

Educational Programs of the JINR University Center

UC Director

Pakuliak S.Z.

BRAZIL-JINR FORUM

**“Frontiers in Nuclear, Elementary Particle, and
Condensed Matter Physics ”**

June 19, 2015

Brief history of JINR Educational Programs

- 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 Students Program at JINR is started



Main directions of the UC activity

- ✧ Students at JINR
- ✧ JINR PhD Studies
- ✧ International practices and schools
- ✧ Outreach activity (school teachers at JINR)



New Development

- ✦ Start of the Summer student program at JINR in 2014
- ✦ Realization of the project “Development of modern education programmes”
- ✦ Creation of the infrastructure to train engineer-physicists

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 Engineering Physics Institute

- Experimental methods of nuclear physics

Dubna International University

- Nuclear Physics
- Theoretical Physics
- Biophysics
- Distributed Computing Systems
- Nanotechnologies and New Materials
- Personal Electronics
- Electronics for Physics Research Installations

JINR Students statistics of last years

Universities	11/12	12/13	13/14	14/15
MPhTI	36	31	23	29
MSU	23	34	23	21
MSTU MIREA	56	19	27	0
NRNU MEPhI	3	6	6	4
Dubna IU	261	253	264	291
Other Universities	121	108	58	31
Total	500	451	401	376

Distribution of students over JINR Laboratories

DLNP	BLTP	FLNR	FLNP	VBLHEP	LIT	LRB	Admin
54	84	83	37	78	13	25	2

TRAINING PROGRAMS

- Lecture courses at JINR-based departments
- Training on the modern physical installations
- HEP data analysis and engineering 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



University Centre

- General information
- News
- International cooperation
- Events
- The JINR Postgraduate Studies
- For secondary school pupils and teachers
- JINR UC study projects and laboratories
- Department of Development and Implementation of Educational Programmes
- UC Scientific-engineering group
- Opportunities for students

General information

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- › [Schools for students, postgraduates and young scientists in JINR Laboratories](#)
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Courses offered in the academic year 2014 - 2015

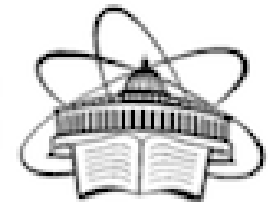
- [Particle Physics and Quantum Field Theory](#)
- [Mathematical and Statistical Physics](#)
- [Condensed Matters, Nanostructure Physics, and Neutron Physics](#)
- [Nuclear Physics](#)
- [Physics Research Facilities](#)
- [Information Technologies](#)
- [Projects and their description](#)



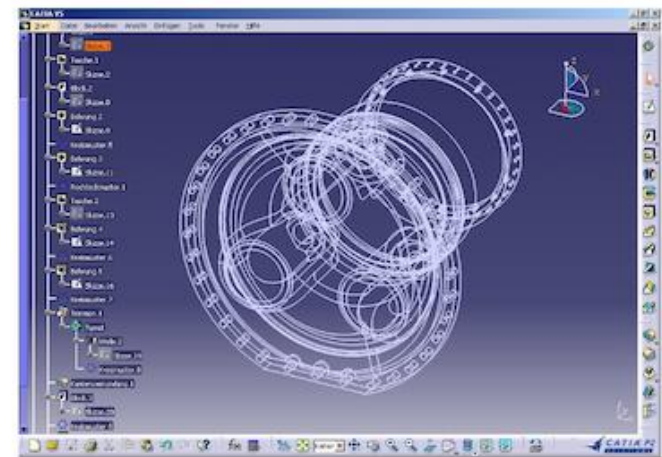
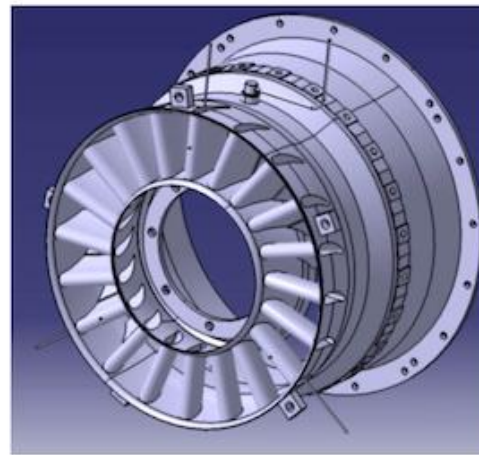
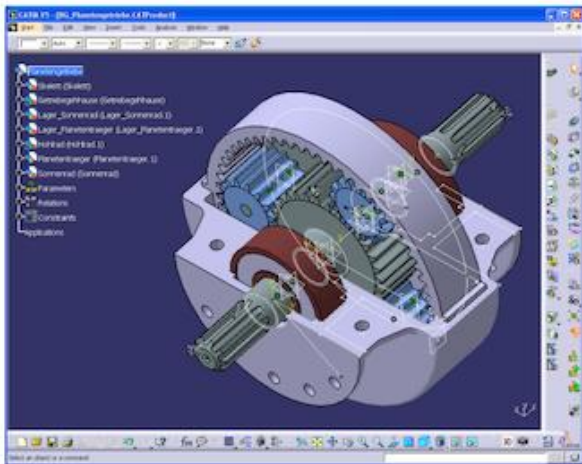
Training course in CATIA-GDML Geometry Builder



Учебно-научный
центр ОИЯИ



This training was organized in collaboration with Research Center FAIR-Russia of the Facility for Antiproton and Ion Research in Europe GmbH

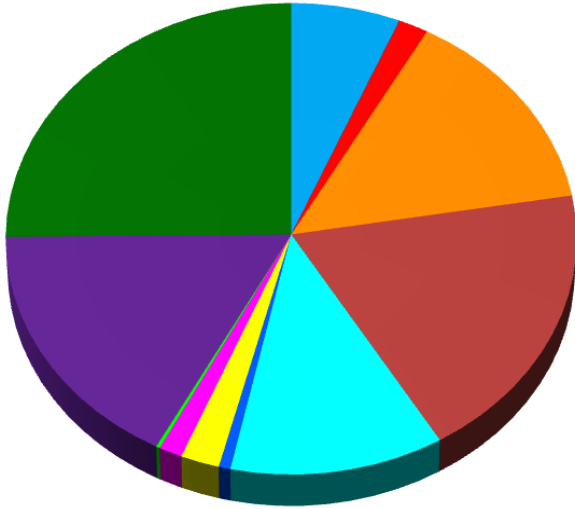


Provision of training postgraduate students from the Member States

- according to new Law on Education in RF PhD studies becomes third level of the higher education system
- for PhD students from JINR Member States we propose the system of dual postgraduate studies

International Student Practice (ISP) at JINR

- Belarus
- Bulgaria
- Arab Republic of Egypt
- Poland
- Romania
- Serbia
- Slovak Republic
- Ukraine
- France
- Czech Republic
- South Africa



Research-Educational Projects at ISP

@ <http://uc.jinr.ru/>

▶ [Всемирно известные ученые в ОИЯИ](#)

▶ [Контакты](#)

▶ [О Дубне](#)

Новости

[29.03.2012](#)

С 26 по 28 марта 2012 года для 18 школьников из Ставропольского края была организована ознакомительная экскурсия в Объединенный институт ядерных исследований и Международный университет «Дубна»



Frank Laboratory of Neutron Physics (FLNP)

[M.-L. Craus](#), [N. Cornei](#) [Transport phenomena and magnetic/crystalline structure of manganites](#)

[N.V. Bazhazhina](#) [Non-destructive analysis of element and isotope composition by neutron spectroscopy methods](#)

[M.V. Frontasyeva](#) [Neutron Activation Analysis for Life Sciences](#)

[T.I. Ivankina](#) [Comparative quantitative analysis of quartz textures in monomineral and multiphase rocks using neutron diffraction at IBR-2, Joint Institute for Nuclear Research Dubna \(Russia\)](#)

[A. Kobzev](#) [Ion Beam Analysis](#)

[A.I. Kuklin](#) [Determination of nanoparticles structure parameters using small angle neutron scattering](#)

[A.I. Kuklin](#) [Small angle neutron scattering \(SANS\) team](#)

[Y. Nikitenko](#) [Studying nanostructure magnetism with the use of polarized neutron reflectometry](#)

Veksler and Baldin Laboratory of High Energy Physics (VBLHEP)

[E. Kokoulina](#), [V. Nikitin](#) [Puzzles of multiplicity](#)

[E. Kokoulina](#), [V. Nikitin](#) [Soft photons at U-70 and Nuclotron](#)

[P. Zarubin](#) [The BECQUEREL Project for Juniors](#)

Flerov Laboratory of Nuclear Reactions (FLNR)

[A. Artyukh](#) [Study of the transfer and fragmentation reactions near Fermi energy. Production of exotic nuclei beams](#)

[O. Orelovitch](#) [Scanning electron microscopy methods in study of micro objects](#)

International Student Practice (ISP) at JINR in 2014

May 18 – June 8: Arabic Republic of Egypt (24 participants)

**July 06 - 27: Czech Republic, Poland, Bulgaria,
Slovak Republic, Romania (70 participants)**

**September 8 – 24: South Africa, Belorussia, Serbia
(45 participants)**



Statistics of 1st (May-June), 2nd (July) and 3rd (September) stages

	2009	2010	2011	2012	2013	2014	2015	Total
Egypt	16	15	20	15	20	24	26	136

	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	Total
Azerbaijan	-	-	-	-	-	-	-	-	-	-	-	4	4
Bulgaria	4	1	-	4	1	-	4	1	3	3	2	2	25
The Czech Republic	9	13	16	4	21	13	22	24	20	21	23	23	209
Poland	11	8	21	27	26	22	21	24	21	20	22	20	243
Romania	4	7	10	11	7	12	11	16	16	14	13	16	137
Slovakia	4	6	8	3	8	-	4	4	2	9	10	10	68
Total	32	35	55	49	63	47	62	69	62	67	70	75	686

	2007	2008	2009	2010	2011	2012	2013	2014	Total
RSA	23	21	23	29	31	33	26	33	219
Belarus	-	-	-	9	12	8	10	8	47
Serbia	-	-	1	1	1	-	-	4	7
Total	23	21	24	39	44	41	36	45	273

32 → **24+70+45=139**

136+686+273=1095

Egyptian Ministry of Science opened the Practice in 2013



Website of the Summer Student Program

<http://students.jinr.ru/>

Summer Student Program

at Joint Institute for Nuclear Research



HOME

SUMMER PROGRAM - 2014

ABOUT JINR

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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**.

Summer Student Program 2014

List of Participants

Total number of participants: 8

Name/Nationality ▲	Education ▲	Year of study	Image ◊
Abbas Ehab Gamal Egypt	Ain shams university Physics department Prof. Abdel nasser Tawfik heavy ion collisions physics Report: Baryon stopping at heavy ion collisions	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 Report: Data processing and particle track reconstruction for a hexagonal wire chamber for the MPD testbeam	5th year of study	
Brazevič Sabina Poland	Adam Mickiewicz University in Poznań Department of Physics Quantum Electronics Medical Physics Report: Superconducting gantry systems in modern hadron therapy	4th year of study	
Kuczynska Manka Matylda 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 Report: ADC 64 channel Low Pass Filter PCB designing.	5th year of study	
Leyva Pernia 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 Not yet submitted	1st year of PhD	
Tichý 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 Spectroscopy Transmutation of spent nuclear fuel, ADTT, simulations of sub-critical systems in MCNPX Report: Monte Carlo efficiency calculations for N-type high-purity germanium detector	1st year of PhD	
Калинин Георгий Викторович Russia	ФГБОУ ВПО «Воронежский Государственный Университет» Химический Кафедра материаловедения и индустрии наноматериалов Not approved by adviser Not approved by organisers	5th year of study	
Тархов Андрей Евгеньевич Russia	МГУ им. М.В. Ломоносова Физический Общей физики и волновых процессов Радиофизика Report: Numerical Modelling of 3D Seismic Problems in Homogeneous Media Using CUDA-technology	4th year of study	

In 2014 we got 30 applications from 9 JINR Member States. 8 students were selected. Their reports are available at the program website

In 2015 we got 127 applications and 34 students from 11 Member States were selected

Summer Student Program 2015

Summer Student Program

at Joint Institute for Nuclear Research



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SUMMER PROGRAM - 2015

SUMMER PROGRAM - 2014

ABOUT JINR

PARTICIPANTS

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SUMMER PROGRAM - 2015

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
▾ Add news article

Participants >

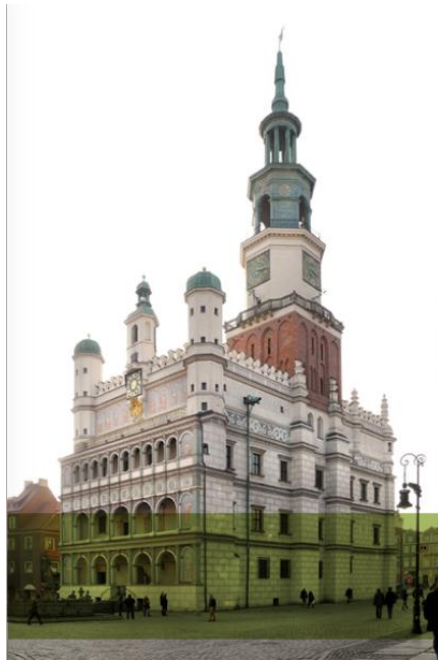
Apply >

Applications >

Participants lists

Photo	Name / Nationality / University	Supervisor
Летняя студенческая программа в ОИЯИ - 2015		
	Gaga Shamili Shetekauri Georgia Tbilisi State university	Marina Vladimirovna Frontasyeva
	Кирилл Виленинович Локтаев Russia Обнинский институт атомной энергетики ИАТЭ НИЯУ МИФИ	Максим Викторович Булавин
	Ibrahim Mohamed Hany Ahmed Egypt Nuclear & Radiation Engineering Department, Faculty of Engineering, Alexandria University	Georgiy Alexandrovich Chelkov
	Тигран Рафаелович Мурадян Armenia Ереванский государственный университет архитектуры и строительства	Анатолий Олегович Сидорин
	Анастасия Олеговна Мерзлая Russia Федеральное государственное бюджетное образовательное учреждение высшего профессионального образования «Санкт-Петербургский государственный университет»	Vyacheslav Mikhailovich Golovatyuk
	Christiaan Petrus Brits Republic of South Africa Stellenbosch University	Vyacheslav Mikhailovich Golovatyuk
	Сергей Васильевич Фёдоров Russia Омский Государственный Университет им. Ф.М. Достоевского	Alexander Vladimirovich Karpov

International summer schools



Seventh International Student Summer School on
Nuclear Physics – Science and Applications
(NUCPHYS-SC&APPL)



DUBNA



UAM
ADAM MICKIEWICZ
UNIVERSITY
IN POZNAŃ



Faculty of Physics Adam Mickiewicz University in Poznań
Poznań, Poland, June 24 – July 4, 2015

<http://7nucphys-2015.home.amu.edu.pl/>



Teacher Programs

<http://teachers.jinr.ru/>

- * First school held in 2009
- * Seven schools at CERN (260 part.)
- * Five schools at JINR (210 part.)



- * More than 25 videoconferences between CERN-JINR and schools
- * Increasing of motivated students



VIDEO-CONFERENCES



Virtual excursions to JINR Labs



General information

- [Regulations of the JINR University Center](#)
- [UC staff](#)
- [FAQ](#)

JINR Basic Facilities

Virtual excursions to the JINR basic facilities:
 Laboratory of High Energy Physics
 Laboratory of Neutron Physics: [IBR-2](#), [IREN](#)
 Laboratory of Nuclear Reactions
 Laboratory of Nuclear Problems
 Laboratory of Information Technologies



Project «Development of modern educational programs»

The goal of the project is to include current scientific data into the educational process, conduct virtual and online laboratory research based on information and communication technologies using modern scientific equipment and data obtained from the existing physical facilities

Project was presented and approved on the 38th session of PAC on CMP and 114th session of JINR Scientific Council

Virtual Laboratory of Nuclear Fission

Virtual Laboratory of Nuclear Fission



science
& technology
Department:
Science and Technology
REPUBLIC OF SOUTH AFRICA



Virtual Laboratory of Nuclear Fission



The goal of the project is to include current scientific data into the educational process, to conduct virtual and online laboratory research based on information and communication technologies using modern scientific equipment and data obtained from the existing physical facilities.



ОБЪЕДИНЕННЫЙ ИНСТИТУТ
ЯДЕРНЫХ ИССЛЕДОВАНИЙ



science
& technology

Department:
Science and Technology
REPUBLIC OF SOUTH AFRICA

Introduction

Theory

Experimental setup

Electronics and data acquisition

Data analysis

Virtual Laboratory of Nuclear Fission

Virtual Laboratory of Nuclear Fission

α - decay

β - decay

γ - decay

fission

fusion

Radioactivity

Induced nuclear fission

Spontaneous nuclear fission

Tests

References

Introduction **Theory** **Experimental setup** **Electronics and data acquisition** **Data analysis**

UNIVERSITY OF KWAZULU-NATAL
DEPARTMENT OF SCIENCE AND TECHNOLOGY
SCHOOL OF PHYSICAL SCIENCES

UNIVERSITY OF WITWATERSRAND
SCHOOL OF CHEMISTRY

DEPARTMENT OF SCIENCE AND TECHNOLOGY
REPUBLIC OF SOUTH AFRICA

Virtual Laboratory of Nuclear Fission

<http://newuc.jinr.ru/section.asp?id=553>

Virtual Laboratory of Nuclear Fission

PIN1 MCP2 MCPD MCP1 PIN2

Block scheme

CAMAC modules

LabView practicum

References

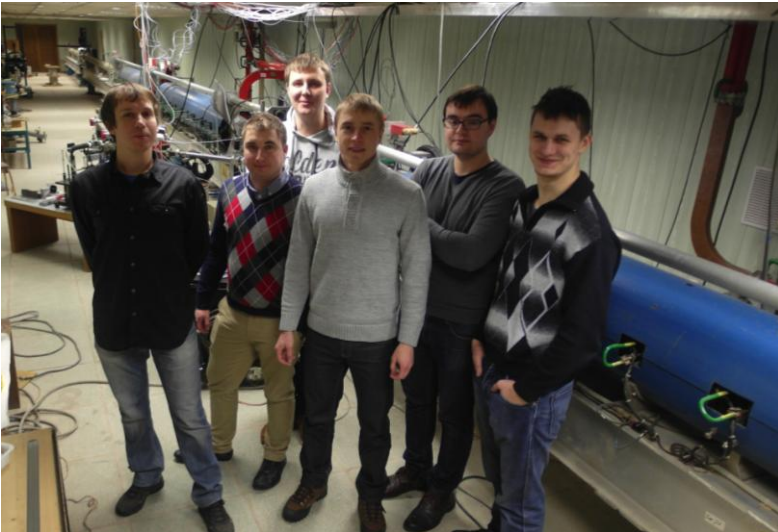
LabView practicum [use right computer]

Introduction Theory Experimental setup **Electronics and data acquisition** Data analysis

science & technology
Department: Science and Technology
REPUBLIC OF SOUTH AFRICA

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



THANK YOU FOR YOUR
ATTENTION