M. V. LOMONOSOV MOSCOW STATE UNIVERSITY

FACULTY OF PHYSICS

CONTENTS

Graduates of Moscow State University always served Russia hand and foot. They always were not only its pride, but also helped to further the development of the University. Such world–known names as A. S. Pushkin, M. Yu. Lermontov, A. P. Chekhov, A. N. Ostrovsky, and I. A. Goncharov were related to Moscow State.

Philosophers, mathematicians, physicists, and other representatives of natural sciences and humanities have been established at Moscow State world–famous scientific Schools.

If there were no Moscow University established, our country would be different from nowadays Russia. On the contrary, the University would not be the nowadays Moscow State University without Russia.

Professor VICTOR A. SADOVNICHY

Rector, M. V. Lomonosov Moscow State University, Academician, Russian Academy of Sciences

This booklet introduces the largest in Russia educational and scientific center in the field of Physics and its applications — Faculty of Physics at M. V. Lomonosov Moscow State University. Physics was among those few subjects that were delivered at Moscow State University for the first time in Russia since it was founded in 1755.

Since that time, over two and a half centuries, many generations of the faculty's staff have been involved into both teaching and conducting scientific research in Physics and we are proud to offer to the nowadays students of Physics not only best traditions of the university Physics in Russia, but also an up–to–date level of research. Nowadays, the Faculty of Physics coordinates teaching of Physics within all Russian universities.

In the curriculum, we combine together classical and modern training techniques, theoretical training at the lectures, seminars, and classes with the intense practical training in the practicums, research labs, and computer classes. Our students set high standards of academic excellence, while the faculties work to maintain the creative environment for their progress.

The Faculty of Physics is under the permanent development: over the past decade, five new chairs as well as a number of new research centers and laboratories have been established.

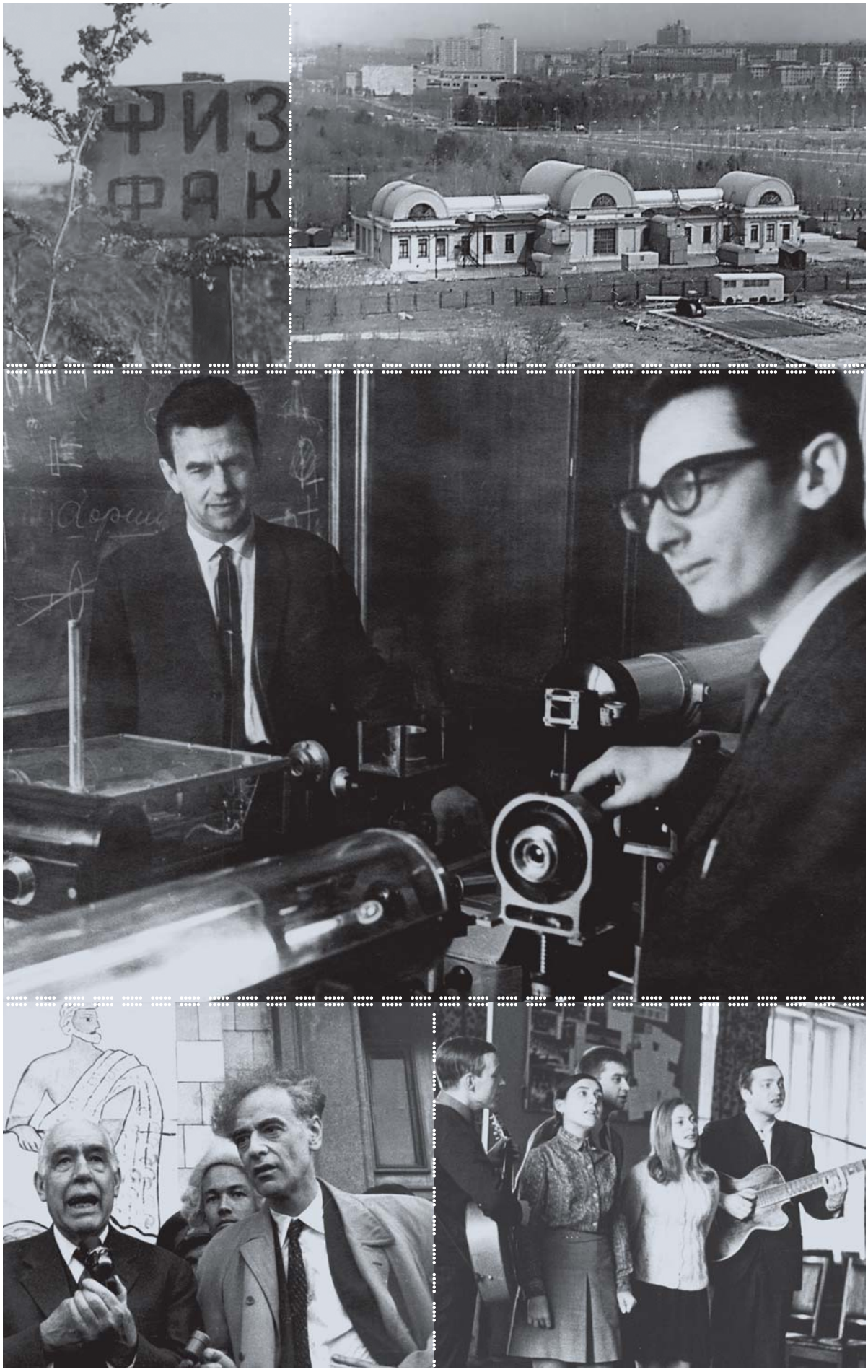
Only those who are able to catch the fact of the matter and follow the logic of any new phenomenon will survive in today's modern world of rapid changes and excessive information. We work hard to teach this our students through better comprehension of the physical laws, with belief that the laws of physics are universal for all phenomena of the material world around us. We believe that combination of theory and practical experience and participation in the scientific research are the musts to form a creative person, what we would like each our graduate to be.

Our graduates work in more than 100 countries around the world. Not all of them are in Science, but also in business, social life, and politics, and we are proud that our education is of value for all of them and helped them to find their places in their lives.

We are always open for cooperation and will be happy to have you among our students, partners, and friends.

Professor Vladimir I. Trukhin

Dean, Faculty of Physics, M. V. Lomonosov Moscow State University


ФИЗ
ФАК

A GLIMPSE BACK INTO THE HISTORY

Lomonosov Moscow State University (MSU) is the most ranked and oldest University in Russia. It was founded as the Emperor's Moscow University under the decree of the empress Yelizaveta Petrovna on January 25, 1755. In 1940 the Moscow State University was named after the famous Russian scientist Mikhailo Vasil'evich Lomonosov, the spiritual father of the University.

At its birth, the University had three faculties — Law, Medicine, and Philosophy. The latter faculty included a Chair of «Experimental and Pure Physics», which also gives the birth of Physics at Moscow University. In 1770 it was reorganized into the Chair of Mathematics and Physics, from which later on, in 1791, a Chair of Experimental Physics was split. It was headed by Prof. Petr Strakhov (1757–1813) who played a crucial role for developing education and research in Physics at Moscow University. He became the first chair of the department of Physics and Mathematics, a correspondent member of St. Petersburg Academy of Sciences, and authored the first textbook on Physics in Russian, «The outline of Physics». In 1805, Prof. Strakhov was elected the rector of Moscow State University.

Next to Prof. Strakhov, the Chair of Physics was headed by Prof. Ivan A. Dvigubsky (1771–1839) who had broad scientific interests in the field of Chemistry, Physics, Medicine, and Biology. He wrote a textbook on Physics, which had several editions, and started publication of a scientific Journal at Moscow University, being its editor. Prof. Dvigubsky was also chaired the department of Physics and Mathematics for 9 years and was then elected for 7 years the rector of Moscow University.

Prof. D. M. Perevoschikov (1988–1880), academician of St. Petersburg Academy of Sciences, chaired the department for 14 years and had been the rector of Moscow University for 2 years. His name is associated with establishing the University Observatory.

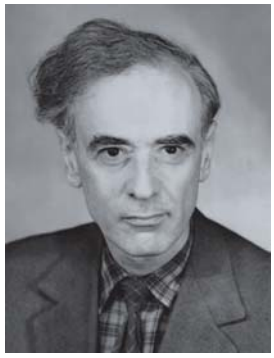
In 1850, the Department of Physics and Mathematics was reorganized into the respected Division headed by a botanist, Prof. Alexander Fisher von Waldheim, for nearly five years. Among other heads of the Division it is worth to mention such prominent figures as astronomer Fyodor Bredihin and anthropologist Dmitry Anuchin. All of them were bright, intelligent, and extraordinary people who contributed a lot into the development of Moscow State University. The heads of the Division — mathematician Leonid Lahtin and biologist Mikael Novikov had also been Rectors of the University.

The research and teaching activities of Prof. A.G.Stoletov, the chair of the Division, are the visible milestones in the life of Moscow State University and developing Physics. He had done a pioneering work in the field of ferromagnetism and discovered the principles of extrinsic photoeffect, which brought him the world popularity and appreciation. He was also the first to establish his scientific School, which had the worldwide importance. By the end of the XX century, his disciples had headed the chairs of Physics at five out of seven major Universities in Russia.

The glory of Moscow State University in the late XIX century was created by the works of theoretical physicist Prof. N.A.Umov, who developed the theory of localization and energy transfer in continuous media and introduced the concept of the energy flux (the Umov–Pointing vector).In 1900, Petr Lebedev became the Professor at Moscow State University. He was the first to measure the light pressure on solid state and in gases and had experimentally confirmed the Maxwell electromagnetic theory of light. In recognition of these his pioneering works he was nominated for the Nobel Prize, but, unfortunately, he passed away before the prize was awarded. Prof. Lebedev established a world-famous School of physicists at Moscow State University, which included more than 30 scientists. Among his disciples were Professors P. P. Lazarev, S. I. Vavilov, N. N. Andreev, V. K. Arkadyev, T. P. Kravets, A. S. Predvoditelev, and many others.In 1919, Prof. V. K. Arkadyev established the Moscow Magnetic Laboratory, which became shortly a world-known lab in which many leading magnitologists had began their career.In 1926, Profs. S. I. Vavilov and V. L. Levshin developed the theory of luminescence and discovered the first nonlinear optical effect.In 1928, Profs. L. I. Mandelshtam and G. S. Landsberg discovered and correctly interpreted the phenomenon of

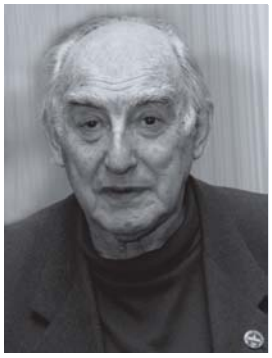

I. E. Tamm


I. M. Frank


L. D. Landau


A. M. Prokhorov


P. L. Kapitsa


V. L. Ginzburg


A. A. Abrikosov


A. D. Sakharov

combinational light scattering in quartz crystal. For the same, simultaneously obtained results on benzol a physicist from India, Dr. Raman was awarded the Nobel Prize in Physics.

In 1933 the Faculty of Physics was established at Moscow State University.

In 1938, Prof. A. A. Vlasov developed the kinetic theory and derived the fundamental equations (called in his name), which are widely used now in plasma theory.

In 1950–70th, Profs. R. V. Khokhlov and S. A. Akhmanov developed theory of nonlinear phenomena in the radio and optical ranges. In 1965, the optical parametric oscillator was launched to work at one of the Faculty's labs. Prof. R. V. Khokhlov was elected rector of Moscow State in 1973 and was in the office until his death in 1977.

In 1958, Prof. S. N. Vernov discovered the radioactive high intensity belts around the Earth, resulted from caption of high energy cosmic particles by the geomagnetic field. The outstanding discoveries had been made by Profs. A. A. Logunov and V. P. Maslov. Prof. A. A. Loguniv served also as rector of Moscow State in 1977–1992.

In the period of 1958–1980, the faculty members won 24 diplomas for their publicly registered in the USSR scientific discoveries. It should be mentioned also that the overall number of discoveries in natural sciences that time resulted in 250.

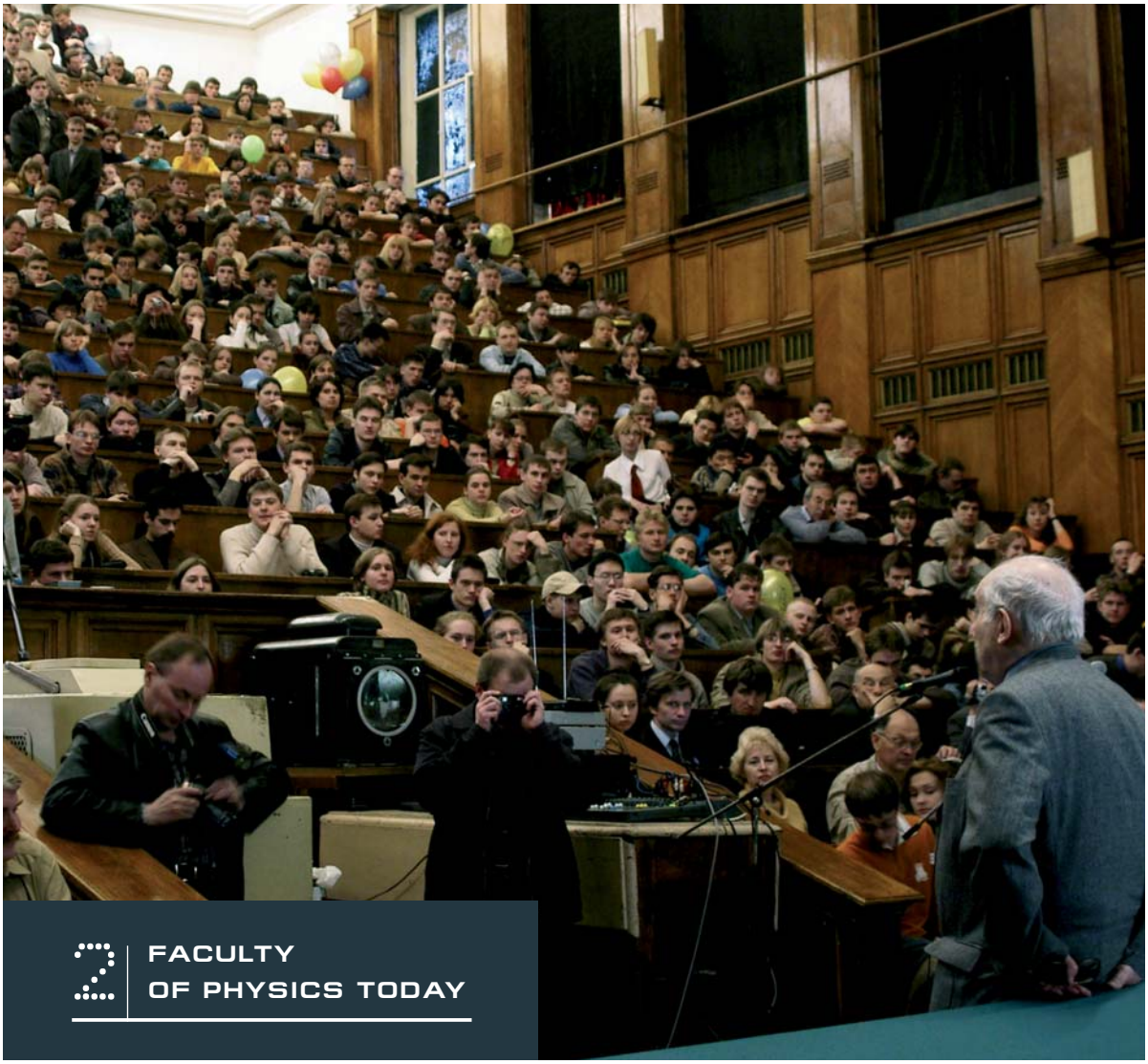
Seven out of ten Russian Nobel Prize winners in Physics have been working at the Faculty of Physics: Profs. I. E. Tamm and I. M. Frank, who won the Nobel Prize in 1958 «for discovery and interpretation of Cherenkov effect»; Prof. L. D. Landau, who won the Nobel Prize in 1962 «for the pioneering research in the theory of condensed matter and liquid Helium, in particular», Professor A. M. Prokhorov, who won the Nobel Prize in 1964 «for fundamental works in the field of quantum electronics that led to the laser invention»; Prof. P. L. Kapitsa, who won the Nobel Prize in 1978 «for fundamental inventions and discoveries in the field of low temperature physics». In October 7, 2003, the former Faculty's Prof. A. A. Abrikosov and the former faculty's graduate, Prof. V. L. Ginzburg were awarded the Nobel Prize in Physics for their outstanding works in the field of theory of superconductivity and superfluidity.

Prof. A. D. Sakharov, our graduate, also becomes a Nobel Prize winner for Peace. His outstanding achievements in physics, specifically his participation in the thermonuclear bomb project, are acknowledged worldwide.

In the overall history of the Faculty of Physics, 82 academicians, 58 correspondent members of Petersburg Academy of Sciences, USSR Academy of Sciences, and then Russian Academy of Sciences, and 8 Nobel Prize winners used to work with in the Faculty. More than 600 staff members have been awarded with 1700 State Prizes of the tsarist Russia, Soviet Union, and Russian Federation.

Many chairs at the Faculty of Physics have been established by outstanding scientists, namely, Prof. S. I. Vavilov (President of the USSR Academy of Sciences), Prof. L. I. Mandel'shtam, Prof. A. N. Tikhonov, Prof. I. E. Tamm (Nobel Prize winner), Prof. P. L. Kapitsa (Nobel Prize winner), and many others.

In the last decade, five new chairs were established at the Faculty, namely, the chairs of computer methods in physics, physics of condensed matter, experimental astronomy, neutronography, and medical physics.



FACULTY OF PHYSICS TODAY

Nowadays, Faculty of Physics includes 7 divisions (experimental and theoretical physics, solid state physics, radiophysics, nuclear physics, geophysics, astronomy, and complimentary education), which fall into 38 chairs.

The faculty's staff consists of about 1,400 employees including faculties, research and technical staff, and administration. Among faculties there are 265 and 235 members with PhD and DrSc (Doctor of Sciences) degrees, respectively, and over 100 full professors.

Research staff consists of 385 researchers among which 265 and 70 hold the PhD and DrSc degrees, respectively.

2,480 students are enrolled into various undergraduate and graduate programs and 380 students study on the PhD program. Every year we accept about 420 fresh students for the undergraduate programs and 130 more students for the PhD studies. Among them, 25% of the graduates receive diploma with distinction and 70% of the PhD students get their PhD degrees.

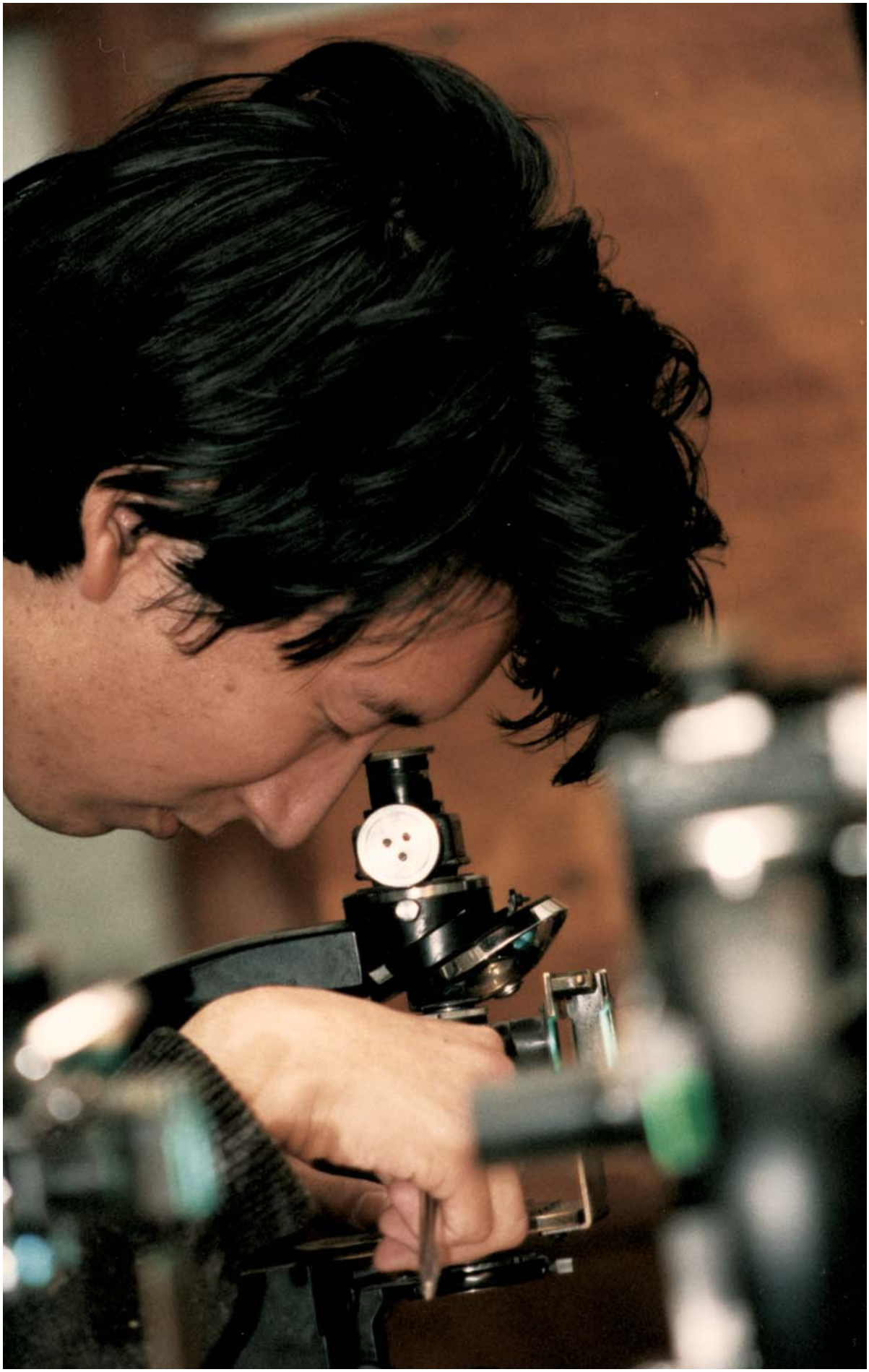
The faculty maintains good links with the Russian Academy of Sciences — 25 faculty's prfessors are the academicians or the correspondent-members of the Russian Academy of Sciences.

Faculty's premises include several buildings totaling in the floor area of about 71,714 sq. meters.

The average annual number of scientific publications published by the faculties and scientific staff members exceeds 1,000 publications in regular scientific journals and over 3,000 conference publications at various Russian and international conferences.

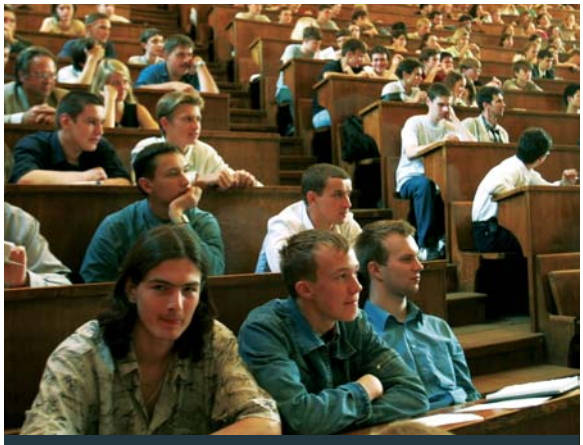
Undergraduate and PhD students co-author one third of those publications.

Annually, the Faculty of Physics organizes and sponsors 15 to 20 national and international meetings.



STRUCTURE OF THE FACULTY

DIVISION OF EXPERIMENTAL AND THEORETICAL PHYSICS	
CHAIRS OF	Theoretical Physics
	Mathematics
	Molecular Physics
	General Physics and Molecular Electronics
	Biophysics
	Quantum Statistics and Field Theory
	General Physics
	Medical Physics
	English Language
DIVISION OF SOLID STATE PHYSICS	
CHAIRS OF	Solid State Physics
	Physics of Semiconductors
	Physics of Polymers and Crystals
	Magnetism
	Low–Temperature and Superconductivity Physics
	General Physics and Magneto–ordered Matter
	Condensed Matter Physics
DIVISION OF RADIOPHYSICS AND ELECTRONICS	
CHAIRS OF	Physics of Oscillations
	General Physics and Wave Processes
	Acoustics
CHAIRS OF	Radiophysics
	Quantum Electronics
	Physical Electronics
DIVISION OF NUCLEAR PHYSICS	
CHAIRS OF	Atomic and Plasma Physics and Microelectronics
	Cosmic Rays and Space Physics
	Optics and Spectroscopy
	Nuclear Physics and Quantum Theory of Collisions
	Quantum Theory and High–Energy Physics
	Elementary Particles Physics
	High Energy Accelerator Physics
	General Nuclear Physics
	Neutronography
DIVISION OF GEOPHYSICS	
CHAIRS OF	Physics of Earth
	Physics of Sea and Inland Waters
	Physics of Atmosphere
	Computer Methods in Physics
DIVISION OF ASTRONOMY	
CHAIRS OF	Astrophysics and Stellar Astronomy
	Celestial Mechanics, Astrometry, and Gravimetry
	Experimental Astronomy
DIVISION OF COMPLIMENTARY EDUCATION	



3 FACULTY'S TUITION STRUCTURE

By law, educational services can be offered in Russia only under an authorized license granted by the Russian Ministry of Education and Science. The Faculty holds all necessary licenses to provide tuition at any level of educational programs available in Russia, namely, BSc, Specialist, MSc, and Post-graduate studies programs.

Students receive their tuition according to the approved curriculum, which covers all available courses, credits, and exams required for each particular qualification. A student can start the next semester only after having completed a full program for the previous semester. The diploma of Moscow State University is awarded only upon receiving credits for all required courses, passing all necessary exams and defending the diploma thesis.

TUITION PROCESS OUTLINE

At the Faculty of Physics, the undergraduates during first five semesters receive basic education, which includes courses and practicums on general physics, mathematics, programming, and other subjects. After that, in the middle of the third year, the students should decide which specialization they would like to join. At this point, the students are assigned to the different chairs, and, along with the general courses they receive some specialized training within the frame of scientific research conducted at the specific chair. As a rule, students participate in scientific seminars organized at the chair and participate in the research projects run by the laboratory they are associated with.

The overall number of general and specialized courses offered by the various chairs of the Faculty is about 40 and more than 650, respectively. Such a wide variety of specialized courses cover most of the modern Physics and its applications.

Along with the theoretical seminars, classes, and lectures, the students conduct practical projects in various practicums on general physics and in the computer classes. Thanks to this, the students learn physical phenomena in practice, and raise practical knowledge of using computers for simulation of physical problems.

In order to help the newly accepted students to perform well in the university environment, the Faculty maintains a system of curators (mentors) who supervise each group of students and help them to solve their problems and advise about their current and future career. When students decide on their specializations, to each of them will be assigned a scientific advisor who introduces him/her into scientific research and advises about the diploma work.

The fundamental principle of professional training adopted at the Faculty is the education of senior students through conducting scientific research in the labs-working in the scientific labs students develop their practical skills in experiment and theory they need for their future career.

The undergraduate students are greatly welcome to work in the numerous laboratories of the Faculty and started to do some research right after the first year of their study at the Faculty (as an exception, some students start their scientific work even at the first year at the Faculty). In the end of their fourth year, students must accomplish an independent research and defend the results of this research in a form of an interim diploma thesis (for specialists) or in a form of Bs diploma work (for bachelors).

Undergraduates under the specialist, master, and bachelor programs must pass a state examination in physics and defend their diploma thesis or a dissertation in the end of the study.

Post-graduate program at the Faculty offers the highest quality tuition and training in various fields of modern Physics. Each of the PhD students has his/her own curriculum, which is settled together with the scientific advisor and takes into account specific scientific interests of the PhD student. During their PhD studies the students must pass exams in a number of disciplines, foreign language, philosophy, and courses on choice inclusive.

In the end of the PhD study, the students must prepare the PhD theses that reflect the original results obtained during their research in the PhD program. In order to receive the PhD degree, the applicant should defend his/her PhD thesis at a meeting of one of the specialized Dissertation Boards at the Faculty or somewhere else.

PHYSICS CURRICULUM

SPECIALIST PROGRAM

(PRE–REQUIREMENTS: SECONDARY EDUCATION)

Program duration: 5.5 years

Offered diploma: in Physics and Astronomy

SPECIALIZATIONS IN:

- physics (34 specializations)
- physics of condensed matter (11 specializations)
- atomic nucleus and particle physics (10 specializations)
- physics of Earth and the planets (3 specializations)
- biochemical physics (2 specializations)
- fundamental radiophysics and physical electronics (14 specializations)
- medical physics (novel specialization, since September 2003)
- astronomy.

SYLLABUS OUTLINE

⊙ **General Physics:**
- mechanics
- molecular physics
- electricity and magnetism
- optics
- atomic physics
- atomic nucleus and particle physics
- practicum on general physics.
- introduction to experimental techniques.

⊙ **Higher Mathematics:**
- calculus
- analytic geometry
- linear algebra
- complex variable function theory
- differential equations
- integral equations and variational calculus
- probability theory and mathematical statistics.

⊙ **Computer methods in physics:**
- programming and computer sciences
- numerical methods in physics.

⊙ **Fundamentals of geophysics and ecology.**

⊙ **Astrophysics.**

⊙ **Radiophysics, practicum on radioelectronics.**

⊙ **Courses on choice:**
- solid–state physics
- general biology and biophysics
- general physical chemistry.

⊙ **Theoretical physics:**
- theoretical mechanics
- electrodynamics
- quantum theory
- thermodynamics and statistical physics
- mechanics of continuous media.

⊙ **Methods of mathematical physics:**
- fundamentals of mathematical modeling.

⊙ **Humanities and social sciences:**
- history of Russia
- world history and culture
- psychology
- pedagogy
- courses on choice in humanities
- philosophy
- economics
- foreign language
- physical training
- history and methodology of Physics (astronomy).

⊙ **Professional training:**
- courses for given specialization, special courses (6–7 credits, 7–9 exams)
- special practicum on Physics (Astronomy)
- allotted time for students' work in the research laboratories at the Faculty or at the collaborating research institutes
- preparing and defending the interim diploma thesis after the 4th year of study of Physics.
- preparing and defending the diploma thesis in the end of the study.

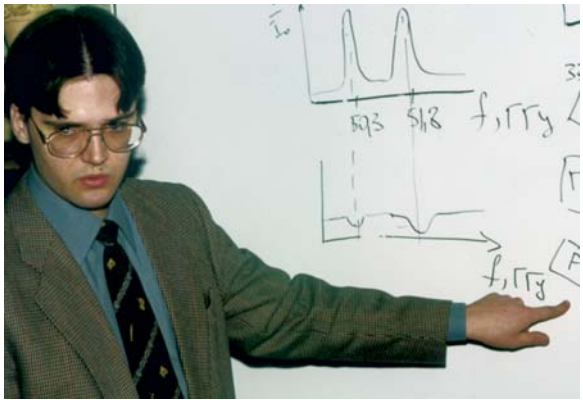
⊙ **Attending practical workshops on:**
- geophysics (for majors in «Physics of Earth and the planets»)
- astronomy (for majors in «Astronomy»)
- biology (for majors in «Bio–chemical physics»)
- pre–diploma training.

⊙ **Final examination in Physics at the commission appointed by the Government.**

⊙ **Final examination in Russian language (for the foreign students).**

⊙ **For majors in Astronomy, in addition to the general courses mentioned above, the courses on general astronomy:**

- spherical astronomy
- galaxy astronomy, astrometry
- general astrophysics
- practical astrophysics
- celestial mechanics
- geophysics
- physics of planets.
- general astronomy.



BSC PROGRAM

(PRE–REQUIREMENTS: SECONDARY EDUCATION)

Program duration: 4 years

Offered diploma: Bachelor in Physics

SYLLABUS OUTLINE

⊙ **General Physics:**
- mechanics
- molecular physics
- electricity and magnetism
- optics
- atomic physics
- atomic nucleus and particle physics
- practicum on general physics
- introduction to experimental techniques.

⊙ **Higher Mathematics:**
- calculus
- analytic geometry
- linear algebra
- complex variable function theory
- differential equations
- integral equations and variational calculus
- probability theory and mathematical statistics.

⊙ **Computer methods in physics:**
- programming and computer sciences
- numerical methods in physics.

⊙ **Courses on choice:**
- solid–state physics
- general biology and biophysics
- general physical chemistry.

⊙ **Theoretical physics:**
- theoretical mechanics
- electrodynamics
- quantum theory
- thermodynamics and statistical physics.

⊙ **Methods of mathematical physics, fundamentals of mathematical modeling.**

⊙ **Fundamentals of geophysics and ecology.**

⊙ **Astrophysics.**

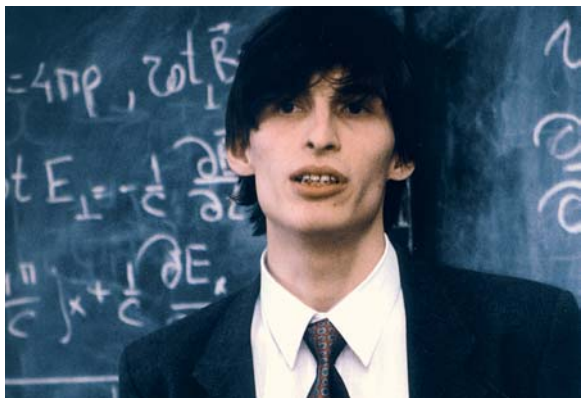
⊙ **Radiophysics. Practicum on radioelectronics.**

⊙ **Humanities and social sciences:**
- history of Russia
- world history and culture
- courses on choice in humanities
- philosophy
- economics
- foreign language
- physical training.

⊙ **Professional training:**
- courses for given specialization, special courses (4 exams, 4 credits)
- special practicums on physics
- allotted time for students' work in the research laboratories at the Faculty or at the collaborating research institutes
- pre–diploma training, preparing and defending the qualification thesis in the end of the study.

⊙ **Final examination in Physics at the commission appointed by the Government.**

⊙ **Final examination in Russian language (for the foreign students).**



MSc PROGRAM

(PRE–REQUIREMENTS: BS OR BA DEGREE)

Program duration: 2 years

Offered diploma: Master in Physics

SPECIALIZATIONS IN:
- astrophysics. Physics of cosmic radiation and space;
- classical and applied astronomy
- celestial mechanics
- radiophysics
- physics of kinetic phenomena
- theoretical and mathematical physics

- acoustic and hydrodynamic wave processes physics
- physics of atmosphere and near–Earth environment
- nuclear and particle physics
- atomic and molecular physics
- physics of open systems
- physics of Earth and planets
- condensed matter physics
- physics of magnetic phenomena
- biophysics
- plasma physics
- semiconductor physics. Microelectronics
- physics of modern radioelectronic technologies
- physics and management of science–intensive technologies.

SYLLABUS OUTLINE

⊙ **General courses:**
- history and methodology of Physics
- philosophical problems of natural sciences
- foreign language
- computer technologies
- philosophy
- courses on choice (2 courses).

⊙ **Professional training:**
- special practicum on physics
- specialized courses (7 courses)
- courses on choice (2 courses)
- allotted time for students' work in the research laboratories at the Faculty or at the collaborating research institutes
- pedagogical training (teaching Physics for the students of Physics as assistants to Professors)
- preparing and defending Ms dissertation in the end of the study.

⊙ **Final examination in Physics at the commission appointed by the Government**

⊙ **Final examination in Russian language (for the foreign students)**

PHD PROGRAM

(PRE–REQUIREMENTS: SPECIALIST DIPLOMA OR MSC DEGREE)

Program duration: 3 years

Diploma PhD in Physics and related specialities awarded after defending PhD thesis

SPECIALIZATIONS IN:
- acoustics
- astrometry and celestial mechanics
- astrophysics, radio astronomy
- biophysics
- ecology
- laser physics
- quantum electronics
- mathematical physics
- optics
- radiophysics
- theoretical physics
- thermophysics and theoretical thermodynamics
- macromolecular compounds
- equipment and methods of experimental physics
- physics of atmosphere and hydrosphere
- geophysics, geophysical methods of mineral exploration
- physics of atomic nucleus and elementary particles
- high–energy physics
- plasma physics
- physics of magnetic phenomena
- low–temperature physics
- physics of semiconductors
- physics of charge–particle beam and accelerating technology
- condensed matter physics
- physical electronics
- chemical physics
- mathematical simulation, numerical methods and program complexes.

SYLLABUS OUTLINE

⊙ **Foreign language.**

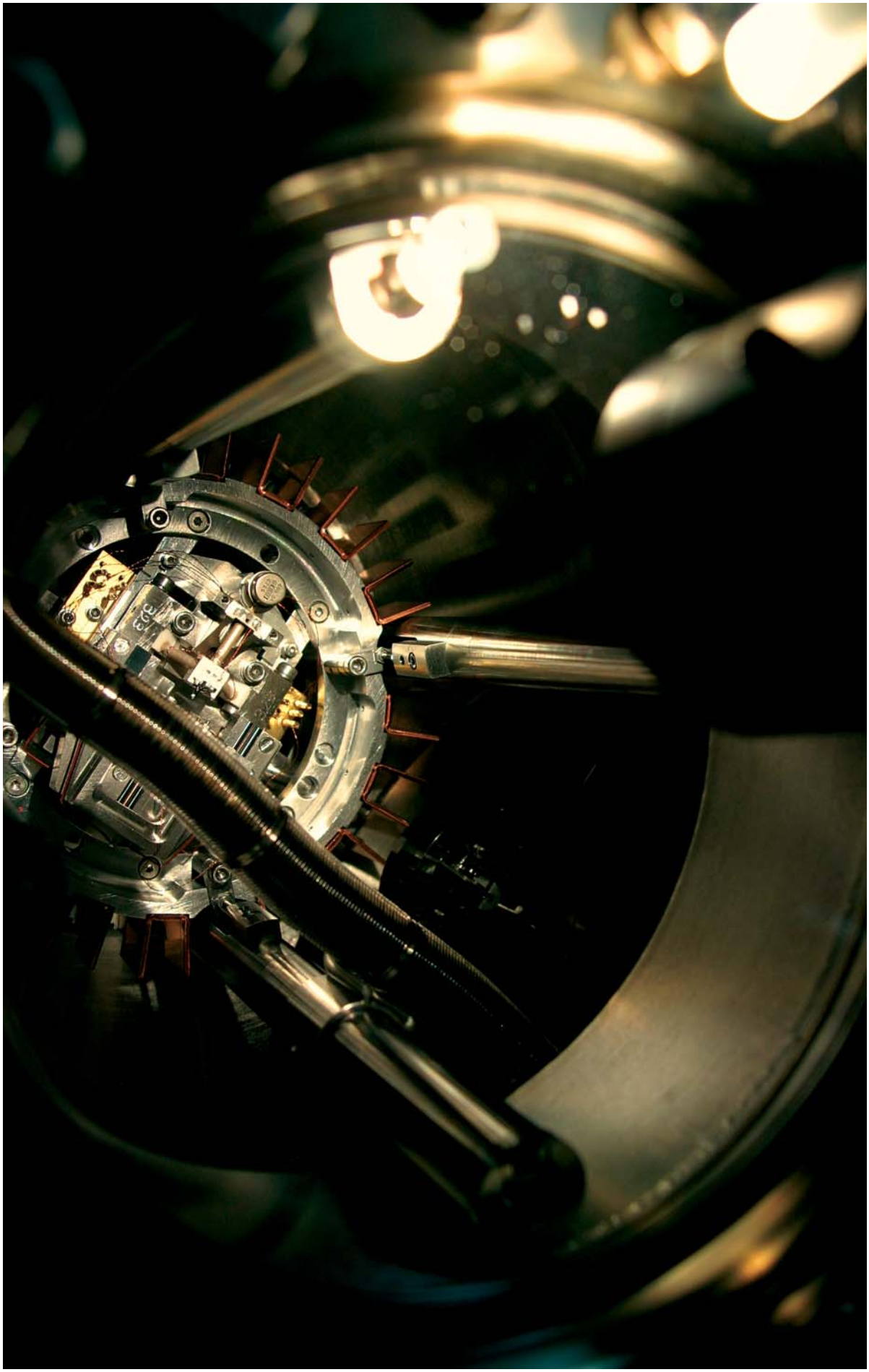
⊙ **Philosophy.**

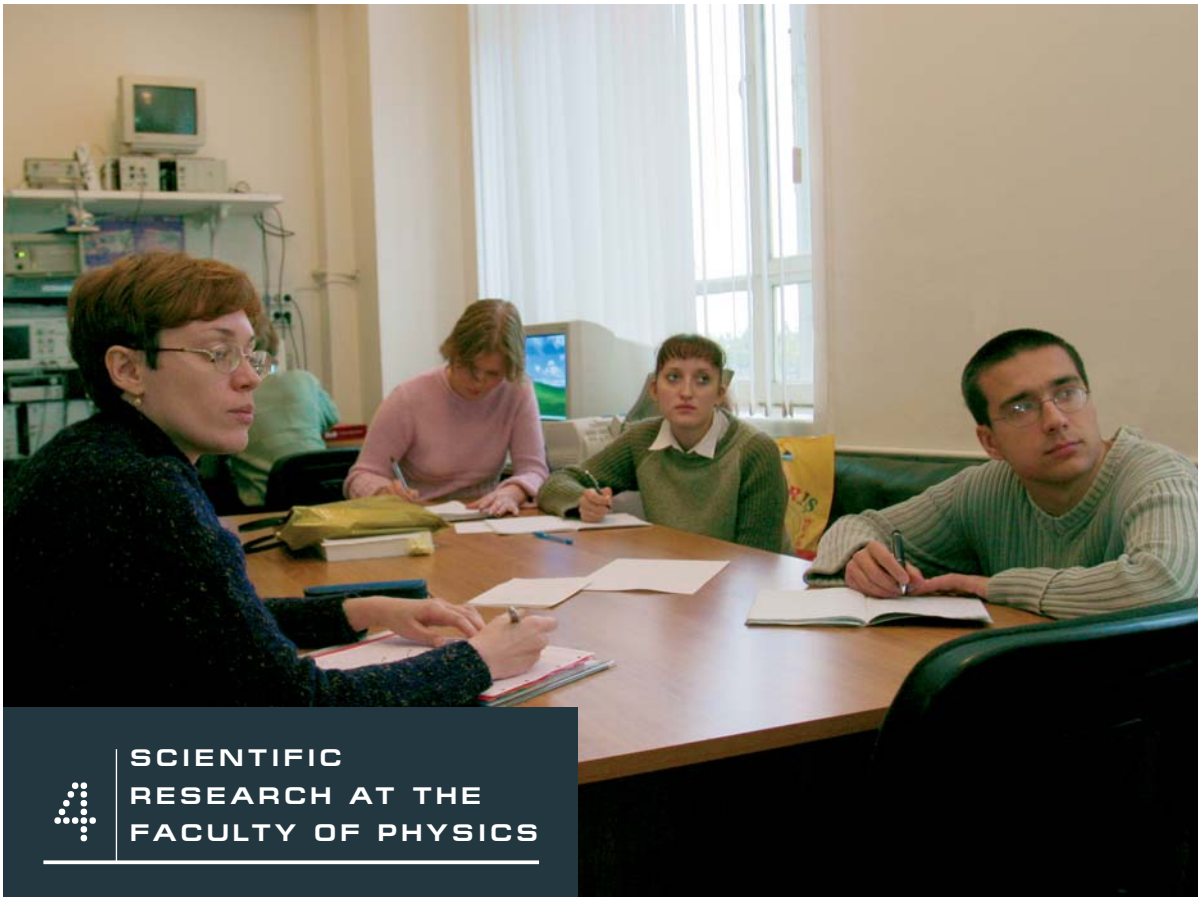
⊙ **Specialized courses in selected specialization, including courses on choice (140 academic hours).**

⊙ **Pedagogical training.**

⊙ **Courses on choice.**

⊙ **Scientific research, including preparation of the PhD thesis.**





4 SCIENTIFIC RESEARCH AT THE FACULTY OF PHYSICS

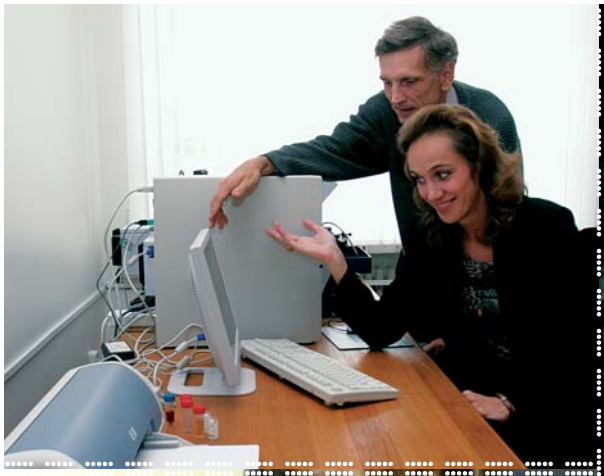
The scientific research conducted at the Faculty of Physics covers almost all fields of modern Physics and fall into the following key directions:

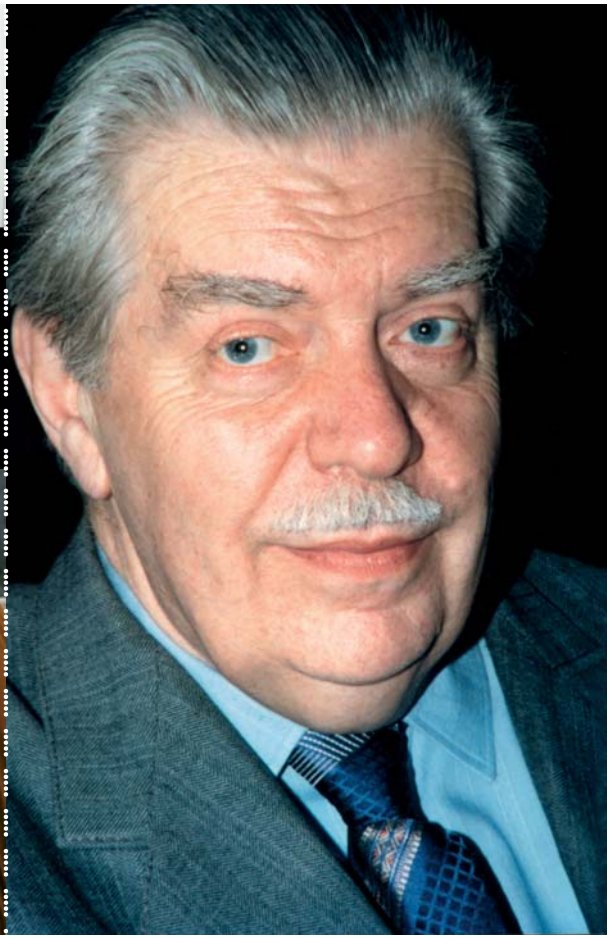
- **Mathematical physics**
- **Physics of condensed matter**
- **Optics and quantum electronics**
- **Radiophysics and electronics, acoustics**
- **Physics of plasma and controlled thermonuclear synthesis**
- **Nuclear physics**
- **Gas dynamics, air dynamics, hydrodynamics, physics of burning and blast, mechanics of multiphase milieus**
- **Life sciences**
- **Science of Earth**
- **Astronomy and astrophysics**
- **Information technologies**
- **Development of education.**

Nowadays, as in the past history of the Faculty, many outstanding Russian scientists were or are now with the Faculty. Among them are Profs. S. I. Vavilov, P. L. Kapitsa, I. E. Tamm, A. A. Vlasov, N. N. Bogolyubov, L. D. Landau, A. N. Tikhonov, A. M. Prokhorov, R. V. Khokhlov, L. V. Keldysh, V. A. Magnitsky, G. T. Zatsepin, A. A. Logunov, V. P. Maslov, A. R. Khokhlov, V. G. Kadyshevsky, A. A. Slavnov, A. M. Cherepaschuk, O. V. Rudenko, and many others. Some of them were awarded the Nobel Prize in Physics — I. E. Tamm and I. M. Frank (1958), L. D. Landau (1962), A. M. Prokhorov (1964), P. L. Kapitsa (1978), V. L. Ginzburg and A. A. Abrikosov (2003) — and many established their world-famous scientific Schools.

The management of scientific research at the Faculty is based on the following principles:

- Fundamental research has highest priority;
- Research that leads to the foundations of modern technologies is greatly welcome;
- Special attention is paid to the socially-oriented research areas;
- Significant breakthrough in science, as we expect, will be related to research in the interdisciplinary fields like biophysics, medical physics, geophysics, ecological physics, etc.





THE FACULTY'S VARIOUS CHAIRS ARE RESPONSIBLE FOR RESEARCH MANAGEMENT AND SPECIALIZED TRAINING OF STUDENTS. CHAIRS ARE COMBINED INTO DIVISIONS LISTED BELOW

DIVISION OF EXPERIMENTAL AND THEORETICAL PHYSICS

CHAIR OF THEORETICAL PHYSICS

Head: DrSc, Professor Andrey A. Slavnov

⊙ **Key research directions:**

- theory of gauge fields and its applications to elementary particle physics
- unified theory of physical effects and phenomena in systems of particles with electromagnetic interaction
- fundamental particles and interactions
- theory of gravitation. Supersymmetric models in the field theory and relativistic strings
- unified theories of fundamental interactions.

⊙ **Offered courses:**

- anomalies in quantum theory
- classical and quantity fields in curved space–time
- classical field theory
- classical theory of gravity
- field theory and quantum gravity
- fundamental particles and interaction
- geometrical methods of the field theory
- geometry and physics
- group theory and its applications
- interaction of particles with electromagnetic fields
- mathematical methods in quantum field theory
- physics of high energies
- quantum field theory
- quantum field theory and statistical physics
- quantum theory of gravity and superstring theory
- supersymmetry
- theory of fundamental interaction

CHAIR OF MATHEMATICS

Head: DrSc, Professor Valentin F. Butuzov

⊙ **Key research directions:**

- singular perturbation theory and its applications
- mathematical models of electrodynamics and plasma

- inverse and ill–posed problems in mathematical physics
- methods of Lobachevsky geometry in non–linear problems of mathematical physics
- the cosmic electrodynamics
- mathematical modeling of processes in physical chemistry.

⊙ **Offered courses:**

Courses in General Mathematics

- analytical theory of differential equations
- applications of spectral theory in mathematical physics
- asymptotical methods
- basics in geometry and topology
- basics of algebra and differential geometry
- basics of the categories theory
- complex analysis. Advanced course
- effective methods in boundary value problems
- elliptic equations
- extremal problems
- functional analysis
- geometrical applications in physics
- integral equations
- inverse problems of mathematical physics
- mathematical aspects of diffraction theory
- mathematical theory of wave–guides
- method of differential inequalities
- non–linear waves
- parabolic equations
- special functions of mathematical physics.

Courses in Numerical Methods and Computer Modeling

- computer physics
- computer science. Introduction
- dynamical adaptive methods in equations of math–ematical physics
- finite difference methods in computer physics
- mathematical models of plasma physics
- mathematical models of quantum mechanics and statistical physics
- numerical methods in MHD
- numerical methods. Advanced course
- numerical methods. Introduction.

CHAIR OF MOLECULAR PHYSICS

Head: DrSc, Professor Nikolai N. Sysoev

⊙ **Key research directions:**

- kinetic and gas–dynamic processes in non–equilib–rium media
- dynamics of molecular movement and non–equi–librium processes in liquids
- origin and evolution of the structure defects caused by various external actions and their con–nection to the physical properties of solids

⊙ **Offered courses:**

- computer methods in solving of physical problems
- diffraction methods in crystal research
- dynamics of plasma and gases
- electrical properties of condensed media
- hydrodynamics of relaxing and reacting media
- management in scientific research
- modern problems of molecular physics
- non–equilibrium thermodynamics
- optical and spectral methods in research of anisotropic fluids
- physical hydrodynamics
- physics and visualization of flows
- physics of combustion and explosion
- physics of liquids
- physics of molecules
- relaxation processes in gases
- solid–state physics
- thermodynamics.

CHAIR OF GENERAL PHYSICS AND MOLECULAR ELECTRONICS

Head: DrSc, Professor Pavel K. Kashkarov

⊙ **Key research directions:**

- physics of solid–state nanostructures
- laser physics of solid body surface
- molecular electronics
- solid–state molecularion sensorics

⊙ **Offered courses:**

- experimental methods in solid state research
- experimental methods of probe microscopy
- introduction to laser technologies
- introduction to solid–state physics
- investigation techniques for solid surfaces and interfaces
- magnetic nanostructures
- non–linear optical phenomena in condensed mat–ter
- optics of solid state
- phase transitions on solid–state surfaces
- physical bases of molecular microelectronics.
- physical foundations of microelectronics
- physics of semiconductors
- physics of solids sensors for molecular analysis
- physics of solid–state surfaces
- radiation physics of solid state
- radiospectroscopy of solid–state and low–dimen–sional systems

- structure and methods of research of ordered molecular ensembles
- x–ray research of thin organic films.

CHAIR OF BIOPHYSICS

Head: DrSc, Professor Vsevolod A. Tverdislov

⊙ Key research directions:

- cell biophysics
- medical biophysics
- nanobioelectronics
- biophysical ecology
- biophysics of complicated systems.

⊙ Offered courses:

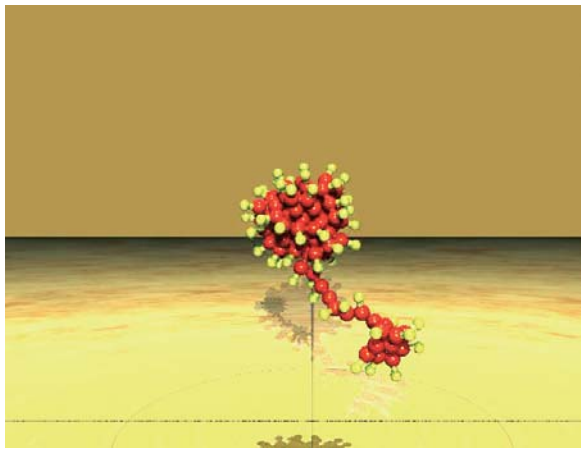
- basics of general chemistry
- basics of human anatomy and histology
- basics of immunology
- biochemistry
- biophysical chemistry
- biophysics of photosynthesis and ecology
- calculation techniques in studies of electronic properties of complex molecules
- cell biophysics
- condensed matter physics for biophysicists
- formal and enzymatic kinetics
- general biology
- general physiology
- immunochemical analysis
- information thermodynamics in biophysics
- introduction in biophysics and medical physics
- introduction in general biology and biophysics
- magnetic properties of molecules. Methods of magnetic resonance spectroscopy in biophysical and biomedical research
- medical biophysics: cellular and molecular aspects of pathogenesis of diseases
- molecular biology
- non–linear dynamics and mathematical modeling of biological systems
- optical properties of complex molecules
- physical chemistry
- physical chemistry of surfaces of molecular structures and nanostructures
- physics of biopolymers
- quantum chemistry and structure of molecules
- radioelectronics and computerized data–acquisition systems in biophysical ex–periment
- statistical methods in biophysics
- thermodynamics of biological processes and selected chapters of bioenergetics.

CHAIR OF GENERAL PHYSICS

Head: DrSc, Professor Alexander M. Saletsky

⊙ Key research directions:

- interaction of ultra–short laser pulses with matter, investigations of physical properties of new materials for quantum– and optoelectronic systems
- investigation of interactions in the condensed medium by spectral–luminescent methods
- biophysics of photosynthesis and ecology
- investigation of features of new magnetic materials and nonhomogeneous systems



- experiments and information technologies in physics education.

⊙ Offered courses:

- condensed media: from structural units to living objects
- foundations of Moessbauer spectroscopy
- introduction into physics of particle interactions at superhigh energies
- introduction to physics of pulsed reversal processes in magnetics
- magnetooptical phenomena in magnetoordered solids
- micromagnetism of magnetics

- modern methods of Moessbauer data processing
- modern trends in self–organization of non–equilibrium non–linear open systems
- molecular luminescence
- molecular spectra and structure of molecules
- molecular spectroscopy
- multilayered optics
- optical methods of research of complex molecular systems
- optics of anisotropic media

⊙ Key research directions:

- quantum field theory
- mathematical physics
- statistical physics.

⊙ Offered courses:

- asymptotic methods in statistical physics and quantum field theory
- classical gauge fields
- condensed matter physics
- dispersion methods in elementary particle physics

- optics of wave beams and pulses
- practical problems of teaching physics
- principles of methodology of physics teaching
- problems of relativistic electrodynamics
- radiospectroscopy of magnetic materials
- spectroscopic methods in biophysics and ecology
- topical issues of cosmic ray physics
- transport of superhigh energy particles through various media.

CHAIR OF QUANTUM STATISTICS AND FIELD THEORY

Head: DrSc, Professor Victor P. Maslov

- gasodynamics of superliquids
- geometrical methods in high–energy physics
- gomological algebra methods in quantum statistics
- introduction to Maslov semiclassical methods
- introduction to non–linear waves theory
- introduction to quantum theory of spontaneous processes
- introduction to statistical mechanics
- introduction to the theory of early Universe
- lattice quantum field theory
- mathematical methods of statistical mechanics of model systems

- method of secondary quantization and polaron theory
- numerical methods in quantum physics
- optimization problems in mathematical physics
- quantum fields
- quantum scattering theory
- quantum statistics
- supersymmetry models of elementary particles
- theory of many–particle systems.

CHAIR OF MEDICAL PHYSICS

Head: DrSc, Professor Vladislav Ya. Panchenko

⊙ **Key research directions:**

- lasers in physics and medicine
- physiological optics and laser technologies in oph–thalmology
- digital image processing in medicine
- novel function–directed spin probes — design and applications
- medical biophysics
- physical methods in oncogenesis.

⊙ **Offered courses:**

- basics of anatomy, histology and cytology
- basics of gene therapy
- basics of introscopy (X–ray, nuclear magnetic res–onance, acoustic, and laser to–mography)
- basics of physiology and pathophysiology
- basics of theory of oscillations and waves
- general and medical acoustics
- general biology and biophysics
- general medicine
- general physical chemistry
- information technology and statistical methods in medicine
- introduction to biophysics of non–ionizing radiation
- introduction to medical physics
- laser technologies in ophthalmology
- mathematical methods of digital image and signal processing
- mathematical modelling of living systems
- medical accelerators
- medical biochemistry
- medical electronics and pickups
- molecular cell biology
- molecular pathology and diagnostics
- optics and laser physics in medicine
- optics of blood
- physical foundations of biotissue ingineering
- physical principles and techniques of proton and neutron radiation therapy
- physical principles of radiation therapy
- physical research methods in biology, and medicine
- physiological optics
- principles of chemistry
- radiation physics, diagnostics and therapy
- remote biomodeling and basics of implantology
- synchrotron emission in medicine.

CHAIR OF ENGLISH LANGUAGE

Head: Ph.D, Ass. Professor Irina Yu. Kovalenko

This chair conducts teaching of English for the undergraduate and graduate students of Physics.

DIVISION OF SOLID STATE PHYSICS

CHAIR OF SOLID STATE PHYSICS

Head: DrSc, Professor Alexander S. Il'yushin

⊙ Key research directions:

- structural physics of rare–earth intermetallics
- x–ray phase–contrast tomography
- physics of structured condensed systems, including self–organization and low–dimensional structures
- physics of the structured matter
- physics of metallic alloys
- moessbauer spectroscopy in application to the nanocrystalline materials.

⊙ Offered courses:

- actual problems of solid–state physics
- computers in solid–state research and information technologies
- diffractional and X–ray structural analysis
- dynamical theory of X–ray scattering
- electron microscopy of solids and biological objects
- introduction to crystallgraphy and techniques of structural experiments
- methods of X–ray analysis
- microscopical theory of metals and allows
- modern problems of solid–state physics
- nuclear physics of solid state
- phase transitions in metal allows
- physics of condensed systems
- physics of real crystal systems
- quantum solid state theory
- rontgenography of condensed matter
- secondary processes in X–ray optics
- solid–state physics
- structural physics of high–temperature superconductors
- structural physics of rare–earth intermetallics
- structural physics of allows with shape memory effects
- synchrotron research in solid–state physics
- synergetic aspects in solid–state physics.

CHAIR OF SEMICONDUCTOR PHYSICS

Head: DrSc, Professor Vladimir S. Dneprovsky

⊙ Key research directions:

- semiconductor optoelectronics
- optical and electronic properties of semiconductors with reduced dimensionality
- physics of disordered (amorphous and microcrystalline) semiconductors
- luminescence and cathodoluminescence of semiconductors
- theory of semiconductors.

⊙ Offered courses:

- cathodoluminescent methods of semiconductor investigation
- computers in experimental physics of semiconductors
- fundamentals of material science and technology of semiconductors
- introduction to condensed matter physics
- kinetics phenomena in semiconductors
- modern problems of semiconductor physics
- non–linear optics of semiconductors and low–dimensional semiconductor struc–tures
- optical phenomena in semiconductors
- photoelectrical phenomena in semiconductors
- physics of non–ordered semiconductors
- physics of semiconductor devices
- physics of semiconductors
- physics of semiconductors
- radiation effects in semiconductors
- theory of semiconductors
- two–dimensional structures and superlattices in semiconductors.

CHAIR OF POLYMER AND CRYSTAL PHYSICS

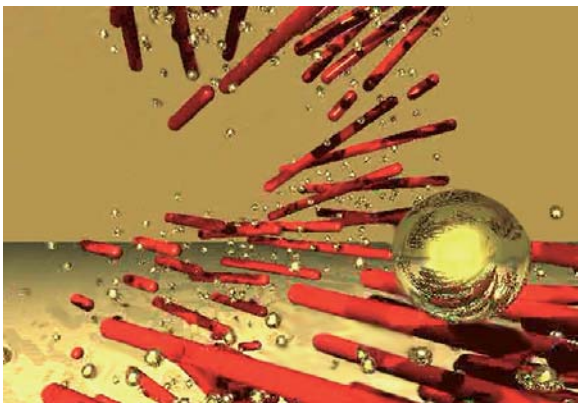
Head: DrSc, Professor Alexei R. Khokhlov

⊙ Key research directions:

- atomic force microscopy of polymers and biopolymers (theory, experiment). Development of models and methods for computer simulation of polymers. Sequence design of copolymers with special functional properties (experiment, theory, computer simulation). Self–assembling structures in amphiphilic polymer systems.
- crystal growth, study of crystallization processes and physical properties. Physical acoustics of crystals. Theoretical crystal physics.
- non–linear dynamics and chaos. Polymer–based non–linear dynamic systems (theory, experiment).
- physics of functional polymer systems. Self–assemblies in responsive polyelectrolyte gels. Microphase separation, formation of other microstructures in polymer systems. Statistical physics of polyelectrolytes, including DNA. Polymers with associating groups (experiment, theory, computer simulation). Polymers at surfaces.
- synthesis and study of diamond films. Low–frequency dielectric dispersion and pyroeffect in crystals and polymers with hydrogen bonds.

⊙ Offered courses:

- additional topics of crystal physics
- analytical nanoscopy
- associating polymers
- autowaves in complex physical–chemical systems
- computer modeling of polymer systems
- crystal growth
- electrophysical properties of dielectrics
- ellipsometry of thin organic films
- fundamentals of crystal physics
- fundamentals of theory of disordered condensed systems
- introduction to crystal physics
- introduction to dynamic theory of chaos
- introduction to polymer science
- mathematical aspects of data processing in physical experiment
- mathematical methods in polymer and crystal science
- methods and applications of theory of phase transitions in polymer physics
- methods of computer simulation in statistical physics
- modern methods of polymer synthesis
- modern Monte–Carlo methods for modeling of polymers
- modern problems of polymer and crystal physics
- molecular kinetics and nanomechanics
- non–linear optics of crystals and polymers
- optical methods of condensed matter investigation
- optics of crystals and polymers
- personal computers in physics research
- physical acoustics of polymers and crystals
- physical methods of investigation of structure of substances: small angle scatter–ing and fluorescence spectroscopy
- physical properties and structure of polymers
- physics of biopolymers
- physics of colloids
- physics of liquid crystals
- quantum chemistry
- self–organization in polymer systems
- statistical methods in chemical physics of polymers
- statistical physics of macromolecules
- statistical physics of polymers on surface
- structural concepts in polymer science
- structural electronography
- structure and methods of investigation of ordered molecular ensembles
- synthesis of polymers with complex spatial architecture.



CHAIR OF MAGNETISM

Head: DrSc, Professor Anatoly V. Vedyayev

⊙ Key research directions:

- spintronics
- investigation of electron structure and magnetic properties of ferro– and ferri–magnetics by magnetooptic method
- investigation of non–linear isolated magnetization waves dynamics and collisions in optically transparent ferromagnets
- investigation of magnetic, magnetooptical, and optical characteristics of magnetic materials and magnetic recording media for storing information
- investigation of magnetic materials for information recording and non–linear electromagnetic systems
- molecular magnetism and magnetism of biological micro–objects.

⊙ Offered courses:

- advanced chapters of magnetism theory.
- computerized data acquisition systems in physical experiments and numerical methods
- critical phenomena and magnetic phase transformations
- electronic structure and properties of transition metals
- experimental methods in magnetism
- experimental setup of modern magnetic laboratory
- introduction to physics of magnetic phenomena
- macromolecular magnetism and magnetism of biological micro–objects
- magnetic materials
- magnetooptical spectroscopy
- magnetooptics of ferromagnetics
- physics of condensed matters
- physics of magnetic phenomena
- quantum models of magnetism
- quantum theory of solids
- transport phenomena in ferromagnetic materials and alloys.

CHAIR OF LOW–TEMPERATURE PHYSICS AND SUPERCONDUCTIVITY

Head: DrSc, Professor Aleksander N. Vasiliev

⊙ Key research directions:

- cooperative quantum effects in the low–dimensional systems
- perspective semiconductor materials and structures
- superconductivity
- nuclear resonance in low–dimensional metal–oxide systems.

⊙ Offered courses:

- computer methods in experimental physics

- condensed matter physics
- cooperative phenomena in solids
- elastic theory and thermal properties of solids
- elementary excitations in crystals
- high–Tc superconductivity
- introduction to low–temperature physics
- low–temperature phase transitions
- methods of quantum field theory in condensed matter physics
- modern problems of low temperature physics
- optoelectronics
- physics of low–dimensional systems
- physics of narrow–gap semiconductors
- physics of semiconductors
- physics of superconductivity
- physics phenomena in non–crystal matter
- physics phenomena in non–ordered matter
- quantum theory of magnetism
- radiospectroscopy
- theoretical physics of low temperatures
- tunneling effects in superconductors.

CHAIR OF GENERAL PHYSICS AND MAGNETOORDERED MEDIA

Head: DrSc, Professor Boris A. Strukov

⊙ Key research directions:

- ferroelectric properties and phase transitions in polyfunctional ferroelectric materials — crystals, liquid crystals, and thin films
- investigation of physical properties of magnetic semiconductors
- investigations of the nature of magnetic, magne–toelastic, and ferroelectric cou–plings in new mag–netic materials based on rare–earth and transition elements
- investigations of hyperfine interactions and local magnetic states in magnetically ordered alloys and compounds
- investigation of magnetic properties and exchange interactions in crystalline and amorphous alloys of rare earth metals
- two–dimensional magnetism. Magnetic refrigera–tion.

⊙ Offered courses:

- computerized data acquisition systems in modern experimental physics
- contemporary experimental methods in solid–state physics
- crystal growth and contemporary methods of materials preparation
- crystallography and representations of crystallo–graphic groups
- introduction to condensed matter physics
- magnetic dielectrics and semiconductors
- magnetic ions in the electric crystalline field
- magnetic structures
- magnetism of nanosystems
- modern magnetic materials
- modern problems of condensed matter physics
- phase transitions and renormalization group
- physics of ferroelectrics
- physics of magnetic phenomena. Part 1. Weak magnetic substances
- physics of magnetic phenomena. Part 2. Exchange interactions in spin–ordered materials
- physics of magnetic phenomena. Part 3. Magnetic anisotropy. Magnetostriction. Domain structure and magnetization
- physics of magnetic phenomena. Part 4. Dynamic properties of magnetic sub–stances
- physics of rare–earth metals and alloys
- quantum theory of solid state.

CHAIR OF CONDENSED MATTER PHYSICS

Head: DrSc, Professor Yury A. Ossipyan

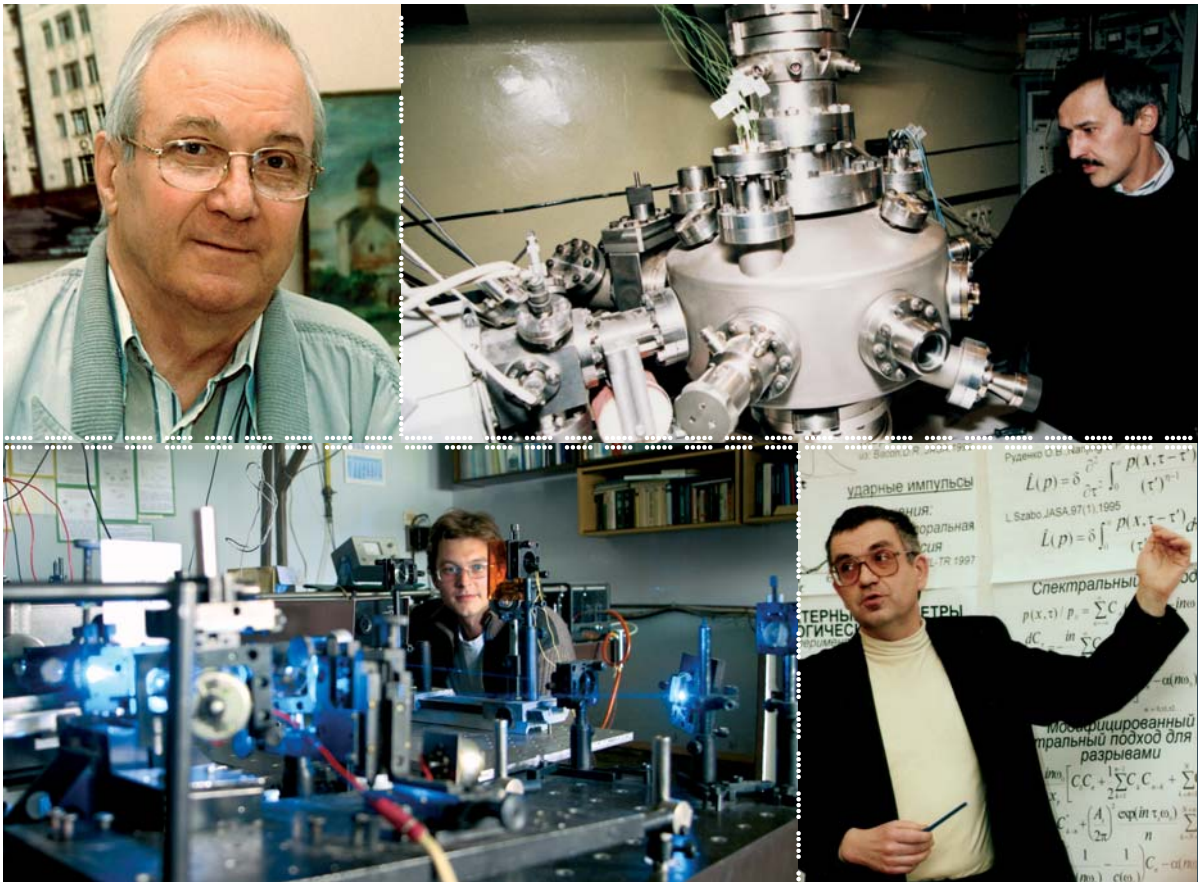
Jointly with the Institute of Solid State Physics, Russian Academy of Science (Chernogolovka, Moscow Region)

⊙ Key research directions:

- low–dimensional electron systems
- superconductivity
- materials science
- quantum transport
- electron properties of materials at low– and high–temperatures.

⊙ Offered courses:

- dielectric and magnetic properties of solids
- electron properties of disordered systems
- electrons in disordered media
- group theory in solid–state physics
- interacting electrons in normal metals
- introduction to physics of superconductors
- modern aspects of solid–state physics
- physical fundamentals of modern methods of investigations of real structure of crystals
- physics of low–dimensional systems
- physics of metals
- physics of semiconductors
- quantum Hall effect
- spectroscopy of semiconductors and dielectrics
- x–ray analysis.



DIVISION OF RADIOPHYSICS AND ELECTRONICS

CHAIR OF PHYSICS OF OSCILLATIONS

Head: DrSc, Professor Alexander S. Logginov

⊙ Key research directions:

- theoretical and experimental investigations of the fundamental losses and noises in oscillators
- quantum measurement theory
- optoelectronics and optical information processing by means of acousto–optic methods
- nonlinear parametric and self–oscillating systems
- dynamic phenomena in materials and devices of photonics and spintronics.

⊙ Offered courses:

- computer methods in physical research
- distributed oscillatory systems
- electronics of semiconductor devices
- fluctuations in physical systems
- foundation of optoelectronics
- group theory in physics of oscillations
- introduction to quantum measurements
- introduction to solid–state physics
- introduction to theory of dynamic systems
- measuring methods based on quantum effects
- non–linear oscillation and wave phenomena in physics
- optical processing of information
- oscillation systems with small dissipation
- parametric and self–oscillating systems
- physics foundation of electrical and acoustical optics
- pulsed signals and transient processes in elec–tronics systems
- quantum communications and quantum calcula–tions
- quantum oscillating systems
- quantum theory of measurements and checking of hypotheses
- semiconductor lasers and optic waveguiges
- statistical analysis and signal processing in physics measurements
- theory of oscillations
- waves in guiding structures.

CHAIR OF GENERAL PHYSICS AND WAVE PROCESSES

Head: DrSc, Professor Vladimir A. Makarov

⊙ Key research directions:

- non–linear optics and non–linear optical materials
- laser diagnostics and spectroscopy of matter and biological objects
- adaptive optics and optics of inhomogeneous media
- quantum and statistical optics, quantum information
- interaction of powerful laser radiation with matter, ultrashort laser pulses.

⊙ Offered courses:

- atomic species and plasma in strong light fields
- autowave processes
- coherent control and time–resolved spectroscopy
- dynamics of biomolecules: Laser spectroscopy and mathematical modeling
- dynamics of lasers
- fundamentals of photonics and optical technologies
- fundamentals of quantum electronics
- high–temperature femtosecond laser–produced plasma
- interaction of laser radiation with molecular gases
- laser diagnostics in biology and medicine
- laser optoacoustics
- lasers and non–linear optics
- matter in strong light field
- modern computer technologies in detection, data–acquisition and data–processing, and control systems
- modern problems of adaptive optics
- non–linear laser spectroscopy
- non–linear polarization optics
- non–linear waves and non–linear optics
- optical data processing
- optics of conducting polymers and nanomaterials
- optics of randomly inhomogeneous media
- optics of ultrashort pulses
- physics of lasers
- physics of solids and phase transition
- quantum random processes
- resonant non–linear optical processes
- statistical and quantum optics
- statistical radiophysics.

CHAIR OF ACOUSTICS

Head: DrSc, Professor Oleg V. Rudenko

⊙ Key research directions:

- non–linear acoustics and non–linear wave physics. Non–linear dynamics. Statistical problems
- inverse problems of acoustic scattering. Non–linear and optico–acoustics diagnostics
- physical acoustics of solids. Acoustics in material science
- natural media acoustics, acoustic ecology
- applied acoustics (ultrasound in medicine, industry, construction, musical and architecture acoustics).

⊙ Offered courses:

- acoustic non–linearity of solids
- acoustics of ocean for acousticians
- acoustics of ocean. Part I. General hydroacoustics
- acoustics of ocean. Part II. Statistical hydroacoustics
- dynamics of continua for radiophysicists
- foundation of vector–phase measurements of acoustical fields
- introduction to acoustics
- inverse scattering problems in acoustics
- methods of hydroacoustical measurements
- microwave acoustics and acoustoelectronics
- non–linear hydroacoustics
- numerical methods in acoustics
- physical acoustics. Parts I&II
- physics of noise and vibrations
- sound sources
- theoretical foundations of acoustics. Part 1. Radiation and scattering of acousti–cal waves
- theoretical foundations of acoustics. Part 2. Acoustical wave propagation in bounded media
- ultrasonics methods in solid–state physics.

CHAIR OF RADIOPHYSICS

Head: DrSc, Professor Anatoly P. Soukhorukov

⊙ Key research directions:

- physics of wave interactions in nonlinear and inhomogeneous media
- microwave electronics

- physics of millimeter waves
- long–distance propagation of waves
- physics of ferrites, ferroelectrics, and magneto–optical crystals.

⊙ **Offered courses:**

- bifurcations and catastrophes
- diffractions and dispersion phenomenon in non–linear media
- digital systems and processes
- electron beam interaction with electromagnetic field
- fiber optics
- microwave solid–state electronics
- millimeters waves
- non–linear microwave electronics
- non–linear waves
- numerical methods in radiophysics
- numerical modeling in non–linear electrodynamics
- physics of microwaves
- propagation of electromagnetic waves in tropo–sphere
- quantum phenomena in radiophysics
- radiospectroscopy
- radiowaves propagation in Earth ionosphere
- submillimeter radiospectroscopy
- wave theory.

CHAIR OF QUANTUM ELECTRONICS

Head: DrSc, Professor Vladimir I. Panov

⊙ **Key research directions:**

- non–linear optics of nanostructures and photon crystals
- dynamics and susceptibility of chaotic systems
- fundamental processes in surface nanostructures and in systems with lowered dimension
- quantum optics, scattering on polaritons and parametric scattering of light
- laser spectroscopy of aqueous media. Non–linear laser fluorimetry of nature organic complexes. Lasers in ecology.

⊙ **Offered courses:**

- correlation spectroscopy
- elementary excitations in solid
- interaction of electromagnetic radiation with mat–ter
- kinetics of complex systems
- laser physics
- laser spectroscopy
- lasers in ecology
- macroscopic quantum effects
- non–linear dynamics
- non–linear optics
- physical basics of quantum information
- physics of condensed state of matter
- physics of nanostructures and mesoscopic phe–nomena
- quantum electronics
- quantum optics
- scanning probe spectroscopy and basics of nano–electronics
- theoretical basics of quantum radiophysics
- theory of non–linear waves
- theory of oscillations.

CHAIR OF PHYSICAL ELECTRONICS

Head: DrSc, Professor Andrei F. Alexandrov

⊙ **Key research directions:**

- physics of different type gas discharges including discharges in supersonic gas flows and in flammable mixture
- electron and ion microscopy and spectroscopy of solid state surfaces and thin films
- physical foundations of micro– and nano–electron–ics elements creation and their diagnostics
- physical foundations for the development of novel materials including the carbonic ones and surface properties modification using plasma and beam technologies
- dense relativistic electron beam physics and plas–ma microwave electronics.

⊙ **Offered courses:**

- additional chapters of solid–state electronics
- diagnostic of plasma
- dynamics of radiating plasma
- electrodynamics of plasma and plasma–like media
- electron spectroscopy and microanalysis
- electron spectroscopy of solid state
- elementary processes and kinetics of low–tem–perature plasma
- emission phenomena at surfaces
- inelastic ion–surface interaction
- interactions of electromagnetic waves with plasma
- introduction in physics of radiating plasma
- novel trends in solid–state physics
- oscillations and waves in plasma media
- physical foundations of gas discharge
- physical foundations of nano– and molecular elec–tronics
- physical foundations of solid–state electronics
- physics of boundary layers of plasma
- physics of intense relativistic electron beams
- practical semiconductor electronics
- theory of plasma instabilities.

DIVISION OF NUCLEAR PHYSICS

CHAIR OF ATOMIC AND PLASMA PHYSICS AND MICROELECTRONICS

Head: DrSc, Professor Alexander T. Rakhimov

⊙ Key research directions:

- study of non–equilibrium plasma in gas discharges
- synthesis of new materials in non–equilibrium plasma
- physics of high–frequency electromagnetic fields and plasma interaction
- physical processes in intense light fields
- microphysics of aerosols and clouds in the upper troposphere
- cryoelectronics.

⊙ Offered courses:

- condensed matter physics
- electrodynamics of superconductors
- experimental methods of atomic and molecular research
- foundations of electronics and theory of oscillations
- foundations of superconductive electronics
- interaction of electromagnetic radiation with plasma
- introduction into single–electronics
- introduction to physics of superconductivity
- introduction to quantum field theory
- introduction to superconductivity and single–electronics effects
- non–equilibrium processes in gaseous media
- oscillations and waves in plasma
- physical processes in intense light fields
- physics and dynamics of Josephson junctions
- physics of atomic collisions
- physics of atoms and molecules
- physics of fundamental interactions
- physics of low–temperature plasma
- plasma spectroscopy
- problems of energetic and plasma physics

- quantum chemistry
- quantum phenonena in solid state physics
- radiophysics and electronics
- transport of particles and quanta through matter.

CHAIR OF COSMIC RAYS AND SPACE PHYSICS

Head: DrSc, Professor Georgiy T. Zatsepin

⊙ Key research directions:

- cosmic rays and fundamental interactions
- cosmic ray astrophysics
- neutrino astrophysics
- x–ray and gamma astronomy
- space physics and solar–terrestrial links.

⊙ Offered courses:

- cosmic ray astrophysics
- cosmic ray research techniques
- electronic devices in nuclear physics
- energetic particles and plasma in magnetospheres of planets
- experimental techniques in space physics
- fundamental interactions and cosmic rays
- high–energy gamma–astronomy
- interactions of radiation with matter
- introduction to cosmic ray physics
- modern non–linear techniques for analysis of complex systems
- neutrino and neutrino astrophysics
- physics of high–energy and elementary particles
- physics of near–Earth and interplanetary space
- solid–body aspects of nuclear physics
- space plasma physics
- techniques of physical experiment
- ultra–high energy cosmic rays
- x–ray and gamma–astronomy.

CHAIR OF OPTICS AND SPECTROSCOPY

Head: DrSc, Professor Vitaly V. Mikhailin

⊙ Key research directions:

- vacuum ultraviolet spectroscopy using synchrotron radiation
- physical issues of optical fiber communications
- the light–dynamical phenomena during generation and propagation of coherent radiation
- non–linear dynamic processes in gas flow lasers and applications for temporal characteristics control.

⊙ Offered courses:

- applied computer optics
- computer methods in processing experimental results and modeling physical problems
- condensed matter physics
- experimental methods in optics
- foundations of physical optics
- interaction of radiation with matter and non–linear optics
- introduction to integrated and fiber optics
- introduction to neural networks and genetic algorithms
- kinetics of molecular media
- laser in medicine
- laser spectroscopy
- luminescence of crystals
- luminescence of rare–earth ions
- methods of analyzing stochastic signals and structures
- molecular luminescence
- non–radiation energy transfer in condensed matter
- optical instruments in synchrotron radiation channels
- optical methods in informatics
- optical spectra of atoms and molecules
- optics of coherent radiation
- physics of fundamental interactions
- physics of lasers
- secondary processes in dielectric crystals
- solid–state spectroscopy
- spectroscopy of atoms and atomic collisions
- statistical optics
- synchrotron radiation and its applications
- synchrotron radiation in biology and medicine
- theory of synchrotron radiation
- topics in modern optics and spectroscopy
- VUV–spectroscopy methods
- x–ray optics.

CHAIR OF PHYSICS OF ATOMIC NUCLEI AND QUANTUM COLLISIONS THEORY

Head: DrSc, Professor Vsevolod V. Balashov

⊙ Key research directions:

- quantum theory of collisions in physics of nuclear reactions, atomic and mesoatomic processes. Quantum theory of few–body systems
- interaction of nuclear radiations with condensed matter

- experimental and theoretical investigations of nuclear reactions, including induced fission, and nuclear structure
- investigation of hyperfine interactions in condensed matter by the methods of nuclear spectroscopy
- nuclear medicine.

⊙ Offered courses:

- additional questions of scattering theory
- advanced chapters of nuclear reactions
- computer methods in collision theory
- condensed matter physics
- density matrix
- experimental methods of nuclear physics
- hadron interactions
- hyperfine interactions in nuclear physics
- interaction of particles and radiation with matter
- kinematics of elementary processes
- nuclear physics at intermediate energy
- nuclear physics of heavy ions
- nuclear reactions
- physics of electromagnetic interaction
- physics of mesoatomic processes
- physics of nuclear fission
- quantum theory of collisions
- spectroscopy and structure of hadrons
- structure of nucleus.

CHAIR OF QUANTUM THEORY AND HIGH-ENERGY PHYSICS

Head: DrSc, Professor Anatoly A. Logunov

⊙ Key research directions:

- quantum theory
- quantum field theory
- theory of gravitation
- electrodynamics
- mathematical physics.

⊙ Offered courses:

- additional chapters of classical electrodynamics
- computer methods in theoretical physics
- dynamical equations in quantum field theory
- foundations of standard model
- gauge field theory
- gravitation theory
- group theory
- introduction to physics of elementary particles
- introduction to theory of gravitation

- methods of contemporary quantum field theory
- modern theoretical problems of contemporary high–energy physics
- numerical methods in theoretical physics
- quantum chromodynamics
- quantum field theory
- renormalization theory and renormgroup theory
- solitons, instantons, and quark bags
- system of analytical calculations «MAXIMA»
- theory of quantum calculations.

CHAIR OF PHYSICS OF ELEMENTARY PARTICLES

Head: DrSc, Professor Vladimir G. Kadyshevsky

⊙ Key research directions:

Branch at the Joint Institute for Nuclear Research (Dubna, Moscow Region)

- cp–violation, c– and b–quark physics, hadron structure studies
- neutrino physics, astrophysics and cosmic rays
- new methods and applications of high energy physics
- new states of hadronic matter (quark–gluon plasma, hybrids, glueballs and multi–quark states
- test of the Standard Model (SM) and searches beyond the SM.

Branch at the Institute for High Energy Physics (Protvino, Moscow Region)

- development of new detectors
- hadron spectroscopy
- investigation of charged kaon decays
- neutrino experiments
- theory of the electroweak and strong interactions.

⊙ Offered courses:

- additional topics of elementary particles kinematics
- applied programs for particles interaction and registration simulation
- bases of computing and information technologies
- computerized data acquisition systems in physical experiments
- detectors of high–energy particles
- electronic methods and automatization of physics experiments
- electronics in high–energy physics
- electroweak interaction (experiment)
- feynmann's diagrams
- introduction to physics of the Standard Model
- introduction to quantum field theory
- kinematics of decays and interactions of elementary particles
- main problems of off–line processing in experimental physics of high–energies
- methods of processing and modeling in physics experiment
- methods of programming in high–energy physics
- methods on nuclear particles detection
- modern methods of particles registration
- nuclear electronics
- numerical methods in physics
- passage of high–energy particles through matter
- phenomenology of high–energy physics
- phenomenology of strong interaction
- physics of condensed matter
- physics of elementary particles
- physics of weak interaction
- quantum chromodynamics
- quantum field theory
- quark–hadron physics
- research of high–energy hadrons interactions
- results of experiment processing automatization
- standard model and its extension at high–energy processes
- statistical methods of measurement results processing in nuclear physics
- structure of nucleus
- techniques of physical experiments
- theory of numerical methods.

CHAIR OF PHYSICS OF HIGH–ENERGY ACCELERATORS

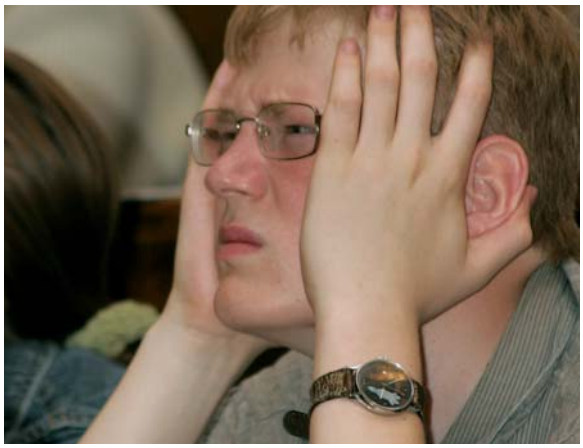
Head: DrSc, Professor Yury M. Ado

⊙ Key research directions:

- acceleration theory. Fundamentals of electromagnetic theory. Analysis of experimental data
- medical physics
- nuclear medicine (simulation, automation, experiment)
- using proton beams in radiotherapy (simulation, automation, and experiment)
- radiation and biological matter interaction. Influence of ionizing radiation to erythrocytes hemolysis kinetics.

⊙ Offered courses:

- biophysics fundamentals of physiological processes
- computer tomography
- computerized control systems of particle accelerators
- fundamentals of particle accelerator physics
- interaction of radiation with heterogeneous mediums



- interaction of radiation with matter
- introduction to medical physics
- introduction to physics of particle accelerators
- main particle accelerator centers of the world
- mathematical methods of experimental data analysis
- medical fundamentals of beam therapy
- non–ionizing radiation in biomedical diagnostics
- nuclear medicine
- physics fundamentals and engineering of proton beam therapy
- physics of cancer
- radiation problem of particle accelerators
- radiobiology
- systems of particle accelerators.

CHAIR OF GENERAL NUCLEAR PHYSICS

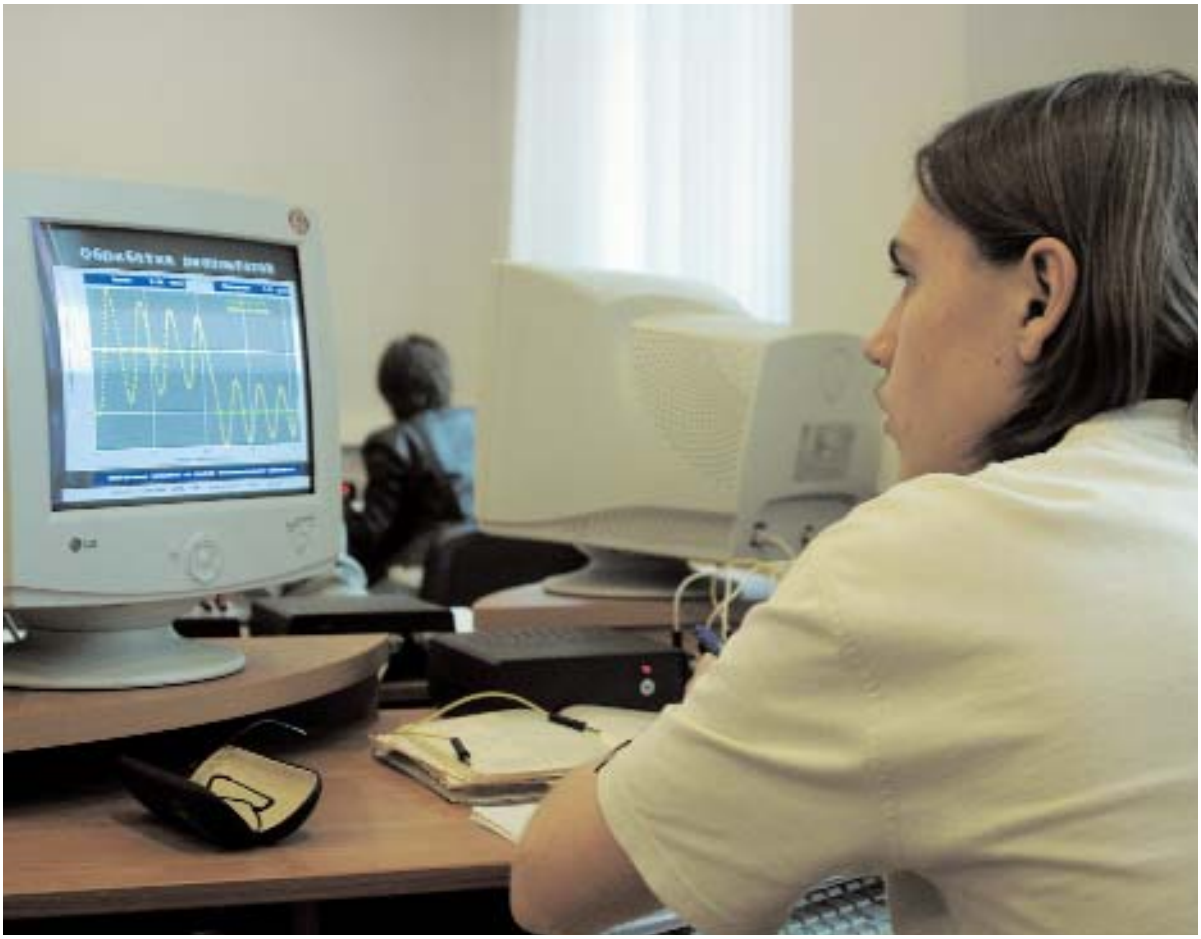
Head: DrSc, Professor Boris S. Ishkhanov

⊙ Key research directions:

- nuclear physics
- high–energy physics
- beams and accelerators
- information technologies for nuclear physics
- nuclear physics for application.

⊙ Offered courses:

- accelerators in nuclear experiment
- atomic collisions in solids and computer simulation
- atomic nuclei
- condensed matter physics
- electromagnetic radiation of electrons
- electroweak interaction
- foundation of quantum chemistry
- hadrons and nuclei
- inertial controlled thermonuclear fusion
- interaction of low–energy Ions with solid–state surface
- interaction of photons and electrons with atomic nuclei
- interaction of radiation with matter
- ion spectroscopy of surface
- mathematical statistics in nuclear physics
- models of atomic nuclei
- nuclear physics of high energies
- nuclear reactions
- nuclear resonance fluorescence
- orientation effects in crystals
- origin of elements
- photonuclear reactions
- physics of atomic collusions
- physics of high–current accelerators
- physics of interface and low–dimensional structure
- physics of ion–atomic collisions
- physics of quarks
- physics of X–ray radiators. X–ray lasers
- quantum field theory
- quantum physics of metals
- radiation ecology
- size and shape of atomic nuclei.



CHAIR OF NEUTRONOGRAPHY

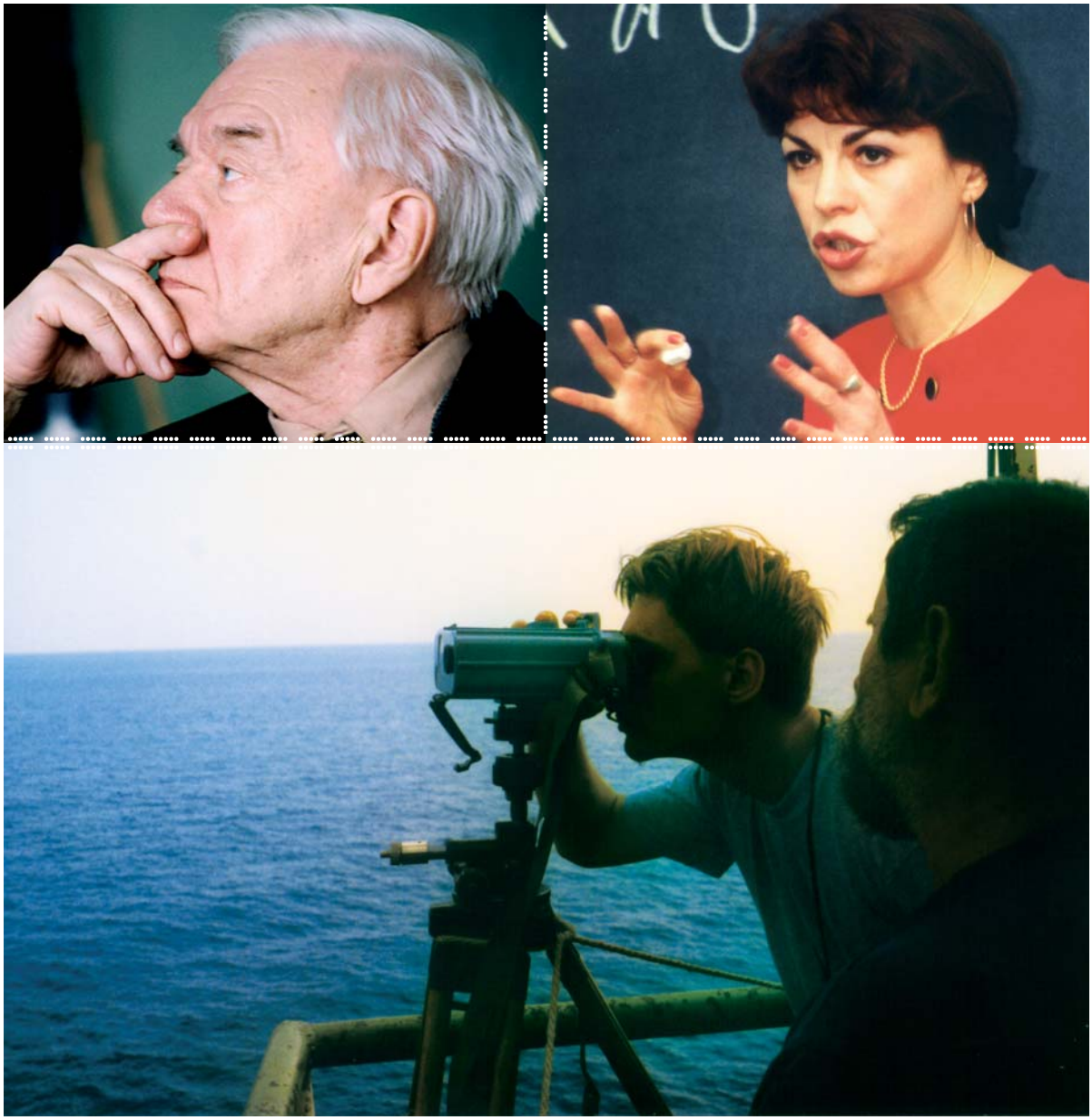
Head: DrSc, Professor Vitaly L. Aksenov

⊙ Key research directions:

- study of surface structure and properties of multi–layered systems, magnetics and superconductors by means of polarized neutron reflectometry and neutron standing waves
- study of structure and dynamics of biological macromolecules, model membranes and polymers by means of neutron and X–ray scattering
- study of structure and properties of new crys–talline materials by neutron diffraction
- study of texture, structure and properties of geo–logical materials by neutron diffraction in wide intervals of temperature and pressure
- physics of nuclear–nuclear interactions at low and middle energies.

⊙ Offered courses:

- computer methods for experimental data pro–cessing in solid–state physics
- condensed matter physics
- condensed matter spectroscopy with synchrotron radiation beams
- crystallography and fundamentals of structural analysis
- diffraction structural analysis
- experimental methods of condensed matter research
- fundamentals of modern texture analysis of mate–rials
- introduction to neutron physics
- low–temperature physics and techniques
- mathematical data processing in nuclear–physical experiments for condensed matter research
- methods for condensed matter research
- modern problems of condensed matter physics
- neutron activation analysis
- neutron optics
- physical methods in molecular biology
- quantum theory of solid states
- slow neutrons in physical research
- structural neutronography
- synchrotron radiation for condensed matter research
- techniques and methods in neutron experiments.



DIVISION OF GEOPHYSICS

CHAIR OF PHYSICS OF EARTH

Head: DrSc, Professor Vladimir I.Trukhin

⊙ **Key research directions:**

- internal structure and physics of the Earth
- origin and evolution of magnetic field of the Earth
- research of magnetism of continental and under–water ocean rocks
- termophysics of minerals and thermal history of Earth (geothermics)
- physics of earthquake and seismic mode.

⊙ **Offered courses:**

- early evolution and gravitation field of the Earth
- electromagnetic field of the Earth
- general geology
- general geophysics and ecology
- geodynamics
- geomagnetism
- geothermics
- inner structure and physics of the Earth
- inverse problems of geophysics
- magnetism of rocs
- mechanics of deformable media
- mechanics of earthquake centre

- modern geophysics methods of ocean bottom research
- physics bases of earthquakes forecast
- physics geology and bases of geotectonics
- physics of the Earth
- seismology: structure of the Earth on seismic date
- seismometry
- thermophysics of minerals and rocks.

CHAIR OF PHYSICS OF SEA AND INLAND WATERS

Head: DrSc, Professor Konstantin V. Pokazeev

⊙ **Key research directions:**

- integrated analytical, numerical, and laboratory modeling of physical processes in hydrosphere
- currents, waves, vortices, and boundary layers in a non–homogeneous fluid
- ecological problems in geophysics. Anthropogenic impact on geophysical processes in the environment.

⊙ **Offered courses:**

- atmosphere–ocean interaction
- dynamics and ecology of inland reservoirs
- dynamics and ecology of inland waters
- ecological problems of geophysics
- geophysical hydrodynamics
- hydrophysical research
- hydrosphere physical processes modeling
- long waves
- mechanics of continua
- ocean acoustics
- ocean optics
- remote methods in oceanology
- river flow dynamics
- sea currents dynamics
- sea waves dynamics
- statistical methods in geophysics
- stratified currents
- theory of turbulence
- thermal and molecular physics of sea.

CHAIR OF PHYSICS OF ATMOSPHERE

Head: DrSc, Professor V'atcheslav Ye. Kunitsyn

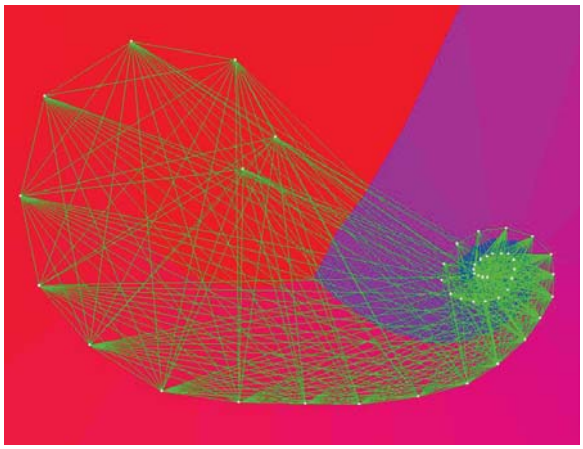
⊙ **Key research directions:**

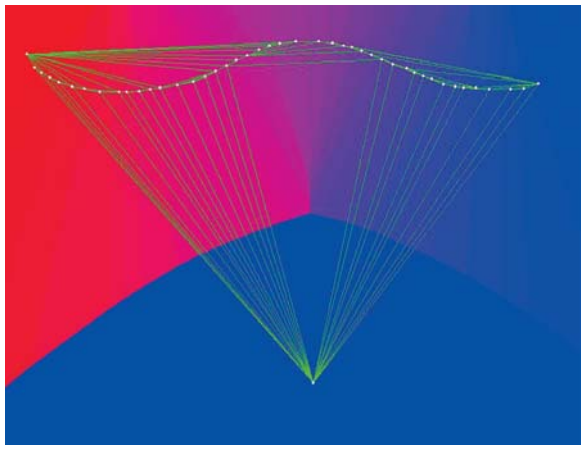
- heat–mass–exchange between ocean and atmosphere
- minor gas and aerosol constituents of the atmosphere
- dynamics of mesoscale processes
- radiophysics and ionospheric radio sounding
- remote sounding and radio tomography of the atmosphere and near space environment.

⊙ **Offered courses:**

- atmospheric optics
- dynamics of atmosphere

- dynamics of mesoscaled processes in atmosphere
- electrical fields and processes in atmosphere
- foundation of climate theory
- interaction between ocean and atmosphere
- mechanics of continua
- numerical methods in geophysics
- optics of atmosphere
- optics of ocean and atmosphere
- physical foundations of Earth probing
- physical foundations of measurements in geo–physics
- physics of atmosphere
- physics of near–Earth space and solar–Earth
- physics of upper atmosphere
- remote probing of atmosphere
- statistical methods in geophysics
- wave and turbulent processes in atmosphere.





CHAIR OF COMPUTER METHODS IN PHYSICS

Head: DrSc, Professor Yuri P. Pyt'ev

⊙ **Key research directions:**

- methods of analysis and interpretation of experi–ments (computing and measurements systems theory)
- mathematical methods of image analysis and interpretation
- methods of fuzzy and uncertain fuzzy mathematics
- mathematical modeling and computational experi–ment
- quantum theory and questions of world outlook
- microelectronics and physics of the micro–world.

⊙ **Offered courses:**

- computational geometry
- computational physics
- computer image processing
- extremal problems
- functional analysis in normalized spaces
- infinite–dimensional linear models
- internet technologies
- introduction to mathematical methods of mea–surements interpretation
- mathematical models of non–linear dynamics
- measure theory
- method and art of mathematical modelling
- methods of mathematical statistics
- morphological analysis of images
- non–numerical programming algorithms
- pattern recognition
- possibility: theory and applications
- programming in JAVA
- statistics and possibility methods of decision mak–ing
- systemic programming
- systems of computer–based modeling
- theory of computer–aided measurement systems
- theory of Hilbert spaces. Operator analysis
- theory of quantum measurements.

DIVISION OF ASTRONOMY

CHAIR OF ASTROPHYSICS AND STELLAR ASTRONOMY

Head: DrSc, Professor Anatoly M. Cherepashchuk

⊙ Key research directions:

- close binary systems
- galactic astronomy
- interstellar medium, dynamics, and star forming regions in galaxies
- relativistic astrophysics
- physical processes inside the Sun and Stars. Helioseismology and astroseismology. Solar activity.

⊙ Offered courses:

- accretion disks
- active galactic nuclei
- advanced chapters of theoretical astrophysics
- astrophysics of neutron stars and black holes
- binary systems
- close binary systems
- cosmology
- elements of stellar dynamics
- evolution of galaxies
- evolutionary astrophysics
- extra–atmospheric astronomy
- filtration of stochastic signals

- formation of stars
- galaxy astronomy
- general theory of relativity
- general theory of relativity and astrophysical observations
- physics of cosmic plasma
- physics of galaxies
- physics of interstellar medium
- physics of stellar atmosphere
- practical radioastronomy
- radiation in relativistic astrophysics
- radioastronomy
- solar physics and helioseismology
- space magnetic hydrodynamics
- spectra of accretion disks radiation
- star clusters
- structure and evolution of stars
- supernovae and stellar wind in Interstellar medium
- theoretical astrophysics
- variable stars.

CHAIR OF CELESTIAL MECHANICS, ASTROMETRY AND GRAVIMETRY

Head: DrSc, Professor Valery L. Panteleev

⊙ Key research directions:

- dynamics of natural satellites of planets
- qualitative celestial mechanics
- astrometry and studying the Earth rotation
- gravimetry, global geodynamics, internal structure of the Earth and planets
- morphological analyses of surface structure of planets and satellites in the Solar system.

⊙ Offered courses:

- earth tides
- ephemerical astronomy
- global geodynamics
- gravimetry
- introduction to astrodynamics
- methods of astrometry observation processing
- observations and management of dynamical objects
- perturbation theory
- planets in the Universe
- practical celestial mechanics
- pulsar astrometry
- radioastrometry
- stability of Hamiltonian systems
- theory of accidental functions
- theory of Earth's shape
- the problem of three bodies.

CHAIR OF EXPERIMENTAL ASTRONOMY

Head: DrSc, Professor Alexander A. Boyarchuk

⊙ Key research directions:

- astronomical instrument–making industry, astronomical observations and data processing
- modern techniques for observational data processing
- astronomical catalogues and databases; techniques, software, and instrumentation for space projects.

⊙ Offered courses:

- astrospectropy
- detectors of optical radiation
- photoelectronic detectors and its application
- practical astronomy
- precision photometry and spectrophotometry.

DIVISION OF COMPLIMENTARY EDUCATION

Head: DrSc, Professor Valery N. Prudnikov

⊙ **Key division's activities:**

- managing specialization for the students of Physics on «Physics and management of science–intensive technologies» (see below)
- complimentary education programs, specifically, offering training courses in elementary mathematics, physics, and astronomy for the attendees (schoolboys, students, etc.)
- offering complimentary educational program for students beyond physics, specifically in computer sciences, languages, etc.
- managing intensive courses and granting qualification in computer sciences and related areas (web– and computer graphics design, managing networks, etc.)

⊙ **Specialization for the students of Physics on «Physics and management of science–intensive technologies»**

One of the key activities of this division is management of specialization for the students of Physics on «Physics and management of science–intensive technologies». This specialization is targeted at teaching students how to run spin–off companies, manage innovation research, arrange technology transfer from the university labs to the industry, basics of consulting in the high–tech area, etc.

The curriculum for this program is based on the two–stages scheme: first, Bachelor, then Master Degree. Students at the first stage must complete the Bachelor program at the Faculty of Physics. The syllabus also includes a number of economic courses and a course of business English.

After successful completing the Bachelor program, the students can continue their studies under the Master's Program. Besides the required courses providing fundamental knowledge in physics, they must attend a number of courses on choice in the field of finance, economy, management, and law. After completing the entire program, the students receive the diploma and are awarded by the Master's degree from the Faculty of Physics.

3 INTERNATIONAL COLLABORATION

The Faculty of Physics is an essential part of the world scientific community. Our faculties perform research within the frame of more than 80 collaborative agreements with the universities and scientific centers worldwide, actively participate in various international projects under umbrella of the Russian and international funding agencies.

In international collaborative research we pursue the following two key goals.

First, we are interested in collaboration with those research centers and universities worldwide who offer research opportunities complimentary to ours. Collaborative efforts between theoretical and experimental groups are also greatly welcome.

Second, in the international exchange of students those joint programs with foreign partners are preferred, which enable our students and postgraduates to compliment their research at Moscow State with the research at the partner's laboratory.

SOME FOREIGN PARTNERS OF THE FACULTY ARE LISTED IN THE TABLE BELOW:

AZERBAIJAN	Baku State University
GERMANY	Max–Plank–Institut fur Quantenoptik, Garching
	Physikalisch–Technischen Bundesanstalt, Braunschweig und Berlin
	Johannes Gutenberg University, Mainz
	Institut fuer Festkorperforschung, Forschungszentrum, Juelich
	Martin–Luther University, Halle–Wittenberg

GERMANY	University of Ulm
	Humboldt–Universitat zu Berlin
SPAIN	University of Valensia
ITALY	University of Messina
	Politecnico di Milano
KAZAKSTAN	Institute or Nuclear Physics, National Nuclear Centre
CHINA	Harbin Institute of Technology, Harbin
	Xiamen University, Xiamen
	Dalian Scientific Test&Control Technology Institute, Dalian
	Peking University, Beijing
KOREA	Chungnam National University, Daejeon
MONGOLIA	National University of Mongolia
NETHERLANDS	University of Amsterdam
POLAND	Institute of Atomic Energy (Otwock–Swierk) and Institute of Physical Chemistry, Polish Academy of Sciences (Warsaw)
	International Laboratory of Strong Magnetic Fields and Low Temperatures, Wroclaw
SINGAPORE	National University of Singapore
SLOVAKIA	Comenius a University, Bratislava
USA	Division of Physics, Mathematics and Astronomy, California Institute of Technology, Pasadena
	Center for Industrial and Medical Ultrasound, Applied Physics Laboratory, University of Washington, Seattle
USA	Department of Earth and Planetary Science, California University, Berkeley
	Department of Physics and Astronomy, Georgia State University, Atlanta
THE UKRAINE	National Taras Shevchenko University, Kiev
	Sea Institute of Hydrophysics of the National Academy of Sciences of Ukraine
FINLAND	University of Helsinki
FRANCE	University of Province–ex–Marseille, Marseille
	Louis Neel National Laboratory for Scientific Research Grenoble
	University of Bordeaux I, Bordeaux
	Department of Liquid Mechanics, Acoustics and Energetics of Ecole Centrale de Lyon
	Laboratory of Annecy–le–Vieux of Theoretical Physics, Cedex
SWITZERLAND	Swiss Federal Institute of Technology, Lausanne
SWEDEN	Blekinge Institute of Technology, Karlskrona
	Royal Institute of Technology
	Chalmers University of Technology, Goteborg
JAPAN	Toyohashi University of Technology
	Tohoku University
	Waseda University

Since 1950, more than 3,500 foreign students from 83 countries graduated from the Faculty of Physics, M. V. Lomonosov Moscow State University.

Faculty of Physics at Moscow State University is well–known in Russia and beyond its borders not only for its excellent research and education, but for traditions of students' life, as well.

One of these traditions, dating back in 50th years of the last century, is the camping trip in the fall, traditionally considered as the «dedication» into profession of Physicists for the fresh, first–year students of Physics. Along with the fresh students, many graduate students and faculty members participate in this event, as well. The «dedication» is organized on one of the week–ends in September. On Saturday, in the morning, participants of the «dedication» camping trip gather at the Faculty and then go together by a suburban train to the suburb of Moscow where they set on the «freshman's path» in the woods. The trip consists of several parts. At the end of each part there is a check point, where one can learn the next direction to go only after taking part in a number of various contests like problem–solving, racing mountain–top, nettle handling, singing, etc. In the evening, the dedication ceremony itself takes place on a campsite in the woods. The contest winners are awarded with different prizes, and all the freshmen are put on the oath afterwards. The dedication procedure ends up with the joint singing of the Faculty's hymn «Dubinushka», followed by dancing, campfire singing, etc.

Since 1974, the Faculty hosts «The First Snow» festival, which lasts for a few weeks and where the students take part in traditional contests like amateur singing, photography, poetry, and, just recently, in skiffle–groups and web–site design. The Festival ends with a university–scale gala–concert, in

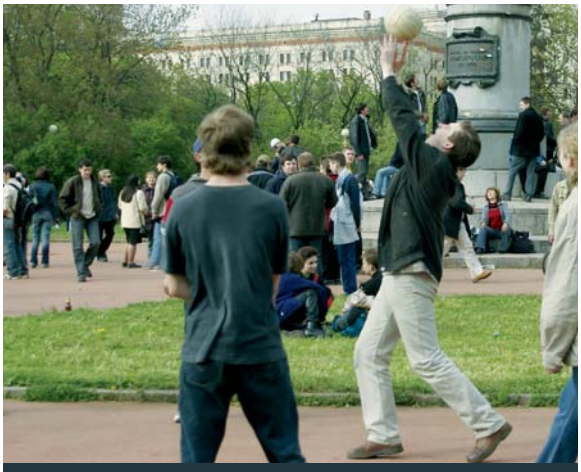
which winners of the various contests present their performances.

The most favorite holiday among students of Physics at Moscow State is the renowned «Day of Physicist», traditions of which go back in 1960, when it used to be called «The Archimedes Day». Its program featured the famous Greek scientist and its key part was the opera under the same name composed and performed by students of Physics.

Regularly, the «Day of Physicist» is celebrated in the early May, but preparation starts much earlier. On the day of celebration all classes are canceled. The afternoon program starts with the festive procession of students to the monument of Michael Lomonosov in front of the Faculty (and MSU) building in order to honor the name of the great Russian scientist, the founder of Moscow State University. Then, it is followed by the traditional performance at the steps of the Faculty (thus, it is called «The Performance at the Steps»), which is attended by thousands of physics students and our former graduates.

Also, the program of the «Day of Physicist» includes various contests, entertaining events, and competitions, which are arranged inside the Faculty. Prizes may range from «a set for expressing one's free will» (three dozens fresh eggs) to a free voucher to the University summer sports camp. On the University sports grounds the teams of students and stuff members compete with each other in football, volleyball, basketball, and chess.

The evening program held at the University Cultural Center hosts talented performers from MSU students and our guests from other universities along with invited musicians who joyfully perform together in a large-scale show.



7 FACULTY OF PHYSICS AND MOSCOW STATE UNIVERSITY

Lomonosov Moscow State University is the university number one in Russia. It is governed by its own charter and funded directly by the Russian Government. Nowadays, the Moscow State consists of 27 humanity and natural sciences faculties (Faculty of Physics, inclusive), 11 research institutes, 18 research centers, 4 museums, the Gorky library, publishing and printing houses. It has also four branches — in Puschino and Chernogolovka (both in Moscow region), in Sevastopol (the Ukraine, at the Black sea shore), and in Astana (Kazakhstan). MSU possesses of more that 600 buildings in Moscow and in other regions (in Crimea and the White Sea, for instance).

Being the largest University in Russia, the Moscow State has overall more than 40,000 students, 8,500 faculty members and scientists (6,900 of them hold PhD or DrSc degrees). A quarter of all fundamental research in Russia is being conducted at Moscow State University.

The number of foreign students at Moscow State exceeds 4,000 from 97 countries.

DORMITORIES

Students have a choice of dorm according to their financial conditions. They may reside in the Main Building Dorm (single rooms) or share the room by two or even three students at any of the five different dorms located in the vicinity of the University campus.

For convenience, on campus there are also more than 20 canteens, many small restaurants, cafeterias, snack-bars, various kinds of service (postal office, recreational facilities, cinema, internet-cafee, etc.).

MEDICAL SERVICE

Medical services at Moscow State University is arranged through a few clinics for students and the faculty. In case of emergency, the qualified doctors can provide first-aid help and then a required treatment. There is also a dental clinic sharing the building with the students' one.

Medical services are given only under the medical insurance sertificates, which can be purchased at university clinics.

LIBRARY

The major MSU library, called Gorky library, was established in 1755, and nowadays contains over 8 million of volumes, two million of which are books in foreign languages. The Gorky library is the third largest library among Russian public libraries.

The Faculty of Physics hosts its own library, which is the chapter of the Gorky library. It is located in the main building of the faculty and serves over 4.5 thousand customers annually. The library offers textbooks, thesis, monographs, and scientific journals.

In a few last years, the library offers to the faculty's customers on-line access to some key journals (published by American Physical Society, Springer, Elsevier, etc.).

RECREATION AND SPORTING FACILITIES

All students at Moscow State (except disable students) must undergo physical training courses, which are the part of the curriculum. Besides that, all students can join any of the numerous MSU sport club sections. The sporting facilities include 12 gyms, two swimming pools, a number of stadiums, a baseball field, a tennis court, and many others.

Also, the University offers to the students extended recreational facilities outside Moscow, in the Moscow region and at the Black Sea, where students can improve their health and relax during winter or summer vacations.

THE CONSTRUCTION OF A NEW CAMPUS

In January 2005, Moscow State will celebrate its 250th anniversary. Approaching this date, a construction of a new campus of the university at the territory adjacent to the existing territory of Moscow State at Vorob'evy Gory — was started in 2004, which should result in a few years from now in doubling the territory and capacity of the university's campus.

By January 2005, this new campus will host a new building of the University's Fundamental Library, and the construction of a number of educational and research facilities is also under way. It is also planned that a new university medical centre will be open there. It should become the clinical base for the Faculty of Fundamental Medicine allowing research in topical areas of modern medicine, like cell and gene therapy.

RUSSIAN LANGUAGE

Teaching at M.V.Lomonosov Moscow State University is conducted in Russian. Therefore, to be enrolled in various MSU's educational programs, a foreigner must pass a test on Russian language or complete a one-year program of the Russian language at the MSU Center for International Education or at the State University Preparatory Department.

MSU CENTER FOR INTERNATIONAL EDUCATION

Mailing address:
24/36 Krzhizhanovskogo St., Build. 1
Moscow, 117259, Russia

Web-site: http://www.cie.ru/

E-mail: ciemsu@yandex.ru; adm@cie.msu.ru

Phone: +7 (095) 124-80-11,
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Fax: +7 (095) 125-44-61

THE UNIVERSITY TESTING CENTER OF THE RUSSIAN LANGUAGE

Web-site:
http://www.philol.msu.ru/rus/kaf/testcentre
(in Russian)

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Leninskie Gory, Moscow, 119992, Russia

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USEFUL NFORMATION

SCHEDULE	
FALL SEMESTER	
Registration	August 20–31
Beginning of classes	September 1
Testing session	December 1–25
Examination session	January 3–25
SPRING SEMESTER	
Beginning of classes	February 7
Testing session	May 7–25
Examination session	June 1–25
GRADING SCHEME Exams are graded by 2 to 5 points:	In order to be allowed to enter the examination session, the students must first successfully pass the testing session, results of which are graded as «passed» or «failed».
5 excellent	
4 good	
3 satisfactory	
2 unsatisfactory	

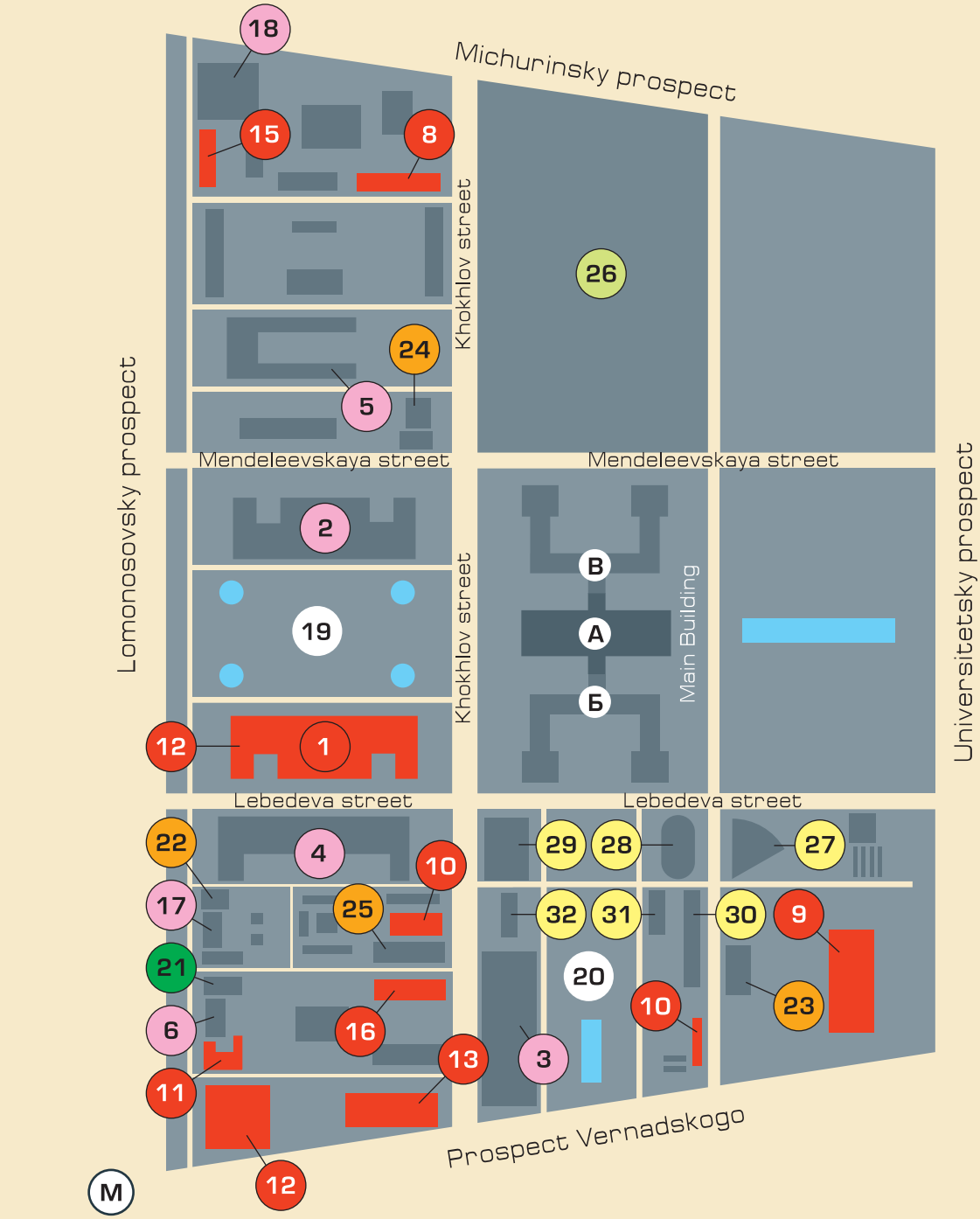
THE UNIVERSITY CAMPUS MAP

The main building of Moscow State at the Vorob'evy Gory university campus (Stalin-like skyscraper) hosts a number of faculties, namely, Faculty of Mathematics and Mechanics, Faculty of Geography, Faculty of Geology, and Museum of Earth. Rector of the University and his office, as well as partly the administration of the University, are also located in this building.

NUMBERS ON THE MAP ARE EXPLAINED BELOW:

1. Faculty of Physics
2. Faculty of Chemistry
3. Humanitarian BuildingPhilological Faculty, Faculty of Philosophy, Faculty of History, Faculty of State Government, Library for the Faculties of Humanities
4. Humanitarian BuildingFaculty of Economics, Faculty of Computational Mathematics and Cybernetics, Faculty of Law, Department of Russian Language for Foreign Students, Library for Science Faculties
5. Faculty of Biology, Faculty of Soil Science
6. Faculty of Sociology
7. D. V. Skobel'tsyn Research Institute of Nuclear Physics
8. Laboratory of Nonlinear Optics, International Laser Center
9. P. K. Sternberg Research Institute of Astronomy
10. Department of Low Temperature Physics and Superconductivity
11. Laboratory of High Energy Physics
12. Laboratory of High Energy Physics
13. Laboratory of Magnetism
14. Laboratory of High Energy Physics
15. Laboratory of Hydrophysics
16. Mechanical Workshops
17. Research Computational Center
18. Research Institute of Mechanics
19. M. V. Lomonosov Monument
20. Second World War Memorial
21. Polyclinic
22. Cafe
23. Cafe
24. Cafe
25. Internet Cafe
26. Botanic Garden
27. Baseball Stadium
28. Football Stadium
29. Stadiums
30. Tennis Courts
31. Gym
32. Track and Field Athletics Gym

MAP OF THE UNIVERSITY CAMPUS



10 CONTACTS

If you have any further questions, please do not hesitate to contact us at the following contacts.

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