

# UNIVERSITY CENTRE

## Practice in JINR Fields of Research

For several years, the JINR University Centre (the UC) has been holding Practices in JINR Fields of Research for students of JINR Member States. The Practices are the most important way of attracting youth to the Institute and a tool of disseminating information on the opportunities for studies and research work at JINR. In 2007, the list of the Practice participants was largely extended. Also, the following important changes were introduced into the Practice organization:

1. Practical work performed by the students with the Institute's research teams was given the research project status.

2. An electronic base was provided containing the project descriptions so that the Practice participants had been able to choose the research area that suited them best and get prepared in advance.

3. The final day of the Practice was allotted for its participants presenting reports on their work on the projects.

4. The Practice, which has been traditionally held in summer, was also provided in winter for South African students and postgraduates.

The 2007 **Summer Practice** was held on 24 June–22 July and consisted of two stages: the first one was attended by students from Poland (27 people), the Czech Republic (4) and Slovakia (3); the second one, by students from Romania (11), Bulgaria (4), and Belarus (3). Among the participants there also were three students from the Sakha Republic (Yakutia) within the Russian Federation.

The 2007 **Winter Practice** for South African students took place on 9–18 December 2007. It was participated by 23 students, postgraduates, and young specialists of seven universities and two major research organizations: the iThemba LABS cyclotron centre in Cape Town and the Nuclear Energy Corporation of South Africa (NECSA, Pretoria). During the rela-

tively short period of the Practice, the young South Africans attended lectures by JINR's leading specialists on the research carried out at the Institute's Laboratories and worked on individual study research projects with the scientific teams of the Laboratory of Neutron Physics (4 projects), Laboratory of Nuclear Reactions (4 projects), and Laboratory of Nuclear Problems (2 projects).

A special feature of the Winter Practice was that it included a special lecture programme for students and postgraduates specializing in theoretical physics. The Laboratory of Theoretical Physics offered intensive courses of few-body systems and astrophysics.

The participants of the Winter Practice for South African students highly appreciated their stay in Dubna and acquaintance with the Institute. They suggested that such practice should last at least three weeks.

## Organization of International Schools

The UC took part in the organization of the Fourth International Summer Student School on Nuclear Methods and Accelerators in Biology and Medicine, which was held on 8–19 July 2007 in Prague. On the Czech part, it was organized by the Institute of Experimental and Applied Physics (the Czech Technical University in Prague) and the Institute of Nuclear Physics (the Czech Academy of Sciences, Prague); the Polish organizer of the School was Adam Mickiewicz University (Poznan).

The School programme included lectures and student reports on nuclear physics, environmental and life sciences, charged particle accelerators, radiation therapy, radiation detectors, biomedical imaging, radiation biology, and trends in biology and other sciences. 22 lectures were given and 6 plenary reports were presented at the School. It was attended by 85 students of 18 countries, including the following

JINR Member States: Belarus, Cuba, the Czech Republic, Poland, Russia, Slovakia, and the Ukraine. The JINR delegation was the most numerous: it included 23 people, of whom 13 were graduate students of the JINR-based Departments and Departments cooperating with JINR, and JINR postgraduates and young scientists.

The necessary condition of attending the School was making an oral or a poster report; thus students made more than 50 ten-minute reports representing results of their research.

### JINR-Based Education Process

In 2007, the UC's own student enrolment and the students attending the JINR-based programmes numbered altogether about 600. Two thirds of them are students of higher education institutions located in Dubna. The JINR-based forms of studies are diverse, varying from a short practice to a full-scale study process at the Institute's Laboratories aimed at preparing diploma theses. On the basis of JINR, more than 150 Master's theses are prepared each year; about one third of them, by students of the JINR-based departments.

Keeping annual student enrolment large enough allows selection for the Institute of the most able of them. As a result, about 100 people have been employed at JINR over the past three years.

### JINR-Based Departments

By an enactment of the Rector of Moscow Institute of Physics and Technology (MIPT), its JINR-based department has been reorganized into the Department of Fundamental and Applied Issues of the Microworld Physics. The department has been headed by Prof. A. N. Sissakian. MIPT authorities have increased the new department's student enrolment and introduced two curricula — for theoretical and experimental spe-

cialties. The specialized training of theoretical physicists is coordinated by the UC in such a way that some of the UC-based courses given to theoretical students are simultaneously attended by students of MIPT and Dubna University.

At the Departments of Theoretical and Nuclear Physics, Dubna University, a Master's programme has been started for the fifth-year students. In 2007, on the grounds of recommendations and requirements by JINR-based departments, the following special courses were started in 2007: Theory of Nuclear Reactions (N. V. Antonenko); Group Theory (A. P. Isayev); Experimental Nuclear Physics (A. V. Kulikov); C++ (Yu. A. Nefyodov); Elementary Particle Physics (M. G. Sapozhnikov); Gravitation and Cosmology (D. V. Fursaev).

### JINR Postgraduate Studies

In 2007, JINR's total postgraduate enrolment was 72. Table 1 below shows the distribution of the UC postgraduates over the JINR Laboratories.

**Table 1**

Laboratory	Number of postgraduates in 2007
Laboratory of Theoretical Physics	22
Laboratory of Nuclear Problems	23
Laboratory of Nuclear Reactions	3
Laboratory of High Energies	6
Laboratory of Neutron Physics	6
Laboratory of Particle Physics	1
Laboratory of Information Technologies	10
Laboratory of Radiation Biology	1
Total	72

Table 2 shows the distribution of the postgraduates over the specialties.

**Table 2**

Specialty	Number of postgraduates in 2007
Nuclear and Elementary Particle Physics (01.04.16)	30
Theoretical Physics (01.04.02)	18
Charged Particle Beam Physics and Accelerator Techniques (01.04.20)	5
Condensed Matter Physics (01.04.07)	3
Instruments and Techniques of Experimental Physics (01.04.01)	3
Mathematical and Software Support of Computers, Computational Complexes, and Computer Systems (05.13.11)	1
Mathematical Modelling, Numerical Methods, and Software Complexes (05.13.18)	10
Radiobiology (03.00.01)	2
High Energy Physics (01.04.23)	—

The 2007 enrolment in the JINR postgraduate programmes was 26 — from Moscow State University (MSU), Moscow Institute of Physics and Technology (MIPT), Moscow Institute of Radio Engineering, Electronics, and Automatics (MIREEA), and many higher education institutions of JINR Member States (mostly Russian ones). In 2007, the number of JINR postgraduates coming from countries other than Russia was 14: Armenia (5), Belarus (3), the Ukraine (3), Uzbekistan (2), and Georgia (1).

The cooperation between the UC and the Philosophy Department for MSU's Natural Science Faculties (the Philosophy Faculty; Head of the Department: Prof. O.D. Volkogonova) has been developing. Beginning with the autumn semester, chapters of the course of the history and philosophy of science are given to the UC postgraduates by the Department's staff.

On 28 May 2007, an interdisciplinary seminar called «Constructing Reality in Science» was held at the UC. Along with the UC, its organizer was the Philosophy Department for MSU's Natural Science Faculties. Among the speakers were staff members of MSU, MIPT, Lebedev Institute of Physics (Russian Academy of Science), and JINR, as well as the UC postgraduates.

### **Secondary School Education**

In 2007, the UC continued to offer an advanced optional course of physics to pupils of the 10th and 11th years of Dubna-based secondary schools. The course consists of lectures and laboratory exercises.

On 25 June–1 July 2007, the Third Open Conference of the Moscow Region Secondary School Pupils on Modern Issues of Natural Sciences was held at the Ratmino holiday house. The Conference was arranged by the UC and the Foundation for Fundamental Physics Support. It was attended by 40 pupils of the 8th–10th years of study who came from Moscow, Dubna, and cities of the Moscow Region.

The Conference was arranged as a set of activities, including the pupils' own work on experimental projects, problem solving contests, team contests, popular lectures by leading scientists on modern issues of sciences, and an excursion to the Laboratory of High Energies, JINR. The Conference aim was to give prospective entrants to the higher education institutions an idea of modern physics research, to show them the advantages of being students of the JINR-based departments, and to select potential participants of the Program of Educating Prospective Scientists.

The JINR partners in organizing the Conference were Dubna University, the Tamm Theoretical Physics Section of the Lebedev Institute of Physics (Russian Academy of Sciences), and other education and re-

search organizations. The Conference was sponsored by the Sistema Joint Stock Finance Corporation and the Dynasty Foundation for Non-Commercial Programmes.

In 2007, JINR hosted traditional visits of acquaintance by foreign school pupils and university students. Those were school pupils from the Polish cities of Lodz, Leszno, Swinoujscie, and Tarnowskie Gory; a group of physics and chemistry students of the University of Twente (the Netherlands), senior pupils of the Kennedy German–American School (Berlin, Germany), and students of the University of Alberta (Edmonton, Canada).

### **Training and Retraining Working Staff**

On 29 October 2007, the UC got a license from the Ministry of Education of the Moscow Region for offering programmes of training specialists in maintenance of the facilities that are within the authority of the Federal Technical Inspection.

In 2007, the UC continued staff training and retraining and held courses of raising workers' and specialists' qualifications. As a result, two people employed at JINR are trained in a chosen specialty, and nine JINR staff members were trained in a second specialty.

58 JINR staff and 27 staff of other Dubna-based organizations completed the courses training specialists in maintenance of the facilities that are within the authority of the Federal Technical Inspection. 26 staff of the JINR Laboratory of Neutron Physics have been trained and certified to maintain machines, mechanisms, and facilities under pressure.

In 2007, 83 JINR authorities and specialists were certified by Territorial Certifying Commissions of the Federal Technical Inspection according to the legal regulations and normative technical documents setting the industrial safety standards in different areas. 134 JINR staff were trained at the JINR-based courses and certified at the JINR Central Certifying Commission. 20 JINR authorities and specialists were examined in industrial safety at the Atomenergoinstitute of Qualifications Raising, Moscow. Nine JINR staff raised their qualifications at seminars held by education institutions of Moscow, St. Petersburg, and Dubna.

In 2007, JINR provided on-the-job training for 43 students of Professional Lyceums 67 and 95 (Dubna), two students of a higher education institution and a technical college.

### **UC-Based Courses**

Since 2007, the UC-based courses of English are offered to JINR's young specialists. They are attended now by more than 50 people of different Laboratories. Classes are held twice a week; they are aimed at the

specialists being able to make reports and keep up scientific discussions in good English.

From November 2007 to February 2008, 78 JINR staff were attending the UC-based courses of mana-

ging industrial enterprises with the help of the 1C automated system Enterprise 8.0. Among the course participants were bookkeepers, economists, planners, and other JINR staff categories.