zagreb, Croatia, Biomedizinische Technik, Vol. 44. Supplement 2, 1999

DATE OF THE LAST PROMOTION: January 1, 2005

NAME: Prof. Dr. Vladimir Paar

ACADEMIC INSTITUTION: University of Zagreb, Faculty of Science, Department of Physics and Croatian academy of sciences and arts, Zagreb, Croatia

E-MAIL AND URL: paar@hazu.hr, http://mahazu.hazu.hr/~paar/

SHORT CURRICULUM VITAE:

1942 born in Zagreb, Croatia
1965,1969,1971 B.Sc. in physics, M.Sc. in physics, Ph.D. in physics, University of Zagreb, Zagreb, Croatia
university and research career, employment:
1965-1975 research assistant, Inst. R. Boskovic, Zagreb
1975-1979 associated professor in physics, Faculty of Science, Physics Dept., University of Zagreb
1980- professor of physics, Faculty of Science, Physics Dept., University of Zagreb
1992- fellow of Croatian academy of sciences and arts
Professional training:
1969-1971 Niels Bohr Institute, University of Copenhagen, Denmark
Guest scientist or professor (shorter or longer visits, total duration five years)
Niels Bohr Institute, Copenhagen
FA Juelich, Germany
Free University, Natuurkundig Laboratorium, Amsterdam
Centre de Spectrometrie Nucleaire, Orsay
Lawrence Livermore National Laboratory, University of California Berkeley
Technical University Muenchen
Federal University of Rio de Janeiro
University of Sussex, Brighton
University of Maryland, College Park
Scientific collaboration: see relevant references on personal web page
Research topics:
theoretical nuclear physics, nuclear field theory, nuclear level density, quantum chaos, nonlinear dynamics and classical chaos, transient chaos, biological oscillators, encryption methods, robotics, gastroenterology, computational genomics, higher order repeats

LIST OF PUBLICATIONS IN THE LAST FIVE YEARS:

1. V. Paar, N. Pavin, A. Rubčić, J. Rubčić, N. Trinajstić, Scale invariant power law and fractality for molecular weights, Chemical Physics Letters 336 (2001) 129-134.
2. A. Gizon, J. Timar, J. Gizon, B. Weiss, D. Barneoud, C. Foin, J. Genevey, F. Hannachi, C.F. Liang, A. Lopez-Martens, P. Paris, B.M. Nyako, L. Zolnai, J.C. Merdinger, S. Brant, V. Paar, Low-lying levels and collective bands in doubly-odd Cs-124, Nuclear Physics A694 (2001) 63-102.
3. H. Buljan, V. Paar, Many-hole interactions and the average lifetimes of chaotic transients that precede controlled periodic motion, Physical Review E 6306 (2001) 6205-6211.
4. V. Paar, N. Pavin, M. Rosandić, Link between truncated fractals and coupled oscillators in biological systems, Journal of Theoretical Biology 212 (2001) 47-56.
5. J. Timar, J. Gizon, A. Gizon, D. Sohler, B. M. Nyako, L. Zolnai, Gh. Cata-Danil, D.

Bucurescu, A. J. Boston, D. T. Joss, E. S. Paul, A. T. Semple, C. M. Parry, S. Brant, V. Paar, Three-quasiparticle rotational bands in 101Rh: IBFBPM description and signature inversion of the pi g9/2 orbital, Nuclear Physics A696 (2001) 241-271.

6. Patent: V. Paar, N. Paar, N. Pavin, Encryption method using nonrepetitive assignment of symbols to chaotic solutions of nonlinear robotic equation, Državni zavod za intelektualno vlasništvo, Patent HR P980607A A2 (30.04.2001).
7. V. Paar, N. Paar, N. Pavin: "Encryption method using nonrepetitive binary ASCII code depending on odd-even signature of number of digits in chaotic solutions of nonlinear robotic equation " (Državni zavod za intelektualno vlasništvo, P990240A, 381-03/99-01/1156, 559-03-99-01).
8. V. Paar, N. Paar, N. Pavin: "Encryption method of arrays of symbols with selective transformation of binary ASCII code using chaotic solutions of nonlinear Duffing equation" (Državni zavod za intelektualno vlasništvo, P990248A, 381-03/99-01/1195, 559-03-99-01).
9. H. Buljan, V. Paar, Parry measure and the topological entropy of chaotic repellers embedded within chaotic attractors, Physica (Amsterdam) D 2994 (2002) 1-13.
10. V. Paar, N. Pavin, A. Rubčić, J. Rubčić, Fractality of abundance-weighted N,Z-chart of isotopes and systematics of atomic weights of chemical elements, Croatica Chemica Acta 75 (2002) 121-129.
11. V. Paar, N. Pavin, A. Rubčić, J. Rubčić, Power laws and fractal behavior in nuclear stability, atomic weights and molecular weights, Chaos, Solitons and Fractals (Cambridge) 14 (2002) 901-916.
12. H. Buljan, V. Paar, Naturally invariant measure of chaotic attractors and the conditionally invariant measure of embedded chaotic repellers, Physical Review E 6503(2002) 036218
13. M. Rosandić, V. Paar, I. Basar, Key-string segmentation algorithm and higher-order repeat 16mer (54 copies) in human alpha satellite DNA in chromosome 7, Journal of theoretical Biology (Cambridge) 221 (2003) 29-37.
14. M. Rosandić, V. Paar, M. Glunčić, I. Basar, N. Pavin, Key-string algorithm – Novel approach to computational analysis of repewtitive sequences in human centromeric DNA, Croatian Medical Journal 44 (2003) 386-406.
15. V. Paar, N. Pavin, Regularity-partial chaos – regularity transition and overlapped KAM scenarios in a conservative system of two linearly coupled double-well oscillators, Modern Physics Letters B 17 (2003) 941-948.
16. V. Paar, N. Pavin, I. Basar, M. Rosandić, I. Luketin, S. Durajlija Žinić, Spectral densities and frequencies in the power spectrum of higher order repeat alpha satellite in human DNA molecule, Croatica Chemica Acta 77 (2004) 73-81.
17. V. Paar, N. Pavin, Overlapping of two truncated crisis scenarios: Generator of peaks in mean lifetimes of chaotic transients, Physical Review E 68 (2003) 036222 1-6.
18. V. Paar, N. Pavin, M. Rosandić, M. Glunčić, I.Basar, R. Pezer, S. Durajlija Žinić, ColorHOR – novel graphical algorithm for fast scan of alpha satellite higher-order repeats and HOR annotation for GenBank sequence of human genome, Bioinformatics 21 (7) (2005) 846-852.

M. Rosandić, V. Paar, I. Basar, M. Glunčić, N. Pavin, KSA for CENP-B box and pJalpha motif distributions in human chromosomes, Chromosome Res. 2006 (accepted for publication).

PUBLICATIONS QULIFYING FOR LECTURSHIP:

1. M. Rosandić, V. Paar, I. Basar, Key-string segmentation algorithm and higher-order

repeat 16mer (54 copies) in human alpha satellite DNA in chromosome 7, Journal of theoretical Biology (Cambridge) 221 (2003) 29-37.

2. M. Rosandić, V. Paar, M. Glunčić, I. Basar, N. Pavin, Key-string algorithm – Novel approach to computational analysis of repewtitive sequences in human centromeric DNA, Croatian Medical Journal 44 (2003) 386-406.
3. V. Paar, N. Pavin, Regularity-partial chaos – regularity transition and overlapped KAM scenarios in a conservative system of two linearly coupled double-well oscillators, Modern Physics Letters B 17 (2003) 941-948.
4. V. Paar, N. Pavin, I. Basar, M. Rosandić, I. Luketin, S. Durajlija Žinić, Spectral densities and frequencies in the power spectrum of higher order repeat alpha satellite in human DNA molecule, Croatica Chemica Acta 77 (2004) 73-81.
5. V. Paar, N. Pavin, Overlapping of two truncated crisis scenarios: Generator of peaks in mean lifetimes of chaotic transients, Physical Review E 68 (2003) 036222 1-6.
6. V. Paar, N. Pavin, M. Rosandić, M. Glunčić, I.Basar, R. Pezer, S. Durajlija Žinić, ColorHOR – novel graphical algorithm for fast scan of alpha satellite higher-order repeats and HOR annotation for GenBank sequence of human genome, Bioinformatics 21 (7) (2005) 846-852.
7. M. Rosandić, V. Paar, I. Basar, M. Glunčić, N. Pavin, KSA for CENP-B box and pJalpha motif distributions in human chromosomes, Chromosome Res. 2006 (accepted for publication).

Position of full professor at University of Zagreb, giving different lecture/courses in general physics, nonlinear dynamics, use of computational methods as well as specialized lectures in graduate and postgraduate study programs

DATE OF THE LAST PROMOTION: Full professor, from 1987, permanent election

LECTURER: Ana-Sunčana Smith

AFFILIATION: Universität Stuttgart, II. Institut für Theoretische Physik

E-MAIL AND WEB ADDRESS**:** smith@theo2.physik.uni-stuttgart.de

BIOGRAPHY:

- Diploma in physics, PMF Zagreb, 2001.
- PhD in physics, Technische Universität München, 2004.
- **Postdoctoral fellow at the I. Institut für Theoretische Physik, Universität Nürnberg-Erlangen, Germany 2005-2006**
- **Postdoctoral fellow at the School of Chemistry, University of Sydney, Australia, 2005.**

LIST OF PUBLICATIONS IN THE LAST FIVE YEARS:

1. A.-S. Smith, E. Sackmann and U. Seifert: Effects of a Pulling Force on the Shape of a Bound Vesicle. *Europhys. Lett.* **64**, 281-287 (*2003*).

2. A-S. Smith, E. Sackmann and U. Seifert: Pulling Tethers from Adhered Vesicles. *Phys. Rev. Lett,* **92**, 208101 (*2004*).

3. A.-S. Smith, U. Seifert: Effective Adhesion Strength of Specifically Bound Vesicles. *Phys. Rev. E.* **71**, 61902 (*2005*).

4. A.-S. Smith and U. Seifert: Force-induced de-adhesion of specifically bound vesicles: Strong adhesion in competition with tether extraction. *Langmuir*, **21**, 11357-11367 (*2005*). Cover page of the November 2005 issue.

5. A.-S. Smith: The Total Solute-Water Correlation Function For Lennard-Jones Particles. *Fizika A,* **14**, 187-194, (*2005).*

6. A.-S. Smith, B. Lorz, U. Seifert, E. Sackmann: Antagonist induced unbinding of specifically adhered vesicles. *Biophys. J.,* **90**, 1064-80 (*2006*).

7. A.-S. Smith, B. Lorz, S. Goennenwein and E. Sackmann: Force-controlled equilibria of specific vesicle-substrate adhesion. *Biophys. J.* **90**, L52-L54 (2006).

8. A.-S. Smith, U. Seifert: Vesicles as a model for controlled (de-)adhesion of cells: a thermodynamic approach. *Soft Matter*. **3**, 275-289 (2007).

9. B.Lorz, A.-S. Smith, C. Gege and E. Sackmann: Adhesion of Giant Vesicles Mediated by Weak Binding of Sialyl-Lewis^X to E-selectin: Influence of Lipopolymers. *Accepted in Langmuir*.

PUBLICATIONS QULIFYING FOR LECTURSHIP:

All publications are on topics in soft matter physics and biophysics. Out of 9 publications, 8 appeareed in the highest quality journalns in the field. Principal investigator on an expanding research project on cell mimetics. 14 contributions to international scientific conferences, out of which 9 invited lectures, including the invited talk at the 2007 March meeting of the Deutsche Physicalische Geseltschaft. 15 invitations for institutional talks. Teaching assistant experiences in the course of Biophysics at the Technische Universität München. Fluent in English and French, active knowledge of German.

DATE OF THE LAST PROMOTION: Research associate since September 2006.

LECTURER: Marina Ilakovac Kveder

AFFILIATION: Ruđer Bošković Institute

E-MAIL AND WEB ADDRESS: kveder@irb.hr, www.irb.hr

BIOGRAPHY*:*

Date and place of birth: March 5, 1958, Zagreb, Croatia
Family status: married

Education:

1981. graduated physics at the Faculty of Science, University of Zagreb;
1985. master degree in medical physics at the Faculty of Science, University of Zagreb;
1988. Ph.D. degree in physics at the Faculty of Science, University of Zagreb;

Professional training:

1986.-1988. J.Stefan Institute, University of Ljubljana: application of nuclear magnetic resonance (NMR) and electron paramagnetic resonance (EPR) methods in studying biological systems;

1992.-1994. Alexander von Humboldt postdoctoral fellowship at Goethe University in Frankfurt, Germany, with the project:Multidimensional NMR spectroscopy of the bovine heart fatty acid binding protein;

Research and professional experience:

1982. employed as a postgraduate student at Ruđer Bošković Institute;
1985. research assistant;
1988. scientific assistant;
1998. research associate;
2003. senior research associate.
2006. senior scientist

LIST OF PUBLICATIONS IN THE LAST FIVE YEARS:

1. S.Antolić, M.Kveder, B.Klaić, V.Magnus, B.Kojić-Prodić: Recognition of the folded conformation of of plant hormone (auxin, IAA) conjugates with glutamic and aspartic acids and their amides, J. Mol. Struct. 560 (2001) 223-237;
2. M.Kveder, G.Pifat, M.Gavella, V.Lipovac:Effect of gangliosides on the copper-induced oxidation of human low-density lipoproteins, Biophysical Chemistry 104 (2003) 45-54;
3. M.Kveder, A.Kriško, G.Pifat, H.-J. Steinhoff: The study of structural accessibility of free thiol groups in human low-density lipoproteins, Biochimica et Biophysica Acta 1631(3) (2003) 239-245;
4. A.Kriško, I.Piantanida, M.Kveder, G.Pifat: The analysis of β-carotene absorbance for studying structural properties of human plasma low density

lipoproteins, Analytical Biochemistry 331 (2004) 177-182;
5. D.Carić, V.Tomišić, M.Kveder, N.Galić, G.Pifat, V. Magnus, M.Šoškić: Absorption and fluorescence spectra of ring-substituted indole-3-acetic acids, Biophysical Chemistry 111 (2004) 247-257;
6. M.Kveder, R.Rakoš, M.Gavella, V.Lipovac, G.Pifat, S.Pečar, M.Schara: The EPR investigation of membrane fluidity upon external oxidative stimulus, Applied Magnetic Resonance 27 (2004) 77-86;
7. A.Kriško, M.Kveder, G.Pifat: Effect of caffeine on oxidation susceptibility of human plasma low density lipoproteins, Clinica Chimica Acta 355 (2005) 47-53;
8. A.Kriško, M.Kveder, S.Pečar, G.Pifat: A study of caffeine binding to human serum albumin, Croatica Chemica Acta 78(1) (2005) 71-77;
9. M. Gavella, M. Kveder, V. Lipovac, R. Rakoš, G. Pifat: Trisialoganglioside GT1b prevents increase in sperm plasma membrane molecular ordering induced by in vitro lipid peroxidation, J. Androl. 26(6) (2005) 724-731;
10. M.Kveder, D.Merunka, A.Ilakovac, J.Makarević, M.Jokić, B.Rakvin: Direct evidence for the glass-crystalline transformation in solid ethanol by means of a nitroxide spin probe. Chemical Physics Letters 419 (2005) 91-95;
11. A.Kriško, I.Piantanida, M.Kveder, G.Pifat, Anthony Lee, Joachim Greilberger, Dijle Kipmen-Korgun and Günther Jürgens: The effect of heparin on structural and functional properties of low density lipoproteins. Biophysical chemistry 119 (2006) 234-239;
12. M.Kveder, M.Andreis, J.Makarević, M.Jokić, B.Rakvin: The EPR study of low molecular weight organogels by means of a nitroxide spin probe. Chemical Physics Letters 420 (2006) 443-447.

PUBLICATIONS QULIFYING FOR LECTURSHIP:

1. M.Kveder, G.Pifat, A. Jelovečki, B. Klaić, S.Pečar, M.Schara: The EPR study of LDL perturbed by alcohols with different molecular architecture, Alcohol. 21 (2000) 1-7;
2. M.Kveder, G.Pifat, B.Vukelić, S.Pečar, M.Schara: Structural aspects of thiol-specific labeling of human plasma LDL, Biopolymers (Biospectroscopy). 57 (2000) 336-343;
3. E.Vass, M.Hollosi, M.Kveder, B.Kojić-Prodić, M.Čudić, Š.Horvat: Spectroscopic evidences of β-turn in N-glycated peptidomimetics related to leukine-enkephalin, Spectrochimica Acta A, 56 (2000) 2479-2489;
4. M.Kveder, A.Kriško, G.Pifat, H.-J. Steinhoff: The study of structural accessibility of free thiol groups in human low-density lipoproteins, Biochimica et Biophysica Acta 1631(3) (2003) 239-245;
5. M.Kveder, D.Merunka, A.Ilakovac, J.Makarević, M.Jokić, B.Rakvin: Direct evidence for the glass-crystalline transformation in solid ethanol by means of a nitroxide spin probe. Chemical Physics Letters 419 (2005) 91-95;
6. M.Kveder, M.Andreis, J.Makarević, M.Jokić, B.Rakvin: The EPR study of low molecular weight organogels by means of a nitroxide spin probe. Chemical Physics Letters 420 (2006) 443-447.

DATE OF THE LAST PROMOTION:

24.2.2006. senior scientist

25.5.2006. assistant professor

LECTURER: Boris Rakvin

AFFILIATION: Ruđer Bošković Institute

E-MAIL AND WEB ADDRESS: rakvin@irb.hr, www.irb.hr

BIOGRAPHY:

WORK EXPERIENCE

• Dates (from – to) 1972-.
Name and address of employer Ruđer Bošković Institute, Zagreb
Type of business or sector Senior scientist
Occupation or position held Head of Laboratory for Magnetic Resonances, Division of Physical Chemistry at Ruđer Bošković Institute, Zagreb
Full professor at the Faculty of Veterinary Medicine, University of Zagreb
Main activities and responsibilities Molecular physics, physics of the solid state and EPR spectroscopy
Education in physics biophysics and medical physics

EDUCATION

Date 1980
Place of education Zagreb
Name and type of organisation providing education Faculty of Natural Science, University of Zagreb
Title or qualification awarded Ph.D. in Physics

TRAINING

Year 1981-82
Place of training Tuscaloosa, Alabama, USA
Name and type of organisation providing training University of Alabama
Principal subjects/Occupational skills covered ESR, ENDOR spectroscopi
Year 1984
Place of training Regensburg, Germany
Name and type of organisation providing training Universität Regensburg
Principal subjects/Occupational skills covered Paramagnetic centers in organic crystals
Year 1985-86, 1988, 1989, 1990, 1992, 1994
Place of training Morgantown, WV, USA
Name and type of organisation providing training West Virginia University
Principal subjects/Occupational skills covered Ferroelectrics, ESR, ENDOR spectroscopy

Year 1991
Place of training Homburg/Sarr, Germany
Name and type of organisation providing training Universität des Saarlandes
Principal subjects/Occupational skills covered Pulsed ESR spectroscopy
Year 2000

Place of training Ljubljana, Slovenia
Name and type of organisation providing training Institute Jožef Stefan
Principal subjects/Occupational skills covered Pulsed ESR relaxation times in organic crystals
Year 2001, 2002, 2003
Place of training Tallahassee, Florida, USA
Name and type of organisation providing training Florida State University
Principal subjects/Occupational skills covered Molecular Magnets

LIST OF PUBLICATIONS IN THE LAST FIVE YEARS:

1. (105) Tkalcec E, Grzeta B, Popovic J, Ivankovic, Rakvin B, Structural studies of Cr-doped mullite derived from single-phase precursors, *J. Phys.Chem. Solids* 67 (2006); 828-835
2. (104) Maltar-Strmecki N, Rakvin B, Evidence for disorder in L-alanine lattice detected by pulsed-EPR spectroscopy at cryogenic temperatures, *Spectrochim. Acta, Part A – Mol. and Biomol. Spectr.* 63 (4) (2006); 784-787
3. (103) Kveder M, Andreis M, Makarević J, Jokić M, Rakvin B, EPR study of low molecular weight organogels by means of a nitroxide spin probe, *Chem.Phys. Lett.*. 420 (2006); 443-447
4. (102) Kveder M, Merunka D, Ilakovac Amon, Makarević J, Jokić M, Rakvin B, Direct evidence for the glass-crystalline transformation in solid ethanol by means of a nitroxide spin probe. *Chem. Phys. Lett*. 419 (2006); 91-95.
5. (101) Rakvin B, Žilić D, Dalal NS, Spin-echo EPR spin-probe measurement of the microsecond-range magnetic field fluctuations near the surface of crystals of the nanomagnet Mn_{12}-Ac: *Solid State Commun*. 136 (2005), 518-522.
6. (100) Rakvin B, Maltar-Strmecki N, Study of the first stable L-alanine paramagnetic center by 2D-HYSCORE spectroscopy: Detection of ^{14}N hyperfine and quadrupole splitting; *Chem. Phys. Lett*. 415 (2005); 3; 375-380.
7. (99) Maltar-Strmecki N, Rakvin B, Thermal stability of radiation-induced free radicals in gamma-irradiated L-alanine single crystals; *Appl. Radiat. Isotopes.* 63 (2005), 3; 375-380.
8. (98) Bermanec V, Wegner R, Kniewald G, Rakvin B, Palinkas LA, Rajic M, Tomasic N, Furic K, The role of uranium(V) ion in the chemical composition of meta-autunite from pegmatites of Quintos de Baixo, Brazil. *Neues Jahrbuch fur Mineralogie-Abhandlungen.* 181 (2005), 1; 27-38.
9. (97) Merunka D, Rakvin B, Displacive and order-disorder behavior of KDP-type ferroelectrics on the local scale. *Solid State Commun*. 129 (2004), 6; 375-377.
10. (96) Merunka D, Rakvin B, Correlation between hydrogen bond geometry and phase transition temperature in KDP-type ferroelectrics *Chem.Phys.Lett.* 393 (2004), 4-6; 558-562.
11. (95) Merunka D, Rakvin B, Modified strong dipole-proton coupling model and local properties of EPR probe in the KDP-type ferroelectrics. *Appl. Magn. Reson*. 27 (2004), 215-224.
12. (94) Merunka D, Rakvin B, Development and application of the modified strong dipole-proton coupling model for KDP-type crystals. *Ferroelectr*. 313 (2004), 99-103.
13. (93) Rakvin B, Maltar-Strmečki N, Ramsey C, Dalal NS, Heat capacity and electron spin echo evidence for low frequency vibrational modes and lattice disorder in L-alanine at

cryogenic temperatures. *J. Chem. Phys*. 120 (2004), 14; 6665-6673.

14. (92) Rakvin B, Žilić D, Dalal NS, North JM, Cevc P, Arčon D, Zadro K, An EPR method for probing surface magnetic fields, dipolar distances, and magnetization fluctuations in single molecule magnets. *Spectrochim. Acta, Part A*. 60 (2004), 1241-1245.
15. (91) Kniewald G, Rakvin B, Bermanec V, Tomašić N, EPR determination of uranium(V) in meta-autunite, *Lithos* 73 (2004), (1-2): S58-S58 S
16. (90) Rakvin B, Žilić D, North JM, Dalal NS, Probing magnetic fields on crystals of the nanomagnet Mn12-acetate bz electron paramagnetic resonance. *J. Mag. Res*. 165 (2003); 260-264.
17. (89) Cage B, Cotton FA, Dalal NS, Hillard EA, Rakvin B, Ramsey CM, EPR probing of bonding and spin localization of the doublet-quartet states in a spin frustrated equilateral triangular lattice: Cu-3(O2C16H23)(6) center dot 1.2C(6)H(12). *Comptes Rendus Chimie.* 6 (2003), 1; 39-46.
18. (88) Cage B, Cotton FA, Dalal NS, Hillard EA, Rakvin B, Ramsey CM, Observation of symmetry lowering and electron localization in the doublet-states of a spin-frustrated equilateral triangular lattice: Cu- 3(O2C16H23)center dot 1.2C(6)H(12). *J. Am. Chem. Soc.* 125 (2003), 18; 5270-5271.
19. (87) Ramsey CM, Hillard EA, Rakvin B, Dalal NS, Cage B, Cotton FA, EPR probing of the doublet and quartet spin states in a rigorously equilateral Cu(II) triangle: a textbook model of spin-frustration. *Abstracts of papers of the American Chemical Society* 225 (2003), U151-U151 813-INORG
20. (86) Merunka D, Rakvin B, Molecular dynamics simulation of the soft mode for hydrogen-bonded. *Ferroelect*. *Phys. Rev. B* 66 (2002), 17; art no.174101.
21. (85) Maltar-Strmecki N, Rakvin B, Cevc P, Arčon D, Relaxation mechanism in gamma–ray-irradiated L-alanine studied by transfer Saturation EPR and pulse EPR. *Appl. Magn. Reson*. 22 (2002), 4; 551-560.
22. (84) Ramsey CM, Rakvin B, Cage B, Dalal NS, Hillard EA, Cotton FA, Spin frustration in an equilateral copper triangle investigated through EPR spectroscopy, *Abstracts of papers of the Maerican Chemical Society* 223 308-Phys (2002)
23. (83) Gil AM, Alberti E, Perreira C, Goodfellow BJ, Rakvin B, A fast MAS H-1 NMR study of amino acids and proteins *J. Mol. Struct*. 602 (2002), 357-266
24. (82) Pivac B, Rakvin B, Tonini R, Corni F, Ottaviani G, Reply to comments on ′EPR study of He-implanted Si′ by Pivac, B. Rakvin, R.Tonini, F. Corni, G. Ottaizani, Published in Mater. Sci. Eng0. B73 (200) 60-63. Written by M. Kakazey, M. Vlasova, and J. G. Gonzales-Reply to discussion *Mat. Sci. Eng.B-Solid* 90 (2002), 1-2; 211-212.
25. (81) Mikšić V, Pivac B, Rakvin B, Zorc H, Corni F, Tonini R, Ottaviani G, DLTS and EPR study of defects in H implanted silicon. *Nucl. Instrum. Meth. B* 186 (2002), 36-40.
26. (80) Rakvin B, Maltar-Strmecki N, Cevc P, Arčon D, A pulse EPR study of longitudinal relaxation of the stable radical in gamma-irradiated L-alanine. *J. Magn. Reson.* 152 (2001), 1; 49-155.
27. (79) Grozdanić D, Milat O, Rakvin B, Pivac B, Slaoui A, Monna R, Grain boundary defects in RTCVD polycrystalline silicon for solar cells. *Vacuum* 61 (2001), 2-4; 257-262.

PUBLICATIONS QULIFYING FOR LECTURSHIP:

1. Maltar-Strmecki N, Rakvin B, Evidence for disorder in L-alanine lattice detected by pulsed-EPR spectroscopy at cryogenic temperatures, *Spectrochim. Acta, Part A – Mol. and Biomol. Spectr.* 63 (4) (2006); 784-787

2. Kveder M, Andreis M, Makarević J, Jokić M, Rakvin B, EPR study of low molecular weight organogels by means of a nitroxide spin probe, *Chem.Phys. Lett.*. 420 (2006); 443-447

3. Kveder M, Merunka D, Ilakovac Amon, Makarević J, Jokić M, Rakvin B, Direct evidence for the glass-crystalline transformation in solid ethanol by means of a nitroxide spin probe. *Chem. Phys. Lett*. 419 (2006); 91-95.

4. Rakvin B, Maltar-Strmecki N, Study of the first stable L-alanine paramagnetic center by 2D-HYSCORE spectroscopy: Detection of ^{14}N hyperfine and quadrupole splitting; *Chem. Phys. Lett*. 415 (2005); 3; 375-380.

5. Maltar-Strmecki N, Rakvin B, Thermal stability of radiation-induced free radicals in gamma-irradiated L-alanine single crystals; *Appl. Radiat. Isotopes.* 63 (2005), 3; 375-380.

6. Rakvin B, Maltar-Strmečki N, Ramsey C, Dalal NS, Heat capacity and electron spin echo evidence for low frequency vibrational modes and lattice disorder in L-alanine at cryogenic temperatures. *J. Chem. Phys*. 120 (2004), 14; 6665-6673.

7. Rakvin B, Žilić D, Dalal NS, North JM, Cevc P, Arčon D, Zadro K, An EPR method for probing surface magnetic fields, dipolar distances, and magnetization fluctuations in single molecule magnets. *Spectrochim. Acta, Part A*. 60 (2004), 1241-1245.

8. Maltar-Strmecki N, Rakvin B, Cevc P, Arčon D, Relaxation mechanism in gamma–ray-irradiated L-alanine studied by transfer Saturation EPR and pulse EPR. *Appl. Magn. Reson*. 22 (2002), 4; 551-560.

9. Rakvin B, Veksli Z, A double-modulation ESR study of internal dynamics in the glassy polymer matrix detected by a nitroxide spin probe. *J. Magn. Reson*. 125 (1997), 1; 28-33.

10. Rakvin B, Double modulation ESR study of irradiated alanine. *Apll. Radiat. Isotopes* 47 (1996), 11-12; 1251-1255.

11. Rakvin B, Improvement of sensitivity in the Alanine/ESR dosimetry. *Apll. Radiat. Isotopes* 47 (1996), 5-6; 525-528.

12. Valić S, Rakvin B, Veksli Z, Grubišić-Gallot Z, Slow molecular-motion in uniaxsially stretched poly(ethylmethacrylate) as observed by double-modulation electron-spin-resonance. *Polym. Bull*. 34 (1995), 2; 235-242.

DATE OF THE LAST PROMOTION:

2004. reelected as senior scientist

1997. full professorship

LECTURER: Dražen Vikić-Topić

AFFILIATION: Ruđer Bošković Institute (RBI), NMR Center

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BIOGRAPHY:
Birthdate: May 4, 1954 in Zagreb, Croatia; married, three children
1979 - Ruđer Bošković Institute (RBI) - NMR facility; Lab for molecular spectroscopy, Zagreb
1996 - Head of NMR Center, RBI
1998.-2002. Senior Research Associate (Assoc. Prof. at RBI)
2000 - Assoc. Professor of Chemistry at University of Zagreb
2002 - Senior Scientist (Full Prof. at RBI)
2002.-2004. Adviser of Director for Organizational Issues
2004.-2005. Chairman of Scientific Council of RBI
2005.- Adviser of Director for Science and Education
Education:
1978, B. Sc. in Inorganic Chemistry, Faculty of Science, Zagreb
1986, M. Sc. in Theoretical and Physical-organic Chemistry, Faculty of Science, Zagreb
1988, Ph. D. in NMR spectroscopy, Faculty of Science, Zagreb
Research Experience:
1989, postdoc, Institute "B. Kidrič", prof. Jurka Kidrič, Ljubljana;
1990, 3 months Indian Institute of Science, prof. C. L. Khetrapal, Bangalore, India;
1990, 2 months NIH (National Institutes of Health), prof. E. D. Becker, Bethesda, MD, USA
1991 - 1993, Visiting Associate with prof. E. D. Becker, NIH, Bethesda, MD, USA
1993 - 1994, Senior Research Assoc. with prof. S. I. Macura, Mayo Clinic, Rochester, Minnesota, USA
1999, 3 months, Visiting Professor, with prof. J. Plavec, National Institute of Chemistry, NMR Centre Ljubljana, Slovenia
Scientific activities:
86 CC/SCI papers, 3 booklets on NMR, 5 professional papers and 4 popular scientifical papers
Collaborations: Austria, Slovenia, USA, Hungary, Macedonia, Czech Republic.
Twenty three lectures abroad and more than thirty domestic lectures
Teaching activities:
1985 - 1987, Depart. of General and Inorganic Chem., Faculty of Science, Univ. Zagreb
1996 - Graduate Studies in Analytical Chem., Faculty of Science, University of Zagreb
1996 - Graduate Studies in Organic Chem., Faculty of Science, University of Zagreb
1999 - Faculty of Food Science & Biotechnology
2000 - School of Health Studies, University of Zagreb
2002 - Graduate Studies in Environmental Chem., Faculty of Technology, University of Osijek
2004 - Graduate Studies in Medicinal Chem., Medical School, University of Zagreb
Organizational activities:
1991 Member of Org. Committee of European Congress on Molecular Spectroscopy, Zagreb

1993 - Member of Org. Committee of Math/Chem/Comp Conferences, IUC, Dubrovnik
1997 – 2005 Co-director of Math/Chem/Comp Conferences, IUC, Dubrovnik
2000, 2003, 2005 Co-director of Central Europe Chemical Meeting, Varaždin
1996, 1998 - 2005 Guest-editor of Croatica Chemica Acta; 1999 - Member of Editorial Board
2003 - Assistant Editor of Croatica Chemica Acta
1997 - 1998 Moderator of Seminars of Croatian Chemical Society (CCS); 2000 - Head of Section for Pure and Applied Spectroscopy of CCS; 2000 - Member of Advisory Board of Croatian Chemical Soc.
1999, 2000, 2003 Organizer of Dubrovnik International NMR Courses and Conferences, Dubrovnik
2000 Guest-editor of Journal of Chemical Information & Computer Science-American Chem. Soc.
2003 International Advisory Board of Summer School on Biomolecular Structure and Dynamics, Otočec, Slovenia

Research Interests:

Isotope effects in NMR spectroscopy; Long-range deuterium isotope effects (LRDIE); Experimental and theoretical aspects and calculations of NMR spectral parameters and their relations to molecular structure and conformation; NMR of bioorganic and pharmaceutical molecules; NMR of organometallic molecules (Hg, Pt, Pd); Spectroscopic investigations (NMR, EPR, MS, IR, UV,VIS) of small peptides, their bioactivity and pharmaceutical utility, modeling and theoretical calculations.

LIST OF PUBLICATIONS IN THE LAST FIVE YEARS:

1. Z. Popović, D. Matković-Čalogović, G. Pavlović, Ž. Soldin, G. Giester, M. Rajić and D. Vikić-Topić: Mercury(II) Complexes of Heterocyclic Thiones. Preparation, Thermal Analysis and Spectral Characterisation of the 1:1 Complexes of Mercury(II) Halides and Pseudohalides with 3,4,5,6-Tetrahydropyrimidine-2-Thione. Crystal Structures of Bis(3,4,5,6-Tetrahydro pyrimidinium-2-Thiolato-S)Mercury(II) Tetrachloro and Tetrabromomercurate (II).
Croat. Chem. Acta 74, 359-380 (2001)

2. D. Vikić-Topić and Lj. Pejov: Computational Studies of Chemical Shifts Using Density Functional Optimized Geometries. II. Isotropic 1H and 13C Chemical Shifts and Substitutent Effects on 13C Shieldings in 2-Adamantanone.
Croat. Chem. Acta 74, 277-293 (2001)

3. B. Žinić, I. Krizmanić, D. Vikić-Topić, D. Srzić and M. Žinić:
Synthesis, NMR and MS Study of Novel N-Sulfonylated Purine Derivatives.
Croat. Chem. Acta 74, 399-414 (2001)

4. D. Vikić-Topić and Lj. Pejov:
On the Choice of Optimal Methodology for Calculating of 13C and 1H NMR Isotropic Chemical Shifts in Cage-like Systems. Case Studies of Adamantane, 2-Adamantanone and 2,4-Methano-2,4-Dehydroadamantane.
J. Chem. Inf. Comput. Sci. 41, 1478-1487 (2001)

5. V. Pilepić, M. Lovrek, D. Vikić-Topić and S. Uršić:
An Unusual Case of Carbon-Nitrogen Bond Formation. Reactivity of C-Nitroso Group toward Acyl Chlorides.
Tetrahedron Lett. 42, 8519-8522 (2001)

6. V. Smrečki, P. Novak, D. Vikić-Topić, T. Hrenar, and Z. Meić:
Deuterium Isotope Effects in 13C NMR Spectra of trans-N-Salicylideneaniline

Isotopomers.
Croat. Chem. Acta 75, 41-49 (2002)
7. G. Pavlović, J. Matijević Sosa, D. Vikić-Topić and I. Leban:
N-(3-Chlorophenyl)-2-Hydroxy-1-Naphthaldimine at 200 K.
Acta Cryst. E58, 317-320 (2002)
8. B. Nigović, N. Kujundžić, D. Vikić-Topić and K. Sanković:
Complex Formation between Transition Metals and 2-Pyrrolidone-5-Hydroxamic Acid.
Acta Chim. Slovenica 49, 525-535 (2002)
9. D. Fleš, R. Vuković, A. Erceg Kuzmić, G. Bogdanić, V. Piližota, D. Karlović, K. Markuš, K. Wolsperger, and D. Vikić-Topić:
Synthesis and Spectroscopic Evidences of N-Arylmaleimides and N-Aryl-2,3-Dimethylmaleimides.
Croat. Chem. Acta 76, 69-74 (2003)
10. Ž. Marinić, M. Ćurić, D. Vikić-Topić and Lj. Tušek-Božić:
Assignment of 1H and 13C NMR Data for Diethyl 2- and 8-Quinolylmethylphosphonates and their Palladium(II) Dihalide Complexes.
Magn. Reson. Chem. 41, 969-973 (2003)
11. M. Jadrijević-Mladar Takač, D. Vikić-Topić and T. Govorčinović:
FT-IR and NMR Spectroscopic Studies of Salicylic Acid Derivatives. I. Gentisamide – a Metabolite of Salicylamide.
Acta Pharm. 54, 163-176 (2004)
12. J. Mastelić, I. Jerković, M.Vinković, Z .Džolić and D.Vikić-Topić:
Synthesis of Selected Naturally Occurring Glucosides of Volatile Compounds.Their Chromatographic and Spectroscopic Properties.
Croat. Chem. Acta 77, 491-500 (2004)
13. M Jadrijević-Mladar Takač and D. Vikić-Topić:
FT-IR and NMR Spectroscopic Studies of Salicylic Acid Derivates. II. Comparison of 2-Hydoxy- and 2, 4- and 2, 5-Dihydroxy Derivatives.
Acta Pharm. 54, 177-191 (2004)
14. I. Nemet, D. Vikić-Topić and L. Varga-Defterdarović:
Spectroscopic Studies on Methylglyxal in Water and Dimethylsulfoxide.
Bioorg. Chem. 32, 560-570 (2004)
15. P. Konjevoda, N. Štambuk, D. Tješić-Drinković, D. Tješić-Drinković, N. Gotovac, D. Ježek, D. Vikić-Topić, A. Votava-Raić: Effects of α-MSH on Experimentally Induced Mucosal Injury of Rat Gastrointestinal System.
Period. Biol. 106, 355-359 (2004)
16. I. Jerković, J. Mastelić, I. Blažević, M. Šindler-Kulyk and D. Vikić-Topić: GC-MS Characterization of Acetylated O-Glucofuranosides: Direct Glucosylation of Volatile Alcohols from Unprotected Glucose.
Croat. Chem. Acta 78, 313-318 (2005)

17. M. V. Diudea, C. L. Nagy, I. Silaghi-Dumitrescu, A. Graovac, D. Janežić and D. Vikić-Topić: Periodic Cages.
J. Chem. Inf. Model. 45, 293-299 (2005)
18. V. Šimunić-Mežnarić, E. Meštrović, V. Tomišić, M. Žgela, D. Vikić-Topić, H. Čičak, P. Novak, and H. Vančik: Nitrosobenzene Library: A Model for Studying Selectivity in the Solid State Nitroso-Azoxide Dimerization.

Croat. Chem. Acta 78, 511-518 (2005)
19. D. Tješić-Drinković, D. Tješić-Drinković, N. Štambuk, P. Konjevoda, A. Votava-Raić, M. Vinković, and D. Vikić-Topić: Alfa-Melanocyte Stimulating Hormone Reduces Colonic Damage in Rat Model of Inflammatory Bowel Disease.
Croat. Chem. Acta 78, 535-539 (2005)
20. M. Randić, D. Vikić-Topić, A. Graovac, N. Lerš, D. Plavšić: Novel Graphical and Numerical Representations of DNA.
Period. Biol. 107, 437-444 (2005)

21. G. Pavlović, V. Tralić-Kulenović, M. Vinković, D. Vikić-Topić, I. Matanović and Z. Popović:
Supramolecular Amide and Thioamide Synthons in Hydrogen Bonding Patterns of N-Aryl-Furamides and N-Aryl-Thiofuramides.
Struct. Chem. (2005) in press
22. V. Pilepić, C. Jakobušić, D. Vikić-Topić and S. Uršić: Evidence for Proton Transfer from Carbon to Chloride Ion in Solution.
Tetrahedron. Lett. 47, 371-375 (2006)
23. Z. Popović, D. Matković-Čalogović, Ž. Soldin, D. Vikić-Topić, G. Giester: On the Interaction Between Mercury(II) Salts and 3-Methylpyrazoline-5-one. The First Crystal Structure of a Cyclic Organomercuric Compound with a Dimercurated Methylenic Carbon Atom.
Struct. Chem. (2006) in press
24. M. Kveder, Ž. Marinić, A. Krišto, D. Vikić-Topić, G. Pifat: Lipid-Protein Interactions in Human Plasma LDL Evidenced by Magnetic Resonance.
Chem. Phys. Lipids (2006) in press
25. Popović, G. Pavlović, M. Vinković, D. Vikić-Topić and M. Rajić Linarić: Coordination modes of 3-hydroxypicolinic acid (OH-picH): synthesis and characterization of cadmium(II) complexes. Crystal and molecular structures of [CdX(OH-pic)(OH-picH)(H2O)]2 X = Cl–, Br–.
Polyhedron (2006) in press

PUBLICATIONS QULIFYING FOR LECTURSHIP:

Horst Friebolin; Basic One- and Two-Dimensional NMR Spectroscopy; Wiley-VCH, Weinheim, 1998

U. Holzgrabe, I. Wawer, B. Diehl; NMR Spectroscopy in Drug Development and Analysis; Wiley-VCH, Weinheim, 1999

L. Pavić, M. Radoš; Mali medicinski leksikon magnetske rezonancije;Školska knjiga, Zagreb, 2005

DATE OF THE LAST PROMOTION: 2000. associate professor of chem., Faculty of Natural Science; 2002. Senior Scientist at RBI

LECTURER: Igor Weber

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BIOGRAPHY:

- Diploma in physics, PMF Zagreb, 1988.
- MSc in physics, molecular biophysics, PMF Zagreb, 1991.
- PhD in physics, Technische Universität München, 1995.
- **Postdoctoral fellow, Department of cell biology, Max-Planck-Institut für Biochemie, Martinsried, Germany, 1995.- 1999.**
- **Research assistant, Cell dynamics research group, Max-Planck-Institut für Biochemie, Martinsried, Germany, 1999.- 2002.**
- **Currenty employed as senior research associate in the Laboratory for electron microscopy, Department of molecular biology, Ruđer Bošković Institute in Zagreb, 2002.-**

LIST OF PUBLICATIONS IN THE LAST FIVE YEARS:

334. Weber, I. (2005). Receptor occupancy on ellipsoidal cell in the presence of a point source of chemoattractant. *J. Chem. Inf. Model.* 45, 1647-1651.

335. Weber, I. (2005). Cryoelectron tomography: implications for actin cytoskeleton research. *Croat. Chem. Acta* 78, 325-331.

336. Htun van der Horst, E., Weber, I. and Ulrich, A. (2005). Tyrosine phosphorylation of PYK2 mediates Heregulin-induced glioma invasion: Novel Heregulin/HER3-stimulated signaling pathway in glioma. *Int. J. Cancer* 113, 689-698.

337. Herak Bosnar, M., De Gunzburg, J., Bago, R., Brečević, L., Weber, I. and Pavelić, J. (2004). Subcellular localization of A an B Nm23/NDPK subunits. *Exp. Cell Res.* 298, 275-284.

338. Barišić, K. and Weber, I. (2004). *Dictyostelium discoideum*: a model organism on the eve of the genome sequencing completion. *Period. Biol.* 106, 103-114.

339. Gerisch, G., Benjak, A., Köhler, J., Weber, I. and Schneider, N. (2004). GFP-golvesin constructs to study Golgi tubulation and post-Golgi vesicle dynamics in phagocytosis. *Eur. J. Cell Biol.* 83, 297-303.

340. Weber, I. (2003). Reflection interference contrast microscopy. In: Biophotonics (G. Marriott and I. Parker, eds.), *Methods in Enzymology*, Vol. 361, pp. 34-47. Elsevier Science (USA), ISBN 0-12-182264-8.

341. Schneider, N., Weber, I., Faix, J., Prassler, J., Müller-Taubenberger, A., Köhler, J., Burghardt, E., Gerisch, G. and Marriott, G. (2003). A Lim protein involved in the progression of cytokinesis and regulation of the mitotic spindle. *Cell Motil. Cytoskeleton* 56, 130-139.

342. Weber, I. (2003). Confocal microscopy of the plant cytoskeleton. *Period. Biol.* 105, 237-249.

343. Weber, I. (2003). Dynamic organization of the actin cytoskeleton in *Dictyostelium*.

Recent Res. Devel. Mol. Cell. Biol. 4, 273-295.

344. Weber, I., Niewöhner, J., Du, A., Röhrig, U. and Gerisch, G. (2002). A talin fragment as an actin trap visualizing actin flow in chemotaxis, endocytosis, and cytokinesis. *Cell Motil. Cytoskeleton* 53, 136-149.

345. Medalia, O., Weber, I., Frangakis, A.S., Nicastro, D., Gerisch, G. and Baumeister, W. (2002). Macromolecular architecture in eukaryotic cells visualized by cryoelectron tomography. *Science* 298, 1209-1213.

346. Bretschneider, T., Jonkman, J., Köhler, J., Medalia, O., Barišić, K., Weber, I., Stelzer, E.H.K., Baumeister, W. and Gerisch, G. (2002). Dynamic organization of the actin system in the motile cells of *Dictyostelium*. *J. Muscle Res. Cell Motil.* 23, 639-649.

347. Müller-Taubenberger, A., Bretschneider, T., Faix, J., Konzok, A., Simmeth, E. and Weber, I. (2002). Differential localization of the *Dictyostelium* PAKa kinase during cytokinesis and cell migration. *J. Muscle Res. Cell Motil.* 23, 751-763.

348. Albrecht, R. and Weber, I. (2002). Interference reflection microscopy. In: Encyclopedia of Life Sciences, Vol. 10, pp. 369-371 (www.els.net). Nature Publishing Group, London, ISBN 0-333-72621-9.

349. Weber, I. and Gerisch, G. (2002). Cortexillins. In: Wiley Encyclopedia of Molecular Medicine, Vol. 1, pp. 914-916. John Wiley & Sons, Inc., New York, ISBN 0-471-37494-6.

350. Tuxworth, R. I., Weber, I., Wessels, D., Addicks, G. C., Soll, D. R., Gerisch, G. and Titus, M. A. (2001). A role for myosin VII in dynamic cell adhesion. *Curr. Biol.* 11, 318-329.

351. Faix, J., Weber, I., Köhler, J., Mintert, U., Lottspeich, F. and Marriott, G. (2001). The recruitment of cortexillins to the cleavage furrow is controlled by IQGAP-related proteins DGAP1/GAPA and links Rac1-signaling to cytokinesis. *EMBO J.* 20, 3705-3715.

352. Insall, R., Müller-Taubenberger, A., Machesky, L., Köhler, J., Simmeth, E., Atkinson, S. J., Weber, I. and Gerisch, G. (2001). Dynamics of the *Dictyostelium* Arp2/3 complex in endocytosis, cytokinesis and chemotaxis. *Cell Motil. Cytoskeleton* 50, 115-128.

Weber, I. (2001). On the mechanism of cleavage furrow ingression in *Dictyostelium*. *Cell Struct. Funct.* 26, 595-602.

PUBLICATIONS QULIFYING FOR LECTURSHIP:

Published 35 scientific papers in internationally peer-reviewed publications, among them 28 papers referred to in the *Current Contents* database. More than 660 citations in international scientific literature. Principal investigator in three research projects, including one bilateral project with Germany. Supervised three diploma theses, currently supervising one diploma thesis and one PhD thesis. Lecturing undergraduate and postgraduate courses in physics and biology at Universities in Zagreb and Osijek. Over 20 contributions to international scientific conferences. Over 15 invited lectures at international and national scientific meetings, societies and institutions. Active knowledge of English and German languages.

DATE OF THE LAST PROMOTION: July 11th 2006, senior scientist

LECTURER: Vesna Svetličić

AFFILIATION: Ruđer Bošković Institute

E-MAIL AND WEB ADDRESS: svetlicic@irb.hr, http://nereus.irb.hr/lem/vesna.htm
www.biofizika.hr

BIOGRAPHY:
education
1984, Ph.D., Ruđer Bošković Institute, Zagreb
1976, M. Sc. Degree, Faculty of Natural Sciences,University of Zagreb
1973, B.Sc. Degree, Faculty of Chemical Engineering, University of Zagreb
additional education
1974, Biomembranes – Lipids, Proteins and Receptors, Advanced Study Institute, Portugal and 1973, Summer Graduate School "Structural Biophysics", University of Zagreb and University of Ljubljana
research at Ruđer Bošković Institute, since 1973

research abroad

Scripps Institution of Oceanography, Marine Biology Research Division, UCSD, USA, guest scientist, 2004-

University of Minnesota, Department of Chemistry, Minneapolis, USA, research associate 1985-19893(3years), visiting professor 1991-1999(3years), affiliated academic staff 1991-2003
Laboratoire d'Electrochimie Interfaciale, Meudon, CNRS, regular scientific missions within collaboration projects, since 1979
Universite P. et M.Curie, Paris, Laboratoire d'Electrochimie, CNRS, scientific missions within collaboration projects, since 1979
teaching
1998- Oceanography Graduate School, University of Zagreb; Marine Oxido-Reduction Processes
1991-1999 (3 years) University of Minnesota, Department of Chemistry, Minneapolis, USA, Graduate Program, specialized courses in electrochemistry
mentor: 3 Ph.D. thesis in progress
main activities: Surface imaging at nanoscale using Scanning Probe Microscopy (AFM), Supramolecular organization of organic molecules et electrodes and at natural interfaces; fundamental research, application in ocean science and marine biophysics
Author of over 50 scientific papers in internationally reviewed journals in the field of surface and colloid chemistry, biophysics and material sciences

LIST OF PUBLICATIONS IN THE LAST FIVE YEARS:
Svetličić V, Ivošević N, Kovač S, Žutić V. Charge displacement by adhesion and spreading of a cell. Bioelectrochem. 2001; 53: 79-86.
Svetličić V, Hozić A. Probing cell surface charge by scanning electrode potential. Electrophoresis. 2002; 23: 2080-2086.
Smodlaka N., Degobbis D., Svetličić V.(urednici), Effect of phosphorus on particle dynamics during phytoplankton blooms. Northern Adriatic mesocosmos experiment Rovinj

2003. Special issue Period Biolog. 2004; 106, 79 str.
Svetličić V, Žutić V, Hozić Zimmermann A. Biophysical Scenario of Giant Gel Formation in the Northern Adriatic Sea. Ann NY Acad Sci. 2005; 1048: 524–527.
Svetličić V, Žutić V. Formation and function of giant gel network in marine ecosystem. Eur Biophys J with Biophys Lett. 2005; 34:729.
Svetličić V, Balnois E, Žutić V, Chevalet J, Hozić Zimmermann A, Kovač S, Vdović N. Electrochemical Detection of Gel Microparticles in Seawater. Croat Chem Acta. 2006;79,107-113.

PUBLICATIONS QULIFYING FOR LECTURSHIP:

Publication list , last 5 years

Leader of AFM facility

DATE OF THE LAST PROMOTION: 2003. senior scientist

LECTURER: Dr.sc. Goran Baranović

AFFILIATION: «R. Bošković» Institute, Zagreb

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BIOGRAPHY:

2002 – present	Project leader "Extended -systems and molecular spectroscopies"
1999 – present	Head of the Laboratory for Molecular Spectroscopy, Department of Organic Chemistry and Biochemistry, R. Bošković Institute
2004 – present	Senior Scientist, R. Bošković Institute, Zagreb, Croatia
1998 – 2004	Senior Research Associate, R. Bošković Institute, Zagreb, Croatia
1995 – 1998	Research Associate in the Laboratory for Molecular Spectroscopy
1975 – 1995	Research Associate and Assistant in the Laboratory for Molecular Physics, R. Bošković Institute, Zagreb, Croatia

LIST OF PUBLICATIONS IN THE LAST FIVE YEARS:

Baranović, Goran. Resonance Raman spectra of deuterated cis-stilbene. *J. Raman Spectrosc.* 32 (2001) 293-299.

Ouillon, Robert; Pinan-Lucare, Jean-Paul; Ranson, Piere; Baranović, Goran. Low-temperature Raman spectra of nitromethane single crystal. Lattice dynamics and Davydov splittings. *J. Chem. Phys.* 116 (2002) 4611-4625.

Volovšek, Vesna; Bistričić, Lahorija; Kirin, Davor; Baranović, Goran. Low-frequency lattice vibrations and dynamics of 4,4‘-dibromobenzophenone. *J. Raman Spectrosc.* 33 (2002) 761-768.

Bistričić, Lahorija; Pejov, Ljupčo; Baranović, Goran. A density-functional theory analysis of Raman and IR spectra of 2-adamantanone. *J. Mol. Struct. Theochem.* 594 (2002) 79-88.

Baranović, Goran. Thermochemistry of spin-crossover Fe(II)complexes calculated with density functional methods. *Chem. Phys. Lett.* 369 (2003) 668-672.

W.M. Kwok, C. Ma, D. Phillips, A. Beeby, T.B. Marder, R.Ll. Thomas, C. Tschuschke, Baranović, Goran, Matousek, Pavel, M. Towrie and A.W. Parker. Time resolved resonance Raman study of S_1 *cis*-stilbene and its deuterated isotopomers, *J. Raman Spectrosc.* 34 (2003) 886-891.

Biliškov, Nikola; Zimmermann, Boris and Baranović, Goran. Vibrational spectroscopy of

macrocyclic oligo(phenyldiacetylenes) – I. A theoretical and experimental study of octadehydrodibenzo[12]annulene and dodecadehydrotribenzo[18]annulene, *J. Mol. Struct.* 661/662 (2003) 65-80.

Baranović, Goran and Babić, Darko. Vibrational study of the $Fe(phen)_2(NCS)_2$ spin-crossover complex by density functional calculations, *Spectrochim. Acta Part A* 60 (2004) 1013-1025.

Bistričić, Lahorija; Baranović, Goran and Ilijić, Saša. Raman study of structural relaxation and boson peak in amorphous films of adamantane, *Spectrochimica Acta Part A: Molecular and Biomolecular Spectroscopy* 61 (2005) 1537-1546.

Zimmermann, Boris and Baranović, Goran. Two-Dimensional Infrared Correlation Spectroscopic Study on Thermal Polymerization of Diphenylbutadiyne, *Vibrational Spectroscopy* 41 (2006) 126-135.

Zimmermann, Boris; Baranović, Goran; Štefanić, Zoran and Rožman, Marko. Spectroscopic Properties of Macrocyclic Oligo(Phenyldiacetylenes)-II. Synthesis and Theoretical Study of Diacetylenic Dehydrobenzoannulene Derivatives with Weak Electron-Donor and -Acceptor Groups, *Journal of Molecular Structure* 794 (2006) 115-124.

Zimmermann, Boris; Baranović, Goran; Macan, Jelena. IR Study of Temperature Induced Rearrangements of Dehydrobenzoannulenes, *Vibrational Spectroscopy* (2006, available on line).

PUBLICATIONS QULIFYING FOR LECTURSHIP:

See above.

DATE OF THE LAST PROMOTION: september 2004.

LECTURER: Marija Luić

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BIOGRAPHY *(education, working experience):*

WORK EXPERIENCE

• Dates (from – to) 1976-
Name and address of employer Rudjer Bošković Institute, Zagreb, Croatia
Type of business or sector Senior scientist (rank of full professor)
Occupation or position held Head of Laboratory for chemical and biological crystallography
Main activities and responsibilities Macromolecular crystallography, enzymes

EDUCATION

Date 1985
Place of education Zagreb
Name and type of organisation providing education
University of Zagreb, Zagreb
Title or qualification awarded Ph.D in natural sciences (geology)
Date 1981
Place of education Zagreb
Name and type of organisation providing education
Faculty of Natural Sciences, University of Zagreb
Title or qualification awarded M.Sc. in natural sciences, geology (mineralogy)
Date 1976
Place of education Zagreb
Name and type of organisation providing education
Faculty of Natural Sciences, University of Zagreb
Title or qualification awarded B. Sc. in geology (mineralogy and petrology)

TRAINING

Year 1983-1986
Place of training Bari, Italy
Name and type of organisation providing training
Dipartimento Geomineralogico,Università di Bari, Italija
Principal subjects/Occupational skills covered
Ph.D. thesis preparation (direct methods in crystallography)
Year 1993-1996
Place of training Berlin, Germany
Name and type of organisation providing training
Freie Universität Berlin, Germany
Principal subjects/Occupational skills covered
Protein crystallography

LIST OF PUBLICATIONS IN LAST FIVE YEARS:

Chapters in books:

1. Tomić, Sanja; Luić, Marija; Šepac, Dragan; Leščić, Ivana; Ljubović, Edina; Kojić-Prodić, Biserka; Šunjić, Vitomir.
MOLECULAR MODELING OF THE COMPLEX OF 1-PHENOXY-2-BUTANOL WITH ACETYL -PSEUDOMONAS CEPACIA LIPASE (PCL), AND ITS P-TRANSITION STATE ANALOG IN COMPARISON WITH THE EXPERIMENTAL RESULTS // Rational Approaches to Drug Design / Hoeltje, Hans-Dieter ; Sippl, Wolfgang (ur.). Duesseldorf : Prous Science, Barcelona, 2001.

Scientific papers in CC journals:

1. Luić, Marija; Koellner, Gertraud; Yokomatsu, Tsutomu; Shibuya, Shiroshi; Bzowska, Agnieszka.
Calf spleen purine nucleoside phosphorylase : crystal structure of the binary complex with a potent multisubstrate analogue inhibitor. // Acta Crystallographica Section D : biological crystallography. 60 (2004) ; 1417-1424 (članak, znanstveni rad).
2. Krizmanić, Irena; Višnjevac, Aleksandar; Luić, Marija; Glavaš-Obrovac, Ljubica; Žinić, Mladen; Žinić, Biserka.
Synthesis, structure, and biological evaluation of C-2 sulfonamido pyrimidine nucleosides. // Tetrahedron. 59 (2003) , 23; 4047-4057 (članak, znanstveni rad).
3. Koellner, Gertraud; Bzowska, Agnieszka; Wielgus-Kutrowska, Beata; Luić, Marija; Steiner, Thomas; Saenger, Wolfram; Stepinski, Janusz.
Open and Closed Conformation of the E. coli Purine Nucleoside Phosphorylase Active Center and Implications for the Catalytic Mechanism. // Journal of Molecular Biology. 315 (2002) , 3; 351-371 (članak, znanstveni rad).
4. Luić, Marija; Koellner, Gertraud; Shugar, David; Saenger, Wolfram; Bzowska, Agnieszka.
Calf spleen purine nucleoside phosphorylase : structure of its ternary complex with an N(7)-acycloguanosine inhibitor and a phosphate anion. // Acta crystallographica - section D : biological crystalography. 57 (2001) ; 30-36 (članak, znanstveni rad).
5. Luić, Marija; Tomić, Sanja; Leščić, Ivana; Ljubović, Edina; Šepac, Dragan; Šunjić, Vitomir; Vitale, Ljubinka; Saenger, Wolfram; Kojić-Prodić, Biserka.
Complex of Burkholderia cepacia lipase with transition state analogue of 1-phenoxy-2-acetoxybutane, Biocatalytic, structural and modelling study.. // European Journal of Biochemistry. 268 (2001) , 14; 3964-3973 (članak, znanstveni rad).

PUBLICATIONS QULIFAYING FOR LECTURSHIP:

1. Luić, Marija; Koellner, Gertraud; Yokomatsu, Tsutomu; Shibuya, Shiroshi; Bzowska, Agnieszka.
Calf spleen purine nucleoside phosphorylase : crystal structure of the binary complex with a potent multisubstrate analogue inhibitor. // Acta Crystallographica Section D : biological crystallography. 60 (2004) ; 1417-1424.
2. Luić, Marija; Koellner, Gertraud; Shugar, David; Saenger, Wolfram; Bzowska, Agnieszka.
Calf spleen purine nucleoside phosphorylase : structure of its ternary complex with an N(7)-acycloguanosine inhibitor and a phosphate anion. // Acta crystallographica - section D : biological crystalography. 57 (2001) ; 30-36.

DATE OF THE LAST PROMOTION: 06.06.2005. senior scientist at Rudjer Bošković Institute

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BIOGRAPHY:
Date of birth
Place of birth 28.04.1972
Podgorica, Montenegro
Education
December 2004
Ph. D. degree in physics Title of the thesis: 'The Role of Hydrogen Bond in Supramolecular Organization of Oxalyl and Phthaloyl Derivatives of Amino Acids' "
2003-2004
Doctoral study at the University of Zagreb
2001-2003
Postgraduate study of physics (biophysics) at the University of Zagreb, Faculty of Science, Department of Physics
1991-2000
Graduate study of physics at the University of Zagreb, Faculty of Science, Department of Physics B. Sc. degree obtained on November 6, 2000. Title of the B. Sc. thesis: 'The Effects of Configuration Space Reduction in Interacting Boson Fermion Models'
Work experience
Employed at the Ruđer Bošković Institute in the Laboratory for chemical and biological crystallography. Operating on the CAD4 Enraf Nonius single crystal diffractometer. Currently working as a senior assistant. Research topics include X-ray crystallography, with special interest in the role of hydrogen bonding in network formation in crystal structures of small organic molecules, topology of hydrogen bonded networks and protein crystallography.

LIST OF PUBLICATIONS IN THE LAST FIVE YEARS:

35. J. Makarević, M. Jokić, Z. Raza, Z. Štefanić, B. Kojić-Prodić, M. Žinić *Chem. Eur. J.* 9 (2003) 2-15
36. Z. Štefanić, B. Kojić-Prodić, Z. Džolić, D. Katalenić, M. Žinić and A. Meden *Acta Cryst.* C59 (2003) 286-288
37. B. Kojić-Prodić, B. Perić, Z. Štefanić, A. Meden, J. Makarević, M. Jokić, M. Žinić *Acta Cryst.* B60 (2004) 90–96
38. B. Kojić-Prodić, Z. Štefanić, M. Žinić *Croat. Chem. Acta* 77 (3)(2004) 415-425
39. Z. Štefanić, A. Meden, M. Lutz, A. M. M. Schreurs, B. Kojić-Prodić, *Acta Cryst.* C60 (2004) 754-756
40. J. Makarević, M. Jokić, Z. Raza, V. Čaplar, D. Katalenić, Z. Štefanić, B. Kojić-Prodić, M. Žinić *Croat. Chem. Acta* 77 (1–2) 403-414 (2004)
41. N. Ilić, I. Habuš, L. S. Barkawi, S. Park, Z. Štefanić, B. Kojić-Prodić, J. Cohen, V. Magnus *Bioorganic. Med. Chem.* 13 (2005), 9; 3229-3240
42. Zimmermann, Boris; Baranović, Goran; Štefanić, Zoran; Rožman, Marko *Journal*

of Molecular Structure 794 (2006) 115–124
Z. Štefanić, J. Makarević, M. Jokić, B. Kojić-Prodić *Journal of Molecular Structure*. (2006) (prihvaćen za objavljivanje)

PUBLICATIONS QULIFYING FOR LECTURSHIP:

43. J. Makarević, M. Jokić, Z. Raza, Z. Štefanić, B. Kojić-Prodić, M. Žinić *Chem. Eur. J.* 9 (2003) 2-15
44. Z. Štefanić, B. Kojić-Prodić, Z. Džolić, D. Katalenić, M. Žinić and A. Meden *Acta Cryst.* C59 (2003) 286-288
45. B. Kojić-Prodić, B. Perić, Z. Štefanić, A. Meden, J. Makarević, M. Jokić, M. Žinić *Acta Cryst.* B60 (2004) 90–96

DATE OF THE LAST PROMOTION: January 2005, Senior Assistent

LECTURER: Saša Kazazić

AFFILIATION: Ruđer Bošković Institute
Bijenička 54, Zagreb, Croatia

E-MAIL AND WEB ADDRESS: kazazic@irb.hr

BIOGRAPHY*:*

Present Position: Research associate
Laboratory for chemical kinetics and atmospheric chemistry
Ruđer Bošković Institute
Born: March 25,1966; Subotica
Education: B.Ss. Faculty of Science and Mathematics, Zagreb, 1995.
M.Sc., University of Zagreb, 1999.
Ph.D., University of Zagreb, 2003.
Postdoctoral specialization, National High Magnetic Field Laboratory,
Tallahassee, Florida, USA, prof. dr. Alan Marshall, 2004-present

Employments:		
	1995-1999.	junior assistant
	1999-2003.	assistant
	2003-	research associate

LIST OF PUBLICATIONS IN THE LAST FIVE YEARS:

1. M. Eckert-Maksić, S. Kazazić, S. P. Kazazić, S. I. Kirin, L. Klasinc, D. Srzić, D. Žigon
Electron ionisation induced fragmentation of fused norbornene analogues containing $SiMe_2$ or $GeMe_2$ and oxygen bridges. Migration of $SiMe_2$ and $GeMe_2$ groups
Rapid Commun. Mass Spectrom. 15 (2001) 462-465.

2. S. Kazazić, S. P. Kazazić, L. Klasinc, S. P. McGlynn, W. A. Pryor
On the proton affinity of peroxynitrite and peroxynitrous acid
Croat. Chem. Acta 74 (2001) 271-275.

3. T. Cvitaš, S. Kazazić, S. P. Kazazić, N. Kezele, L. Klasinc, D. Srzić, H. Budzikiewicz
Gas phase kinetics of metal ion ligation by pirene
Croat. Chem. Acta 74 (2001) 725-733.

4. S. Kazazić, S. P. Kazazić, L. Klasinc, S. P. McGlynn, W. A. Pryor
Proton affinities of N-O anions and their protonated forms
J. Phys .Org. Chem 15 (2002) 728-731.

5. D. Srzić, S. Kazazić, B. Kralj, L. Klasinc, J. Marsel, H. Güsten, S.P. McGlynn
The niobium and tantalum riddle: Gas-phase monocation reactions with pyrene and

pyrene-D_{10}

Int. J. Mass Spec. 230 (2003) 135-140.

6. S. Kazazić, L. Klasinc, B. Kovač, D. Srzić,

Gas phase ligation of Cr^+ and Fe^+ with 4,9-diazapyrene
Rapid Commun. Mass Spectrom. 17 (2003) 2361-2363.

7. M. Rožman, S. Kazazić, L. Klasinc, D. Srzić
Kinetics of gas-phase hydrogen/deuterium exchange and gas-phase structure of protonated phenylalanine, proline, tyrosine and tryptophan
Rapid Commun. Mass Spectrom. 17 (2003) 2769-2772.

8. S. Kazazić, L. Klasinc, M. Rožman, D. Srzić, J. von Knop

Isotope effect in the gas phase reaction of pyrene-D_{10} with Nb^+ ions

Croat. Chem. Acta, 77 (2004) 321-324.

9. S. Kazazić, S. P. Kazazić, L. Klasinc, S. P. McGlynn, D. Srzić

Gas-phase reactions of Nb^+ and Fe^+ with perfluoronaphthalene and perfluoroanthracene
Rapid Commun. Mass Spectrom. 18 (2004) 2354-2356.

10. S. Kazazić, L. Klasinc, S. P. McGlynn, D. Srzić, M. G. H. Vicente
Gas-phase metallation reactions of porphyrins with metal monocations
J. Phys. Chem. A 108 (2004) 10997-11000.

11. S. Kazazić, S. P. Kazazić, L. Klasinc, M. Rožman, D. Srzić
Gas phase ligation kinetics of metal monocations
Croat. Chem. Acta 78 (2005) 269-274.

12. S. Kazazić, S. P. Kazazić, L. Klasinc, M. Rožman, D. Srzić

Gas phase ligation of U^+. Comparison of pyrene, phenanthridine and phenanthrene as ligand
Croat. Chem. Acta 79 (2006) 125-128.

PUBLICATIONS QULIFYING FOR LECTURSHIP:
Scientific papers:

1. D. Srzić, S. Martinović, Lj. Paša-Tolić, N. Kezele, S. Kazazić, Lj. Senković, S. M. Shevchenko, L. Klasinc
Laser desorption Fourier transform mass spectrometry of natural polymers
Rapid Commun. Mass Spectrom. 10 (1996) 580-582.
2. D. Srzić, S. Kazazić, L. Klasinc
Gas-phase reaction of iron Fe+ ions with phenanthrene and azaphenanthrene in a laser desorption/ionization Fourier-transform mass spectrometry experiment
Rapid Commun. Mass Spectrom. 10 (1996) 688-690.
3. D. Srzić, S. Kazazić, L. Klasinc

Deuterium labeling study of the gas-phase reaction of Fe+/Cr+ with pyrene by FTMS
Croat. Chem. Acta 69 (1996) 1449-1454.
4. D. Srzić, S. Kazazić, L. Klasinc, H. Güsten, S. P. McGlynn
An FTMS investigation of the competition between uranium oxidation and ligation reactions
Croat. Chem. Acta 70 (1997) 223-228.
5. D. Srzić, S. Kazazić, L. Klasinc, H. Budzikiewicz
Gas-phase synthesis and reaction of complexes of polycyclic aromatics with metallic positive ions
Rapid Commun. Mass Spectrom. 11 (1997) 1131-1133.
6. H. Budzikiewicz, T. Cvitaš, S. Kazazić, L. Klasinc, D. Srzić
Gas phase reaction rate measurements in FTMS
Rapid Commun. Mass Spectrom. 13 (1999) 1109-1111.
7. D. Srzić, S. Kazazić, S. Martinović, Lj. Paša-Tolić, N. Kezele, D. Vikić-Topić, S. Pečur, A. Vrančič, L. Klasinc
FTMS of natural polymers
Croat. Chem. Acta 73 (2000) 69-80.
8. M. Friedman, S. Kazazić, N. Kezele, L. Klasinc, S. P. McGlynn, S. Pečur, W. A. Pryor
Role of nitrogen oxides in ozone toxicity
Croat. Chem. Acta, 73 (2000) 1141-1151.
9. M. Eckert-Maksić, S. Kazazić, S. P. Kazazić, S. I. Kirin, L. Klasinc, D. Srzić, D. Žigon
Electron ionisation induced fragmentation of fused norbornene analogues containing SiMe2 or GeMe2 and oxygen bridges. Migration of SiMe2 and GeMe2 groups
Rapid Commun. Mass Spectrom. 15 (2001) 462-465.
10. T. Cvitaš, S. Kazazić, S. P. Kazazić, N. Kezele, L. Klasinc, D. Srzić, H. Budzikiewicz
Gas phase kinetics of metal ion ligation by pirene
Croat. Chem. Acta 74 (2001) 725-733.
11. D. Srzić, S. Kazazić, B. Kralj, L. Klasinc, J. Marsel, H. Güsten, S.P. McGlynn
The niobium and tantalum riddle: Gas-phase monocation reactions with pyrene and pyrene-D10
Int. J. Mass Spec. 230 (2003) 135-140.
12. S. Kazazić, L. Klasinc, B. Kovač, D. Srzić,
Gas phase ligation of Cr+ and Fe+ with 4,9-diazapyrene
Rapid Commun. Mass Spectrom. 17 (2003) 2361-2363.
13. M. Rožman, S. Kazazić, L. Klasinc, D. Srzić
Kinetics of gas-phase hydrogen/deuterium exchange and gas-phase structure of protonated phenylalanine, proline, tyrosine and tryptophan
Rapid Commun. Mass Spectrom. 17 (2003) 2769-2772.
14. S. Kazazić, L. Klasinc, M. Rožman, D. Srzić, J. von Knop
Isotope effect in the gas phase reaction of pyrene-D10 with Nb+ ions
Croat. Chem. Acta, 77 (2004) 321-324.
15. S. Kazazić, S. P. Kazazić, L. Klasinc, S. P. McGlynn, D. Srzić
Gas-phase reactions of Nb+ and Fe+ with perfluoronaphthalene and perfluoroanthracene
Rapid Commun. Mass Spectrom. 18 (2004) 2354-2356.

16. S. Kazazić, L. Klasinc, S. P. McGlynn, D. Srzić, M. G. H. Vicente
Gas-phase metallation reactions of porphyrins with metal monocations
J. Phys. Chem. A 108 (2004) 10997-11000.
17. S. Kazazić, S. P. Kazazić, L. Klasinc, M. Rožman, D. Srzić
Gas phase ligation kinetics of metal monocations
Croat. Chem. Acta 78 (2005) 269-274.
18. S. Kazazić, S. P. Kazazić, L. Klasinc, M. Rožman, D. Srzić
Gas phase ligation of U+. Comparison of pyrene, phenanthridine and phenanthrene as ligand
Croat. Chem. Acta 79 (2006) 125-128.

Professional papers:

1. S. Kazazić, S. Pečur, D. Srzić
Matricom potpomognuta ionizacija desorpcijom laserskog zračenja
(Matrix Assisted Laser Desorption Ionization)
Kem. Ind. 48 (1999) 181-187.
2. M. Rožman, S. Kazazić
LDI FTMS studij H/D izmjene na gramicidinu s pomoću D2S
(LDI/FTMS study of the H/D exchange of gramicidin S with D2S)
Kem. Ind. 49 (2000) 1-5.
3. S. Kazazić, S. Martinović
Kemijska ionizacija u spektrometriji masa
(Chemical ionization mass spectrometry)
Kem. Ind. 53 (2004) 265-272.

DATE OF THE LAST PROMOTION: 11/11/2003

LECTURER: Silvia Tomic

AFFILIATION: Institut za fiziku

E-MAIL AND WEB ADDRESS: stomic@ifs.hr, http://real-science.ifs.hr

http://real-science.ifs.hr/pages/silvia.html

BIOGRAPHY:

WORK EXPERIENCE

• Dates (from – to) 2002-2006
Name and address of employer Institute of Physics
Type of business or sector Scientific research
Occupation or position held Scientific adviser, permanent
Main activities and responsibilities Project leader of 0035015 “Systems of reduced dimensionality: from synthetic organic to biomaterials”; students (PhD, diploma, internship) superviser

• Dates (from – to) 1999-2002
Name and address of employer Institute of Physics
Type of business or sector Scientific research
Occupation or position held Scientific adviser
Main activities and responsibilities Project leader of 00350103 “Novel electronic states in molecular conductors” and of 0035015 “Systems of reduced dimensionality: from synthetic organic to biomaterials”; students (PhD, master of science, diploma, internship) superviser

• Dates (from – to) 1991-1999
Name and address of employer Institute of Physics
Type of business or sector Scientific research
Occupation or position held Senior scientific associate
Main activities and responsibilities Project leader of "Novel anisotropic conductors and superconductors" and of 00350103 “Novel electronic states in molecular conductors”, students (phD, master of science, diploma, internship) superviser

• Dates (from – to) 1986-1991
Name and address of employer Institute of Physics of the University
Type of business or sector Scientific research
Occupation or position held Scientific associate
Main activities and responsibilities Collaborator (until 1989) and leader (since 1989) of the project "Synthetic conductors and superconductors"

• Dates (from – to) 1981-1986

Name and address of employer Institute of Physics of the University
Type of business or sector Scientific research
Occupation or position held Research assistent
Main activities and responsibilities Research in organic conductors and superconductors leading to doctoral thesis at
Laboratoire de Physique des Solides, Université Paris-Sud

• Dates (from – to) 1977-1981
Name and address of employer Institute of Physics of the University
Type of business or sector Scientific research
Occupation or position held Research assistent
Main activities and responsibilities Research in calorimetric properties of the phase transitions in inorganic quasi-one-dimensional
conductors leading to Master of Science thesis at University of Zagreb

EDUCATION

Date 1981 -1986
Place of education Orsay, France
Name and type of organisation providing education Laboratoire de Physique des Solides, Université Paris-Sud, associated to CNRS
Title or qualification awarded Docteur en Sciences Physiques, these d'etat

Date 1977 - 1981
Place of education Zagreb, Croatia
Name and type of organisation providing education Postgraduate study of Solid State Physics at the Faculty of Science, University of Zagreb
Title or qualification awarded Master of Science

Date 1971 - 1977
Place of education Zagreb, Croatia
Name and type of organisation providing education Faculty of Science, University of Zagreb
Title or qualification awarded Graduated Engineer in Physics (Bachelor in Physics)

TRAINING

Year 1987
Place of training Orsay, France
Name and type of organisation providing training Laboratoire de Physique des Solides, Université Paris-Sud, associated to CNRS
Principal subjects/Occupational skills covered Organic conductors and superconductors, electrical transport measurement techniques,
electron spin resonance, high pressure, high magnetic field, criogenic techniques

LIST OF PUBLICATIONS IN THE LAST FIVE YEARS:

82. "Low-frequency dielectric spectroscopy of commensurate density waves"
S.Tomić, M.Pinterić, T.Vuletić, J.U.von Schütz and D.Schweitzer, Synthetic Metals 120, 695-698 (2001).

83.”Non-ohmic electrical transport in the Peierls-Mott state of deuterated copper-DCNQI systems”

T.Vuletić, M.Pinterić, M.Lončarić, S.Tomić and J.U.von Schütz, Synthetic Metals 120, 1001-1002 (2001).

84.”Influence of quantum Hall effect on linear and nonlinear conductivity in the FISDW states of the organic conductor $(TMTSF)_2PF_6$”

T.Vuletić, C.Pasquier, P.Auban-Senzier, S.Tomić, D. Jérome, K.Maki and K.Bechgaard, Eur. Phys. J B21, 53-60 (2001).

85.”Complex low-frequency dielectric relaxation of the charge-density wave state in the $(2,5(OCH_3)_2DCNQI)_2Li$”

M.Pinterić, T.Vuletić, S.Tomić and J.U.von Schütz, Eur. Phys. J B 22, 335-341 (2001).

86.”Superconductivity and magnetism in organic layered superconductors”

S.Tomić, M.Pinterić, M.Prester, D.Drobac and K.Maki, Physica C 364-365, 247-250 (2001).

87.”Coexistence of superconductivity and spin density wave orderings in the organic superconductor $(TMTSF)_2PF_6$”

T.Vuletić, P.Auban-Senzier, C.Pasquier, S.Tomić, D. Jérome, M.Heritier and K.Bechgaard, Eur. Phys. J B 25, 319-331 (2002).

88. “Charge-density wave formation in $Sr_{14}Cu_{24}O_{41}$”

B.Gorshunov, P.Haas, T.Rôôm, M.Dressel, T.Vuletić, B.Korin-Hamzić, S.Tomić, J.Akimitsu and T.Nagata, Phys.Rev.B 66 060508(R) (2002).

89. “Genuine superconducting ground state in κ-$(BEDT\text{-}TTF)_2Cu[N(CN)_2]Br$: an understanding after decade of controversy”

S.Tomić, M.Pinterić, M.Prester, Đ.Drobac and K.Maki, Synthetic Metals 137/1-3, 1327-1329 (2003).

90. “Influence of internal disorder on the superconducting state in the organic layered superconductor κ-$(BEDT\text{-}TTF)_2Cu[N(CN)_2]Br$”

M.Pinterić, S.Tomić, M.Prester, Đ.Drobac and K.Maki, Phys.Rev.B66 , 174521 (2002).

91.”Modalities od self-oganized charge response in low dimensional systems”

S.Tomić, T.Vuletić, M.Pinterić and B.Korin-Hamzić, J.de Physique IV France 12, PR9-211 – PR9-214 (2002).

92. “Coexistence of superconductivity and spin density wave orderings in Bechgaard and Fabre salts”

C.Pasquier, P.Auban-senzier, T.Vuletić, S.Tomić, M.Héritier and D.Jérome, J.de Physique 12, PR9-197 – PR9-200 (2002).

93. “Suppression of the charge-density wave state in $Sr_{14}Cu_{24}O_{41}$ by calcium doping”

T.Vuletić, B.Korin-Hamzić, S.Tomić, B.Gorshunov, P.Haas, T.Rôôm, M.Dressel, J.Akimitsu and T.Nagata, Phys.Rev.Lett.90, 257002 (1-4) (2003).

94. “Variable-range hopping conductivity in the copper-oxygen chains of $La_3Sr_3Ca_8Cu_{24}O_{41}$”

T.Vuletić, B.Korin-Hamzić, S.Tomić, B.Gorshunov, P.Haas, M.Dressel, J.Akimitsu, T.Sasaki and T.Nagata, Phys.Rev.B67, 184521 (1-4) (2003).

95. "Mott-Peierls phase in deuterated copper-DCNQI systems: a comprehensive study of longitudinal and transverse conductivity and aging effects"

M.Pinterić, T.Vuletić, M.Lončarić, K.Petukhov, B.Gorshunov, J.U.von Schütz, S.Tomić and M.Dressel, J.of Physics, Condensed Matter, 15, 7351-7364 (2003).

96. "Properties of Mott-Peierls insulating phase in deuterated copper-DCNQI systems" M.Pinterić, T.Vuletić and S.Tomić, Proceedings of 39th International Conference on Microelectronics, Devices and Materials MIDEM'03, Ptuj, Slovenia, 231-236 (2003).

97. «The superconducting order parameter in the organic layered superconductor -(BEDT-TTF)$_2$Cu[N(CN)$_2$]Br"

M.Pinterić, S.Tomić and K.Maki, J.de Physique IV France 114, 245-249 (2004).

98. «Gossamer superconductivity in -(BEDT-TTF)$_2$X?"

M.Pinterić, S.Tomić and K.Maki, Physica C 408-410, 75-76 (2004).

Special issue: Proceedings of the International Conference on Materials and Mechanisms of Superconductivity. High Temperature Supercondictors VII, M2SRIO - Edited by W.Ortiz, E. Mello, E. Granato and Elisa Baggio Saitovitch

99. "Anisotropic Charge Modulation in the Ladder Planes of $Sr_{14-x}Ca_xCu_{24}O_{41}$"

T.Vuletić, T. Ivek, B.Korin-Hamzić, S.Tomić, B.Gorshunov, P.Haas, M.Dressel, J.Akimitsu, T. Sasaki and T.Nagata, Phys.Rev.B 71, 012508 (2005).

100."Anisotropy and field-dependence of the spin-density wave dynamics in the quasi one-dimensional conductor $TMTSF_2PF_6$"

P.Zornoza, K.Petukhov, M.Dressel, T.Vuletić, N.Biškup and S.Tomić, Eur. Phys. J. B 46, 223–230 (2005).

101. "Phase diagrams of $(La,Y,Sr,Ca)_{12}Cu_{24}O_{41}$: switching between the ladders and the chains",

T.Vuletić, T. Ivek, B.Korin-Hamzić, S.Tomić, B.Gorshunov, P.Haas, M.Dressel, C.Hess, B.Büchner, and J.Akimitsu, J.de Physique IV, 131, 299-304 (2005).

102. "The spin-ladder and spin-chain system $(La,Y,Sr,Ca)_{12}Cu_{24}O_{41}$: electronic phases, charge and spin dynamics"

T.Vuletić, B.Korin-Hamzić, T. Ivek, S.Tomić, B.Gorshunov, M.Dressel, and J.Akimitsu, Physics Reports 428, 169-258 (2006).

PUBLICATIONS QULIFYING FOR LECTURSHIP:

1. "Dielektrična spektroskopija biomaterijala"

S.Tomić, T.Vuletić, S.Dolanski Babić, S.Krča, D.Ivanković, L.Griparić, D.Zanchi, A.Vernhet, C.Poncet-Legrand,

Četvrti znanstveni sastanak Hrvatskog fizikalnog društva, Zagreb, 13 – 15 studeni 2003 (predavanje)

2. “Dielectric spectroscopy of genomic DNA solutions”

.S. Tomić, T.Vuletić, S.Dolanski Babić, D.Vurnek, S.Krča, D.Ivanković, L.Griparić

International Conference “From Solid State to Biophysics”, Cavtat, Croatia (2004), http://dubrovnik2004.epfl.ch/ (predavanje).

3.” Dielektrična relaksacija genomske deoksiribonukleinske kiseline”

S.Tomić, S.Dolanski Babić, T.Vuletić, S.Krča, D.Ivanković, R.Žaja, R.Podgornik, L.Griparić,

4.znanstveni sastanak hrvatskih biofizičara, Institut R.Bošković, Zagreb (9 rujna 2005) (plenarno predavanje).

4. “Dielectric relaxation of genomic deoxyribonucleic acid”

S.Tomić, S.Dolanski Babić, T. Vuletić, D.Vurnek, S. Krča, D. Ivanković, R. Žaja, R. Podgornik and L. Griparić

4th Symposium of Science and Technology of Nanomaterials, Ljubljana, Slovenia (2005) (predavanje).

5. “Dielectric spectroscopy of DNA aqueous solutions”
S.Tomić, S.Dolanski Babić, T. Vuletić, S. Krča, D. Ivanković, L. Griparić

and R. Podgornik

International conference on synthetic metals ICSM 2006, Dublin, Ireland (2006) (predavanje).

6. „Screening and fundamental length scales in semidilute Na-DNA solutions“
S.Tomić, T.Vuletić, S.Dolanski Babić, S.Krča, D.Ivanković, L.Griparić and R.Podgornik
International Conference “From Solid State to Biophysics”, Cavtat, Croatia (2006), http://dubrovnik2006.epfl.ch/ (predavanje).

Lectures/seminars

1. “Dielectric relaxation of DNA aqueous solutions”

S.Tomić, Internal seminar for the group of Prof.F.Livolant and of Dr.H.Bouchiat: Laboratoire de Physique des Solides, Université Paris-Sud, Paris (December 2005).

Diploma and internship reports

1.K.Radmanović: «Komora za mjerenje dielektrične konstante uzoraka u tekućoj fazi», diplomski rad, Prirodoslovno-matematički fakultet Sveučilišta u Zagrebu (2006); voditelj: S.Tomić.

2.B.Frka-Petešić, „Utilisation de la spectroscopie dielectrique basse frequence dans l'etude de systems colloidaux“, Rapport de stage u okviru studija Master M1 de Physique (Magistere de physique) pri Université Denis Diderot Paris VII; rad izrađen u Laboratoriju za biofiziku, Institut za fiziku, Zagreb; voditelji: S.Tomić i T.Vuletić.

Publications

1.”Screening and fundamental length scales in semidilute Na-DNA solutions”

S.Tomić, S.Dolanski Babić, T. Vuletić, S. Krča, D. Ivanković, R. Podgornik and L. Griparić, submitted to Phys.Rev.Lett (2006).

2.”Dielectric relaxation of DNA aqueous solutions”

S.Tomić, S.Dolanski Babić, T. Vuletić, S. Krča, D. Ivanković, R. Podgornik and L. Griparić, cond-mat/0602255

and articles 92, 85, 88, 93, 99, 102

DATE OF THE LAST PROMOTION: 2004

LECTURER: Tomislav Vuletić

AFFILIATION: Institut za fiziku, Zagreb

E-MAIL AND WEB ADDRESS: tvuletic@ifs.hr, www.ifs.hr/~tvuletic

BIOGRAPHY:

Education

2004 Ph.D. in Solid State Physics, Faculty of Science, University of Zagreb, Croatia
Thesis: 'Collective Electronic States of the New Quasi-one-dimensional Materials '
Thesis Committee: Slaven Barisic, Martin Dressel , Amir Hamzic, Denis Jérome, Silvia Tomic
1998 B.Sc. in Physics, Faculty of Science, University of Zagreb, Croatia
title: 'Nonlinear conductivity in quasi-one dimensional organic conductors (TMTSF)2PF6 and (TMTSF)2AsF6 '

Employment, positions

2004-present Assistant researcher (post-doc level) in the group of S. Tomic at the Institute of Physics, Zagreb
1998-2004 Ph.D. student in the group of S. Tomic at the Institute of Physics, Zagreb
1999-2000 visitor for 10 months in the group of D. Jérome at Laboratoire de Physique des Solides, Université Paris-Sud, Orsay, France

Current research interests

Focus on biopolymers, polyelectrolytes, colloids (DNA, latex, tannins...), with high regard for the counterion atmospheres and aqueous environment. As approaching this new field of work, I am going to use extensive experience in experimental solid state physics of synthetic quasi-one-dimensional materials (organics and cuprates), as well as recent experience in the field of dielectric spectroscopy of aqueous (biological) samples.

Scientific accomplishments

2005-2006 Coauthored a review paper for the field of quasi-one-dimensional cuprates, published in Physics Reports.
2002-2004 Designed and constructed a chamber for dielectric spectroscopy of aqueous samples. Planned and executed establishment of a Biophysics Lab, now in routine operation at the Institute of Physics, Zagreb. Research performed in this Lab has already been presented at several conferences and seminars, internationally. The relevant publications are in various stages of preparation.
1999-present Coauthored 18 original scientific articles in well known international physics journals (see attached list).
1999-present Attended 16 international science conferences to which I contributed by posters or oral presentations. 1 invited talk. (see attached list).

LIST OF PUBLICATIONS IN THE LAST FIVE YEARS:

1 T.Vuletić, T. Ivek, B.Korin-Hamzić, S.Tomić, B.Gorshunov, M.Dressel and J.Akimitsu, *The Spin-Ladder and Spin-Chain System (La,Y,Sr,Ca)$_{14}$Cu$_{24}$O$_{41}$: Electronic Phases, Charge and Spin Dynamics,* Phys. Rep. 428, 169-258 (2006).

2 P. Zornoza, K. Petukhov, M. Dressel, N. Biskup, T. Vuletić, and S. Tomić, *Anisotropy and field-dependence of the spin-density-wave dynamics in the quasi one-dimensional conductor (TMTSF)$_2$PF$_6$,* Eur. Phys. J. B 46, 223-230 (2005).

3 T.Vuletić, T. Ivek, B.Korin-Hamzić, S.Tomić, B.Gorshunov, P.Haas, M.Dressel, J.Akimitsu, T. Sasaki and T.Nagata, *Anisotropic Charge Modulation in the Ladder Planes of Sr$_{14-x}$Ca$_x$Cu$_{24}$O$_{41}$ by calcium doping,* Phys. Rev. B 71, 012508(4) (2005).

4 M. Pinterić, T. Vuletić, M. Lončarić, K. Petukhov, B. Gorshunov, J. U. von Schütz, S. Tomić and M. Dressel, *Mott–Peierls phase in deuterated copper-DCNQI systems: a comprehensive study of longitudinal and transverse conductivity and ageing effects*, J. Phys.: Condens. Matter 15, 7351-7364 (2003).

5 T.Vuletić, B.Korin-Hamzić, S.Tomić, B.Gorshunov, P.Haas, T.Rôôm, M.Dressel, J.Akimitsu and T.Nagata, *Suppression of the charge-density wave state in Sr$_{14}$Cu$_{24}$O$_{41}$ by calcium doping,* Phys. Rev. Lett 90, 257002(4) (2003).

6 T. Vuletić, B. Korin-Hamzić, S. Tomić, B. Gorshunov, P. Haas, M. Dressel, J. Akimitsu, T. Sasaki, T. Nagata, *Variable-range hopping conductivity in the copper-oxygen chains of La$_3$Sr$_3$Ca$_8$Cu$_{24}$O$_{41}$,* Phys. Rev. B 67, 184521(4) (2003).

7 B. Gorshunov, P. Haas, T. Room, M. Dressel, T. Vuletić, B. Korin-Hamzić, S. Tomić, J. Akimitsu, T. Nagata, *Charge Density Wave formation in Sr$_{14}$Cu$_{24}$O$_{41}$,* Phys. Rev. B 66, 060508R(4) (2002).

8 T. Vuletić, P. Auban-Senzier, C. Pasquier, S. Tomić, D. Jérome, M. Héritier and K. Bechgaard, *Coexistence of Superconductivity and Spin Density Wave orderings in the organic superconductor (TMTSF)$_2$PF$_6$,* Eur. Phys. J. B 25, 319-331 (2002).

9 M. Pinterić, T. Vuletić, S. Tomić and J.U. von Schütz, *Complex low-frequency dielectric relaxation of the charge-density wave state in the (2,5(OCH$_3$)$_2$DCNQI)$_2$Li,* Eur. Phys. J. B 22, 335 - 341 (2001).

10 T. Vuletić, C. Pasquier, P. Auban-Senzier, S. Tomić, D. Jérome, K. Maki and K. Bechgaard, *Influence of quantum Hall effect on linear and nonlinear conductivity in the FISDW states of the organic conductor (TMTSF)$_2$PF$_6$,* Eur. Phys. J. B 21, 53 - 60 (2001).

11 T.Vuletić, T. Ivek, B.Korin-Hamzić, S.Tomić, B.Gorshunov, M.Dressel, C. Hess, B. Büchner and J.Akimitsu, *Phase diagrams of (La,Y,Sr,Ca)$_{14}$Cu$_{24}$O$_{41}$: switching between the ladders and the chains,* J. Phys. IV France 131, 299-305 (2005).

12 C. Pasquier, P. Auban-Senzier, T. Vuletić, S. Tomić, M. Héritier, D. Jérome, *Coexistence of superconductivity and spin density wave orderings in Bechgaard and Fabre salts,* J. Phys. IV France 12, Pr9-197-200 (2002).

13 S. Tomić, T. Vuletić, M. Pinterić, B.Korin-Hamzić, *Modalities of Self-Organized Charge Response in Low Dimensional Systems,* J. Phys. IV France 12, Pr9-211-214 (2002).

14 T. Vuletić, M. Pinterić, M. Lončarić, S. Tomić and J.U. von Schütz, *Non-ohmic electrical transport in the Peierls-Mott state of deuterated copper-DCNQI systems*, Synth.

Metals 120, 1001-1002 (2001).
15 S. Tomić, M. Pinterić, T. Vuletić, J.U. von Schütz and D. Schweitzer, *Low-frequency dielectric spectroscopy of commenurate density waves*, Synth. Metals 120, 695-698 (2001).

PUBLICATIONS QUALIFYING FOR LECTURESHIP:
CONFERENCES/WORKSHOPS

1. " Komora za mjerenje kompleksne vodljivosti uzoraka biomaterijala u tekućoj fazi"
T.Vuletić, M.Vukelić, K.Radmanović, S.Tomić,
3. znanstveni sastanak hrvatskih biofizičara, Zagreb, 13 lipnja 2003 (ORAL).
2. «Dielectric response of genomic DNA solutions: preparation, spectrophotometry and dielectric spectroscopy measurements»
S.Dolanski Babić, T.Vuletić, D.Vurnek, S.Tomić, S.Krča, D.Ivanković, L.Griparić

International Conference "From Solid State to Biophysics", Cavtat, Croatia (2004), http://dubrovnik2004.epfl.ch/ (POSTER).
3. "Dielectric spectroscopy of genomic DNA solutions"

T.Vuletić, S.Tomić, S.Dolanski Babić, S.Krča, D.Ivanković, L.Griparić
International Conference on Biological Physics, Gothenburg, Sweden (2004), http://fy.chalmers.se/icbp2004/. POSTER)
4. "Low-frequency dielectric spectroscopy of aqueous solutions"
T.Vuletić, R.Žaja, M.Vukelić, S.Tomić, I.Sondi
Workshop on Biopolymers: Thermodinamics, Kinetics and Mechanics of DNA, RNA and Proteins, ICTP, Trieste, Italy (2005). (ORAL & POSTER).
5. "Dielectric spectroscopy of genomic DNA solutions"

T.Vuletić, S.Dolanski Babić, S.Tomić, S.Krča, D.Ivanković, L.Griparić

15th IUPAB and 5th EBSA Intrenational Biophysics Congress, August 27th – September 1st, Montpellier, France (2005) (POSTER)
6."Niskofrekventna dielektrična spektroskopija polistirenskog latexa"
T.Vuletić, B. Frka-Petešić, M.Ujević, S.Tomić, I. Sondi,
4.znanstveni sastanak hrvatskih biofizičara, Institut R.Bošković, Zagreb (9 rujna 2005) (ORAL).
7. "Dielectric relaxation of nanosized particles dispersed in water" ; T. Vuletić, B. Frka-Petešić, S.Tomić, I.Sondi; 4th Symposium of Science and Technology of Nanomaterials, Ljubljana, Slovenia (2005) (ORAL).
SEMINARS
T. Vuletić: Fundamental length scales in aqueous Na-DNA, Kyoto University and Tokyo University, Japan (2006)
B.Frka-Petešić, „Utilisation de la spectroscopie dielectrique basse frequence dans l'etude de systems colloidaux", Rapport de stage for Master M1 de Physique (Magistere de physique) at Université Denis Diderot Paris VII; work made at Biophysics lab, Institut za fiziku, Zagreb; SUPERVISORS: S.Tomić and T.Vuletić.
publications 1, 3, 5, 9 as well as
In the refereeing process
S. Tomić, T. Vuletić, S. Dolanski Babić, S. Krča, D. Ivanković, L. Griparić, S. Tomić, R.

Podgornik, *Screening and fundamental length scales in semidilute Na-DNA aqueous solutions*, submitted to Physical Review Letters. In preparation S. Tomić, S. Dolanski Babić, T.Vuletić, S. Krča, D. Ivanković, L. Griparić and R. Podgornik, *Dielectric relaxation of DNA aqueous solutions,* cond-mat/0602255, in preparation for Physical Review E. T. Vuletić, S. Tomić, *Integrated setup for dielectric spectroscopy of aqueous samples*, in preparation for Review of Scientific Instruments.
DATE OF THE LAST PROMOTION: scientific associate (znanstveni suradnik), October 21st 2005.

LECTURER: Hrvoje Zorc

AFFILIATION: Rudjer Boskovic Institute, Bijenička c. 54, Zagreb

E-MAIL AND WEB ADDRESS: zorc@irb.hr

BIOGRAPHY*:*

Personal data: born 14 June 1951 in Zagreb

Education:
- 1966-1970: Mathematical high school, Zagreb
- 1970-1976: Faculty of Science, Department of Physics, University of Zagreb
- 1977-1979: Postgraduate study of physics, atomic and molecular physics, University of Zagreb
- 1991: Ph. D. physics awarded in Rudjer Boskovic Institute and University of Zagreb

Work: 1977. - now:

46. Deputy Head of Division of Laser and Atomic R&D, Rudjer Boskovic Institute, Zagreb
47. Research associate, Rudjer Boskovic Institute, Zagreb
48. Head of the Laboratory of Optical Thin Films in the Division
49. Scientist for development of hard optical coatings and ion-assisted deposition in Omega Optical, Brattleboro, VT, SAD
50. Head of Laboratory of Lasers and Optics in the Division of Rudjer Boskovic Institute
51. Head of Division of Laser and Atomic R&D, Rudjer Boskovic Institute, Zagreb
52. Deputy Minister of science, education and sports for technology development
53. Senior research associate, Rudjer Boskovic Institute, Zagreb

Professional activities outside the Institute:
- Member of Technology Council in the Ministry of Science, Technology and Informatics (2001-2004.)
- Member of Council of National Innovation System (2004-2005.)
- High level representative of Croatia in EUREKA (2004-)
- Head of Negotiation team for negotiations wit IBRD for the loan for restructuring science-technology system (2005.)

Other activities and memberships:

54. Member of Croatian Physical Society
55. Member of Croatian Astronomical Society
56. Member and past president (1989-1995) of Croatian Vacuum Society
57. Member of Optical Society of America

LIST OF PUBLICATIONS IN THE LAST FIVE YEARS:

1. Kovačević I. Dubček P. Zorc H. Radić N. Pivac B. Bernstorff S.: GISAXS characterization of Ge islands on Si(100) substrates., Vacuum. 80(1-3 Special Issue SI):69-73, 2005 Oct 14.
2. Gracin D. Dubček P. Zorc H. Juraić K.: Medium range ordering of amorphous silicon-carbon alloys studied by GISAXS, optical spectroscopy and IBA., Thin Solid Films. 459(1-

2):216-219, 2004 Jul 1.
3. Desnica UV. Buljan M. Desnica-Franković ID. Dubcek P. Bernstoff S. Ivanda M. Zorc H.: Direct ion beam synthesis of II-VI nanocrystals., Nuclear Instruments & Methods in Physics Research Section B-Beam Interactions with Materials & Atoms. 216:407-413, 2004 Feb.
4. Janicki V. Zorc H.:Refractive index profiling of CeO2 thin films using reverse engineering methods.: Thin Solid Films. 413(1-2):198-202, 2002 Jun 24.
5. Borjanović V. Kovačević I. Zorc H. Pivac B.: Irradiation effects on polycrystalline silicon., Solar Energy Materials & Solar Cells. 72(1-4):183-189, 2002 Apr.
6. Mikšić V. Pivac B. Rakvin B. Zorc H. Corni F. Tonini R. Ottaviani G.: DLTS and EPR study of defects in H implanted silicon., Nuclear Instruments & Methods in Physics Research Section B-Beam Interactions with Materials & Atoms. 186:36-40, 2002 Jan.

PUBLICATIONS QULIFYING FOR LECTURSHIP:

1. I. Radman, A. Peršin, H. Zorc, K. Tisaj, V. Stanišić, M. Lončarić, D. Soldo Roudnicky, A. Radman: First results of the use of new LED-based light sources on PDD and PDT of Mycosis Fungoides, 5th International Symposium on Photodynamic Diagnosis and Therapy in Clinical Practice, B. Kramer, H. Kostron, G. Jori (ur.). Bressanone, 2003.
2. I. Kopriva , A. Peršin, H. Zorc, J. Lipozenčić, A. Pašić, K. Kostović, M. Lončarić: Comparative study of PDD fluorescent excitation and image processing methods, 6th international symposium on Photodynamic Diagnosis and Therapy in Clinical Practice, Bressanone, 2006.
3. N. Puizina-Ivić, A. Peršin, H. Zorc: DT protocol improvements in treatment of Actinic Keratosis and Bowen's Disease, 6th international symposium on Photodynamic Diagnosis and Therapy in Clinical Practice, 10-14. 10. 2006., Bressanone, Italija
4. K. Kostović, J. Lipozenčić, A. Pašić, A. Peršin, H. Zorc, R. Čeović and D. Hrsan: Topical photodynamic therapy in the treatment of malignant epidermal precancerous and cancerous lesions, 6th international symposium on Photodynamic Diagnosis and Therapy in Clinical Practice, 10-14. 10. 2006., Bressanone, Italija
5. M. Doko, A. Švarc, M. Jurin, S. Borović, H. Zorc,: Intraoperative photodynamic therapy succesfully eliminates large tumor in mice. , Periodicum biologorum. 99 (1997) , 3; 361-365
6. M. Doko, A. Švarc, M. Jurin, S. Borović, H. Zorc,: The Role of Light Intensity, Irradiation Time and Photoactive Substance Concentration in Photodynamic Therapy in Preclinical Research., Acta medica Croatica. 51 (1997) , 4-5; 181-189
7. A. Švarc, M. Jurin, S. Borović, H. Zorc: Mathematical model for heat deposition in tissue during photodynamical therapy., Journal of Biological Systems. 4 (1996) , 2; 261-276
8. A. Švarc, M. Jurin, S. Borović, H. Zorc, M. Doko: A mathematical model for the effect of red light penetration depth on tumor growth , Acta medica Croatica. 50 (1996) , 3; 119-124

DATE OF THE LAST PROMOTION: 30 June 2005, senior research associate

6. MEDICAL PHYSICS

LECTURER: Lončarić Srećko, Ph.D.
AFFILIATION: Clinical Department of Nuclear Medicine and Radiation Protection of Medical School and KBC-Zagreb.
E-MAIL AND WEB ADDRESS: **sreclon@public.srce.hr**, **http://public.srce.hr/~sreclon/**
BIOGRAPHY: Lončarić Srećko, Ph.D. Associate Professor at Faculty of Natural Sciences, scientific collaborator at Medical School. Head of Polyclinical section of biophysics in Clinical department of nuclear medicine of Medical School and KBC-Zagreb. Born in 1951 in Zagreb, Croatia. Graduated in theoretical physics from Faculty of Natural Sciences and Mathematcs, University of Zagreb, in 1976. M.S. degree in theoretical physics earned in 1981 from University of Zagreb, field "Nuclear Physics and Elementary Particles". Ph.D. degree earned from Medical School of Zagreb in 1989, field "Physics". Since 1977 employed in Clinical Department of Nuclear Medicine and Radiation Protection, Clinical Hospital Center - Zagreb and Medical School of University of Zagreb. School year 1978/1979 spent as assistant of physics in Faculty of Electrical Engineering and Computing of Zagreb. School year 1985./1986 spent with dr. Henry Wagner Jr. in The Johns Hopkins Medical Institutions, Baltimore, MD, USA, as the fellow of International Atomic Energy Agency (I.A.E.A.). There, intensively studied artifacts in SPECT by use of computer simulations. After return from US Ph.D. thesis entitled "Study of Artifacts in Single Emission Computed Tomography", has been made and defended. Thesis investigated and explained artifacts induced by attenuation of radiation within the patient body and by spatially dependent gamma camera resolution. During period 1988-1994 external technical collaborator in Nuclear Medicine Department u Brookhaven National Laboratory, Long Island, NY, USA. Period 1993-1995 spent with dr. Wei Chang in Rush Presbyterian - St. Luke's Medical Center, Chicago, IL, USA. Involved in development of asymmetric-fan-beam collimator and necessary algorithm for tomographic reconstruction, about what several papers have been published. During this period also worked on projects sponsored by Siemens Medical Systems, Hoffman Estates, IL, USA and Park Medical Systems, Lachine, Quebec, Canada. Paper published in JNM in 1998, was on 46th Annual Meeting of Society of Nuclear Medicine (SNM, Los Angeles 1999.) awarded as the second best paper from basic sciences that appeared during previous year in that respectful journal. During period 1995-2000 successfully collaborates with University of California, Davis Medical Center, Division of Nuclear Medicine, Sacramento, California, USA. Since 2000 till now successfully collaborates with Department of Radiology, University of North Carolina, Chapel Hill, North Carolina, USA. Since 1995 appointed as the Chief of Polyclinical Section of Biophysics in Clinical Department of Nuclear Medicine and Radiation Protection; Clinical Hospital Center - Zagreb and Medical School of University of Zagreb. Section staff consists of 16 employees: 3 physicists (1 Ph.D., 2 M.S.), 2 M.S. electrical engineers, 2 chemists (1 M.S., 1 B.S.) and 9 technicians. Section of Biophysics is responsible for technical and scientific support within the Department of Nuclear Medicine: instrumentation calibration and quality control, preparation and quality control of

diopharmaceuticals. Member of medical emergency preparedness team for nuclear power plant NE Krsko in the case of a nuclear accident. During the period 2002-2005 principal investigator of project „Dosimetric study of radioiodine therapy of benign thyroid diseases“ of Ministry of Science. Main fields of interests and scientific research are computer techniques in nuclear medicine and emission computer tomography - SPECT and PET: algorithms for image reconstruction, attenuation and scatter correction of nuclear radiation. Also involved in internal dosimetry and radiation protection under clinical and accidental circumstances, as well as in quantitative and qualitative analysis of whole body radioactivity and in procedure development for external and internal decontamination.

LIST OF PUBLICATIONS IN THE LAST FIVE YEARS:

353. Ivanovic, M., S. Loncaric, A. Khandani, W. H. McCartney, Evaluation of PET Standard Uptake Values Dependence on Imaging Protocols for Dual Time Point Imaging. Journal of Nuclear Medicine (Supplement), Vol. 46(6):174P, 2005.
354. M. Ivanovic, S. Loncaric, W.H. McCartney and A. Khandani: Evaluation of PET Standard Uptake Values Dependence on Imaging Protocols for Dual Time Point Imaging. Medical Imaging Conference record, Rim, Italija, M10-324, 2004
355. Grošev D, Lončarić S, Vandenberghe S et al.: Triple-head gama camera PET: system overview and performance characteristic. Nucl Med Comm; 23:809-814, 2002.
356. B. Kasal, S. Lončarić, D. Dodig: spatial resolution index of a gamma camera measured by bar phantom and fourier spectrum analysis. WFNMB - 8th World Congress of Nuclear Medicine, 29.9-04.10. 2002, Santiago de Chile, Chile
357. Ivanovic M., Pellot-Barakat C., Weber D.A., Loncaric S., Shelton D.K., Effects of Patient Motion in Coincidence Studies on Hybrid PET/SPECT System Abstract Book of the 2000 IEEE Nuclear Science Symposium and Medical Imaging Conference, Lyon, France, P740, 2000.

PUBLICATIONS QULIFYING FOR LECTURSHIP:

358. Ivanovic, M., S. Loncaric, A. Khandani, W. H. McCartney, Evaluation of PET Standard Uptake Values Dependence on Imaging Protocols for Dual Time Point Imaging. Journal of Nuclear Medicine (Supplement), Vol. 46(6):174P, 2005.
359. Hollinger E.F., Loncaric S., Yu D.C., Ali A., Chang W.: Using Fast Sequential Asymmetric Fanbeam Transmission CT for Attenuation Correction of Cardiac SPECT Imaging. J Nucl Med, vol. 39, 1335-1347, 1998
360. Chang W., Loncaric S., Huang G., Ni B., Sanpitak P.: Asymmetric-fan transmission CT on SPECT system. Phys Med Biol, vol. 40: 913-928, 1995
361. Loncaric S., Chang W., Huang G.: A Processing Technique for the Truncated Projections of Asymmetric-Fan-Beam Transmission Imaging. IEEE Trans Nucl Sci, vol. 42: 2292-2297, No 6, December 1995
362. Loncaric S., Chang W., Huang G.: Using Simultaneous Transmission and Scatter SPECT Imaging from External Sources for The Determination of Thoracic m-map. IEEE Trans Nucl Sci, vol. 41: 1601-1606, No 4, August 1994

DATE OF THE LAST PROMOTION: 2002

LECTURER: Prof. dr. sc. Mladen Vrtar

AFFILIATION: Permanent: KBC Zagreb, Rebro,
Honorary: Physics department, Faculty of science

E-MAIL AND WEB ADDRESS: mladen.vrtar@kbc-zagreb.hr

BIOGRAPHY*:*

1963. Finished gymnasium in Zagreb
363. Finished study of physics, Faculty of science - Diploma engineer of physics (Dipl.Eng.)
1968. - 1972. Assistant, theoretical physics department "Ruđer Bošković Institute".
364. Master of science, Faculty of science (Mr.sc.)
365. - till today, radiophysicist, Clinic of oncology and radiotherapy, University Hospital Centre Zagreb
366. - 1983. specialisation in radiotherapy physics: Manchester (1974), London (1982), Paris (1982)
Uppsala (1983).
1987. - till today, head of radiophysics unit, Clinic of Oncology and Radiotherapy UHC Zagreb
1989. - Doctor of physical science (Dr.sc.), Faculty of science Zagreb
1994. - till today, president of medical physics division of CROMBES (Croatian Medical and Biological Engineering Society) and long term Croatian delegate at EFOMP
1995. - till today, lecturer at Faculty of science, subjects: "Medical physics" (diploma study), "Radiological and radiotherapeutical physics" and "Dosimetry and radiation protection" (postgraduate study)
1999. - Docent at Physics department of Faculty of science
2000. - till today, head of the scientific direction of postgraduated doctor study of Medical physics
2003. - till today, founder and head of interdisciplinary postgraduated specialist study of Medical physics
2005. - Professor of physics at Physics department of Faculty of science

LIST OF PUBLICATIONS IN THE LAST FIVE YEARS:
(Only in journals, conferences excluded):

1.Vrtar M. Total body irradiation dosimetry of a low dose rate 60Co gamma field. Fizika B Vol 10, No 4, 255-268, 2001.
2. Vrtar M. A dosimetric method of total body irradiation. Cellular & Molecular Biology Letters 7: No.2, 337-340, 2002
3. Labar B., Bogdanić V., Nemet D., Mrsić M., Serventi-Seiwerth R., Sertić D., Golubić-Čepulić B., Vrtar M., Šantek F., Batinić D., Mikulić M., Pulanić D. Allogeneic Stem Cell Transplantation in Treatment of Aggressive Lymphomas: Case Series. Cro Med J. 43 (5): 565-568, 2002.
4. Faj D., Vrtar M. , Krajina Z. Jurković S., Margaretić D. Model of Total Skin Electron Treatment Using the "Six-Dual-Field" Technique. Coll. Antropol. 27: 713-721, 2003.
5. Kovačević N., Vrtar M., Vekić B. A simple calculation method for 106Ru-106Rh eye

applicators. Radiotherapy and Oncology 74 : 293-299, 2005.
PUBLICATIONS QULIFYING FOR LECTURSHIP: More than100 scientific and specialistic publications, conference summaries and other activities: 29 scientific papers (including 14 CC), 27 edited presentations on international conferences, 34 on domestic conferences, 8 scientific and specialistic editions in books, and student papers, 8 specialistic presentations on domestic and international meetings, 2 heads of scientific projects (including 1 IAEA project), 3 collaborations in realisation of scientific projects, 2 times reviewer in scientific project, 5 invited lectures on international meetings and 9 on domestic. Citation number: 85 SCI for publications : see above
DATE OF THE LAST PROMOTION: 2005. - Professor of physics at Physics department of Faculty of science

LECTURER: Branko Breyer

AFFILIATION:

Laboratory Breyer, Prilaz Gj. Dezelica 79, Zagreb

E-MAIL AND WEB ADDRESS: branko.breyer@lab-breyer.com

BIOGRAPHY:
Profession: Electronic engineer and Medical physicist, University Professor
Born: 9 May, 1941, Zagreb, Croatia
Membership of Professional Societies:
Croatian society for medical ultrasound (Past President), Croatian radiation protection society, Croatian Society for Medical and Biological Engineering, Institute of Physical Sciences in Medicine (Great Britain), American Institute of Ultrasound in Medicine (USA) (Senior Member)
Major Tasks Carried Out:
- Head of Medical physics department at the Gynaecological Cancer Centre
- Purchase, installation and commission of complete hospital equipment
- Industrial design and prototype construction of a Doppler fetal heart monitor
- Invention of new medical instruments (11 USA patents).
- Taking part in the writing of two WHO Manuals (Maintenance of Medical Equipment, Interpretation of Ultrasound Images for General Practitioners)
Radiation protection calculation and consulting. Active collaboration in legislation on nonionising radiation protection (ultrasound, microwave, laser, etc.).
Over 150 scientific papers
Key Qualifications:
- Diploma of Electrical Engineering in 1964
- M.Sc.: Nuclear electronics, radiocarbon measurement technology, Univ. of Zagreb, 1969
- Ph.D. in 1971 with a thesis including electronic technology and dosimetry/spectrometry physics;
- Specialization at the Medical Physics Department, Royal Marsden Hospital, Sutton, London, U.K., 1974 – Medical ultrasound and radiotherapy
Scientific activity: Active participation in European and world congresses in medical ultrasound and medical physics, over 150 publications; 15 letters patent for inventions in the field of medical and other instrumentation.

LIST OF PUBLICATIONS IN THE LAST FIVE YEARS:
Ferek-Petric and Branko Breyer: Ultrasound methods and implantable medical devices using same, United States Patent 7,037,266 : May 2, 2006
Branko Breyer and Bozidar Ferek-Petric: THERAPY DEVICE FOR VENOUS POOLING DETECTION, EvropskiPatent 0959945B1: 2001-08-08

PUBLICATIONS QULIFYING FOR LECTURSHIP:
Breyer,B.: Medicinski dijagnosticki ultrazvuk - uvod u fiziku i tehniku, (monografija), Skolska knjiga, Zagreb,1991.
Breyer B., A. Despot, M. Predanić, S. Judin: Characteristics of blood flow in cancer of the uterine cervix, Ultrasound. Obstet. Gynecol. 3 (1993) 1-3
Heffer-Lauc M., Latin V., Breyer B., Floegel M., Mueller W.E.G., Lauc G.: Glycoprotien

and ganglioside changes in human trophoblasts after exposure to pulsed Doppler ulrasound, Ultrasound Med. Biol. 21,(1995) 579
Breyer. B, A. Kurjak: Safety of diagnostic ultrasound in obstetrics
Textbook of perinatal medicine, A. Kurjak, editor, pp 401-408, The Parthenon Publishing Group, London, New York, 1998
Breyer, B, Ferek-Petric Bozidar, Cikes,I: Properties of Ultrasonically Marked Leads, PACE, 12, (1989), 1369-1380
B.Breyer, I.Cikes, B.Ferek-Petric: Cardiac ultrasonically marked leads and method for use of the same
U.S.A. patent 4,706,681 (1987)
B.Breyer and I.Cikes: Ultrasonically marked cardiac catheters
U.S.A. patent 4,697,595 (Oct. 6, 1987)
B.Breyer and B.Ferek-Petric: Hydrodynamic system for blood flow measurement
U.S. pat. 5,271,408 Dec 21 ,1993, and British patent no. 0 506 030
B.Ferek-Petric and B.Breyer: Tricuspid flow synchronized cardiac electrotherapy system with blood flow measurement transducer and controlled pacing signals based on blood flow measurement
U.S. patent 5,243,976 (Sep. 14. 1993)
B.Ferek-Petric and B.Breyer: Pacing method and system for blood flow velocity measurement and regulation of heart stimulating signals based on blood flow velocity
U.S. pat. 5,318,595 (June 7, 1994)
Breyer Branko; Ferek-Petric; Bozidar: Blood flow measurement device,
United States Patent 5,785,657, Jul. 28, 1998
Ferek-Petric Bozidar, Branko Breyer, Ivo Cikes: Ultrasonic marked cardiac ablation catheter,
United States Patent 5,840,030, Nov. 24, 1998

DATE OF THE LAST PROMOTION: 1994

LECTURER: Gordana Žauhar

AFFILIATION:

School of Medicine, Department of Physics, University of Rijeka

E-MAIL AND WEB ADDRESS: gordz@medri.hr

BIOGRAPHY*:*

I was born on 18th of December 1963. Primary and high school I have finished in Rijeka. Graduated in 1986 and got a B. Sc. in chemistry and physics at Faculty of Philosophy on the University of Rijeka. In 1994. I finished the postgraduate studies of medical physics at Faculty of Science on the University of Zagreb and got a title Master of science in physics (medical physics). In 2001. I got a PhD in Physics at Faculty of Science on the University of Zagreb.

At first, I worked as a teacher in one secondary school in Rijeka. Also, I worked for 6 months at University Hospital Rijeka on the Department of Radiology and Oncology as a medical physicists on radiotherapy treatment planning**.** Now, I work as an assistant professor at the Department of Physics, School of Medicine, on the University in Rijeka.

I have received the EFOMP Travel Award for Young Physicists in 1996. That award has given me an opportunity to visit Medical Physics Department at Royal United Hospital in Bath, UK. The scholarships which I have received from The Primorsko-Goranska County (Republic of Croatia) in 1996 and in 1999 made it possible for me to spend a period of four months at Medical Physics Department in Bath, UK. During my stay there I learned a lot about acoustic streaming and I was involved in some research as well. The results of this work are published. In September 2003 I got a bursary from the IPEM (The Institute of Physics and Engineering in Medicine) for attending 9th Annual Scientific Meeting of the IPEM which was held at the University of Bath.

have rece.

I speak and write English and know a little Italian.

LIST OF PUBLICATIONS IN THE LAST FIVE YEARS:

367. Milotic, F. Fuckar, Z. Gazdik, M. Cicvaric, T. Milotic, I. Zauhar, G. Inflamed Urachal Cyst Containing Calculi in an Adult. // Journal of Clinical Ultrasound. 30, 4 (2001), str. 253-255.

368. Cvjetković, N. Velepič, S.M. Velepič, M.M. Komljenović, D. Žauhar, G. The Quantitative Analysis of the Vascularization Following Two Basic Auditory Canal Skin Incisions. // Coll. Antropol. 27, 1(2003), str. 279-284.

369. Prpić Massari, L. Kaštelan, M. Gruber, F. Laškarin, G. Sotošek Tokmadžić, V., Štrbo, N. Zamolo, G. Žauhar, G. Rukavina, D. Perforin expression in peripheral blood lymphocytes and skin-infiltrating cells in patients with lichen planus. // British Journal of Dermatology. 151, 2(2004), str. 433-439.

370. Kastelan, M. Prpic Massari, L. Gruber, F. Zamolo, G. Zauhar, G. Coklo, M.

Rukavina, D. The role of perforin-mediated apoptosis in lichen planus lesions. // Arch Dermatol Res. 296, 5(2004), str. 226-230.

371. Kastelan, M. Prpic Massari, L. Gruber, F. Zamolo, G. Zauhar, G. Coklo, M. Rukavina, D. Perforin expression is upregulated in the epidermis of psoriatic lesions. // British Journal of Dermatology. 151, 4(2004), str. 831-836.
372. Žauhar, G. Acoustic streaming in liquids induced by ultrasound. // Liječnički vjesnik. 126, S2(2004.), str. 125-125.
373. Batinac, T. Zamolo, G. Stemberger C. Coklo, M. Lenkovic, M. Zauhar, G. Stasic, A. Apoptosis and proliferation in epidermis of venous leg ulcers. // International Angiology. 24, 3(S1)(2005), str. 198.
374. Zauhar, G. Starritt, H.C. Duck F.A. Comparison of the acoustic streaming in amniotic fluid and water in medical ultrasonic beams. // Ultraschall Med. 27, 2(2006), 152-158.

PUBLICATIONS QULIFYING FOR LECTURSHIP:

375. ZAUHAR, G. STARRITT, H.C. DUCK, F.A. Studies of acoustic streaming in biological fluids with an ultrasound Doppler technique. // The British Journal of Radiology, 71, (1998.), 297-302.
376. MILETIĆ, D. FUČKAR, Ž. ŠUSTIĆ, A. MOZETIČ, V. ŠTIMAC, D. ŽAUHAR, G. Sonographic Measurement of Absolute and Relative Renal Length in Adults. // Journal of Clinical Ultrasound, 26, 4(1998), 185-189.
377. Milotic, F. Fuckar, Z. Gazdik, M. Cicvaric, T. Milotic, I. Zauhar, G. Inflamed Urachal Cyst Containing Calculi in an Adult. // Journal of Clinical Ultrasound. 30, 4 (2001), str. 253-255.
378. Zauhar, G. Starritt, H.C. Duck F.A. Comparison of the acoustic streaming in amniotic fluid and water in medical ultrasonic beams. // Ultraschall Med. 27, 2(2006), 152-158.

DATE OF THE LAST PROMOTION: 1st July 2005.

LECTURER: Prof. Dr. Sc. Ante Šantić. Prof. emeritus

AFFILIATION: Faculty of Electrical Engineering and Computing. Zagreb

E-MAIL AND WEB ADDRESS: ante.santic@fer.hr
www.zesoi.fer.hr/history/history.hr.php-32

BIOGRAPHY: Prof. Dr. sc. Ante Šantić received the Dipl. Ing. degree in 1953. and the D.Sc. degree in 1966. both in electrical (electronic) engineering from the University of Zagreb, Faculty of Electrical Engineering. From 1954. to 1970. he worked: first as a research engineer and than from 1959. as the head of Electronics Laboratory in the Institute of Electrical Engineering in Zagreb. At the beginning he worked on the research and development of special electronic instrumentation. As the head of Electronics Laboratory he started developement of medical electronic instrumentation particularly electroencephalographs (EEG) in which he developed entire electronic part and continued with leading EEG small series manufacture. During this research he obtained two patents and developed electrical stimulators, respiration, heart rate and the bioimpedance measuring instrumentation, and an oscilloscope for biological signals measurement. He also holds as the secondary appointment at the Faculty of Electrical Engineering University of Zagreb the teaching assistant position from 1956 and the assistant professor from 1964. In 1969 he became associate professor and in the 1975 full professor. In 1970 he joined in full time job at the same Faculty. At that time he introduced two new lectures called: "Electronic Instrumentation" and "Biomedical Electronics". He also founded Biomedical Electronics Laboratory.

His research activities are in the field of special electronic instrumentation for measurement mechanical quantities (blood pressure measurement in fingers), and biomedical electronics like in the biotelemetry, bioelectrical signal processing, non-invasive measurements, gait analysis, pulse plethysmography etc.. He wrote two books: "Electronic instrumentation" (3 editions, 1982., 1988., 1993.) and "Biomedical Electronics" (1995) edited by Školska knjiga. The last book was awarded by the Croatian Academy of Sciences and Arts as the most successful book in the engineering sciences in 1995. He spent one year (1975/76) as the Fulbright Post-Doctoral Fellow at the Case Western Reserve University of Cleveland, Ohio, USA and afterwards was invited as the visiting professor from 1982 to 1984 at the same University. He was vice-dean from 1976. to 1978., and the dean from 1978. to 1980. of the Electrical Engineering Faculty.

He was also awarded with Republic Award "Nikola Tesla" in 1980. for his contribution in the field of Biomedical Engineering and recently in 1997. with the Republic Award "Red Danice Hrvatske s likom Ruđera Boškovića" for his contribution in science. He is also recipient of Award from Croatian Academy of Science and Art for his distinct contribution in the field of engineering sciences in 1997., and Award "Josip Lončar" for his contribution to the Faculty of Electrical Eng. & Computing. In 2000 he got prestigeous State Award for Life Achievement from the Goverment of Croatia and was nominated to be Prof. Emeritus. In 2003 he got most siginificat award from IEEE Engineering in Medicine and Biology Society (USA), named: "EMBS Career Achievement Award".

LIST OF PUBLICATIONS IN THE LAST FIVE YEARS:

1. Šantić,Ante; Bilas,Vedran; Lacković,Igor.A system for measurement forces in feet and crutches during normal and pathological gait. // Periodicum Biologorum. 104 (2002) , 3; 305-310 (paper, scientific work).

2. Bilas,Vedran; Šantić,Ante: Diversity techniques for mobile optical biotelemetry // Proceedings of the International Federation for Medical & Biological Engineering. Medicon 2001 /Zagreb : FER, CROMBES, 2001. 305-308 (international review, scientific work).
3. Bilas,Vedran; Šantić,Ante; Lacković,Igor; Ambruš,Davorin: A low-power wireless interface for human gait assessment // Proceedings of the 18th IEEE Instrumentation and Measurement Technology Conference. Piscataway : IEEE, 2001. 614-618 (international review, scientific work).
4. Lacković, Igor; Šantić, Ante: Accuracy improvement of noninvasive finger blood pressure measurement // Proceedings of the International Federation for Medical & Biological Engineering, vol. 1, Medicon 2001 Zagreb. FER, CROMBES, 2001. 281-284 (international review, scientific work).
5. Kovačić, Dubravko; Šantić, Ante: An electrical impedance tomography system for current pulse measurements // Proceedings of the International Federation for Medical & Biological Engineering Medicon 2001 Zagreb : FER, CROMBES, 2001. 255-257 (international review, scientific work).
6. Kovačić, Dubravko; Šantić, Ante: Pulse measurement performance in differential resistivity image reconstru-ction // Biomedical Applications EIT, Scientific Abstracts.London. 2001. (international reiew, scientific work).
7. Šantić, Ante; Kovačić, Dubravko; Gilly, Hermman: Force measuring device applied in cardiopulmonary resuscitation // Proceedings of the International Federation for Medical & Biological Engineering Medicon 2001 / Zagreb : FER, CROMBES, 2001. 273-276 (international reiew, scientific work).
8. Starčević, Filip; Šantić, Ante: Electrode - tissue Interface Properties in Pulse Plethysmography Measurement // Medicon and ealth Telematics 2004.(international reiew, scientific work).

PUBLICATIONS QUALIFYING FOR LECTURESHIP:
1..- Ante, Šantić: "Biomedicinska elektronika." Školska knjiga. Zagreb. 1995. pp. 382.
2.- Ante, Šantić: "Elektronička instrumentacija." Školska knjiga. Zagreb. 1993. 3. edition. pp. 432. .
3.- Ante, Šantić: "Mjerni uređaji s jednodimenzijskim prikazom mjerne veličine"/ Elektrotehnika: elektronika, komunikacije i električni strojevi / Modlic, Borivoje ; Budin, Ivan (editor). Zagreb : Školska knjiga, 2002.
4.- Ante, Šantić: "Biomedicinska elektronika"/ Elektrotehnika : elektronika, komunikacije i električni strojevi / /Modlic,Borivoje ; Budin, Ivan (editor). Zagreb : Školska knjiga, 2002.
5.- Ante, Šantić: "Biomedical Telemetry" / Wiley Encyclopedia of Electrical and Electronics Engineering / Webster, John G. (editor). New York : John Wiley & Sons, Inc, 1999.
6.- A. Šantić, M. R. Neuman:"A Low Input Voltage DC-DC Convertor for Implanted Electronic Circuits".
Journal of Bioengineering. Vol. 1977, Sept. pp. 357-358. Pergamon Press.
7.- M. R. Neuman, A. Šantić: " Biotelemetry Systems", Chapter in the book. "Medical Monitoring in the Home and
Work Enviroment" Loughton Miles and R. Broughton (editors). Raven Press. New York. 1990. pp. 59-70.
8.- A. Šantić: "Theory and Application of Diffuse Infrared Biotelemetry". CRC Critical Review in Biomedical Engineering. CRC Press. Vol. 18. Issue 4. Boca Raton, Florida 1991.

Medline. pp. 289.-309. 29 request for separates.
9.- A. Šantić, M.R. Neuman: "Instrumentation for Sensing Blood Pressure at the Finger" AAMI 18th Annual Meeting. May 22-2T5, 1983. Dallas.
10.- A. Šantić: "Pulse Plethysmography in Cardiovascular and Respiratory Measurement". 7th International Confe- rence on Mechanics in Medicine and Biology" Portschach. Austrija. Oct. 13-16, 1991 pp.14-15.
11.- A. Šantić, M. Šaban: "Features of Pulse Plethysmography and a Comparison with Impedance Plethysmography". Proceedings of the 14th Annual International Conference of the IEEE Engineering in Medicine and Biology Society. Paris. Oct. 29- Nov.1. 1992. pp. 1738-1739.
12.- A. Šantić, L. Lacković: "Simultaneous Applications of Multiple Oscillometric Methods for Blood Pressure Measurements in Finger". Proceedings of 1st Joint BMES/EMBS Conference and 21st Annual International Confe-rence of IEEE Engineering in Medicine and Biology Society. Atlanta. Oct. 13-16, 1999. Vol 1., pp. 231.-232. INSPEC.

DATE OF THE LAST PROMOTION:
Full Professor since 1975., scientific consultant, Prof. Emeritus since 2000.

LECTURER:
Ranka Štern Padovan

AFFILIATION:
Radiologist; Head of the Department of Diagnostic and Interventional Radiology, University Hospital Center 'Zagreb', Croatia; PhD, Associate Professor at Medical School, University of Zagreb

E-MAIL AND WEB ADDRESS:
rpstern@mef.hr

BIOGRAPHY:
Date and place of Birth:
July 5th, 1948, Zagreb
Education:
Elementary School, Zagreb, Croatia
High School, Zagreb, Croatia
1968-1973 Medical School, University of Zagreb, Croatia
1975-1977 Postgraduate Study in Biomedicine
1981 Educational Course in the Institute of Radiology and Oncology, Mount Sinai
Medical Centre, Huston, USA
1988 Radiology Department, New York, USA
1996 London Clinic, London, GB
1997 Northwick Park Hospital, Harrow, GB
1999 Department of Radiology, Georgetown University, USA
2001 Allgemeines KrankenHaus Wien, Austria
2003 Klinikum Groshaden - Institut fur Klinishe Radiologie, Munchen, Germany
Students Activities:
1972-1975 Student assistant in Department of Anatomy
1973 University Rector's Award for Students Research Work
Academic and Teaching Carrier:
1975-1981 Assistant Lecturer in Department of Anatomy, Medical School, University of
Zagreb, Croatia
1977 Master of Science Degree
1978 PhD Degree
1981-1990 Senior Lecturer in Department of Anatomy, Medical School, University of
Zagreb
1990-1999 Senior Lecturer in Department of Radiology and General Clinical Oncology,
Medical School, University of Zagreb
1999 Assistant Professor in Department of Radiology and General Oncology, Medical School, University of Zagreb
1975 Teaching 'Anatomy' and Radiology in Medical Schools in Zagreb, Osijek, Split,
Dental Medicine School in Zagreb. Teaching 'Radiologic Anatomy' and

	'Clinical Anatomy' in Medical School in Zagreb
1997	Principal Lecturer of postgraduate study 'Radiology', Lecturer of Radiology in
	postgraduate studies 'Oncology', 'Urology', 'Emergency Medicine', 'Orthopedics and Rheumatology', 'Biology', 'Medical Physics'
1981	Mentor of several MS and PhD thesis
1972	Active participant of several Academic and Clinical Research Projects
2003	Vice Chairman of Department of Radiology and General Clinical Oncology,
	Medical School, University of Zagreb
Professional Carrier:	
1973-1974	Internship and State Exam
1979-1982	Radiology Residency and Residency Exam
1984	Employee in Department of Diagnostic and Interventional Radiology, University Hospital Center 'Zagreb', Croatia
1988-1998	Head of Urogenital Section of Department of Diagnostic and Interventional
	Radiology, University Hospital Center 'Zagreb', Croatia
1998	Head of Department of Diagnostic and Interventional Radiology, University
	Hospital Center 'Zagreb', Croatia
1981	Mentor of numerous interns and residents. Teaching in several professional
	educational courses
1998	Member of Radiology Committee of Ministry of Health of Republic of
	Croatia
Memberships:	
	Croatian Medical Association
	European Congress of Radiology
	Radiology Society of North America
	Croatian Society of Anatomy, Histology and Embryology

LIST OF PUBLICATIONS IN THE LAST FIVE YEARS:

379. Barbarić-Babić V, Marinić J, Sjekavica I, Molnar M, Štern-Padovan. Korelacija hydro-CT metode s drugim radiološkim metodama u dijagnostici tumora želuca. Kongres hrvatskog onkološkog društva, Zagreb 2001.
380. Štern-Padovan R. Suvremena radiološka dijagnostika abdomena. Simpozij posvećen akademkinji Jeleni Krmpotić-Nemanić, Zagreb 2001.
381. Sjekavica I, Štern Padovan R, Marinić J, Babić V. Aortal native CT – Diagnostic value of calcification. Croatian-Slovenian-Hungarian Radiological Symposium Pecs. 2001.
382. Štern Padovan R, Roglić A, Batinica M, Čikara I. CT review of extranodal lymphoma with unusual localization – case report. Croatian-Slovenian-Hungarian Radiological Symposium Pecs. 2001.
383. Štern Padovan R, Marinić J, Klapan T, Pavliša G. CT review of complications on inflammatory renal diseases. Croatian-Slovenian-Hungarian Radiological Symposium Pecs. 2001.

384. Barbarić-Babić V, Sjekavica I, Molnar M, Marinić J, Frković M, Krznarić Z, Štern-Padovan R. Crohn` s disease – sonography, barium study, CT. 11 European Congress of Radiology, Vienna, Austria, European Radiology 2001;11(6):42
385. Barbarić-Babić V, Sjekavica I, Molnar M, Marinić J, Frković M, Krznarić Ž, Štern-Padovan R. Crohn´s disease - sonography, barium study, CT. Acta med. Croat. 2001; 55(4):89-140.
386. Štern-Padovan R. Hepatobilijarni sustav, gušterača i slezena. U: Hebrang A, Lovrenčić M. Radiologija. Zagreb: Medicinska naklada 2001.
387. Agbaba M, Štern-Padovan R. Urogenitalni sustav nadbubrežne žlijezde. U: Hebrang A, Lovrenčić M. Radiologija. Zagreb: Medicinska naklada 2001.
388. Štern Padovan R. Radiologija u Hrvatskoj – danas i sutra. U: Štulhofer M, Kurjak A. i sur. Klinička medicina u Hrvatskoj danas i sutra. Zagreb: Akademija medicinskih znanosti Hrvatske 2002.
389. Štern Padovan R. CT i MR u gastroenterologiji. U: Vucelić B i sur. Gastroenterologija i hepatologija. Zagreb: Medicinska naklada 2002.
390. Paladino J, Glunčić V, Štern-Padovan R, Vinter I, Lukić IK, Marušić A. Cranial base kyphosis and the surface morphology of the anterior cranial fossa. Ann Anat 2002;184:21-25
391. Župančić B, Antabak A, Popović Lj, Župančić V, Čavčić J, Majerović M, Batinica S, Štern-Padovan R, Poropat M, Leutić T. Successful Early Pyeloplasty in Infants. Archives of Medical Research 2002;33:158-161
392. Paladino J, Gjurašin M, Glumičić V, Štern-Padovan R, Vinter I. Important features for the eyebrow keyhole approach. Periodicum biologorum 2002;102(4):405 -409
393. Bilić R, Jelić M, Štern-Padovan R, Pećina M, Vukičević S. Scaphoid reconstruction by OP-1. Second European Conference of Bone Morphogenetic Proteins, Zagreb 2002.
394. Heinrich Z, Pirker N, Paladino J, Štern-Padovan R. Failed back surgery sindrome- clinical report. 3. Kongres Hrvatskog neurokirurškog društva, Zagreb 2002.
395. Lušić M, Štern-Padovan R. Postprocessing and volume rendering on MSCT – new era in radiology. XXI Annual Meeting of the Radiologists of the Alpe-Adria Region, Opatija 2002.
396. Sjekavica I, Štern-Padovan R, Moscatello I, Kuhar-Šeronja M. Boerhaaveov sindrom. 3. Kongres Hrvatskog društva radiologa s međunarodnim sudjelovanjem, Split 2002.
397. Čikara I, Sjekavica I, Štern-Padovan R, Batinica S. Valjanost ultrazvuka kod procjene funkcije transplantiranog segmenta jetre u djece. 3. Kongres Hrvatskog društva radiologa s međunarodnim sudjelovanjem, Split 2002.
398. Štern-Padovan R, Čikara I, Batinica M, Radanović B. Cistični Wilmsov tumor trogodišnjeg dječaka. 3. Kongres Hrvatskog društva radiologa s međunarodnim sudjelovanjem, Split 2002.
399. Lušić M, Radoš M, Štern-Padovan R, Batinica M. Multislice CT – Image postprocessing metode. 3. Kongres Hrvatskog društva radiologa s međunarodnim sudjelovanjem, Split 2002.
400. Štern-Padovan R, Lušić M, Radoš M, Marinić J, Oberman B. Višeslojna kompjuterizirana tomografija – volumni prikaz trbušnih organa i pripadajućih krvnih žila. 3. Kongres Hrvatskog društva radiologa s međunarodnim

sudjelovanjem, Split 2002.

401. Šten-Padovan R, Sjekavica I, Marinić J, Barbarić-Babić V, Batinica M. Nativna CT kod AAA: Dijagnostička vrijednost kalcifikacija. 3. Kongres Hrvatskog društva radiologa s međunarodnim sudjelovanjem, Split 2002.
402. Čikara I, Sjekavica I, Molnar M, Štern-Padovan R, Bubić-Filipi Lj. Primjena ultrazvuka u bolesnika s kliničkim znakovima odbacivanja transplantiranog bubrega. 3. Kongres Hrvatskog društva radiologa s međunarodnim sudjelovanjem, Split 2002.
403. Štern-Padovan R, Roglić A, Batinica M, Klapan T. CT pregled ekstranodalnog limfoma neobične lokalizacije. 3. Kongres Hrvatskog društva radiologa s međunarodnim sudjelovanjem, Split 2002.
404. Barbarić Babić V, Marinić J Sjekavica I, Molnar M, Štern Padovan R Korelacija "Hydro–CT" metode s drugim radiološkim metodama u dijagnostici tumora želuca. 3. Kongres Hrvatskog društva radiologa s međunarodnim sudjelovanjem, Split 2002.
405. Lušić M, Radoš M, Štern-Padovan R. Teleradiology today for the advanced medicine tomorrow. 1. Hrvatski Kongres telemedicine s međunarodnim sudjelovanjem, Makarska 2002.
406. Štern Padovan R, Lušić M. Dijagnostika vaskularnih anomalija neinvazivnom angiografijom – MSCTA. Drugi Simpozij Hrvatskog društva za dječju kardiologiju i reumatologiju s međunarodnim sudjelovanjem. Zagreb. 2003.
407. Potočki K, Pavliša G, Giljević Z, Batinica M, Štern-Padovan R, Davila S. Radiološki prikaz prijeloma kralješnice uslijed osteoporoze. 2. Hrvatski Kongres o osteoporozi, Rovinj 2003.
408. Štern Padovan R, Lušić M, Oberman B, Marinić J, Čikara I, Hrabak M. MSCT – angiografija u procjeni ateroskleroze renalne arterije. Četvrti Hrvatski kongres o aterosklerozi s međunarodnim sudjelovanjem. 2003.
409. Štern Padovan R, Lušić M, Oberman B, Marinić J, Čikara I, Hrabak M. MSCT – angiografija abdominalne aorte. Četvrti Hrvatski kongres o aterosklerozi s međunarodnim sudjelovanjem. 2003.
410. Hrabak M, Štern Padovan R, Lušić M, Oberman B. Multislice CT angiography (MSCTA) of abdominal aorta. Hungarian-Slovenian-Croatian Radiological Symposium. Koprivnica. 2003.
411. Batinica M, Štern Padovan R, Lušić M, Hrabak M, Pavliša G. Multislice CT angiography (MSCTA) in evaluation of portosystemic implants in children with portal hypertension. Hungarian-Slovenian-Croatian Radiological Symposium. Koprivnica. 2003.
412. Lušić M, Štern Padovan R, Čikara I, Potočki K. Multislice CT angiography (MSCTA) of portal hypertension. Hungarian-Slovenian-Croatian Radiological Symposium. Koprivnica. 2003.
413. Hrabak M, Štern Padovan R, Lušić M, Marinić J. Multislice CT angiography (MSCTA) in evaluation of renal arteries. Hungarian-Slovenian-Croatian Radiological Symposium. Koprivnica. 2003.
414. Pavliša G, Štern Padovan R, Lušić M, Hrabak M, Batinica M. Multislice CT angiography (MSCTA) in evaluation of acute thoracic injury in patients with multiple trauma. Hungarian-Slovenian-Croatian Radiological Symposium. Koprivnica. 2003.
415. Crkvenac Z, Potočki K, Štern-Padovan R, Lušić M, Batinica M, Crkvenac A.

Radiological analysis of proximal femur fractures. European Radiology, European Congress of Radiology, Vienna, Austria 2003;13(1):716
416. Štern-Padovan R, Batinica M, Lušić M, Pavliša G, Čikara I, Potočki K, Batinica S. Multislice CT angiography (MSCTA) in evaluation of surgical portosystemic shunts in children with portal hypertension. European Congress of Radiology, Vienna, Austria. European Radiology 2003; 13(1):913
417. Štern-Padovan R, Lušić M, Pavliša G, Batinica M, Potočki K. Comprehensive imaging of portal venous blood disturbance. European Radiology 1-13, 2003.
418. Štern-Padovan R, Pavliša G, Lušić M, Potočki K, Batinica M. The value and advantages of multislice CT-angiography (MSCTA) in detection of acute thoracic aortic injury in patients with multiple trauma. European Congress of Radiology, Vienna, Austria. European Radiology 2003; 13(1):1025.
419. Sjekavica I, Barbarić-Babić V, Krznarić Z, Čikara I, Štern-Padovan R. Comparison of mesenteric arterial blood flow in the superior mesenteric artery and affected bowel loops by Doppler US in the assessmant of Crohns disease activit: preliminary results. 14 annual meeting and postgraduate course - ESGAR – Budapest/HU. European Radiology 2003;13(2):122.
420. Štern Padovan R. Radiološka dijagnostika zloćudnih tumora jajnika. U: Ćorušić A, Babić D. Dijagnostika, liječenje i prognoza zloćudnih tumora jajnika. Medicinski fakultet. 2003.
421. Štern Padovan R. Neinvazivna radiološka dijagnostika u novorođenčadi sa žuticom. U: Batinica S. Novorođenačka žutica – kirurško – pedijatrijski aspekti. Poslijediplomski tečaj. Medicinski fakultet, Medicinska naklada 2004.
422. Gašparović H, Štern-Padovan R, Batinica S, Jelić I. Intracardiac Shrapnel in a Polytraumatized Child. Ann Thorac Surg 77 2004;1083-1085
423. Pasini J, Mokos I, Đelmiš J and Štern-Padovan R. Disseminated ureteral carcinoma discovered in a woman patient at childbirth. European Journal of Obstetrics & Gynecology and Reproductive Biology, Article in Press, doi:10.1016/j.ejogrb.2004.11.041
424. Sjekavica I, Pavliša G, Šeronja –Kuhar M, Moscatello I, Štern-Padovan R. Boerhaave s syndrome:a case with an atypical right-sided oesophageal perforation. Radiol Oncol 2004; 38 (1):1-4
425. Štern-Padovan R, Lušić M, Marinić J, Potočki K,Hrabak M. Evaluation and manegement of high-risk acute polytrauma patients with multislice CT (MSCT). ECR 2004, European Radiology 2004;14 (2):356
426. Štern-Padovan R, Lušić M, Oberman B, Potočki K. Emergency multislice CT angiography (MSCTA) in patients with suspected aortic dissection. ECR 2004, European Radiology 2004; 14(2):937
427. Potočki K, Jelušić M, Tambić-Bukovac L, Štern-Padovan R, Hrabak M. Epidemiology of juvenile spondylarthropathies in Croatia: A retrospective study over the last 6 years. ECR 2004, Europien Radiology 2004;14(2):645
428. Štern Padovan R, Kralik M, Barišić D, Lušić M. Large dysgerminoma in 15 years old female patient – case report. Hungarian-Slovenian-Croatian Radiological Symposium. Heviz. 2004.
429. Čačić Z, Batinica M, Radanović B, Čikara I, Ilakovac K, Štern Padovan R. Covered stent-graft application in treatment of peripherial circulation pseudoaneurysms. Hungarian-Slovenian-Croatian Radiological Symposium. Heviz.

2004.

430. Štern Padovan R, Hrabak M, Čikara I, Sjekavica I, Molnar M. US and CT findings in pediatric patients after partial liver transplantation. Hungarian-Slovenian-Croatian Radiological Symposium. Heviz. 2004.

431. Štern Padovan R, Roglić A, Roglić M, Čačić Z, Župančić-Salek S. A retroperitoneal and femoral hemetoma in a lung cancer patient. Hungarian-Slovenian-Croatian Radiological Symposium. Heviz. 2004.

432. Štern Padovan R, Lušić M, Radoš M. Teleradiology in dailypractice. 2nd Croatian Congress on Telemedicine with International Participation. Zagreb. 2004.

433. Čikeš M, Miličić D, Strozzi M, Šeparović Hanževački J, Čikeš I, Štern Padovan R, Karadža J, Seiwerth S. Retrokardijalni paragangliom koji oponaša tumor lijeve pretklijetke. 5. Kongres Hrvatskog kardiološkog društva s međunarodnim sudjelovanjem. Opatija. 2004.

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438. Stern Padovan R, Lusic M, Sjekavica I, Hrabak M, Potocki K, Oberman B, Marinic J. Ruptured abdominal aortic aneurysm: MSCT imaging. ECR 2005; European Radiology 2005;15(1):1002

439. Judaš M, Radoš M, Jovanov-Milošević N, Hrabac P, Štern-Padovan R and Kostović I. Structural, Immunocytochemical and MR Imaging Properties of Periventricular Crossroads of Growing Cortical Pathways in Preterm Infants. AmJ Neuroradiol 2005;26:2671-2784.

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441. Štern-Padovan R. Radiološka dijagnostika ginekoloških tumora. U: Ćorušić A i Babić D. Ginekološka anatomija. Medicinska naklada 2005.

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443. Štern-Padovan R. Radiološke metode u dijagnostici karcinoma vrata maternice. U: Dijagnostika, liječenje i prognoza preinvazivnih lezija i karcinoma vrata maternice. Priručnici stalnog medicinskog usavršavanja. Medicinska naklada 2006.

444. Bilić R, Šimić P, Jelić M, Štern-Padovan R, Dodig D, Pompe van Meedervoort H, Martinović S, Ivanković D, Pećina M, Vukičević S. Osteogenic

protein-1 (BMP-7) accelerates healing of scaphoid non-union with proximal pole sclerosis. International Orthopaedics 2006;30:128-134

445. Škrablin S, Štern-Padovan R, Banović V, Radoš M, Kuvačić I, Lovrić H. Uloga magnetske rezonance u fetalnoj medicini. Lijec Vjesn 2006;128:79-83

PUBLICATIONS QULIFYING FOR LECTURSHIP:

DATE OF THE LAST PROMOTION:
November 11th, 2005, Assistant Professor in Department of Radiology and General Oncology, Medical School, University of Zagreb

LECTURER:
Jasminka Brnjas-Kraljević

AFFILIATION:
University of Zagreb; School of Medicine, Department of Physics and Biophysics; Šalata 3b,
10 000 Zagreb

E-MAIL AND WEB ADDRESS:
kraljevi@mef.hr

BIOGRAPHY:
Born in Zagreb in year 1944. B.Sc. in Physics honoured at School of Natural Sciences, University of Zagreb in 1967; M.Sc. in Molecular biology at School of Natural Sciences, University of Zagreb in 1972 and Ph.D. in Physics, at School of Natural Sciences, University of Zagreb in 1982. Married and mother of two sons. The younger son was killed during the War.
Languages: English, German, French (passiv)
Visiting scientist at: Department of Biophysics, Portsmouth Politechnic, Portsmouth, England; Tata Institut, Bombay, India; Institute für Biophysikalische Chemie der J. W. Goethe Universität, Frankfurt, Germany; Institut Elektrohimii A. N. Frumkin, Akademija SSSR, Moskva; Institute für Röntgenfeinstructurforschung der Österreichische Akademie der Wissenschaften, Graz, Austria; Institut für Medizinische Biochemie, Karl-Franzens Universität Graz, Austria.
Congress participations:
domestic:2 invited lectures, 3 short lectures and about 23 posters
international: 1 invited lecture, 5 short lectures and about 30 posters
Scientific Projects – financed by The Ministry of science and technology RH; principal investigator in 4 projects; investigator in 3
- international cooperation; investigator on 5 projects
In Organizing Committee of 10 International Congresses

LIST OF PUBLICATIONS IN THE LAST FIVE YEARS:
Raguž, M. and Brnjas-Kraljević, J. Resolved Fluorescence Emission Spectra of PRODAN in Ethanol/Buffer Solvents J. Chem. Inf. Model. 45 (2005), 1636-1640.
Brnjas-Kraljević, J.; Kveder, M.; Pifat, G.; Pečar, S. and Schara, M. The ESR Kinetic Study of Lipid Phase in HDL Croat. Chem. Acta 74 (2001), 147-160.

PUBLICATIONS QULIFYING FOR LECTURSHIP:
J. Brnjas-Kraljević: Struktura materije i medicinska dijagnostika, Medicinska knjiga Zagreb, 2001
J. Brnjas-Kraljević, S. Maričić, V. Bračika: Self-association of oxyhaemoglobin. A nuclear magnetic relaxation study in H2O/D2O solutions, Biophys. Chem. 6, 191-200, 1977
J. Brnjas-Kraljević, S. Maričić: Hydratation and selfasociation of haemoglobin in solution, Biochem. Biophys. Res. Comm. 83, 1048-1054, 1977
J. Brnjas-Kraljević, G. Pifat, S. Maričić: Quaternary Structure, Hydration and Selfassociation of Hemoglobin. A Proton Magnetic Relaxation Study, Physiol. Chem. Phys. 11, 371-376, 1979

DATE OF THE LAST PROMOTION: 2002

LECTURER: Zvjezdana Roller-Lutz

AFFILIATION: University of Rijeka, Medical and Philosophical Faculty

E-MAIL AND WEB ADDRESS: roller@medri.hr, http://www.medri.hr/~roller

BIOGRAPHY:

Date and place of birth: November 2nd 1949., Zagreb
married, Croatian

EDUCATION
1968. High school, Zagreb
1973. Dipl.ing. Physics, PMF Zagreb
1977. Master of Physics, University of Zagreb
1981. Dr.rer.nat.,Institute "R. Bošković", University of Zagreb
1990. Scientific associate, Institute "Ruđer Bošković"

EMPLOYMENT
1973. - 1977. Institute for Natural Sciences, and
Medical Faculty University of Rijeka, assistent
1977. - 31.05.1986. Institute "R. Bošković", Zagreb, assistent
01.06.1986. – 01.03.1999. Universität Bielefeld, Fakultät für Physik:
01.12.'91. - 29.11.'95. Oberassistentin
30.11.'95. - 01.03.'99. Dozentin
01.03.1999. - 21.05.1999. Associated proffessor University of Rijeka, Phylosophical Faculty and Medical Faculty
od 21.05.1999.

od 01.10.1999. Full proffessor University of Rijeka, Medical Faculty and Phylosophical Faculty
Head of Department of Physics, Medical Faculty University of Rijeka

Visiting position
May 1981. - April 1982. Universität Freiburg
01.06.1982. - 30.06.1984. Hahn-Meitner-Institut, Berlin
01.11.1984. - 31.01.1986. Universität Bielefeld
1997. i 1998. DAAD - Kurzdozentur, Phylosophical Faculty, University of Rijeka
svibanj/lipanj 2001. International cooperation
Department of Physics, Tokyo Metropolitan University

PRICES:
1989. Bennigsen Förderpreis

LIST OF PUBLICATIONS IN THE LAST FIVE YEARS:

446. B. Siegmann, U. Werner, Z. Kaliman, Z. Roller-Lutz, N.M. Kabachnik, and H.O. Lutz: Multiple ionization of diatomic molecules in collisions with 50-300-keV hydrogen and helium ions, Phys.Rev. A66, 052701 (2002)

447. J. Lu, E.Y. Sidky, Z. Roller-Lutz, and H.O. Lutz:

448. Antihydrogen formation by collisions of antiprotons with positronium in a magnetic field,
449. Phys.Rev. A68, 024702 (2003)

PUBLICATIONS QULIFYING FOR LECTURSHIP:

450. Z. Roller-Lutz, Y. Wang and H.O. Lutz, S.E. Nielsen, A. Dubois: Quantum-mechanically complete study of charge transfer from nonisotropic initial to nonisotropic final states in H+ -Na(3p±1) collisions, Phys.Rev. A61 (2000) 022710
451. Z. Roller-Lutz, Y. Wang, H.O. Lutz, T. Bastug, T. Mukoyama and B. Fricke: Charge exchange in collision of C60+ ions with laser-excited aligned Na atoms, Phys. Lett. A262 (1999) 66-71
452. Z. Roller-Lutz, Y. Wang, H.O. Lutz, U. Saalmann and R. Schmidt: Strong temperature dependence of laser-enhanced charge transfer in collisions of sodium clusters with sodium atoms, Phys. Rev. A59 (1999), R2555-R2558
453. H. Reihl, C. Sprengel, Z. Roller-Lutz, H.O. Lutz: Production of a spinpolarized keV Sr+ ion beam by laser-optical pumping, Nucl. Instr. and Meth., A357 (1995) 225-230

DATE OF THE LAST PROMOTION: September, 28th 2004.

LECTURER: Professor Zeljko Reiner MD,PhD, FESC

AFFILIATION: School of Medicine, University of Zagreb and University Hospital Center Zagreb

E-MAIL AND WEB ADDRESS: zreiner@kbc-zagreb.hr

BIOGRAPHY: Born in Zagreb, Croatia 28 May 1953

PRESENT POSITION

Director, University Hospital Center Zagreb and head, Department of metabolic diseases, University Hospital Center Zagreb, Croatia

DEGREES AND HONOURS

1976 MD (University of Zagreb); 1978 M Sc (Molecular biology, University of Zagreb); 1982 Ph D (Endocrinology and metabolism, University of Zagreb); 1983 Croatian State Board Examination in Internal medicine (education in Zagreb and Hamburg, Germany); 1986. State Board in endocrinology and diabetology; 1986-1988 associate professor of pathophysiology, School of Medicine, University of Zagreb; 1998-1997 professor of pathophysiology; since 1997 professor of internal medicine (tenure), School of Medicine, University of Zagreb; 1984-1985 visiting scientist, Lipoproteins and atherosclerosis research program, Oklahoma Medical Foundation, Oklahoma City, USA; since 2000 chairman, University department of internal medicine, School of Medicine, University of Zagreb; 1987-1990 Vice-president of School of Medicine Council, University of Zagreb; 1990-1993 Vice-dean for international relations, School of Medicine, University of Zagreb; since 1990 full member of the Croatian Academy of Medical Sciences and since 2004 president of the Croatian Academy of Medical Sciences; 1991-1993 vice-president of the National Health Council of Croatia; 1991-1993 president of the University Hospital Center Zagreb Council; since 1992 associated member of the Croatian National Academy of Sciences and Arts and since 2006 full member (one of only 20 full members-physicians); since 2000 chairman of the Academy Committee for Study of Atherosclerosis; 1992-2000 president of the National Drug Registration Committee of Croatia; 1995-1998 member of the World Health Organization (WHO) Executive board in Geneva; 1993-1997 State secretary for health of Croatia; 1997-2000 Minister of health of Croatia; 2000-2002 chairman of the WHO Tobacco-free-Europe Committee.

FELLOWSHIP AND MEMBERSHIP IN SOCIETIES

Fellow of the European Society of Cardiology (FESC); 2002-2006 member of the European Atherosclerosis Society Executive Committee; since 2004 member of the Congress Program Committee of the European Society of Cardiology; founder and member of the Executive Committee of the Croatian Hypertension Society since 1992; 1992-1993 secretary general of the Croatian Medical Association (member of the Board since 2004); founder and president of the Croatian Atherosclerosis Society since 1995; member of the Scientific Board of the Croatian Vascular Surgery Society since 1996; founder and vice-president of the Croatian Obesity Society since 2003; since 2004 member of the Joint European Societies Cardiovascular Diseases Prevention Committee, and since 2005 member of the Joint task force for the European guidelines on cardiovascular disease prevention in clinical practice.

POSITIONS

First consultant position 1983. Present consultant position since 1986. Chairman of the

Clinical research department, Institute of pathophysiology (1986-1995) and head of the Department of internal medicine, University Hospital Center Zagreb (1995-2003).
POSTGRADUATE TEACHING EXPERIENCE

Since 1983 professor on postgraduate study in diabetology (in English) at the University of Zagreb, since 1989 professor on postgraduate study in clinical pharmacology on University of Zagreb, and since 1988 chairman on postgraduate study in physiology and pathophysiology on Faculty of sciences, University of Zagreb. He organized numerous continous medical education courses on risk factors for cardiovascular diseases, atherosclerosis, lipidology, hypertension etc. for general practitioners, internists, cardiologists, diabetologists and neurologists. He was the founder and chairman of the "Croatian school on hyperlipidaemias and atherosclerosis", an educational program in which more than 600 Croatian physicians were trained during 6 years. He wrote chapters in 19 textbooks and handbooks.
SCIENTIFIC ACTIVITY
He was principal investigator of many scientific research projects eg. 1982-1987 he was principal investigator of a research project on steroid receptors and atherosclerosis and co-investigator in 2 projects, 1987-1991 director of all research projects concerning chronic noncomunicable diseases in Croatia, 1991-1996 project director of "Metabolic and hormonal factors influencing the development of atherosclerosis", 1996 - 2001 project director of "Metabolic and hormonal risk factors for atherosclerosis", and since 2001 he is project director of "New" and "old" risk factors for atherosclerosis". He was engaged in 2005-2006 as an expert of the European Commission for the evaluation of proposals received under the 6FP for research and technological development. He was also one of the 3 members of the WHO's "Leon Bernard Prize" committee.
He was a member of the International advisory and/or scientific boards of all European atherosclerosis society congresses (including the last in Prague 2005 and the next in Helsinki 2007) and International atherosclerosis society congresses for more than the last ten years (including the last in Kyoto 2003 and the next in Rome 2006). He was also a member of the Program committee of European Society of Cardiology Congresses (including the last in Stockholm 2005) and World Congresses of Cardiology (including the next in Barcelona 2006). He was president of all 5 Croatian atherosclerosis congresses and member of the scientific boards of Croatian cardiology congresses and Alps-Adria. He was invited speaker on many international and national congresses and visiting professor on several universities.
He has published 310 scientific papers, mostly in indexed journals with significant impact factor, and was author and/or editor of 9 books. He is a member of the editorial boards of numerous scientific journals eg. "Atherosclerosis", "European Journal for Cardiovascular Prevention and Rehabilitation", "Medical Journal","Lipidi" (Editor-in-chief), "Medicus", "Acta Clinica Croatica

LIST OF PUBLICATIONS IN THE LAST FIVE YEARS:

454. Reiner Ž, Tedeschi-Reiner E. Novije spoznaje o patofiziologiji ateroskleroze. Liječ Vjesn 2001;123:26-31.
455. Pintarić I, Eterović D, Tocilj J, Reiner Ž, Lušić I. Effect of simvastatin on micropulmonary red cell mass in patients with hyperlipo-proteineinemia. Atherosclerosis 2001;154:493-496.
456. Reiner Ž, Tedeschi-Reiner E. Prehrana u prevenciji moždanog udara.

Medicus 2001;10:41-47.
457. Reiner-Tedeschi E. Estrogeni i rizik nastanka ateroskleroze. Liječ Vjesn 2001;123:135-141.
458. Reiner Ž, Tedeschi-Reiner E. Hiperlipidemije i njihovo kliničko značenje. Farmac tehn 2001;5:5-9.
459. Reiner Ž. Uvod , U: 80. obljetnica Klinike za unutarnje bolesti Medicinskog fakulteta Sveučilišta u Zagrebu i Kliničkog bolničkog centra Zagreb – Spomenica (ur. Ž. Reiner), KBC Zagreb 2001; str. 5-6.
460. Dugački V., Reiner Ž. Povijest Klinike za unutarnje bolesti, U: 80. obljetnica Klinike za unutarnje bolesti Medicinskog fakulteta Sveučilišta u Zagrebu i Kliničkog bolničkog centra Zagreb – Spomenica (ur. Ž. Reiner), KBC Zagreb 2001; str.7-10.
461. Reiner Ž. Terapija hiperlipidemija danas. U: Racionalna primjena lijekova (ur: B.Vrhovac, I.Francetić), Medicinska naklada, Zagreb 2002; str. 51-56.
462. Reiner Ž. Povećana količina C-reaktivne bjelnčevine u krvi kao čimbenik rizika za aterosklerozu,U: Prevencija ateroskleroze – novi čimbenici rizika (ur. Ž.Reiner), HAZU Zagreb 2002; str. 73-85.
463. Reiner Ž, Eugenia Tedeschi-Reiner. Vloga statinov v preprečevanju srčno-žilnih bolezni. Krka Med Farm 2002, 23(33), str. 19-32.
464. Antonić-Degač K, Hrabak-Žerjavić V, Kaić-Rak A, Matasović D, Mayer H, Mesaroš-Kanjski E, petrović Z, Reiner Ž, Strnad M, Šerman D. Prehrambene smjernice za odrasle. Hrvatski Zavod za javno zdravstvo i Akademija medicinskih znanosti Hrvatske 2002, str.3-16.
465. Reiner Ž. Uloga i mjesto hipolipemika danas. Medicus 2002;11:37-47.
466. Reiner Ž. Čimbenici rizika za infarkt srca i moždani udar. Belupo Koprivnica 2002.
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468. Reiner-Tedeschi E, Reiner Ž. Omega-3 masne kiseline u prevenciji kardiovaskularnih bolesti. MEDIX 2002; 43:29-30.
469. Reiner Ž. Patophysiology and classification of cardiovascular diseases caused by atherosclerosis. U: New trends in classification, monitoring and management of cardiovascular diseases – Handbook (Ed. E.Topić). Medicinska Naklada - Zagreb, 2002, str. 1-4.
470. Reiner Ž. Današnji stavovi o racionalnoj dijagnostici i liječenju hiperkolesterolemije. U: Racionalna dijagnostika i liječenje endokrinih i metaboličkih bolesti (Ur. M.Solter i M. Vrkljan), AMZH i Zavod za endokrinologiju, dijabetes i bolesti metabolizma KB "S.milosrdnice, Zagreb 2002, str.123-128.
471. Kes P, Bobić I, Reiner Ž, Ratković-Gusić I. Učinak liječenja eritropoetinom na koncentraciju serumskih lipoproteina u hemodijaliziranih bolesnika. Liječ Vjesn 2002; 124:146-150.
472. Kes P, Reiner Ž, Brunetta B. Poremećaji lipoproteina u kroničnom zatajenju bubrega, nefrotskom sindromu i dijalizi. Liječ Vjesn 2002;124:372-377.
473. Tedeschi-Reiner E, Reiner Ž, Iveković R, Novak-Lauš K. Is lipoprotein(a) a risk factor for atherosclerosis of the retinal arteries? Coll Antropol 2002; 26:609-

614.
474. Tedeschi-Reiner E, Reiner Ž, Iveković R, Novak-Lauš K, Pintarić I. Plasma cortisol in men: relationship with atherosclerosis of retinal arteries. Coll Antropol 2002; 26:615-619.
475. Reiner Ž, Tedeschi-Reiner, E. Patofiziologija i čimbenici rizika za perifernu arterijsku opstrukcijsku bolest. U: Prevencija ateroskleroze - Periferna vaskularna bolest (Ur. Ž. Reiner), HAZU, Zagreb, 2003., str. 15-24.
476. Reiner Ž. Kardiovaskulare Risikofaktoren in Kroatien, U: Pravention von Herzinfarkt und Schlaganfal (ur. P. Schwandt, Haas G.- M.),Stiftung zur Pravention der Arterioskleroze, Munchen 2003., str. 68-70.
477. Reiner Ž. Statini u primarnoj i sekundarnoj prevenciji koronarne bolesti. Medicus 2003;12(1):85-90.
478. 157. Reiner Ž., Tedeschi-Reiner E, Pintarić I. Statini u prevenciji bolesti srca i mozga. U: Povezanost bolesti srca i mozga (Ur. V. Goldner), HAZU, Zagreb, 2004., str. 33-43.
479. Tedeschi-Reiner E, Reiner Ž, Sonicki Z. Atherosclerosis and Retinal Arteries in Men: Role of Serum Lipoproteins and Apoproteins. Croat Med J 2004;45:333-337.
480. Pintarić I, Filipović-Grčić P, Reiner Ž, Matijaca M, Tomić S, Grbić Ž. Čimbenici rizika i karotidna ateroskleroza u bolesnika s tranzitornom ishemijskom atakom. Liječ vjesn 2004;126:57-60.
481. Reiner Ž. Povećani CRP kao čimbenik rizika kardiovaskularnih bolesti. Tečaj trajnog usavršavanja liječnika "Arterijska hipertenzija – nove smjernice, znače li korak naprijed?" 2004;134-136.
482. Reiner Ž. Treba li u akutnom koronarnom sindromu započeti liječenje statinima? Acta Med Croat 2004;58:147-150.
483. Reiner Ž, Laganović M. Metabolički sindrom – međuodnos inzulinske rezistencije, arterijske hipertenzije i mikroalbuminurije. Medicus 2004; 13:193-201.
484. Reiner Ž, Galić M, Hanževački M, Tedeschi-Reiner E. Učestalost istodobne primjene statina s inhibitorima citokroma P 450 u Hrvatskoj. Liječ vjesn 2005;127:65-68.
485. Lucić Vrdoljak A, Bradamante V, Radić B, Peraica M, Fuchs R, Reiner Ž. Butyrylcholinesterase activity and plasma lipids in dexamethasone treated rats. Acta Pharm 2005;55:177-185.
486. Muačević-Katanec D, Bradamante V, Reiner Ž, Sučić M, Poljičanin T, Bušljeta I, Metelko Ž. Clinical study on the effect of simvastatin on butyrylcholinesterase activity. Arznei Forsch/Drug Res 2005; 55(5):271-275.
487. Reiner Ž. Genski poremećaji serumskih lipoproteina. Paediatr Croat 2005;49:133-139.
488. Tedeschi-Reiner E, Strozzi M, Skorić B, Reiner Ž. Relation of atherosclerotic changes in retinal arteries to the extent of coronary artery disease. Am J Cardiol 2005; 96:1107-1109.
489. Reiner Ž, Tedeschi-Reiner E, Romić Ž. Effects of rice policosanol on serum lipoproteins, homocysteine, fibrinogen and C-reactive protein in hypercholesterolaemic patients. Clin Drug Invest 2005; 25:701-707.
490. Bergman Marković B, Kranjčević K, Reiner Ž, Milaković Blažeković S, Stojanović Špehar S. Drug therapy of cardiovascular risk factors: Gidelines versus Reality in primary health care service. Croat Med J 2005; 46:984-989.

491. Bergman-Marikovi ć B, Reiner Ž, Bergovec M, Stavljenić-Rukavina A, Ivanković D, Sertić J, Vincelj J. Deletion polymorphism of the angiotensin I-converting enzyme gene in the elderly patients with coronary heart disease. Atheroslerosis 2001; 152(2), str. 58.
492. Reiner Ž, Tedeschi-Reiner E. Low endogenous progesteron is a risk factor for atherosclerosis of the retinal arteries. Atheroslerosis 2001; 152(2), str. 76.
493. Pintarić I, Eterović D, Tocilj J, Reiner Ž. Effect of simvastatin on micropulmonary red cell mass in patients with hyperlipoproteinemia. Atheroslerosis 2001; 152(2), str. 96.
494. Reiner Ž. Lipid lowering therapy – prevention of cardiovascular disease. Acta Clin Croat 2001; 40, str.53-54.
495. Reiner Ž. Hrvatsko ispitivanje azitromicina u aterosklerozi (CROAATS). Liječ.vjesn 2001, 123 (suppl.2), str. 7.
496. Tedeschi-Reiner E, Reiner Ž. Povećani ukupni i LDL-kolesterol te trigliceridi kao čimbenik rizika za aterosklerozu krvnih žila oka. Liječ.vjesn 2001, 123 (suppl.2), str. 51.
497. Pintarić i, Eterović D, Tocilj J, Reiner Ž, Lušić I. Učinak simvastatina na plućni kapilarni volumen eritrocita u bolesnika s hiperlipoproteinemijom. Liječ.vjesn 2001, 123 (suppl.2), str. 66.
498. Bergman-Marković B, Reiner Ž, Bergovec M, Stavljenić-Rukavina A, Ivanković D, Sertić J, Vincelj J. Polimorfizam ACE gena u bolesnika s koronarnom bolešću starije životne dobi. Liječ.vjesn 2001, 123 (suppl.2), str. 82
499. Reiner Ž. Clinical studies with HMG-COA reductase inhibitors. Period. biol 2001; 103 (suppl 1/, str. 59.
500. Reiner Ž. Azithromycin in the Secondary Prevention of Adverse Cardiovascular Events in C.pneumoniae-positive Post-Myocardial Infarction Patients (CROAATS). Knjiga sažetaka The Sixt International Conference on the Macrolides, Azalides, Streptogramins, Ketolides and Oxazolidinones, Bologna 23-25., January 2002, str.145.
501. Reiner Ž. Infection, inflammation and cardiovascular risk. 3rd International Congress of the Central European Vascular Forum, Portoroz 19-23.5.2002. Centr Europ Vasc J 2002; 1:21.
502. Reiner Ž. Can Calcium Antagonists Prevent Atherosclerosis; 3rd International congress of the Central European Vascular Forum, Portorož 2002.
503. Reiner Ž. Značenje liječenja hiperlipidemija pri koronarnoj bolesti srca. Kardiovaskularna škola, Brijuni 14-16. lipanj 2002.
504. Reiner Ž. Nelipidni antiaterosklerotski (pleiotropni) učinci statina. Kardiovaskularna škola, Hvar 12-14. travanj 2002.
505. Reiner Ž. Blokatori kalcijevih kanala i ateroskleroza. U: Arterijska hipertenzija – novi aspekti ranijih spoznaja. Tečaj trajnog usavršavanja liječnika , Zagreb, 7-8. lipnja 2002.
506. Reiner Ž. ELSA studija- rezultati i značaj. Knjiga sažetaka: Novi pogled na terapiju hipertenzije i ateroskleroze. Čatež 14-15. lipnja 2002.
507. Muačević-Katanec D, Bradamante V, Reiner Ž, Sučić M, Metelko Ž. Possible influence of statins on the paraoxonase activity. Atheroslerosis 2002; 3(2), str. 168.
508. Reiner Ž. Infection and atherosclerosis – the possible role of antibiotics in coronary heart disease (CHD) treatment. Atheroslerosis 2002; 3(2), str. 191.

509. Reiner Ž. Mediterranean diet and atherosclerosis. Knjiga sažetaka: International Conference on Mediterranean diet and health. Brijuni 12-15. rujna 2002, str. 21.
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DATE OF THE LAST PROMOTION: 1997. professor (tenure)

LECTURER: Prof.dr.sc. Zdenko Krajina

AFFILIATION: University hospital Zagreb, Kispaticeva 12, 10 000 Zagreb

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BIOGRAPHY:

He was born in Sisak, Croatia, Aug 2nd 1946. He graduated at Zagreb University Faculty of Medicine in 1973, and finished residency in Radiation Oncology in 1981. Also in 1981 he finished postgraduate study in biology in Zagreb, and cervicofacial cancerology in Paris in 1986. After receiving a PhD in medical sciences in 1989, he worked as assistant professor at Faculty of Medicine 1992-1999, and as full professor since then.

1983-1986 he finished fellowships at Curie Institute in Paris and Goustave Roussy Institute in Villejuif, France, in 1987 he finished one in the USA, and from 1989 till 1999 he attended many educational programs at European oncology centers as active participant of international projects involved in head and neck and breast cancer research. 1978-1992 he was employed at University Hospital Center Zagreb, 1992-1998 at Institute for Tumors, 1998-2001 at Osijek University Hospital as head of the Department of general clinical oncology, and since 2001 at University Hospital Center Zagreb as head of the Department of oncology. He is professor of oncology at the Faculty of medicine in Zagreb since 1979, and is involved in postdoctoral studies as well since 1981.

His main fields of interest are head and neck cancer chemoradiotherapy, malignant lymphomas, breast cancer and gastrointestinal cancer.

He is author and coauthor of 8 books and 5 scripts, 43 chapters in books for students of medicine and postgraduates, and 48 educational and scientific papers published in domestic and foreign literature, cited 214 times. He is president of Croatian Society for Radiotherapy and Oncology, member of Croatian Medical Sciences Academy, and ESTRO (European Society for Therapeutic Radiology and Oncology). In 1996 he was awarded for best scientific paper in medical sciences as editor and author of „Radioterapija“ in 1999 by Croatian medical society. He participated in seven clinical trials based on good clinical practice.

In 1996 I was awarded for best scientific paper in medical sciences field as editor and author of "Radioterapija" and 1999 by Croatian medical society. I was participated in seven Clinical studies basis on good clinical practice.

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7. M. Šamija, E. Vrdoljak, Z. Krajina: Klinička onkologija. Zagreb, Medicinska naknada, 2006.
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3. M. Šamija, E. Vrdoljak, Z. Krajina: Klinička onkologija. Zagreb, Medicinska naknada, 2006.

DATE OF THE LAST PROMOTION: 1999. professor of oncology

7. GEOPHYSICS

LECTURER: Dr. Gordana Beg Paklar, assistant professor

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BIOGRAPHY*:*

B. Sc. in physics – geophysics, 1989; M. Sc. in physical oceanography, 1992; Ph. D. in physics – physical oceanography, 2000; University of Zagreb. Since 1989 employed in the Laboratory of Physical Oceanography at Institute of Oceanography and Fisheries in Split. Promoted to Research Associate on 27 October 2006. Teaches course on oceanography at Maritime faculty in Split and numerical modelling at Postgraduate Doctoral Study of Physics in Zagreb. Promoted to Assistant Professor at Maritime faculty in Split on 21 April 2004.

LIST OF PUBLICATIONS IN THE LAST FIVE YEARS:

1. G. Beg Paklar, A. Bajić, V. Dadić, B. Grbec, M. Orlić (2005): Bora-induced currents corresponding to different synoptic conditions above the Adriatic. Annales Geophysicae, 23, 1083-1091.
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5. M. Orlić, G. Beg Paklar, Z. Pasarić, B. Grbec, M. Pasarić (2006): Nested modeling of the east Adriatic coastal waters. Acta Adriatica, 47 (Suppl.), 219-245.
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of Oceanic Engineering. 32 (2), 428-435.

10. G. Beg Paklar, N. Žagar, M. Žagar, R. Vellore, D. Koračin, P-M., Poulain, M. Orlić, I. Vilibić, V. Dadić (2008): Modeling the trajectories of satellite-tracked drifters in the Adriatic Sea during a summertime bora event. Journal of Geophysical Research. 113, C11; S1104-1-S1104-22.
11. I. Vilibić, G. Beg Paklar, N. Žagar, H. Mihanović, N. Supić, M. Žagar, N. Domijan, M. Pasarić (2008): Summer breakout of trapped bottom dense water from the northern Adriatic. Journal of Geophysical Research - Oceans. 113, C11; S1102-1-S1102-19.

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M. Orlić, V. Dadić, B. Grbec, N. Leder, A. Marki, F. Matić, H. Mihanović, G. Beg Paklar, M. Pasarić, Z. Pasarić, I. Vilibić (2007): Wintertime buoyancy forcing, changing seawater properties and two different circulation systems produced in the Adriatic. Journal of Geophysical Research, 112, C3, C03S07, doi:10.1029/2005JC003271.

G. Beg Paklar, N. Žagar, M. Žagar, R. Vellore, D. Koračin, P-M., Poulain, M. Orlić, I. Vilibić, V. Dadić (2008): Modeling the trajectories of satellite-tracked drifters in the Adriatic Sea during a summertime bora event. Journal of Geophysical Research. 113, C11; S1104-1-S1104-22.

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G. Beg Paklar, D. Koračin and C.E. Dorman (2009): Wind-induced ocean circulation along California and Baja California coasts in June 1999. Atmospheric Research. (in press).

DATE OF THE LAST PROMOTION: 27 October 2006

LECTURER: Dr. Danilo Degobbis, research adviser

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BIOGRAPHY:

Born 9 May 1947 at Rovinj, Croatia. M.S. in Oceanology and Ph.D. in Chemistry at the University of Zagreb; research scientist at the CMR, Rovinj since 1970; laboratory head since 1985; about 80 scientific papers, mostly in international journals, and about 100 contributions to technical reports and other professional publications; UNEP expert; member of CIESM and ASLO.

Professional experience: mechanisms of nutrient and organic matter cycles; long term changes in the northern Adriatic ecosystem, in particular due to anthropogenic eutrophication, anoxia events and mucilage phenomena; impact of human activity in coastal zone.

Principal investigator or participated in numerous national, bilateral (with Italy, Slovenia and USA), and international research projects (NSF, Smithsonian Institution, and NOAA, Washington, USA; CNR, Italy; Alpe-Adria; EU; UNDP; UNEP), as well as in applied oceanographic researches and studies related to the management of the northern Croatian coastal area.

Teacher at the postgraduate study of Oceanology and Geophysics of the Zagreb University. Lecturer of several MSc theses and PhD dissertations.

LIST OF PUBLICATIONS IN THE LAST FIVE YEARS:

1. Degobbis, D.; Precali, R.; Ivančić, I.; Smodlaka, N.; Fuks, D.; Kveder, S., 2000. Long-term changes in the northern Adriatic ecosystem related to anthropogenic eutrophication. Int. J. Environment and Pollution, 13(1-6), 495-533.
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17. Grilli, F., Marini, M., Degobbis, D., Ferrari, C.R., Fornasiero, P., Russo,A., Gismondi, M., Djakovac, T., Precali, R., Simonetti, R. 2005. Circulation and fluxes in the northern Adriatic Sea in the period June 1999-July 2002. Part II: Nutrient budgets. Sci. Total Envir., 353, 115-125.
18. Degobbis,D., Precali, R., Ferrari, C.R., Djakovac, T., Rinaldi, A., Ivančić, I., Gismondi, M., Smodlaka, N. 2005. Changes in nutrient concentrations and ratios during mucilage events in the period 1999-2002. Sci. Total Envir., 353, 103-114.
19. Fuks D, Radić J, Radić T, Najdek M, Blažina M, Degobbis D, Smodlaka N (2005) Relationships between heterotrophic bacteria and cyanobacteria in the northern Adriatic in relation to the mucilage phenomenon. Sci Tot Environ, 353,178-188.

PUBLICATIONS QULIFYING FOR LECTURSHIP (selected):

1. Degobbis, D., 1981. Hydrographic characteristics of Rijeka Bay (the northern Adriatic). Thalassia Jugosl., 17, 141-154.
2. Degobbis, D., 1983. Influence of external sources on the nutrient content of Rijeka Bay (northern Adriatic). Thalassia Jugosl., 19, 99-108.
3. Ivančić, I., Degobbis, D., 1987. Mechanisms of production and fate of organic phosphorous in the northern Adriatic Sea. Mar. Biol., 94 (1), 117-125.
4. Smodlaka, N., Degobbis, D., 1987. Mehanizam eutrofikacije u sjevernom Jadranu. Pomorski zbornik, 25, 585-594.
5. Degobbis, D., 1989. Increased eutrophication in the northern Adriatic Sea. Mar. Pollut. Bull., 20, 452-457.
6. Degobbis, D., 1990. A stoichiometric model of nutrient cycling in the northern Adriatic Sea and its relation to regeneration processes. Mar. Chem., 29, 235-253.

7. Degobbis, D. 1990. Eutrophication-related phenomena in the Adriatic Sea and Yugoslav coastal region. In: H. Bart, L. Fegan (Editors), Proceedings of the Workshop "Eutrophication-Related Phenomena in the Adriatic Sea and in other Mediterranean Coastal Zones", Rome, 28-30 May 1990. Commission of the European Communities, Directorate-General for Science, Research and Development, Water Pollution Research Report 16, Brussels, 83-95.
8. Degobbis, D. and Gilmartin, M., 1990. Nitrogen, phosphorus and silicon budgets for the northern Adriatic Sea. Oceanol. Acta, 13, 31-45.
9. Gilmartin, M., Degobbis, Revelante, N., Smodlaka, N., 1990. The mechanism controlling plant nutrient concentrations in the northern Adriatic Sea. Int. Rev. gesam. Hydrobiol., 75, 425-445.
10. Degobbis, D., Ivančić, I., Precali, R., Smodlaka, N., 1991. Neuobičajene oceanografske prilike u sjevernom Jadranu tokom 1989. godine. 1. Oceanografska svojstva, ciklus hranjivih soli i jesenska pridnena anoksija. Hidrografski godišnjak 1989, 27-47.
11. Degobbis, D., Ivančić, I., Precali, R., 1991. Neuobi…ajene oceanografske prilike u sjevernom Jadranu tokom 1989. godine. 2. Omjeri AOU i koncentracije hranjivih soli tokom procesa regeneracije. Hidrografski godišnjak 1989, 48-60.
12. Degobbis, D., Precali, R., Ivančić, I., Filipić, B., Smodlaka, N., 1991. Mogući mehanizam stvaranja sluzavih nakupina u sjevernom Jadranu u razdoblju 1988-1990. Pomorski Zbornik, 29, 337-354.
13. Grñeti*ƒ*, Z., Precali, R., Degobbis, D., Škrivanić, A., 1991. Nutrient enrichment and phytoplankton response in an Adriatic karstic estuary. Mar. Chem., 32, 313-331.
14. Degobbis, D., Fonda-Umani, S., Franco, P., Malej, A., Precali, R., Smodlaka, N., 1995. Changes in the northern Adriatic ecosystem and appearance of hypertrophic gelatinous aggregates. Sci. Total Envir., 165, 43-58.
15. Degobbis, D., Precali, R., Ivančić, I., Smodlaka, N., Kveder, S., 1997. The importance and problems of nutrient flux measurements to study eutrophication of the northern Adriatic. Period. Biol., 99, 161-167.
16. Najdek, M., Degobbis, D., 1997. The relative importance of autochthonous and allochthonous sources of organic matter in the northwestern Adriatic sediment. Period. Biol., 99, 181-191.
17. Degobbis, D.; Malej, A.; Fonda-Umani, S., 1999. The mucilage phenomenon in the northern Adriatic. A critical review of the present scientific hypotheses. Ann. Ist. Super. Sanit , 35(3), 373-381.
18. Harding, Jr., L.W.; Degobbis, D.; Precali, R., 1999. 5. Production and fate of phytoplankton: annual cycles and interannual variability. Malone T.C., Malej A., Harding L.W., Smodlaka N., Turner R. E. (eds), Ecosystems at the Land-Sea Margin. Drainage Basin to Coastal Sea. Coastal and Estuarine Studies, (55), American Geophysical Union, Washington, DC, pp. 131-172.
19. Degobbis, D.; Precali, R.; Ivančić, I.; Smodlaka, N.; Fuks, D.; Kveder, S., 2000. Long-term changes in the northern Adriatic ecosystem related to anthropogenic eutrophication. Int. J. Environment and Pollution, 13(1-6), 495-533.
20. Malej, A.; Degobbis, D.; Fonda Umani, S. 2000. Problems and issues of the wider northern Adriatic. In: Crisciani, F.; Degobbis, D., Malačič, V., Pagnotta, R., Purini, R., eds. Proceedings of the International Workshop on the Coordinated Adriatic Observing System@ CAOS, 21-22 October 1998, Trieste. CNR, Thalassographic Institute, Trieste, pp. 25-31.
21. Supić, N., Orlić, M., Degobbis, D., 2000. The Istrian countercurrent and its year to year

variability. Estuar. Coast. Shelf Sci, 51, 385-397.
22. Najdek, M., Degobbis, D., Mioković, D., Ivančić, I., 2002. Fatty acid and phytoplankton compositions of different types of mucilaginous aggregates in the northern Adriatic Sea. J. Plankton Res. 24 (5), 429-441.
23. Supić, N., Orlić, M., Degobbis, Đakovac, T., Krajcar, V., Precali, R., 2001-2002. Occurrence of the Istrian Coastal Countercurrent in 2000, a year with a mucilage event. Geofizika, 18-19, 45-57.
24. Supić, N., Orlić, M., Degobbis, D., 2003. Istrian Coastal Countercurrent in the year 1997. Nuovo Cimento, 26, 117-131.
25. Cozzi, S., Ivančić, I., Catalano, G., Djakovac, T., Degobbis, D., 2004. Dynamics of the oceanographic properties during mucilage appearance in the northern Adriatic Sea: analysis of the 1997 event in comparison to earlier events. J. Mar. Systems, 50, 223-241.
26. Russo, A., Maccaferri, S., Djakovac, T., Precali, R., Degobbis, D., Deserti, M., Paschini, E., Lyons, D. 2005. Meteorological and Oceanographic conditions in the northern Adriatic Sea during the period June 1999 - July 2002: Influence on the mucilage phenomenon. Sci. Total Envir., 353, 24-38.
27. Grilli, F., Marini, M., Degobbis, D., Ferrari, C.R., Fornasiero, P., Russo,A., Gismondi, M., Djakovac, T., Precali, R., Simonetti, R. 2005. Circulation and fluxes in the northern Adriatic Sea in the period June 1999-July 2002. Part II: Nutrient budgets. Sci. Total Envir., 353, 115-125.
28. Degobbis,D., Precali, R., Ferrari, C.R., Djakovac, T., Rinaldi, A., Ivančić, I., Gismondi, M., Smodlaka, N. 2005. Changes in nutrient concentrations and ratios during mucilage events in the period 1999-2002. Sci. Total Envir., 353, 103-114.

DATE OF THE LAST PROMOTION: 8 March 2004.

LECTURER: Dr. Davorka Herak, associate professor

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BIOGRAPHY*:*

Main research activities are seismicity of Croatia, earthquake locations, determination of velocity structures, anisotropy studies, surface waves, quantification of earthquakes, historical seismology, attenuation of seismic waves, mid-term earthquake prediction for External Dinarides, earthquake hazard and risk.

Publications: 40 scientific papers, 29 conference papers and abstracts, one book chapter, 3 invited communications, several professional and popular papers.

Teaching: Seismology, Theory of elasticity with applications in geophysics, Gravity and figure of the Earth and Physics of the Earth and atmosphere (undergraduate courses). Physics of the Earth interior (postgraduate course).

Scientific activities: Collaborator in a number of international and national seismological projects, e.g. GSHAP seismic hazard assesment for the Adria region; Interpretation of broadband seismograms and Regional and global seismicity since the beginning of the 20th century in the framework of the cooperation of the Zagreb and Hamburg Universities; Project 436 KRO 17/1/96 (Study of mechanical seismographs and the records of historical earthquakes) Deutche-forschungs-gemeinschaft, (Bonn); COST 625; Physical, spatial and temporal characteristics of seismicity in Croatia; Seismicity of Croatia. Principal investigator of the scientific project „Study of the geomagnetic field and heterogeneities of the litosphere in Croatia“ since 2007.

Technical Editor of the Geofizika journal (1984-1989). Secretary of the Geofizika journal (1990-2003). Member of Editorial Board of the Geofizika journal. Reviewer for the international scientific journals.

Head of the Department of Geophysics (Faculty of Science, University of Zagreb) since 2004.

1. **LIST OF PUBLICATIONS IN THE LAST FIVE YEARS:**
2. **Herak, D., M. Herak, E. Prelogović, S. Markušić, Ž. Markulin: Jabuka island (Central Adriatic Sea) earthquakes of 2003. Tectonophysics, vol. 398, 2005, 167-180.**
3. **Herak, M., D. Herak (2005): Empirical earthquake recurrence laws in Croatia estimated by forward modeling. Proceedings of the Second International Conference Science and Technology for Safe Development of Lifeline Systems, CEI, Bratislava, October 24-25, 2005, 68-73.**
4. **Ivančić I., Herak D., Markušić S., Sović I., M. Herak: Seismicity of Croatia in the period 2002-2005. Geofizika 23/2 2006, 87-103.**
5. **Herak, D., M. Herak: Andrija Mohorovičić (1857– 1936) – on the occasion of the 150th anniversary of his birth. Seismological Research Letters, vol. 78, 2007, 671-**

674.

6. **Herak, M., D. Herak: Development of seismometry and seismic tomography in Croatia. Computerized Tomography Theory and Application 17/3, 2008, 18-26.**
7. Herak, M. Herak, D.: Estimating building fundamental frequencies and damping from vibrations induced by ambient noise. Proceedings of International seminar on seismic risk and rehabilitation on the 10th anniversary of the July 9 1998 Azores earthquake, (Eds. Oliveira, C. S., Costa, A.,; Nunes, J. C.), Horta, Faial, Universidade dos Asores, July 9-13, 2008. 137-140.
8. Herak, M., D. Herak: Development of seismometry and seismic tomography in Croatia. Computerized Tomography Theory and Application 17/3, 2008, 18-26.
9. Herak, D., Herak, M., Tomljenović, B.: *Seismicity of North-Western Croatia*. Tectonophysics, 2009, 465, 212-220.
10. Herak, M., Herak, D., Stipčević, J.: *Azimuthal anisotropy of Pg-wave velocity in hypocentral volumes of NW Croatia*. Acta Geophysica. (2009) (accepted for publication).

PUBLICATIONS QUALIFYING FOR LECTURSHIP:

1. Herak M., D. Herak: Određivanje disperzije Rayleighevih valova na nekoliko putanja do Skopja. Acta Seismologica Iugoslavica 9, 1983, 33-43.
2. Herak. D., M. Herak: Utjecaj parametara jednog modela Zemljine kore i gornjeg plašta na disperziju Rayleighevih valova. Geofizika 1, 1984, 203-215.
3. Herak D., M. Herak: Body-wave velocities in the circum-Adriatic region. Tectonophysics 241, 1995, 121-141.
4. Herak, M. and D. Herak: Distance dependence of M_s and calibrating function for 20 second Rayleigh waves. Bulletin of the Seismological Society of America, 83, No. 6, 1993, 1881-1892.
5. Herak M., M. Živčić, Herak D.: Pg-wave velocity anisotropy in the hypocentral volume of the Krn Mt. (Slovenia) earthquake sequence. Journal of Applied Geophysics, 54, 3-4, 2003, 257-264.
6. Herak, M., Herak, D., Stipčević, J.: *Azimuthal anisotropy of Pg-wave velocity in hypocentral volumes of NW Croatia*. Acta Geophysica. (2009) (accepted for publication).

DATE OF THE LAST PROMOTION: 2007.

LECTURER: Dr. Branko Grisogono, full professor

AFFILIATION: Department of Geophysics, Faculty of Science, University of Zagreb, Croatia

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BIOGRAPHY:

B.S. and M.S. at Fac. of Sci. 1983 and 1987, PhD at DRI-UNR, USA, 1992. Postdoc at Uppsala Univ., Sweden, 1993-1995; assoc. prof. 1996. Stockholm Univ., Sweden, 1997-2003, assoc. prof. Fac. of Sci., Zagreb, since 2003, full prof. 2007. Advisory board of 'Tellus' since 12/2002, Editorial board 'Meteorol. Atmos. Phys.'; guest editor in 'Bound.-Layer Meteorol.' and 'Meteorol. Z.' Co-organized one intl. conference and two intl. workshops. Published over 45 peer-reviewed papers, cited over 440 times, editorial book (Springer 2007), textbook on dynamic meteorology (Školska knjiga, Zagreb, 2008), etc.

LIST OF PUBLICATIONS IN THE LAST FIVE YEARS:

552. Parmhed, O., J. Oerlemans and B. Grisogono, 2004: Describing surface-fluxes in katabatic flow on Breidamerkurjökull, Iceland. Quart. J. Roy. Meteorol. Soc. 130, 1137-1151.
553. G.B. and L. Enger, 2004: Boundary-layer variations due to orographic wave-breaking in the presence of rotation. Quart. J. Roy. Meteorol. Soc. 130, 2991-3014.
554. Parmhed, O., I. Kos and B. Grisogono, 2005: An approximate Ekman layer solution for smooth eddy diffusivity profiles. Bound.-Layer Meteorol. 115, 399-407.
555. Mauritsen, T., G. Svensson, and B. Grisogono, 2005: Wave flow simulations over Arctic leads. Bound.-Layer Meteorol. 117, 259-273.
556. Jeričević A. and B. Grisogono, 2006: The critical bulk Richardson number in urban areas: verification with application in NWP model. Tellus. 58A, 19-27.
557. Belušić, D., M. Pasarić, Z. Pasarić, M. Orlić and B. Grisogono, 2006: On local and non-local properties of turbulence in the bora flow. Meteorol. Z. 15, 301-306.
558. Kraljević, L. and B. Grisogono, 2006: Sea-surface temperature effects on 3D Bora-like flow. Meteorol. Z. 15, 169-178.
559. G.B, B. Ivancan-Picek and M. Furger, 2006: International Conference on Alpine Meteorology and MAP Meeting 23-27 May 2005, Zadar, Croatia. Meteorol. Z. 15, 131-131 (editors' report).
560. Telišman Prtenjak, M., B. Grisogono and T. Nitis, 2006: Shallow mesoscale flows at the north-eastern Adriatic coast. Quart. J. Roy. Meteorol. Soc. 132, 2191-2216.
561. Zilitinkevich, S. H. Savijärvi, A. Baklanov, B. Grisogono and K. Myrberg, 2006: Forthcoming meetings on planetary boundary-layer theory, modeling and applications. Bound.-Layer Meteorol. 119, 591-593.
562. Stiperski, I., I. Kavčič, B. Grisogono and D. R. Durran, 2007: Including Coriolis effects in the Prandtl model for katabatic flow. *Quart. J. Roy. Meteorol. Soc.* 133, 101–106.
563. Telišman Pretenjak, M. and B. Grisogono, 2007: Sea/land breeze climatological characteristics along the northern Croatian Adriatic Coast. *Theoretical & Applied Climatology.* 90, 201-215.
564. Kavčič, I. and B. Grisogono, 2007: Katabatic flow with Coriolis effect and gradually varying eddy diffusivity. *Bound.-Layer Meteorol*. 125, 377-387.
565. Mauritsen, T., G. Svensson, S. Zilitinkevich, I. Esau, L. Enger and B. Grisogono, 2007: A total turbulent energy closure model for neutrally and stably stratified atmospheric boundary layers. *J. Atmos. Sci*. 64, 4113-4126.

566. Belušić, D., B. Grisogono and Z. Bencetić Klaić, 2007: Atmospheric origin of the devastating coupled air-sea event in the east Adriatic. *J. Geophys. Res*. 112, D17111.
567. Belušić, D., M. Žagar and B. Grisogono, 2007: Numerical simulation of pulsations in the bora wind. *Quart. J. Roy. Meteorol. Soc.* 133, 1371-1388.
568. Baklanov, A. and B. Grisogono (Eds.), 2007: *Atmospheric Boundary Layers Nature, Theory and Applications to Environmental Modelling and Security*. Springer, 241 pp.
569. Grisogono, B., L. Kraljević and A. Jeričević, 2007: The low-level katabatic jet height versus Monin-Obukhov height. *Quart. J. Roy. Meteorol. Soc.* 133, 2133-2136.
570. Teixeira, M.A.C. and B. Grisogono, 2008: Internal wave drag in stratified flow over mountains on a beta plane. *Quart. J. Roy. Meteorol. Soc.* 134, 11-19.
571. Telišman Prtenjak, M., Z. Pasarić, Zoran, M. Orlić i B. Grisogono, 2008: Rotation of sea/land breezes along the northeastern Adriatic coast. *Ann. Geophys*. 26, 1711-1724.
572. Grisogono B., and D. Belušić, 2008: Improving mixing length-scale for stable boundary layers. *Quart. J. Roy. Meteorol. Soc*. 134, 2185-2192.
573. Grisogono, B. and D. Belušić, 2009: A review of recent advances in understanding the meso- and micro-scale properties of the severe Bora wind. *Tellus* 61A, 1-16.

PUBLICATIONS QULIFYING FOR LECTURSHIP:

2. G.B., 1995: A generalized Ekman layer profile within gradually-varying eddy diffusivities. Quart. J. Roy. Meteorol. Soc. 121, 445-453.
3. G.B., 1995: Wave-drag profiles in a mesoscale model with a higher-order closure turbulence scheme. J. Appl. Meteorol. 34, 941-954.
4. Smedman, A.-S., H. Bergström and B. Grisogono, 1997: Evolution of stable internal boundary layers over a cold sea. J. Geophys. Res. 102, 1091-1099.
5. Rogers, D., C. Dorman, K. Edwards, I. Brooks, K. Melville, S. Burk, W. Thompson, T. Holt, L. Ström, M. Tjernström, B. Grisogono, J. Bane, W. Nuss, B. Morley and A. Schanot, 1998: Highlights of Coastal Waves 1996. Bull. Amer. Met. Soc. 79, 1307-1326.
6. G.B. and J. Oerlemans, 2001: A theory for the estimation of surface fluxes in simple katabatic flows. Quart. J. Roy. Meteorol. Soc. 127, 2725-2739.
7. G. B, B. Ivancan-Picek and M. Furger, 2006: International Conference on Alpine Meteorology and MAP Meeting 23-27 May 2005, Zadar, Croatia. Meteorol. Z. 15, 131-131 (Editorial).
8. Baklanov, A. and B. Grisogono, 2007: Atmospheric boundary layers: nature, theory and applications to environmental modelling and security. *Bound.-Layer Meteorol*. 125, 157-160. DOI: 10.1007/s10546-007-9217-2. (Editorial)

DATE OF THE LAST PROMOTION: 15/05/2007.

LECTURER: Dr. Vanda Grubišić, full professor

AFFILIATION: Department of Meteorology and Geophysics, Faculty of Earth Sciences, Geography and Astronomy, University of Vienna

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BIOGRAPHY:

Education

B.Sc. 1987	University of Zagreb, Croatia	Physics/Meteorology
M.Phil. 1992	Yale University	Atmospheric Sciences
Ph.D. 1995	Yale University	Atmospheric Sciences

Postdoctoral 1995-1997 National Center for Atmospheric Research Mesoscale Meteorology

Professional Experience

2009–present Full Professor, University of Vienna, Department of Meteorology and Geophysics

2005–2009 Associate Research Professor, Desert Research Institute, Division of Atmospheric Sciences

2004–2007 Director, Advanced Computing in Environmental Sciences (ACES) computational and visualization facilities at the Desert Research Institute

2002–2006 Coordinator, ACES program, Nevada System of Higher Education

1999–2005 Assistant Research Professor, Desert Research Institute, Division of Atmospheric Sciences

1997–1999 Visiting Scientist, National Center for Atmospheric Research (NCAR), Mesoscale and Microscale Meteorology Division

1995–1997 Postdoctoral Fellow, National Center for Atmospheric Research (NCAR), Advanced Study Program

1991–1995 Graduate Assistant in Research, Yale University, Department of Geology and Geophysics

1987–1989 Research Assistant, University of Zagreb, Geophysical Institute

Synergistic Activities

Chair, Terrain-induced Rotor Experiment (T-REX) Scientific Steering Committee, 2004–present

Member, US National Science Foundation, Advisory Committee for the Geoscience Directorate, 2008–present

Member, American Meteorological Society Committee on History of Atmospheric Science, 2008–present

Member, American Meteorological Society Committee on Mesoscale Processes, 2006–present

Chair, Committee for Peter B. Wagner Memorial Award for Women in Atmospheric Sciences, 2000–2009

Member, University Corporation for Atmospheric Research (UCAR) President's Advisory

Committee on University Relations, 2006–2009

Member Representative, Nevada System of Higher Education at the University Corporation for Atmospheric Research, 2003–2009

Member, Mesoscale Alpine Programme Steering Committee, 2001–2006

Chair, American Meteorological Society Committee on Mountain Meteorology, 2000–2004

Member, American Meteorological Society Committee on Mountain Meteorology, 1998–2004

LIST OF PUBLICATIONS IN THE LAST FIVE YEARS:

1. Grubišić, V., and I. Stiperski, 2009: Lee wave resonances over double bell-shaped orography. *J. Atmos. Sci.*, In press.
2. Doyle, J. D., V. Grubišić, W. O. J. Brown, S. F. J. De Wekker, A. Dörnbrack, Q. Jiang, S. Mayor, and M. Weissmann, 2009: Observations and numerical simulations of subrotor vortices during T-REX. *J. Atmos. Sci.*, In press.
3. Wang, J., J. Bian, W. O. J. Brown, H. Cole, V. Grubišić, and K. Young, 2009: Vertical air motion from T-REX radiosonde and dropsonde data. *J. Atmos. Oceanic Technol.*, In press.
4. Li, Y., R. B. Smith, and V. Grubišić, 2009: Using surface pressure variations to categorize the diurnal valley circulations: Experiments in Owens Valley. *Mon. Wea. Rev.*, In press.
5. Horvath, K., S. Ivatek-Šahdan, B. Ivančan-Picek, and V. Grubišić, 2009: Evolution and structure of severe cyclonic bora: Contrast between the northern and southern Adriatic. *Weather and Forecasting*, In press.
6. Grubišić, V., and B. J. Billings, 2008: Summary of the Sierra Rotors Project wave and rotor events. *Atmos. Sci. Letters*, 9, 176-181.
7. Grubišić, V., J. D. Doyle, J. Kuettner, S. Mobbs, R. B. Smith, C. D. Whiteman, R. Dirks, S. Czyzyk, S. A. Cohn, S. Vosper, M. Weissmann, S. Haimov, S. F. J. DeWekker, L. L. Pan, F. K. Chow, 2008: The Terrain-induced Rotor Experiment: A field campaign overview including observational highlights. *Bull. Amer. Meteor. Soc.*, 89, 1513–1533.
8. Smith, R. B., B. K. Woods, J. Jensen, W. A. Cooper, J. D. Doyle, Q. Jiang, and V. Grubišić, 2008: Mountain waves entering the stratosphere. *J. Atmos. Sci.,* 65, 2543–2562.
9. Grubišić, V., and B. J. Billings, 2008: Climatology of the Sierra Nevada mountain wave events. *Mon. Wea. Rev.*, 136, 757–768.
10. Grubišić, V., and B. J. Billings, 2007: The intense lee-wave rotor event of Sierra Rotors IOP 8. *J. Atmos. Sci.*, 64, 4178–4201.
11. Grubišić, V., and M. Orlić, 2007: Early observations of rotor clouds by Andrija Mohorovičić. *Bull. Amer. Meteor. Soc.*, 88, 693–700.
12. Mitchell, D. L., A. Huggins, and V. Grubišić, 2006: A new snow growth model with application to radar precipitation estimates. *Atmos. Res.,* 82, 2–18.
13. Billings B., V. Grubišić, and R. D. Borys, 2006: Maintenance of a mountain valley cold pool: A numerical study. *Mon. Wea. Rev.,* 134, 2266–2278.
14. Grubišić, V., R. K. Vellore, A. W. Huggins, 2005: Quantitative precipitation forecasting of wintertime storms in the Sierra Nevada: Sensitivity to the microphysical parameterization and horizontal resolution. *Mon. Wea. Rev.,* 133, 2834–2859.

15. Grubišić, V., 2004: Bora-driven potential vorticity banners over the Adriatic. *Quart. J. Roy. Meteor. Soc.,* 130, 2571–2603.
16. Grubišić, V., and J. Lewis, 2004: Sierra Wave Project revisited: 50 years later. *Bull. Amer. Meteor. Soc.,* 85, 1127–1142.

PUBLICATIONS QULIFYING FOR LECTURSHIP:
All of the above.

DATE OF THE LAST PROMOTION: 2009.

LECTURER: Dr. Zvjezdana Bencetić Klaić, associate professor

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BIOGRAPHY*:*

Education

1998 Ph.D. Natural Science-Physics, University of Zagreb, Croatia
1989 M.S. Physics-Atmospheric Physics, University of Zagreb, Croatia
1983 B.S. Physics-Meteorology, University of Zagreb, Croatia

Professional Experience

2006-present Associate Professor, Andrija Mohorovičić Geophysical Institute, Faculty of Science, University of Zagreb
2002-2006 Assistant Professor, Andrija Mohorovičić Geophysical Institute, Faculty of Science, University of Zagreb
1998-2002 Senior Assistant, Andrija Mohorovičić Geophysical Institute, Faculty of Science, University of Zagreb
1994-1998 Assistant, Andrija Mohorovičić Geophysical Institute, Faculty of Science, University of Zagreb
1991-1994 Creation of databases, software enterprise '3Dnet', Zagreb
1988-1991 Hydrological and hydrotechnical modeling, 'Hidroprojekt', Zagreb
1983-1988 Graduate Research Assistant, Andrija Mohorovičić Geophysical Institute, Faculty of Science, University of Zagreb

Research Areas

Planetary Boundary Layer Pollution, Modeling of the Long-range Transport of Pollutants, Mesoscale Modeling, Biometeorology, Stratosphere-troposphere exchange

Scholarships, Professional and Scientific Visits

2000 Post-doctoral scholarship of the Greek State Scholarship Foundation (I.K.Y.) at Laboratory of Heat Transfer and Environmental Engineering, Aristotle University, Thessaloniki, Greece
2000 Visiting Scientist at Desert Research Institute, Reno, Nevada, USA
1998 Professional collaboration on ALADIN project, Meteo-France, Toulouse, France
1987 Post-graduate scholarship of the Norwegian Government at Norwegian Meteorological Institute, Oslo, Norway

Professional activities

2003-present: Editor-in-Chief of the journal Geofizika
2003-present: Member of the EURASAP Committee
2005-present: Member of the Managing Committee of the Croatian Meteorological Society
2006-present: Member of the Advisory Board of the journal Meteorologische Zeitschrift
2009- present EURASAP Newsletter Editor

LIST OF PUBLICATIONS IN THE LAST FIVE YEARS:

2. Klaić, Z. B., Pasarić, Z., Tudor, M., 2009: On the interplay between sea-land breezes and Etesian winds over the Adriatic. J. Marine Syst., in press.
3. Nitis, T., Kitsiou, D., Moussiopoulos, N. Klaić, Z. B., 2009: Meteorological simulations with use of satellite data for assessing urban heat island under summertime anticyclonic conditions. Int. J. Environment and Pollution, in press.
4. Špoler Čanić, K., Vidič, S., Klaić, Z. B., 2009: Precipitation chemistry in Croatia

during the period 1981–2006. J. Environ. Monit., DOI: 10.1039/b816432k.

5. Bešlić, I., Šega, K., Čačković, M., Klaić, Z. B., Bajić, A., 2008: Relationship between 4-day air mass back trajectories and metallic components in PM10 and PM2.5 particle fractions in Zagreb air, Croatia. Bull. Environ. Contam. Toxicol., 80, 270-273.
6. Bešlić, I., Šega, K., Čačković, M., Klaić, Z. B., Vučetić, V., 2007: Influence of weather types on concentrations of metallic components in airborne PM10 in Zagreb, Croatia, Geofizika, 24, 93-107.
7. Belušić, D., Grisogono, B., Klaić, Z. B., 2007: Atmospheric origin of the devastating coupled air-sea event in the east Adriatic. J. Geopyis. Res.-Atmos., DOI: 10.1029/2006JD008204.
8. Pasarić, Z., Belušić D., Klaić, Z. B., 2007: Orographic influences on the Adriatic sirocco wind. Ann. Geophysicae, 25, 1263-1267.
9. Belušić D., Klaić Z. B., 2006: Mesoscale dynamics, structure and predictability of a severe Adriatic bora case. Meteorol. Z., 15, 157-198.
10. Bešlić, I., Šega, K., Šišović, A., Klaić, Z. B., 2005: PM10, CO and NOx concentrations in the Tuhobić road tunnel, Croatia. Int. J. Environ. Pollut, 25, 251-262.
11. Nitis, T., Kitsiou, D., Klaić, Z. B., Prtenjak, M. T., Moussiopoulos, N., 2005: The effects of basic flow and topography on the development of the sea breeze over a complex coastal environment. Q. J. R. Meteorol. Soc., 131, 305–327.

PUBLICATIONS QULIFYING FOR LECTURSHIP:

1. Belušić D., Klaić Z. B., 2006: Mesoscale dynamics, structure and predictability of a severe Adriatic bora case. Meteorol. Z., 15, 157-198.
2. Klaić, Z. B., Belušić, D., Herceg Bulić, I., Hrust, L., 2003: Mesoscale modelling of meteorological conditions in the lower troposphere during a winter stratospheric ozone intrusion over Zagreb, Croatia. J. Geophys. Res.-Atmos., 108, 4720, 10.1029/2003JD003878.

DATE OF THE LAST PROMOTION: February 2006.

LECTURER: Dr. Darko Koračin, research professor

AFFILIATION: Division of Atmospheric Sciences, Desert Research Institute, 2215 Raggio Parkway, Reno, NV 89512, USA.

E-MAIL AND WEB ADDRESS: darko.koracin@dri.edu, http://www.dri.edu/People/darko

BIOGRAPHY:

Dr. Koračin has over 15 years experience in conducting research and application studies focused on atmospheric, dispersion, and air quality modeling and forecasting. He investigates the properties and evolution of atmospheric flows over both complex terrain and the ocean through the development and application of high-resolution mesoscale meteorological models. His expertise includes assessing the emission, transport, and dispersion of environmental pollutants using national regulatory and advanced air quality models for complex terrain. His work also aims to coupling of atmospheric models with oceanic and hydrological modules. He received three U.S. Fulbright awards (2001, 2003, and 2005) as a Senior Scientist Specialist in the area of Environmental Modeling to design and conduct Atmospheric Modeling course at the Geophysical Institute of the University of Zagreb, Croatia.

Dr. Koračin has published over 30 peer-reviewed articles in recognized US and international journals and has presented over 80 conference papers at domestic and international conferences. He is currently serving as an editor for the Journal of Geophysical Research – Atmospheres and for Geofizika. He has been invited to visit many institutions and participate in and design environmental research and education in the US, Denmark, Sweden, Croatia, Brazil, and Turkey. He is actively involved in the Atmospheric Sciences graduate program at the University of Nevada, Reno. Dr. Koracin has been teaching graduate level classes (Boundary-layer Modeling, Atmospheric Modeling, Regional Scale Dynamics, and Atmospheric Radiation) and mentoring students in the M.S. and PhD programs as well as post-doctoral research associates. He was recently elected as Director of the Atmospheric Sciences Graduate Program at the University of Nevada, Reno. Dr. Koracin is a member of the American Meteorological Society, the American Geographical Society, and the American Geophysical Union. He is an elected member of the Coastal Environment Committee of the American Meteorological Society.

LIST OF PUBLICATIONS IN THE LAST FIVE YEARS:

574. Koracin, D., J. Lewis, W. T. Thompson, C. E. Dorman, and J. A. Businger, 2001: Transition of a stratus layer into a fog layer along the California coast: Observations and modeling. J. Atmos. Sci, 58, 1714-1731.
575. Koracin, D., and C. Dorman, 2001: Marine atmospheric boundary layer divergence and clouds along California in June 1996. Mon. Wea. Rev., 129, 2040-2055.
576. Beg Paklar, G., V. Isakov, D. Koracin, V. Kourafalou, and M. Orlic, 2001: A case study of bora-driven flow and density changes on the Adriatic shelf (January 1987). Cont. Shelf Res., 21, 1751-1783.
577. Podnar, D., D. Koracin, and A. Panorska, 2002: Application of artificial neural networks to modeling the transport and dispersion of tracers in complex terrain. Atmos. Environ. 36, 561-570.
578. Lewis, J., D. Koracin, R. Rabin, and J. Businger, 2003: Sea fog off the California coast: Viewed in the context of transient weather systems. J. Geoph. Res. (Atmos). 108, No. D15, 4457, 10.1029/2002JD002833.
579. Lewis, J., D. Koracin, and K. Redmond, 2004: Sea fog research in the UK and USA:

Historical essay including outlook. Bull. Amer. Met. Soc., 85, 395–408.

580. Koracin, D., C. E. Dorman, and E. P. Dever, 2004: Coastal perturbations of marine layer winds, wind stress, and wind stress curl along California and Baja California in June 1999. J. Phys. Ocean., 34, 1152-1173.
581. Kos, I., D. Belusic, A. Jericevic, K. Horvath, D. Koracin, and M. T. Prtenjak, 2004: Education and Research: Initial development of the Atmospheric Lagrangian Particle Stochastic (ALPS) dispersion model. Geofizika, 21, 37-52.
582. Koracin, D., A. Kochanski, C. E. Dorman, and E. P. Dever, 2005: Wind stress curl and upwelling along the California coast, Bull. Amer. Met. Soc., 86, 629-630.
583. Luria, M., R.L. Tanner, R.J. Valente, S. T. Bairai, D. Koracin, and A. W. Gertler, 2005: Local and transported pollution over San Diego California. Atmospheric Environment, 39, 6765-6776.
584. Koracin, D., D. F. Leipper, and J. M. Lewis, 2005: Modeling sea fog on the U.S. California coast during a hot spell event. Geofizika, 22, 59-82.
585. Bebis, G., R. Boyle, D. Koracin, and B. Parvin, Eds, 2005: Advances in Visual Computing. Lecture Notes in Computer Science, 3804, Springer, 755pp.
586. Koracin, D., J. A. Businger, C. E. Dorman, and J. M. Lewis, 2005: Formation, evolution, and dissipation of coastal sea fog. Bound.-Layer Meteorol., 117, 447-478.
587. Chow, J. C., J. G. Watson, L-W. A. Chen, D. Koracin, B. Zielenska, D. Tang, F. Perera, J. Cao, and S.C. Lee, 2006: Exposure to PM2.5 and PAHs from the Tong Liang, China - Epidemiological Study. J. Environ. Sci. Health, Part A (in print).
588. Dorman, C. E., E. P. Dever, J. Largier, and D. Koracin, 2006: Buoy measured wind, wind stress, and wind stress curl over the shelf off Bodega Bay, California. Deep Sea Research (in print).

PUBLICATIONS QULIFYING FOR LECTURSHIP: All.

DATE OF THE LAST PROMOTION: 1 July 2002

LECTURER: Dr. Marijan Herak, full professor

AFFILIATION: Department of Geophysics, Faculty of Science, University of Zagreb

E-MAIL AND WEB ADDRESS: herak@irb.hr, http://geo101.gfz.hr/~mherak/index.html

BIOGRAPHY*:*

Born: October 3, 1956 in Zagreb, Croatia
Nationality: Croatian
Marital status: Married, one son

CURRENT POSITION/ADDRESS:

Department of Geophysics, Faculty of Science, University of Zagreb, Horvatovac bb, 10000 Zagreb, Croatia.

Phone: +385 1 460 5914, Fax: +385 1 4680 331, E-mail: herak@irb.hr

EDUCATION:

1975: Graduate Secondary school in Zagreb;

1981: B.Sc. Physics (Geophysics), Faculty of Science, University of Zagreb;

1985: M.Sc. Physics of the Earth's interior, University of Zagreb;

1991: Ph. D. Physics of the Earth's interior, University of Zagreb

PROFESSIONAL POSITIONS:

2002–	Full professor, Geophysical Institute, Faculty of Science, University of Zagreb
1997–2002	Associate professor, Geophysical Institute, Faculty of Science, University of Zagreb
1992–1997	Assistant professor, Geophysical Institute, Faculty of Science, University of Zagreb
1982–1992	Assistant, Geophysical Institute, Faculty of Science, University of Zagreb

PROFESSIONAL DUTIES:

2000–2004	Head of the Department of Geophysics, Faculty of Science
2004–2008	Vice-Dean of the Faculty of Science

TEACHING:

Seismology, Engineering seismology, Statistical methods in geophysics (undergraduate courses); Coordinator of the postgraduate courses in Geophysics, University of Zagreb

LANGUAGES:

English (fluent), German (fair)

INTERNATIONAL TRAINING AND STUDY VISITS:

1984: "Ettore Majorana" – Centre for Scientific Culture, International School of Applied Geophysics, Erice, Italy;

1991: UNESCO training course in seismology, Potsdam, Germany;

1993, 1995: Workshop on nonlinar dynamics, Trieste, Italy;

1984: University of Southern California, Los Angeles, USA;

1987–1999: 12 visits to the Institute of Geophysics, University of Hamburg, Hamburg, Germany;

1998: International workshop on intraplate earthquakes, Beijing, China.

MAIN RESEARCH TOPICS:

Seismology: Seismicity of Croatia, earthquake locations, determination of velocity structures, anisotropy studies, surface waves, quantification of earthquakes, historical seismology, attenuation of seismic waves, earthquake statistics, earthquake prediction, earthquake hazard and risk, seismic zonation.

PROFESSIONAL ACTIVITIES:

Editor-in-Chief, *Geofizika* journal (since 1994); editor, *Geofizika* journal (1984–1994), Secretary of the Croatian Committee for Geodesy and Geophysics; Titular member of Croatia in the European Seismological Commission (since 1998);

SCIENTIFIC PROJECTS:

Principal investigator on the project Seismicity of Croatia (since 1997). Collaborator in a number of international seismological projects: GSHAP seismic hazard assessment for the Adria region (1994–1997); IGCP seismotectonics and seismic hazard assessment N.382 of the Mediterranean basin (1996–2000); "Interpretation of broadband seismograms" and "Regional and global seismicity since the beginning of the 20th century", in the framework of the cooperation of the Zagreb and Hamburg Universities (since 1983); project 436 KRO 17/1/96 (Study of mechanical seismographs and the records of historical earthquakes) – Deutsche Forschungsgemeinschaft, Bonn (1996–1997); UNESCO/IGCP project 414 – Seismic ground motion in large urban areas (since 1997); SESAME – Seismic Hazard Assessment in the European-Mediterranean region (IGCP project n. 382) (2000–2003); MIDSEA project (Zürich, Switzerland, 1998); GSHAP – The global seismic hazard assessment program, (ILP, ICSU, UN/IDNDR project) (1992–1998); COPERNICUS Programme "Quantitative seismic zoning of the Circum-Pannonian Region" (1997–2000); "Physical, spatial and temporal characteristics of seismicity in Croatia (1980–1996)", COST Action 625 – 3-D monitoring of active tectonic structures (2004–2006); NATO SfP project "Assessment of seismic site amplification and of seismic building vulnerability in the Republic of Macedonia, Croatia and Slovenia" (2004-2008), Bilateral project with Macedonia: Istraživanje anizotropije brzine seizmičkih valova na području Makedonije (2005.–2007.), Istraživanje geomagnetskog polja i nehomogenosti litosfere u području Hrvatske (MZOŠ: 119-1193086-1314, 2006–); NATO SfP 983054 – Harmonization of seismic hazard maps for the Western Balkan countries (2007–2010); M.E.E.T.I.N.G. (Mitigation of Earthquake Effects in Towns and in Industrial Regional Districts) (2008); and others.

MEMBERSHIPS:

Seismological Society of America (since 1983); Associate member of Croatian Academy of Science and Arts (since 2006)

MEETINGS, CONFERENCES, CONGRESSES:

43 presentations (see http://moho.gfz.hr/~mherak)

PUBLICATIONS:

56 scientific papers (33 of which published in journals covered in Current Contents), 2 books (co-editor), 7 chapters in books, 9 popular papers.

LIST OF PUBLICATIONS IN THE LAST FIVE YEARS:

1. Herak, M., I. Lokmer, F. Vaccari, G. F. Panza: Linear amplification of horizontal strong ground motion in Zagreb (Croatia) for a realistic range of scaled point sources, PAGEOPH, 161, 2004, 1021-1041.
2. Herak, D., M. Herak, E. Prelogović, S. Markušić, Ž. Markulin: Jabuka island (Central Adriatic Sea) earthquakes of 2003, Tectonophysics, 2005, 398, 167-180.
3. Herak, M., D. Herak: Empirical earthquake recurrence laws in Croatia estimated by

forward modeling. Proceedings of the Second International Conference Science and Technology for Safe Development of Lifeline Systems, CEI, Bratislava, October 24-25, 2005, 68-73.

4. Ivančić I., Herak D., Markušić S., Sović I., M. Herak: Seismicity of Croatia in the period 2002-2005. Geofizika, 23/2, 2006, 87-103.
5. Herak, D., M. Herak: Andrija Mohorovičić (1857– 1936) – on the occasion of the 150th anniversary of his birth. Seismological Research Letters, vol. 78, 2007, 671-674.
6. Herak, M., D. Herak: Development of seismometry and seismic tomography in Croatia. Computerized Tomography Theory and Application 17/3, 2008, 18-26.
7. Herak, M. Herak, D.: Estimating building fundamental frequencies and damping from vibrations induced by ambient noise. Proceedings of International seminar on seismic risk and rehabilitation on the 10th anniversary of the July 9 1998 Azores earthquake, (Eds. Oliveira, C. S., Costa, A., Nunes, J. C.), Horta, Faial, Universidade dos Asores, July 9-13, 2008, 137-140.
8. Herak, M., D. Herak: Development of seismometry and seismic tomography in Croatia. Computerized Tomography Theory and Application 17/3, 2008, 18-26.
9. Herak, M.: ModelHVSR - A Matlab® Tool to Model Horizontal-to-Vertical Spectral Ratio of Ambient Noise. Computers and Geosciences. 34, 2008, 11, 1514-1526.
10. Herak, D., Herak, M., Tomljenović, B.: Seismicity of North-Western Croatia. Tectonophysics, 2009, 465, 212-220.
11. Mucciarelli M., Herak, M., Cassidy J. (Eds.): Increasing Seismic Safety by Combining Engineering Technologies and Seismological Data, Springer – NATO series, Dordrecht, 2009, pp 382.
12. Herak, M.: The use of ambient noise for building and soil characterisation, Increasing Seismic Safety by Combining Engineering Technologies and Seismological Data (M. Mucciarelli, M. Herak, J. Cassidy, Eds.), Springer – NATO series, Dordrecht, 2009, 1-2.
13. Herak, M.: Recent applications of ambient vibration measurements in Croatia, Increasing Seismic Safety by Combining Engineering Technologies and Seismological Data (M. Mucciarelli, M. Herak, J. Cassidy, Eds.), Springer – NATO series, Dordrecht, 2009, 281-292.
14. Herak, M. and Herak D.: Recent measurements of ambient vibrations in free-field and in buildings in Croatia, Coupled Site and Soil-Structure Interaction Effects with Application to Seismic Risk Mitigation (T. Schantz and R. Iankov, eds.), Springer – NATO series, Dordrecht, 2009, (in press).
15. Herak, M.: Overview of recent ambient noise measurements in Croatia in free-field and in buildings, Rudarsko-geološko-naftni zbornik, (2009) (accepted for publication).
16. Tomljenović, B., Herak, D., Herak, M.: Seismotectonics of the Zagreb area, Rudarsko-geološko-naftni zbornik, (2009) (accepted for publication).
17. Herak, M., Herak, D., Stipčević, J.: Azimuthal anisotropy of Pg-wave velocity in hypocentral volumes of NW Croatia. Acta Geophysica. (2009) (accepted for publication).

PUBLICATIONS QUALIFYING FOR LECTURSHIP:

589. Herak, M. (1989): HYPOSEARCH – An earthquake location program. Computers & Geosciences, 15, No. 7, 1157-1162.
590. Panza, G. F., Duda, S. J., Cernobori, L., M. Herak (1989): Surface-wave magnitude calibrating function: theoretical basis from synthetic seismograms. Tectonophysics, 166, 35-43.

591. Herak, M., D. Herak (1990): Anomalous seismicity of the Knin area prior to the M=5.5 earthquake of 1986. Tectonophysics, 172, 323-329.
592. Lee, V., Trifunac, M., Herak, M., Živčić, M., D. Herak (1990): M_L^{SM} computed from strong motion accelerograms recorded in Yugoslavia. Earthquake Engineering and Structural Dynamics, 19, 1167-1179.
593. Herak, M. (1991): Lapse time dependent Q_c-spectra observed in the Dinarides region. Physics of the Earth and Planetary Interiors, 67, 303-312.
594. Herak, M., D. Herak (1993): Distance dependence of Ms and calibrating function for 20 second Rayleigh waves, Bulletin of the Seismological Society of America, 83, No. 6, 1881-1892.
595. Herak, D., Herak, M. (1995): Body-wave velocities in the circum-Adriatic region, Tectonophysics, 241, 121-141.
596. Herak, M., D. Herak, S. Markušić (1996): Revision of the earthquake catalogue and seismicity of Croatia, 1908-1992, Terra Nova, 8, 86-94.
597. Herak, M., Allegretti, I., S. J. Duda (1996): Magnification of undamped seismographs and the analysis of the 1906 San Francisco earthquake record obtained on the Vicentini seismograph in Zagreb (Croatia). Terra Nova, 8, 286-292.
598. Herak, M., I. Allegretti, D. Herak, S. J. Duda (1998): Numerical modeling of the observed Wiechert seismograph magnification. PAGEOPH, 152, 539-550.
599. Markušić S., Herak, M. (1999): Seismic zoning of Croatia, Natural Hazards, 18, 269-285.
600. Herak, D., M. Herak, G. F. Panza, G. Costa (1999): Application of the CN intermediate term earthquake prediction algorithm to the area of the Southern External Dinarides, PAGEOPH, 156, 689-699.
601. Lokmer, I., M. Herak (1999): Anisotropy of P-wave velocity in the upper crust of the central External Dinarides, Studia Geophysica et Geodaetica, 43, 345-356.
602. D. Slejko, R. Camassi, I. Cecić, D. Herak, M. Herak, S. Kociu, V. Kouskouna, J. Lapajne, K. Makropoulos, C. Meletti, B. Muco, C. Papaioannou, L. Peruzza, A. Rebez, P. Scandone, E. Sulstarova, N. Voulgaris, M. Živčić, P. Zupančič (1999): Seismic hazard assessment for Adria, Annali di Geofisica, 42, 1085-1107.
603. Herak, M. (1999): Principal contributor for Croatia in Giardini D., Grunthal G., Shedlock K., P. Zhang. (Eds.): Global seismic hazard map (GSHAP Project). Attachment to Annali di Geofisica, 42.
604. Markušić, S., Suhadolc, P., Herak, M., Vaccari, F. (2000): A contribution to seismic hazard assessment in Croatia from deterministic modeling. PAGEOPH, 157, 1/2, 185-204.
605. Allegretti, I., Herak, D., Herak, M., Duda, S. J. (2000) Consistency of magnitudes of the largest historical earthquakes of the first half of the 20th century determined on the basis of Göttingen and Zagreb Wiechert seismograms, Studia Geophysica et Geodaetica, 44, 13-25.
606. Herak, M., G. F. Panza, G. Costa (2001): Theoretical and observed depth correction for M_S, PAGEOPH, 158, 1517-1530.
607. Herak, M., Orlić, M., Kunovec-Varga, M. (2001): Did the Makarska earthquake of 1962 generate a tsunami in the central Adriatic archipelago? Journal of Geodynamics, 31, 71-86.
608. Herak, M., Herak, D., Markušić, S., I. Ivančić (2001): Numerical modelling of the Ston-Slano (Croatia) aftershock sequence, Studia Geophysica et Geodaetica, 45, 251-266.

609. Herak, M., Markušić, S., I. Ivančić (2001): Attenuation of peak horizontal and vertical acceleration in the Dinarides area, Studia Geophysica et Geodaetica 45, 383-394.
610. Markušić, S., Herak, M., Herak, D., I. Ivančić (2002): Peak horizontal-to-vertical acceleration ratio and local amplification of strong ground motion, Studia Geophysica et Geodaetica, 46, 83-92.
611. Panza, G. F., Alvarez, L., Aoudia A., Ayadi, A., Benhallou, H., Benouar, D., Chen Yun-Tai, Cioflan, C., Ding Zhifeng, El-Sayed, A., Garcia, J., Garofalo, B., Gorshkov, A., Gribovszki, K., Harbi, A., Hatzidimitriou, P., Herak, M., Kouteva, M., Kuznetzov, I., Lokmer, I., Maouche, S., Marmureanu, G., Matova, M., Natale, M., Nunziata, C., Parvez, I., Paskaleva, I., Pico, R., Radulian, M., Romanelli, F., Soloviev, A., Suhadolc, P., Triantafyllidis, P., Vaccari, F. (2002): Realistic modeling of seismic input for megacities and large urban areas (the UNESCO/IUGS/IGCP project 414), Episodes, 25, No. 3, 160-184.
612. Lokmer, I., M. Herak, G. F. Panza, F. Vaccari (2002): Amplification of strong-ground motion in the city of Zagreb, Croatia, estimated by computation of synthetic seismograms, Soil Dynamics and Earthquake Engineering, 22, 105-113.
613. Herak, M., M. Živčić, D. Herak (2003): Azimuthal anisotropy of the P-wave velocity in the hypocentral volume of the Krn Mt. (Slovenia) earthquake sequence, Journal of Applied Geophysics, 54, 3-4, 257-264.
614. Herak, M., I. Lokmer, F. Vaccari, G. F. Panza (2004): Linear amplification of horizontal strong ground motion in Zagreb (Croatia) for a realistic range of scaled point sources, PAGEOPH, 161, 1021-1041.
615. Herak, D., M. Herak, E. Prelogović, S. Markušić, Ž. Markulin (2005): Jabuka island (Central Adriatic Sea) earthquakes of 2003, Tectonophysics, 398, 167-180.
616. Herak, M. (2008): ModelHVSR - A Matlab® Tool to Model Horizontal-to-Vertical Spectral Ratio of Ambient Noise. Computers and Geosciences. 34, 11 1514-1526.
617. Mucciarelli M., Herak, M., Cassidy J. (Eds.) (2009): Increasing Seismic Safety by Combining Engineering Technologies and Seismological Data, Springer – NATO series, Dordrecht, pp 382.
618. Herak, M. (2009): The use of ambient noise for building and soil characterisation, Increasing Seismic Safety by Combining Engineering Technologies and Seismological Data (M. Mucciarelli, M. Herak, J. Cassidy, Eds.), Springer – NATO series, Dordrecht, 1-2.
619. Herak, M. (2009): Recent applications of ambient vibration measurements in Croatia, Increasing Seismic Safety by Combining Engineering Technologies and Seismological Data (M. Mucciarelli, M. Herak, J. Cassidy, Eds.), Springer – NATO series, Dordrecht, 281-292.
620. Herak, M. and Herak D. (2009): Recent measurements of ambient vibrations in free-field and in buildings in Croatia, Coupled Site and Soil-Structure Interaction Effects with Application to Seismic Risk Mitigation (T. Schantz and R. Iankov, eds.), Springer – NATO series, Dordrecht, (in press).
621. Herak, M., Herak, D., Stipčević, J. (2009): Azimuthal anisotropy of Pg-wave velocity in hypocentral volumes of NW Croatia. Acta Geophysica. (accepted for publication).

DATE OF THE LAST PROMOTION: 2002 (full-professor), 2007 (re-election)

LECTURER: Dr. Mirko Orlić, full professor

AFFILIATION: Department of Geophysics, Faculty of Science, University of Zagreb

E-MAIL AND WEB ADDRESS: orlic@irb.hr**,** http://geo101.gfz.hr/~morlic

BIOGRAPHY:

Mirko Orlić was born on 26 May 1955 in Zagreb, and has obtained B. Sc. (1978), M. Sc. (1981) and Ph. D. (1988) degrees at the University of Zagreb. Worked for a while in Great Britain (Institute of Oceanographic Sciences, Birkenhead, 1980), spent an academic year as a visiting scholar in USA (Scripps Institution of Oceanography, La Jolla, Ca, 1993). First employed by the Rudjer Bošković Institute, since 1983 works at the Faculty of Science, University of Zagreb. Teaches physical oceanographic courses in Zagreb and introductory geophysical courses at the Split and Osijek universities. Supervised preparation of about twenty B. Sc. theses, six M. Sc. theses and five Ph. D. theses. Was Head of the Graduate Study of Physics at the University of Zagreb (1994-2000). By performing empirical and theoretical investigations of physical processes in the coastal sea and of atmosphere-sea interaction has authored or co-authored more than 60 refereed publications (more than 40 in CC/SCI journals), about 100 conference communications (12 of which were invited) and a book (which has got the J. J. Strossmayer award). Since 1980 planned, participated in, and published results from physical oceanographic experiments in the North Adriatic, since 1983 supervises tide-gauge station at Bakar. Led three national projects and a number of international projects concerned with the atmosphere-sea interaction (in the scope of Croatian-USA, Croatian-Slovenian-Italian and Croatian-EU cooperation), participated in the international research cruises in the Adriatic in 2002, 2003 and 2006. Formerly active as the editor of "Geofizika" and of two conference proceedings, presently is a guest-editor of "Journal of Geophysical Research" and "Journal of Marine Systems" and the geophysics editor of "Encyclopaedia Croatica". Acted as reviewer for several Croatian and a number of international journals, took part in the organization of a dozen symposia held in Croatia and abroad. Has performed various administrative duties at the University of Zagreb and the Ministry of Science, Education and Sports.

LIST OF SELECTED PUBLICATIONS IN LAST FIVE YEARS:

1. D. Belušić, M. Pasarić and M. Orlić: Quasi-periodic bora gusts related to the structure of the troposphere. Q. J. R. Meteorol. Soc. 130, 2004, 1103-1121.
2. N. Leder and M. Orlić: Fundamental Adriatic seiche recorded by current meters. Ann. Geophys. 22, 2004, 1449-1464.

I. Vilibić, N. Domijan, M. Orlić, N. Leder and M. Pasarić: Resonant coupling of a traveling air pressure disturbance with the east Adriatic coastal waters. J. Geophys. Res. 109, C10001, 2004, doi: 10.1029/2004JC002279.

3. M. Pasarić and M. Orlić: Meteorological forcing of the Adriatic – present vs. projected climate conditions. Geofizika 21, 2004, 69-87.
4. C. M. Lee, F. Askari, J. Book, S. Carniel, B. Cushman-Roisin, C. Dorman, J. Doyle, P. Flament, C. K. Harris, B. H. Jones, M. Kuzmić, P. Martin, A. Ogston, M. Orlić, H. Perkins, P.M. Poulain, J. Pullen, A. Russo, C. Sherwood, R. P. Signell and D. Thaler: Northern Adriatic response to a wintertime bora wind event. Eos, Transactions, American Geophysical Union 86, 2005, 157-165.
5. H. Peters and M. Orlić: Turbulent mixing in the springtime central Adriatic Sea. Geofizika 22, 2005, 1-19.

6. Z. Pasarić, M. Orlić and C. M. Lee: Aliasing due to sampling of the Adriatic temperature, salinity and density in space. Estuar. Coast. Shelf Sci. 69, 2006, 636-642.
7. H. Mihanović, M. Orlić and Z. Pasarić: Diurnal internal tides detected in the Adriatic. Ann. Geophys. 24, 2006, 2773-2780.
8. M. Orlić, G. Beg Paklar, Z. Pasarić, B. Grbec and M. Pasarić: Nested modeling of the east Adriatic coastal waters. Acta Adriat. 47 (Suppl.), 2006, 219-245.
9. M. Orlić, V. Dadić, B. Grbec, N. Leder, A. Marki, F. Matić, H. Mihanović, G. Beg Paklar, M. Pasarić, Z. Pasarić and I. Vilibić: Wintertime buoyancy forcing, changing seawater properties, and two different circulation systems produced in the Adriatic. J. Geophys. Res. 111, C03S07, 2006, doi: 10.1029/2005JC003271 [printed 112(C3)2007].
10. H. Peters, C. M. Lee, M. Orlić and C. E. Dorman: Turbulence in the wintertime northern Adriatic Sea under strong atmospheric forcing. J. Geophys. Res. 112, C03S09, 2007, doi: 10.1029/2006JC003634.
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13. G. Beg Paklar, N. Žagar, M. Žagar, R. Vellore, D. Koračin, P.-M. Poulain, M. Orlić, I. Vilibić and V. Dadić: Modeling the trajectories of satellite-tracked drifters in the Adriatic Sea during a summertime bora event. J. Geophys. Res. 113, C11S04, 2008, doi: 10.1029/2007JC004536.

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2. M. Orlić, M. Kuzmić and Z. Vučak: Wind-curl currents in the Northern Adriatic and formulation of bottom friction. Oceanol. Acta 9, 1986, 425-431.
3. M. Orlić: Oscillations of the inertia period on the Adriatic Sea shelf. Continent. Shelf Res. 7, 1987, 577-598.
4. M. Orlić, B. Penzar and I. Penzar: Adriatic sea and land breezes: clockwise versus anticlockwise rotation. J. Appl. Meteor. 27, 1988, 675-679.
5. M. Orlić, M. Gačić and P. E. LaViolette: The currents and circulation of the Adriatic Sea. Oceanol. Acta 15, 1992, 109-124.
6. M. Orlić, M. Kuzmić and Z. Pasarić: Response of the Adriatic Sea to the bora and sirocco forcing. Continent. Shelf Res. 14, 1994, 91-116.
7. Cerovečki, M. Orlić and M. C. Hendershott: Adriatic seiche decay and energy loss to the Mediterranean. Deep-Sea Res. I 44, 1997, 2007-2029.
8. N. Supić and M. Orlić: Seasonal and interannual variability of the northern Adriatic surface fluxes. J. Mar. Sys. 20, 1999, 205-229.
9. M. Orlić and M. Pasarić: Sea-level changes and crustal movements recorded along the east Adriatic coast. Nuovo Cim. C 23, 2000, 351-364.
10. M. Pasarić, Z. Pasarić and M. Orlić: Response of the Adriatic sea level to the air pressure and wind forcing at low frequencies (0.01-0.1 cpd). J. Geophys. Res. 105, 2000, 11423-11439.
11. N. Supić, M. Orlić and D. Degobbis: Istrian Coastal Countercurrent and its year-to-year variability. Estuar. Coast. Shelf Sci. 51, 2000, 385-397.
12. G. Beg Paklar, V. Isakov, D. Koračin, V. Kourafalou and M. Orlić: A case study of bora-driven flow and density changes on the Adriatic shelf (January 1987). Continent.

Shelf Res. 21, 2001, 1751-1783.
13. M. Herak, M. Orlić and M. Kunovec-Varga: Did the Makarska earthquake of 1962 generate a tsunami in the central Adriatic archipelago? J. Geodyn. 31, 2001, 71-86.
14. M. Orlić: Anatomy of sea level variability – an example from the Adriatic. F. El-Hawary (ed): The Ocean Engineering Handbook, CRC Press, Boca Raton (USA), 2001, 1.1-1.14.
14. I. Vilibić and M. Orlić: Adriatic water masses, their rates of formation and transport through the Otranto Strait. Deep-Sea Res. I 49, 2002, 1321-1340.

DATE OF THE LAST PROMOTION: 13 September 2005.

LECTURER: Dr. Zoran Pasarić, assistant professor

AFFILIATION: Department of Geophysics, Faculty of Science, University of Zagreb

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BIOGRAPHY:

Education:

1999. Ph. D. University of Zagreb, Faculty of Science, Mathematical Department
1989. M. Sc. University of Zagreb, Faculty of Science, Mathematical Department
1983. B. Sc., University of Zagreb, Faculty of Science, Mathematical Department

Working experience:

2006. – present, assistant professor, University of Zagreb, Faculty of Science, Geophysical Department
2001. – 2005., senior lecturer, University of Zagreb, Faculty of Science, Geophysical Department
2000., senior research assistant, Ruđer Bošković Institute, Zagreb
1990. – 1999., research assistant, Ruđer Bošković Institute, Zagreb
1986.-1989., assistant, Ruđer Bošković Institute, Zagreb

LIST OF PUBLICATIONS IN LAST FIVE YEARS:

1. V. Radić, Z. Pasarić and N. Šinik (2004): Analysis of Zagreb climatological data series using empirically decomposed intrinsic mode functions, Geofizika 21, 15-36.
2. D. Belušić, M. Pasarić, Z. Pasarić, M. Orlić and B. Grisogono (2005): On local and non-local properties of turbulence in the bora flow, Meteorologische Zeitschrift, 14, 1-6.
3. I. Vilibić, M. Orlić, S. Ćupić, N. Domijan, N. Leder, H. Mihanović, M. Pasarić, Z. Pasarić, M. Srdelić and G. Strinić (2005): A new approach to sea level observations in Croatia. Geofizika. 22, 21-57, (review article).
4. S. Cocito, M. Novosel, Z. Pasarić and M.M. Key Jr. (2006): Growth of the carbonate bryozoan Pentapora fascialis (Cheilostomata, Ascophora) around submarine freshwater springs in the Adriatic Sea, Linzer biologische Beiträge, 38(1), (in press).
5. J. Juras and Z. Pasarić (2006): The correlation coefficient of bivariate normal distribution as a measure of association in the contingency table, Geofizika 23, (in press).
6. Z. Pasarić, M. Orlić and C. M. Lee (2006): Aliasing due to Sampling of the Adriatic Temperature, Salinity and Density in Space, Estuarine Coastal and Shelf Science 69, (in press).
7. H. Mihanović, M. Orlić, and Z. Pasarić (2006): Diurnal internal tides detected in the Adriatic, Annales Geophysicae - Atmospheres Hydrospheres & Space Sciences 24(11), 2773-2780.
8. Z. Pasarić, D. Belušić and Z. Bencetić Klaić (2007): Orographic influences on the Adriatic sirocco wind, Annales Geophysicae 25(6), 1263-1267.
9. M. Orlić, V. Dadić, B. Grbec, N. Leder, A. Marki, F. Matić, H. Mihanović, G. Beg Paklar, M. Pasarić, Z. Pasarićand I.Vilibić (2007): Wintertime buoyancy forcing, changing seawater properties, and two different circulation systems produced in the Adriatic, Journal of Geophysical Research - Oceans 112(C3), 1-21.
10. M. Lazar, M. Pavić, Z. Pasarić and M. Orlić (2007): Analytical modelling of wintertime coastal jets in the Adriatic Sea, Continental Shelf Research 27(2), 275-285.

11. M. Orlić, G. Beg Paklar, Z. Pasarić, B. Grbec and M. Pasarić (2006): Nested modeling of the east Adriatic coastal waters, Acta Adriatica 47, Supplement, 219-245.
12. M. Telišman Prtenjak, Z. Pasarić, M. Orlić and B. Grisogono (2008): Rotation of sea/land breezes along the northeastern Adriatic coast, Annales Geophysicae - Atmospheres Hydrospheres & Space Sciences. 26(7), 1711-1724.

PUBLICATIONS QULIFAYING FOR LECTURSHIP:

1. M. Pasarić, Z. Pasarić and M. Orlić (2000): Response of the Adriatic sea level to the air pressure and wind forcing at low frequencies (0.01-0.1 cpd), Journal of Geophysical Research 105, 11423-11439
2. Z. Pasarić, M. Orlić and C. M. Lee (2006): Aliasing due to Sampling of the Adriatic Temperature, Salinity and Density in Space, Estuarine Coastal and Shelf Science 69, (in press)
3. M. Telišman Prtenjak, Z. Pasarić, M. Orlić and B. Grisogono (2008): Rotation of sea/land breezes along the northeastern Adriatic coast, Annales Geophysicae - Atmospheres Hydrospheres & Space Sciences. 26(7), 1711-1724.

DATE OF THE LAST PROMOTION: 14 July 2006.

LECTURER: Dr. Robert Precali, senior research associate

AFFILIATION: "Ruđer Bošković" Institute, Center for Marine Research, G. Paliaga 5, 52210 Rovinj

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BIOGRAPHY:

I was born on 27 April 1953 at Volosko, Croatia. B.Sc. in chemistry, Faculty of Science, Zagreb University, 1976. M.Sc. in oceanography, Zagreb University, 1981. Ph.D. in chemistry, Zagreb University, 1995. Specialisations at Brookhaven National Laboratory, Upton, NY, USA, Scripps Institution of Oceanography, La Jolla, CA, USA, UNEP, Athens, Greece. My main filed of interest is the research of processes involved in organic matter cycling in the marine ecosystem, mainly the seasonal cycle of primary production, mechanisms of eutrophication (anoxia, mucilage events) and long-term changes in the Adriatic ecosystem. In 1986 I designed and realised the CMR oceanographic database which I am steel maintaining and improving. I regularly participated in the research programs granted by the Ministry of Science as many national and international scientific projects (granted by NSF and Smithsonian Institution, USA; Alpe-Adria; UNEP etc.). I was coordinator of 3 scientific and 2 applied projects. The work resulted in 55 scientific publications, of which 25 with international review and 20 scientific notes and extended abstract. I attended about 30 scientific congresses. From 1998 as a consultant for UNEP I am participating in the design and implementation of the Long-Trend Monitoring Programme of contaminants in biota and sediments in some Mediterranean countries. In 2002 I also participated in the definition of UNEP/MED POL monitoring strategy for assessing Mediterranean eutrophication.

LIST OF PUBLICATIONS IN LAST FIVE YEARS:

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624. Degobbis,D., Precali, R., Ferrari, C.R., Djakovac, T., Rinaldi, A., Ivančić, I., Gismondi, M., Smodlaka, N. 2005. Changes in nutrient concentrations and ratios during mucilage events in the period 1999-2002. Sci Total Environ 353, 103-114.
625. Grilli, F., Marini, M., Degobbis, D., Ferrari, C.R., Fornasiero, P., Russo,A., Gismondi, M., Djakovac, T., Precali, R., Simonetti, R. 2005. Circulation and fluxes in the northern Adriatic Sea in the period June 1999-July 2002. Part II: Nutrient budgets. Sci Total Environ 353, 115-125.
626. Grilli, F., Paschini, E., Russo, A., Precali, R., Supić, N. 2005. Circulation and horizontal fluxes in the northern Adriatic Sea (June 1999-July 2002). Part I: Geostrophic circulation and current measurement. Sci Total Environ 353, 57-67.
627. Fonda Umani, S., Milani, L., Borme, D., de Olazabal, A., Parlato, S., Precali, R., Kraus, R., Lučić, D., Njire, J., Totti, C., Romagnoli, T., Pompei, M., Cangini,. M. 2005. Inter-annual variations of planktonic food webs in the northern Adriatic Sea and their role in driving organic carbon fluxes. Sci Total Environ 353, 218-231.
628. Precali, R., Giani, M., Marini, M., Grilli, F., Ferrari, C. R., Pečar, O., Paschini, E. 2005. Mucilaginous aggregates in the northern Adriatic Sea in the period 1999-2002:

Typology and distribution. Sci Total Environ 353, 10-23.

629. Russo, A., Maccaferri, S., Djakovac, T., Precali, R., Degobbis, D., Deserti, M., Paschini, E., Lyons, D. 2005. Meteorological and Oceanographic conditions in the northern Adriatic Sea during the period June 1999 - July 2002: Influence on the mucilage phenomenon. Sci Total Environ 353, 24-38.

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2. Fuks, D., Precali, R., Devescovi, M., 1994. Bacterial production in the stratified karstic estuary of the Krka River. Acta Adriat. 34: 21-28.
3. Degobbis, D., Precali, R., Ivančić, I., Smodlaka, N., Fuks, D., Kveder, S., 2000. Long-term changes in the northern Adriatic ecosystem related to anthropogenic eutrophication. Int J Environ Poll 13, 495-533.
4. Pečar, O, Precali, R., Giani, M., Blažina, M., Smodlaka, N. 2004. Northern Adriatic mesocosm experiment Rovinj 2003: primary production and total organic carbon. Period Biol 106 23-29.
5. Fonda Umani, S., Milani, L., Borme, D., de Olazabal, A., Parlato, S., Precali, R., Kraus, R., Lučić, D., Njire, J., Totti, C., Romagnoli, T., Pompei, M., Cangini,. M. 2005. Inter-annual variations of planktonic food webs in the northern Adriatic Sea and their role in driving organic carbon fluxes. Sci Total Environ 353, 218-231.

DATE OF THE LAST PROMOTION: 28 October 2005.

LECTURER: Dr. Franjo Šumanovac, full professor

AFFILIATION: Faculty of Mining, Geology and Petroleum Engineering, University of Zagreb

E-MAIL AND WEB ADDRESS: franjo.sumanovac@rgn.hr

BIOGRAPHY*:*

He was born on August, 14th 1959 in Bošnjaci and completed secondary school in Županja in 1978. He graduated in 1983 in the Study of Geology of the Faculty of Mining, Geology and Petroleum Engineering with excellent score and average grade of all examinations of 4.9. Ph. D. thesis under the title "Quantitative gravity interpretation and its application in complex geophysical explorations" was defended on November, 22nd 1989 at the Faculty of Mining, Geology and Petroleum Engineering.

He has taken employment at the Department of Geophysical Exploration and Mine Surveying of the Faculty of Mining, Geology and Petroleum Engineering since 1983. He accomplished academic title of the assistant professor in 1991, the associate professor in 1998, and full professor in 2002. From March, 1st to December, 31 1992 he stayed at the TNO Institute of Applied Geoscience in Delft (the Netherlands) using postdoctoral fellowship granted by the Commission of the European Community.

He is lecturer for several courses in the PhD study at the Faculty of Mining, Geology and Petroleum Engineering. He regularly participated in research project funded by the Ministry of Science, Education and Sports and leads the scientific research project "Geophysical explorations of aquifer systems, environment and energy resources". He participated in international scientific research project "ALP 2002–Seismic Exploration of the Alpine Lithosphere" and led Croatian part of the project. The project was carried out in Austria, Italy, Slovenia, Czech Republic, Hungary and Croatia, but scientists from other countries also participated (Poland, Denmark, USA, Canada, Finland, etc.).

He presented papers at many international and domestic scientific meetings. He led many research projects that enabled supply with several geophysical instruments, software and additional equipment. He advanced professional geophysical work in Croatia introducing the electrical tomography method in hydrogeological explorations. He is head of the Department of Geophysical Exploration and Mine Surveying of the Faculty of Mining, Geology and Petroleum Engineering. He is a member of international and domestic professional societies (Society of Exploration Geophysicists, European Association of Geoscientist and Engineers, Scientific Council for Oil of the Croatian Academy of Sciences and Arts, etc.).

LIST OF PUBLICATIONS IN THE LAST FIVE YEARS:

1. Šumanovac, F. (2004): Electrical imaging of faults in karst water explorations. Near Surface 2004, Proceedings of the 10th European Meeting of Environmental and Engineering Geophysics, P-036, Utrecht.
2. Šumanovac, F. & ALP 2002-Radna grupa (2005): ALP 2002 – Istraživanja litosfere na području Alpa i Dinarida. Knjiga sažetaka, 3. Hrvatski geološki kongres, 153-154, Opatija.
3. Šumanovac, F., Filipović, I., Orešković, J. & ALP 2002-Radna grupa (2005): ALP 2002

– Two-dimensional Seismic Modelling on ALP01 and ALP02 Profiles. Abstract Book, 7th Workshop on Alpine Geological Studies, 93-94, Opatija.

4. Šumanovac, F. (2005): Geophysical water exploration on the Korčula Island (Croatia). 67th Conference, European Association of Geoscientists & Engineers (EAGE), paper G002, Madrid.
5. Šumanovac, F. (2005): Electrical tomography in the exploration of construction material material deposits. 67th Conference, European Association of Geoscientists & Engineers (EAGE), paper P113, Madrid.
6. Šumanovac, F. (2006): Mapping of thin sandy aquifers by using high resolution reflection seismics and 2-D electrical tomography. Journal of Applied Geophysics, 58, 144-157.
7. Šumanovac, F., Pekaš, Ž. & Majtanić, H. (2006): Mapping Limestone Aquifer by Electrical and Seismic Methods in the Zmajevac Area (Croatia). 12th European Meeting of Environmental and Engineering Geophysics - Near Surface 2006, P064, Helsinki.
8. Šumanovac, F., Ženko, T., Matjašić, I. & Majtanić, H. (2006): Električna tomografija u istraživanju ležišta tehničko-građevnog kamena. Zbornik radova simpozija "Mining 2006", Žunec, N. (ur.), Zagreb: Springer Business Media Croatia, 16-25, Dubrovnik.
9. Orešković, J. & Šumanovac, F. (2007): Reservoir Characterization of the Stari Gradac Gas Condensate Field Using Seismic Attributes. Nafta, 58, 94-104.
10. Šumanovac, F. & Dominković Alavanja, S. (2007): Determination of resolution limits of electrical tomography on the block model in a homogenous environment by means of electrical modelling. Rudarsko-geološko-naftni zbornik, 19; 47-56.
11. Terzić, J., Šumanovac, F. & Buljan, R. (2007): An Assessment of Hydrogeological Parameters on the Karstic Island of Dugi Otok, Croatia. Journal of Hydrology, 343, 29-42.
12. Brückl, E., Bleibinhaus, F., Gosar, A., Grad, M., Guterch, A., Hrubcová, P., Keller, G.R., Majdański, M., Šumanovac, F., Tiira, T., Yliniemi, J., Hegedűs, E. & Thybo, H. (2007): Crustal structure due to collisional and escape tectonics in the Eastern Alps region based on profiles Alp01 and Alp02 from the ALP 2002 seismic experiment. Journal of Geophysical Research - Solid Earth, 112, B6; 06308-25.
13. Engelsfeld, T., Šumanovac, F. & Pavin, N. (2008): Investigation of underground cavities in a two-layer model using the refraction seismic method. Near Surface Geophysics, 6, 221-231.
14. Šumanovac, F., Orešković, J., Kolar, S. & ALP 2002 Working Group (2008): Lithospheric structure at the contact of the Dinarides and the Pannonian Basin in the area of Croatia, ELGI Centenary Conference, Budapest.

PUBLICATIONS QUALIFYING FOR LECTURSHIP:

1. Zagorac, Ž., Šumanovac, F. & Jungwirth, M. (1988): Duboko istraživanje novom geoelektričnom metodom kod Ferdinandovca. Nafta, 39, 255-261, Zagreb.
2. Šumanovac, F. (1990): Računanje oblika struktura iz gravimetrijskih karata uz upotrebu podataka iz bušotina. Nafta, 41, 161-187, Zagreb.
3. Zagorac, Ž. & Šumanovac, F. (1990): Geomagnetska istraživanja ležišta građevinskih materijala. Rudarsko-geološko-naftni zbornik, 2, 35-39, Zagreb.
4. Zagorac, Ž. & Šumanovac, F. (1992): Gravity prospecting in platform areas. Rudarsko-geološko-naftni zbornik, 4, 1-5, Zagreb.
5. Šumanovac, F. (1996): Three-dimensional modelling software in gravity inversion

procedure. Nafta, 47, 161-167.
6. Šumanovac, F., Ritsema, I.L. & Bril, B.H. (1996): System architecture for 3D gravity modelling. Geologia Croatica, 49/2, 145-153,
7. Šumanovac, F. & Weisser, M. (2001): Evaluation of resistivity and seismic methods for hydrogeological mapping in karst terrains. Journal of Applied Geophysics, 47, 13-28.
8. Šumanovac, F. (2004): Electrical imaging of faults in karst water explorations. Near Surface 2004, Proceedings of the 10th European Meeting of Environmental and Engineering Geophysics, P-036, Utrecht.
9. Šumanovac, F. (2006): Mapping of thin sandy aquifers by using high resolution reflection seismics and 2-D electrical tomography. Journal of Applied Geophysics, 58, 144-157.
10. Šumanovac, F. & Dominković Alavanja, S. (2007): Determination of resolution limits of electrical tomography on the block model in a homogenous environment by means of electrical modelling. Rudarsko-geološko-naftni zbornik, 19; 47-56.
11. Terzić, J., Šumanovac, F. & Buljan, R. (2007): An Assessment of Hydrogeological Parameters on the Karstic Island of Dugi Otok, Croatia. Journal of Hydrology, 343, 1-2; 29-42.
12. Brückl, E., Bleibinhaus, F., Gosar, A., Grad, M., Guterch, A., Hrubcová, P., Keller, G.R., Majdański, M., Šumanovac, F., Tiira, T., Yliniemi, J., Hegedűs, E. & Thybo, H. (2007): Crustal structure due to collisional and escape tectonics in the Eastern Alps region based on profiles Alp01 and Alp02 from the ALP 2002 seismic experiment. Journal of Geophysical Research - Solid Earth, 112, B6; 06308-25.
13. Engelsfeld, T., Šumanovac, F. & Pavin, N. (2008): Investigation of underground cavities in a two-layer model using the refraction seismic method. Near Surface Geophysics, 6, 221-231.

DATE OF THE LAST PROMOTION: 17th April, 2007.

LECTURER: Dr. Bruno Tomljenović, associate professor

AFFILIATION: Faculty of Geology, Mining and Petroleum Engineering, University of Zagreb

E-MAIL AND WEB ADDRESS: bruntom@rgn.hr

BIOGRAPHY:

Education:

1988. B.Sc. in Geology at the University of Zagreb, Faculty of Mining, Geology & Petrol. Engineering and Faculty of Sciences.

1995. M.Sc. in Natural Sciences, Field: Geosciences, Branch: Geology and Mineralogy at the Faculty of Sciences, University of Zagreb.

2002. Ph.D. in Natural Sciences, Field: Geosciences, Branch: Geology and Mineralogy at the Faculty of Sciences, University of Zagreb.

Working experience:

1990–1995 Assistant at the Faculty of Mining, Geology & Petrol. Engineering, University of Zagreb; Exercises in: General Geology, General and Stratigraphic Geology;

1995–2004 Assistant and Senior Assistant at the Faculty of Mining, Geology & Petrol. Engineering, University of Zagreb; Courses and exercises in: Structural Geology, General Geology, General and Stratigraphic Geology.

2005–2008 Docent (Assistant Professor) at the Faculty of Mining, Geology & Petrol. Engineering, University of Zagreb; Courses and exercises in: Structural Geology, General Geology, Petrology and Geology.

2008- Associate Professor at the Faculty of Mining, Geology & Petrol. Engineering, University of Zagreb; Courses in Structural Geology, Tectonics, Tectonic Geomorphology, Seismotectonics, General Geology, Petrology and Geology

LIST OF PUBLICATIONS IN THE LAST FIVE YEARS:

1. Herak, D., Herak, M. & Tomljenović, B. (2009): Seismicity and earthquake focal mechanisms in North-Western Croatia.- Tectonophysics.- 465, 212-220.
2. Judik, K., Rantitsch, G., Rainer, T.M., Arkai, P. & Tomljenović, B. (2008): Alpine metamorphism of organic matter in metasedimentary rock from Mt. Medvednica (Croatia). - Swiss. J. Geosci., 101, 605-616.
3. Tomljenović, B., Csontos, L., Marton, E., & Marton, P. (2008): Tectonic evolution of the northwestern Internal Dinarides as constrained by structures and rotation of Medvednica Mountains, North Croatia.- U: Siegesmund, S., Fügenschuh, B. & Froitzheim, N. (ur.): Tectonic Aspects of the Alpine-Dinaride-Carpathian System, Geological Society London, Spec. Publ., 298, 145-167.
4. Balen, D., Horváth, P., Tomljenović, B., Finger, F., Humer, B., Pamić, J.(†), Árkai, P. (2006): A record of pre-Variscan Barrovian regional metamorphism in the eastern part of the Slavonian Mountains (NE Croatia).- *Mineralogy and Petrology*, 87, 143-162.
5. Márton, E., Jelen, B., Tomljenović, B., Pavelić, D., Poljak, M., Márton, P., Avanić, R., & Pamić, J., (2006): Late Neogene counterclockwise rotation in the SW part of the Pannonian Basin. - *Geol Carpathica*; 57, 1, 41-46.
6. Márton, E.; Pavelić, D.; Tomljenović, B.; Márton, P.; & Avanić, R. (2005): Paleomagnetic investigations in the Croatian part of the Pannonian Basin: a review. - *Acta Geol. Hungarica*, 48, 2, 225-233.
7. Judik, K.; Árkai, P.; Horváth, P.; Dobosi, G.; Tibljaš, D.; Balen, D.; Tomljenović, B.;

Pamić, J. (2004): Diagenesis and low-temperature metamorphism of Mt. Medvednica, Croatia: Mineral assemblages and phyllosilicate characteristics. - *Acta Geol. Hungarica*, 47, 2-3; 151-176.

8. Prelogović, E., Pribičević, B.; Ivković, Ž.; Dragičević, I.; Buljan, R.; Tomljenović, B. (2004): Recent structural fabric of the Dinarides and tectonically active zones important for petroleum-geological exploration in Croatia.- *Nafta,* 55, 4; 155-161

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1. Herak, D., Herak, M. & Tomljenović, B. (2009): Seismicity and earthquake focal mechanisms in North-Western Croatia.- Tectonophysics.- 465, 212-220.
2. Tomljenović, B., Herak, D., Herak, M. & Kralj, J. (2008): Seismogenic zones of northwestern Croatia. - 46-47.
3. Tomljenović, B., Csontos, L., Marton, E., & Marton, P. (2008): Tectonic evolution of the northwestern Internal Dinarides as constrained by structures and rotation of Medvednica Mountains, North Croatia.- U: Siegesmund, S., Fügenschuh, B. & Froitzheim, N. (ur.): Tectonic Aspects of the Alpine-Dinaride-Carpathian System, Geological Society London, Spec. Publ., 298, 145-167.
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2006 Ph. D. Physics. Earth's magnetic field, University of Zagreb, Croatia.

2002 Master degree in Atomic and Molecular physics and Astrophysics, University of Zagreb, Croatia.

1996 Diploma of Engineering in Physics, Faculty of science, University of Zagreb, Croatia.

1990 Diploma from School of mathematics and computer sciences, Secondary school Labin, Croatia.

PROFESSIONAL POSITIONS:

2009- Assistant professor, Geophysical Institute, Faculty of Science, University of Zagreb.

2006-2009 Senior research assistant, Geophysical Institute, Faculty of Science, University of Zagreb.

2003-2006 Research assistant, Geophysical Institute, Faculty of Science, University of Zagreb.

1982–1992 Assistant, Geophysical Institute, Faculty of Science, University of Zagreb.

TEACHING:

Planetary science, Geomagnetism and aeronomy, Geophysical practicum

MAIN RESEARCH TOPICS:

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LANGUAGES:

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INTERNATIONAL TRAINING AND STUDY VISITS:

2009 Workshop on Terrestrial magnetism, International Space Science Institute, Bern, Switzerland

2007 Workshop on Magnetospheric dynamic, International school of Space Science, L'Aquila, Italy

2008, 2006, 2005, 2003 Geophysical Institute in Potsdam (GeoForscungsZentrumPotsdam) , Germany

2004 IAGA Workshop, Japan.

2003 Astronomy Department, University of California at Berkeley.

2003 Workshop on European Magnetic Repeat Station Surveys, Niemegk, Germany.

2000, 2001 Astronomy Department, University of California at Berkeley.

2000 Workshop in Adaptive optics, University of California at Santa Cruz.

1995,1996 Department of the Earth and Planetary science, Trieste, Italy.

PROJECTS:

Principal investigator of the bilateral Croatian-German project: "Modelling the European

secular variation on regional scale". Collaborator on the project: "Istraživanje geomagnetskog polja i nehomogenosti litosfere u području Hrvatske" (MZOŠ: 119-1193086-1314, 2006–).

PROMOTION OF SCIENCE:

2002 Participant of the V Academic school in Zadar, Croatia, in the debate: "The position of the science and the young scientists in Croatia".

July, 2002 Teaching astronomy at the Summer youth school of natural sciences, Croatia.

June, 2002 Contact and Training seminar in Ohrid, Macedonia, organized by YouthNet Center. Participant.

2001, 2002 Giving presentations in astronomy, in a few high schools.

1999 Establishing the Croatian Association For The Promotion And Application of Sciences.

LIST OF PUBLICATIONS IN LAST FIVE YEARS:

1. Brajša, Roman; Wohl, Hubertus; Hanslmeier, Arnold; Verbanac, Giuliana; Ruždjak, Domagoj; Cliver, Edward; Svalgaard, Leif; Roth, Markus: On solar cycle predictions and reconstructions. Astronomy & Astrophysics. (2008) (accepted for publication)
2. Showalter, Mark; de Pater, Imke; Verbanac, Giuliana; Hamilton, Douglas; Burns, Joseph: Properties and dynamics of Jupiter's gossamer rings from Galileo, Voyager, Hubble and Keck images. Icarus. 195 (2008), 1; 361-377.
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4. Verbanac, Giuliana; Korte, Monika; Mandea, Mioara: On minimizing the external field contributions in annual means of the geomagnetic observatories. Geofizika. 25 (1) (2008); 27-39.
5. Brajša, Roman; Wohl, Hubertus; Ruždjak, Domagoj; Vršnak, Bojan; Verbanac, Giuliana; Svalgaard, Leife; Hochedez, Jean-Francois: On the solar rotation and activity. Astronomische Nachrichten (0004-6337) 328 (2007), 10; 1013-1015.
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9. Verbanac, Giuliana; Lühr, Hermann; Rother, Martin: Evidence of the ring current effect in geomagnetic observatories annual means. Geofizika. 23 (2006); 13-20.
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12. Brajša, Roman; Woehl, Hubertus; Vršnak, Bojan; Ruždjak, Vladimir; Clette, Frederic; Hochedez, Jean-Francois; Verbanac, Giuliana; Temmer, Manuela: Spatial distribution and north-south asymmetry of coronal bright points from mid-1998 to mid-1999. Solar

physics. 231 (2005), 1; 29-44.

13. Verbanac, Giuliana; de Pater, Imke; Showalter, Mark; Lissauer, Jack.Keck: Infrared Observations of Saturn's Main Rings Surrounding Earth's August 1995 Ring Plane Crossing. Icarus (New York, N.Y.). 174 (2005); 241-252.
14. Vujnović, Vladis; Verbanac, Giuliana; Orešković, Jasna; Marki, Antun; Marić, Krešimir; Lisac, Inga; Ivandić, Monika: Results of the preliminary geomagnetic field strength measurements in the northern part of middle Croatia. Geofizika. 21 (2004), 1; 1-13.
15. Brkić, Mario; Bašić, Tomislav; Verbanac, Giuliana: Geomagnetism in Croatia - a Historical Overview. Geodetski list. 57 (80) (2003), 3; 183-194.

PUBLICATIONS QULIFAYING FOR LECTURSHIP:
All of the above.

DATE OF THE LAST PROMOTION: 2009.

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