JINR Educational Programme

S.Z. Pakuliak, UC Director

International Student Practice at JINR
September 10, 2014
Joint Institute for Nuclear Research

JINR is an International Intergovernmental Organization located in Dubna, Russian Federation, about 120 km north of Moscow.
An agreement between RSA and JINR was signed on October 5, 2005 in Moscow.

One of the first projects supported by the RSA DST in the framework of this Agreement was the organization the student practices at JINR, which were organized already eight times starting from 2007.

Our main goal now is to create conditions for long-term placement programme for SA young scientists.
Practice 2007
December 9-18, 2007

23 students from 8 universities of the RSA came to Dubna for the Practice for the first time in December, 2007
Brief history of JINR Program

- 1956 – JINR is established
- 1961 – Moscow State University branch is organized in Dubna (D.I.Blokhintsev, V.I. Veksler and S.N.Vernov)
- 1991 – JINR University Centre is established
- 1995 – JINR’s PhD program is opened
- 1994 – Dubna International University (DIU) is founded
- 2003 – education program in physics is started at DIU
- 2004 – International Summer Practices are started
- 2014 – Summer Student Program at JINR is started
Main directions of UC activity

- Students, JINR-based departments
- JINR postgraduate programmes
- International education actions
- Secondary-school oriented activity
STUDENTS at JINR
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

Dubna International University
- Nuclear Physics
- Theoretical Physics
- Biophysics
- Distributed Computing Systems
- Nanotechnologies and New Materials
- Personal Electronics

Total number of students – about 450
“Nuclear physics, new materials and technologies” was opened on July 9, 2008 at the Gumilev Eurasian University on the basis of the DC-60 heavy ion cyclotron of Interdisciplinary Scientific Research Center.

During CP held in Astana on November 19, 2009 a four-side agreement between GEU, DIU, NNC and JINR regarding the training of bachelors and masters in nuclear physics was signed.
TRAINING PROGRAMS

• Lecture courses at JINR-based departments
• Training on the modern physical installations
• HEP data analysis training programs

LECTURE COURSES

• particle physics and quantum field theory – 24
• mathematical and statistical physics – 7
• condensed matter, physics of nanostructures and neutron physics – 16
• informational technologies – 8
• nuclear physics – 19
• physical equipments – 7
Last academic year there were 471 students from Russia – 87%, Belorussia – 1%, Ukraine – 3%, Republic of Kazakhstan – 8%, Moldova – 1%.
JINR PhD program
JINR postgraduate programmes

- Nuclear and Elementary Particle Physics;
- Theoretical Physics;
- Charged Particle Beam Physics and Accelerator Techniques;
- High Energy Physics;
- Solid State Physics;
- Physics Experiment Techniques, Instrument Physics, and Physics Research Automation;
- Computational Mathematics;
- Mathematical and Software Support of Computers, Computational Complexes, and Networks;
- Mathematical Simulation and Numerical Methods;
- Radiobiology.
STATISTICS OF JINR PhD STUDENTS 2011-2013

Distribution by the JINR Laboratories

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<th>BLTP</th>
<th>VBLHEP</th>
<th>DLNP</th>
<th>LIT</th>
<th>FLNR</th>
<th>FLNP</th>
<th>LRB</th>
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<td>2013</td>
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<td>2012</td>
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<td>2011</td>
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<td>15</td>
<td>11</td>
<td>9</td>
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<td>2</td>
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</table>
During 2014 36 PhD students from Russia, Armenia, Belorussia, Kazakhstan, Germany, Moldova and Ukraine
International Student Practices at JINR
International student practice 2014

May 18 – June 8: Arabic Republic of Egypt (24 participants)
July 6 - 27: Czech Republic, Poland, Bulgaria, Slovak Republic, Romania (69 participants)
September 8 – 24: South Africa, Belorussia, Serbia (45 participants)

During the Practice students work on small research-educational projects
Goals of the Practice

- to give an idea about JINR fields of research
- to get to be acquainted with JINR research teams
- to work on student-research projects at JINR facilities
- to learn new facts in different sciences
- to attract students from different countries to start a scientific career at JINR
Projects and their description

Bogoliubov Laboratory of Theoretical Physics (BLTP)

Nanostructures and nanoscale phenomena

- Topological defects
  - K. Osipov, P. Korolev

- Carbon nanostructures
  - V. Osipov, O. Kuznetsov, V. Dalkov

- Josephson nanojunctions
  - Yu.M. Shukrinov

- Biophysics
  - K. Osipov, O. Kuznetsov

- Quasicrystals, glasses, amorphous solids
  - Yu.M. Shukrinov

- Computer simulation of tunneling characteristics of superconducting nanostructures
  - Yu.M. Shukrinov

Dzhelelov Laboratory of Nuclear Problems (DLNP)

- Comparative PCR assay of the intragenic DNA lesions induced by γ-rays and fission neutrons in Drosophila melanogaster
  - I.O. Abramov

- Cosmic ray study using Air Shower Time coincidence Arrays
  - S.A. Charkov, E.A. Demidov, A.E. Zherchenkov

News

- 02.11.2010
  - The Scientific school for teachers of
Study of the transfer and fragmentation reactions near Fermi energy and the production of exotic nuclei beams in the reaction

J. Geyer (Stellenbosch University)
A. Morrison (University of Cape Town)

Nucleus-Nucleus Collision Centrality Determination For NICA/MPD. ZDC Resolution

A. Sehone (Stellenbosch University)
His Excellency, Ambassador Extraordinary and Plenipotentiary of the Arab Republic of Egypt in the Russian Federation appeals to students from Egypt with a welcoming speech and award certificates of completion the Practice at JINR.
Visit of Prof. Dr. Nadia Iskandar Zakhary
Minister of Scientific Research and Technology of ARE in 2013
Daphney Singo, a PhD student of Stellenbosch University:

"It is the second time that I have participated in such Practice. I specialize in neutron nuclear physics, but this time I have been involved in condensed matter research with neutrons under the supervision by Dr. Alexander Kuklin. I am very much satisfied; I am really impressed by the opportunities the IBR-2 reactor offers for this kind of research."
Purpose and Implementation of the Program

Program Purpose
The main purpose of the Summer Student Program at JINR is to attract graduate students from the JINR Member States on a competitive basis to the Institute scientific groups that implement the main JINR research projects.

Program Dates
The Summer Student Program at JINR will be organized in the form of student research projects in the scientific groups and will last from 6 to 8 weeks during the period from June to September of each calendar year.

Program Participants
Participants of the Program may be students finishing third (penultimate) year of bachelor studies, master students or PhD students enrolled in the first year of graduate school, studying at universities and research organizations of the JINR Member States.

Application Procedure
To participate in the selection competition one has to:

• register at the web-page of the Program indicating all necessary contact information;
• fill in the application form in the section "SUMMER PROGRAM - 20**" to participate in the Program of year 20**.
### List of Participants

<table>
<thead>
<tr>
<th>Name</th>
<th>Nationality</th>
<th>Education</th>
<th>Year of study</th>
<th>Image</th>
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</thead>
</table>
| Abbas Elhad Gamal     | Egypt       | Ain Shamsa University  
Physics department  
Prof. Abdal Nasser Tewfik  
heavy ion collisions physics                                          | 1st year of PhD |       |
| Bielski Rafal         | Poland      | AGH University of Science and Technology  
Faculty of Physics and Applied Computer Science  
Department of Particle Interactions and Detection Techniques  
Experimental Particle Physics                                      | 5th year of study |       |
| Brazewić Sabina       | Poland      | Adam Mickiewicz University in Poznań  
Department of Physics  
Quantum Electronics  
Medical Physics                                                        | 4th year of study |       |
| Kuczynska Marlena Mitłak | Poland      | AGH University of Science and Technology  
Faculty of Physics and Applied Computer Science  
Department of Particle Interactions and Detection Techniques  
front-end electronics for radiation detectors and instrumentation of particle physics experiments | 5th year of study |       |
| Leyva Pemia Diana     | Cuba        | Center of Applied Technologies and Nuclear Development (CEADEN)  
Physics Department  
Detectors and Radiation Damage Laboratory  
Development, characterization and simulation of multipurpose radiation detectors | 1st year of PhD  |       |
| Tichy Pavel           | Czech_Republic | Czech Technical University in Prague - Faculty of Nuclear Sciences and Physical Engineering  
Department of Nuclear Reactors  
Nuclear Physics Institute, Academy of Sciences of the Czech Republic - Department of Nuclear Spinecroscope  
Transmutation of spent nuclear fuel, ADTT, simulations of sub-critical systems in MGNPX | 1st year of PhD |       |
| Kalinin Georgiy Viktorovich | Russia | ФГБОУ ВПО «Воронежский Государственный Университет»  
Химический  
Кафедра математики и индустрии наносистем нанометропелен  | 8th year of study |       |
| Tarhkov Andrei Evgeniev | Russia      | MGU im. M.V. Lomonosova  
Fizicheskiy  
Obshchey fiziki i kolektsionnykh processov  
Radiofizika      | 4th year of study |       |
Infrastructure to train engineer-physicists

• To create training and engineering department at UC
• This department has to develop regular training programs on real "training" facilities
• These programs can be offered to the Member States and can be used in organizing International Student Practices and the Summer Student Program
Outreach programs
TEACHER’S PROGRAM

http://teachers.jinr.ru/

- First school held in 2009
- Five schools at CERN (193 part.)
- Five schools at JINR (210 part.)

- More than 25 videoconferences between CERN-JINR and schools
- Increasing of motivated students
Виртуальная академия физики высоких энергий для школьников и учителей

Окончание регистрации на школу в ОИЯИ
25.05.2014 00:00
38
Дн
05 час 35 мин 48 сек
Страница школы

Имя пользователя

Запомнить меня

Войти

- Напомнить логин/пароль
- Зарегистрироваться

Сайт «Виртуальная академия физики высоких энергий» создается Учебно-научным центром Объединенного института ядерных исследований для презентации и сопровождения научно-образовательных программ ОИЯИ, нацеленных на школьников и школьных учителей из стран-участниц Института.

К работе сайта приглашаются школьные учителя и ученики старших классов, которым интересно узнать о достижениях современной физики от современных исследователей, работающих в ОИЯИ, CERN и других научных центрах, где проводятся исследования по ядерной физике и физике высоких энергий.

На сайте будут открыты разделы для участников научных школ учителей физики, организуемых Учебно-научным центром ОИЯИ в сотрудничестве с Европейской организацией ядерных исследований (CERN). К участию в этих школах будут в первую очередь приглашаться те учителя, кто станет активным участником этого сетевого ресурса. На сайте будут собираться и храниться информация о видеоконференциях между школами стран-участниц ОИЯИ и учеными из международных научно-исследовательских организаций.

На сайте заработает новостная лента, в которой на популярном уровне будут сообщаться о физических явлениях и открытых, возникающих на исследовательских установках большого адронного коллайдера и базовых установках ОИЯИ.

Одна из главных задач сайта - стать специализированной социальной сетью, площадкой для общения школьных учителей, которым интересно донести до своих учеников информацию о том, что такое современная физика. Попетители сайта смогут высказывать свое мнение в обсуждении их на форуме сайта, обмениваться новыми учебно-методическими материалами и т.д.

Функционал и разработка этого интернет-портала должна обеспечивать выполнение указанных выше задач и быть способной к модернизации под новые задачи, которые могут возникнуть в процессе общения пользователей сайта. Поэтому разработчики этого ресурса будут приветствовать любые конструктивные замечания и предложения по улучшению работы сайта и его функционала.

Группа разработчиков сайта «Виртуальная академия физики высоких энергий»
Lecture by Dmitri Gorbunov, "Cosmology – secret of dark matter" was downloaded 1655 times
Laboratory practical work at UC
Virtual excursions to JINR Labs
Nuclear Knowledge Base
http://nrv.jinr.ru/

<table>
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<tr>
<th>Nuclear Properties</th>
<th>Nuclear Models</th>
<th>Nuclear Decays</th>
<th>Nuclear Reactions</th>
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<tr>
<td></td>
<td>Shell Model</td>
<td>Alpha-decay</td>
<td>Elastic scattering</td>
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<td>Liquid Drop Model</td>
<td>Beta-decay</td>
<td>Classical</td>
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<td>Two-Center Shell Model</td>
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<td>Semi-classical</td>
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<td>Decay of excited nuclei</td>
<td>Break-up reactions</td>
<td>Direct process (DWIA)</td>
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<td>Channel Coupling</td>
<td>3-body classical model</td>
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<td>Two-nucleon transfer</td>
<td>Massive transfer</td>
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<td>Fusion</td>
<td>Empirical model</td>
<td>Sequential decay</td>
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<td>Driving potentials</td>
<td>Synthesis of SHF (movie)</td>
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<td>Evaporation residues</td>
<td>Monte Carlo</td>
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<td>Pre-equilibrium LP formation</td>
<td>4-body classical model</td>
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<td>Kinematics:</td>
<td>2-body / 3-body / Q-values</td>
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All resources of the NRV Knowledge Base are free to use. We, nevertheless, need a support of our project by official establishment for further development of it. New models of nuclear dynamics and much more experimental data on nuclear reactions have to be included.

If you get useful results, please, quote the NRV in your papers and talks. In case of elastic scattering, for example, appropriate reference could be V.I. Zagrebin et al., Ot code of NRV, http://nrv.jinr.ru/nrv/, and so on.
Contacts

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