The Educational Programme of the JINR University Centre in 2010-2016

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106th Session of the JINR Scientific Council, 24-25 September 2009

Main Tasks

First Priority Topic 06-0-1078-2009/2013

"Organization, Maintenance, and Development of Education Process at JINR"

- Students, JINR-based departments
- JINR postgraduate programmes
- International education actions
- Student laboratory infrastructure
- Secondary-school oriented activity
- Technical staff retraining

Education process for students

- formation of a single JINR-based education space by working out the required and optional courses for the students of the JINR-based departments and the UC-attached students from JINR Member States;
- creation of a system of module courses representing JINR's main fields of research (in particular, in cooperation with Scientific-Educational Center "Neutronography of nonosystems and materials" at FLNP);
- making provisions for the recognition of these courses by the universities of the JINR Member States for students of these states;
- creation of a modern auditorium complex with modern educational equipment;
- working out specialized programmes at the requests of JINR's scientific subdivisions (training for NICA-MPD project);
- publishing the UC's textbooks on the basis of its lecture courses.

JINR-based departments

Moscow State University

- Elementary Particle Physics
- Neutron Diffraction Studies

Moscow Institute of Physics and Technology

- Fundamental and Applied Problems of Micro-world Physics

Moscow Institute of Radio Engineering, Electronics, and Automatics

- Electronics for Physics Research Installations
- Information Technologies of Computing Systems

Dubna International University

- Nuclear Physics
- Theoretical Physics
- Biophysics
- Distributed Computing Systems
- Nanotechnologies and New Materials

Moscow Engineering and Physics Institute

- Heavy Ion Physics

Lecture courses at JINR-based departments

University Centre

- General information
- News
- International cooperation
- JINR UC study projects and laboratories
- The JINR Postgraduate Studies
- Opportunities for students
- For secondary school pupils
- Events

General information

- UC staff
- FAQ
- Courses offered in the academic year 2008 -- 2009
- JINR-based departments
- UC's partner universities
- JINR Basic Facilities

Courses offered in the academic year 2008 -- 2009

Particle Physics and Quantum Field Theory

Mathematical and Statistical Physics

Condensed Matters, Nanostructure Physics, and Neutron Physics

Nuclear Physics

Physics Research Facilities

Information Technologies

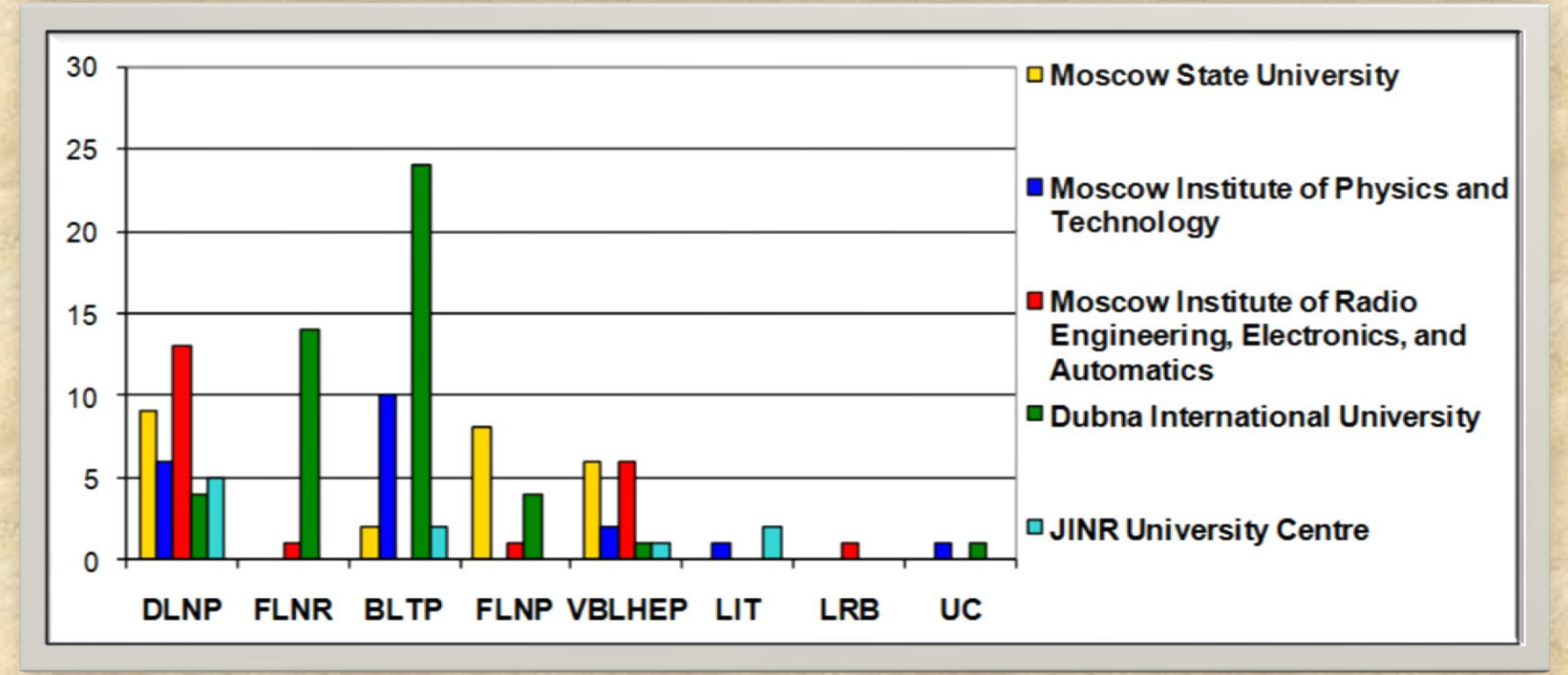
Projects and their description

Lecture courses in Condensed Matters, Nanostructure Physics, and Neutron Physics

Condensed Matters, Nanostructure Physics, and Neutron Physics

	Course	Lecturer	Department	Semester
1.	Radiation – Matter Interaction	Mikhail Golovkov (FLNR)	NP	autumn
2.	Introduction to Radiation Physics of Solids and Radiation Science of Materials	Vladimir Skuratov FLNR)	NP	autumn
3.	Neutron Optics and Fundamentals of Neutron Diffraction Studies	Alexander Frank (FLNP)	NP	spring
4.	Low-Temperature Physics and Techniques	Igor Goncharov (VBLHEP)	NDS	autumn
5.	Theoretical Methods of Condensed Matter Physics	Timur Tropin (FLNP)	NDS	autumn
6.	Synchrotron Radiation in Condensed Matter Research	Sergei Tyutyunnikov (VBLHEP)	NDS	autumn, spring
7.	Neutron Optics	Vladimir Ignatovich (FLNP)	NDS	autumn, spring
8.	Quantum Solid State Theory	Mikhail Avdeev (FLNP)	NDS	autumn
9.	Neutron Diffraction Study Techniques	Mikhail Avdeev (FLNP)	NDS	spring
10.	Fundamentals of Neutron Texture Analysis	Anatoly Nikitin (FLNP)	NDS	spring
11.	Introduction to Condensed Matter Physics	Mikhail Avdeev (FLNP)	NDS	spring
12.	Experimental Methods of Condensed Matter Research	Igor Goncharov (VBLHEP)	NDS	autumn
13.	Diffraction Structure Analysis	Anatoly Balagurov (FLNP)	NDS	autumn

JINR employees involvement into teaching programmes



More than 90 lecturers from all JINR laboratories

List of Proposals for PhD Theses (VBLHEP)

I. Research direction: "NICA, NICA/MPD and Nuclotron-M"

1. **PhD thesis, accelerator: "Stochastic cooling system for Nuclotron".** Supervisor: Trubnikov G.V. (trubnikov@jinr.ru). The work will be in collaboration with the Research Center at Juelich). It implies:
   a. Improvement of the pick-ups and kicker prototypes being in use at Juelich,
   b. R&D of the wide-band (band width 2 GGz) powerful amplifier, delay lines etc.
   c. Production, mounting, tests at the ring.
2. **PhD thesis, accelerator: "Simulation of particle dynamics in NICA accelerators/rings".** Supervisors: Sidorin A.O. (sidorin@jinr.ru), Mikhailov V.A. (vmikhaylov@jinr.ru).
3. **PhD thesis, accelerator (further perspective): "Setting a new Linac of RFQ type in exploitation".** Supervisor: Kobetz V.V. Necessary pre-requisite: basic education in accelerator theory/technics.

II. Research directions: "Physics of heavy ions, search for new physics, violation of fundamental symmetries "

1. **PhD thesis, physics: "Measurement of 2-neutrino decay probability of a charged kaon in experiment NA-62".** Supervisors: Kekelidze V.D. (Vladimir.Kekelidze@cern.ch), Madigozhin D.T. (madigo@sunse.jinr.ru).
2. **PhD thesis, physics: "Study of rare radiation decays of charged kaons in experiment NA-62".** Supervisors: Kekelidze V.D. (Vladimir.Kekelidze@cern.ch), Madigozhin D.T. (madigo@sunse.jinr.ru).
3. **PhD thesis, physics: "Search for sgoldstino in decays of charged kaons in experiment NA-62".** Supervisors: Kekelidze V.D. (Vladimir.Kekelidze@cern.ch), Madigozhin D.T. (madigo@sunse.jinr.ru).

JINR postgraduate programmes

- A 15% increase in the number of the JINR postgraduates; postgraduate license continuation in 2011. Now the University Centre is licensed to have 58 postgraduate students. During spring session 9 new postgraduate student started their studies at the UC. At the moment, 15 applicants are passing the entering examinations for JINR PhD studies.
- Development – jointly with Plenipotentiaries of JINR member states – of a special grant and stipend system for attracting applications to JINR postgraduate studies from these countries.
- Introduction of a bilateral postgraduate system in which postgraduates would have two supervisors: at JINR and at their home universities in JINR member states.

International education activities

- gradual introduction of conducting practices all the year round taking into account a permanent growth in the number of applications for attending practices;
- update and extension of the database of short research projects performed by students during the practices;
- organization of traditional International Summer Student Schools on “Nuclear Physics Methods and Accelerators in Biology and Medicine” in different member states;
- support of the UC student visits to different research centres and accepting student delegations from JINR member and associated member states;
- increasing the number of JINR member state universities with which agreements on cooperation is concluded.

International Student Practice

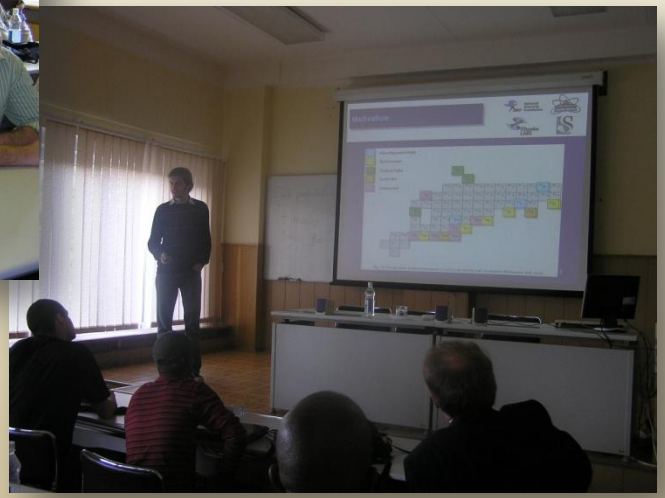
Summer Practices in 2009

July 6 - July 20:	*September 6 - 25:*	*Oct. 19 – Nov. 6:*
Czech R. (12 students), Poland (23 students) and Romania (13 students)	South African students (23 participants)	Students from Arab Republic of Egypt (20 part.)

Practice will include 19 research projects:

DLNP – 5, FLNP – 3, LIT – 1, VBLHEP – 2, FLNR – 5, LRB - 3

Practice 2009



In situ and post irradiation analysis of mechanical stress in Al_2O_3:Cr

- **Vladimir Skuratov**, Joint Institute for Nuclear Research, RU
- Gzegorz Bujnarowski, Opole University, Opole, PL
- Yuri Kovalev, Joint Institute for Nuclear Research, RU
- **Jacques O'Connell**, NMMU, Port Elizabeth, ZA
- Karoly Havancsak, Eotvos University, Budapest, Hu

REI-15 Book of Abstracts 2009, Padova, Italy

5th International Summer School

„Nuclear Physics Methods and Accelerators in Biology and Medicine“

Bratislava July 6-15, 2009

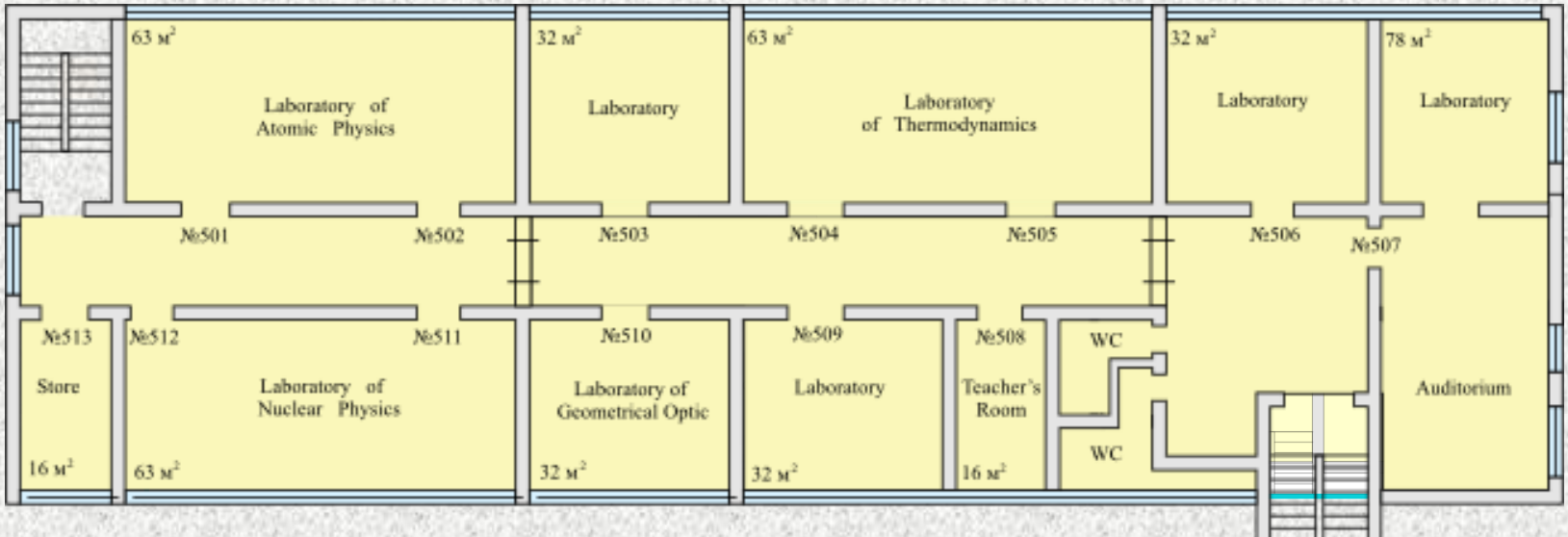
Lecturers from JINR:
Profs. G. Trubnikov, G. Shirkov, A. Sidorin, M. Frontasieva

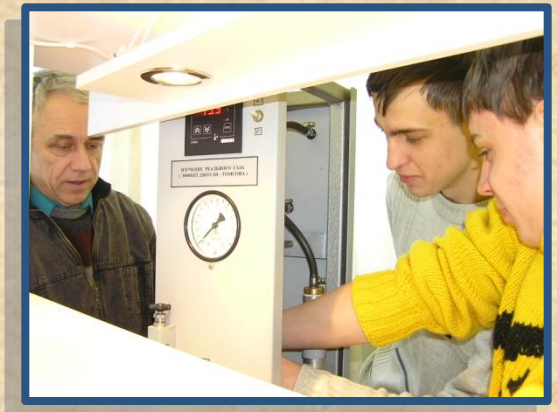
Poland – 24, Czech R. – 21, Russia – 17, Slovak R.- 10, South Africa – 6, Bulgaria – 2
Algeria – 1, Armenia – 1, Canada – 2, Germany – 1, Greece – 1, Mexico – 1, Sweden – 1, Turkey – 1, Ukraine – 1, USA – 1

http://fyzikus.fmph.uniba.sk/5summerschool/

UC infrastructure support and development

- All the fifth floor of Building 113 will be repaired at the beginning of September 2009 before new academic year.
- In cooperation with the Faculty of the Natural and Engineering Sciences of Dubna International University the University Centre will create the students laboratories for learning the nanotechnology fundamentals.
- We are searching the funds to equip the student laboratory by the scanning probe microscopes “NANOEDUCATOR”.





UC Infrastructure

Student Laboratories

- The Laboratories occupy 430 sq. meters on the fifth floor of Building 113, the Laboratory of Nuclear Problem's site of JINR.
- The Laboratories of Molecular Physics, Optics, and Atomic Physics have been created.
- The Laboratory of Nuclear Physics was organized, with the sponsor support of the Joint-Stock Financial Corporation "Sistema".
- We plan to create the Laboratories of Mechanics and Electricity.

NanoEducator

The scientific training complex with a set of learning aids, accessories for introducing students to nanotechnology and giving them a basic understanding of how work with objects at nanoscale level

3 scanning probe microscopes

NTI
NanoTechnology Instruments

Secondary school activities

- The UC will continue to organize acquaintance visits by school delegations from JINR member states.
- Jointly with CERN, the University Centre will be annually holding professional advancement courses for teachers of physics from the schools with advanced level of physics and mathematics. First event of this program will take place at CERN on November 1-7 and is supported by the grant of the Federal Agency in Science and Innovations.
- The University Centre will concentrate their efforts to advertise among school pupils the possibilities to get good education at JINR based departments and to start scientific carrier at JINR.

Visit of Polish school pupils and teachers to JINR

June 22 – July 2, 2009

Support of JINR's engineering and technical staff

One of the UC's functions is offering programmes of training specialists in the maintenance of the facilities that are supervised by the Russian Federation's Technical Inspection. This activity includes training and retraining JINR's engineering and technical staff.

Conclusion

- The Education Programme of the JINR University Centre should be developed in such a way to resolve the issue of providing the Institute with research, engineering, and technical staff coming from its member states.

- The UC's main aim is to provide conditions for a major growth in the number of students and postgraduates from JINR Member States attending the JINR-based programmes.

Thank you for your attention