



JINR

Human Resource Development

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Outline

International Student Practice

Summer Student Programme

JINR outreach programmes

Science brings nations together

RSA-JINR Agreement

October 5, 2005, Moscow



One of the first projects supported in the framework of this Agreement was the organization of student practices at JINR

The 1st Practice for South African students

December 9 – 18, 2007



23 students from 8 universities of the RSA came to Dubna

The 2nd Practice

September 22 – October 10, 2008



International Student Practice at JINR



1st STAGE, May

South Africa



2nd STAGE, July

Bulgaria, Czech Republic, Slovakia,
Poland, Romania, Azerbaijan



3rd STAGE, September

Egypt, Belarus, Cuba, Serbia

Main goals

- Train students that can advance in the various nuclear research activities offered by JINR, to the benefit of the JINR Member States
- Integrate young scientists into the international scientific community



JINR provides



- World-class scientific research
- Wide range of research areas
- Qualified supervision
- Fruitful contacts
- International collaboration
- Variety of training programmes
- Unique location (Dubna)

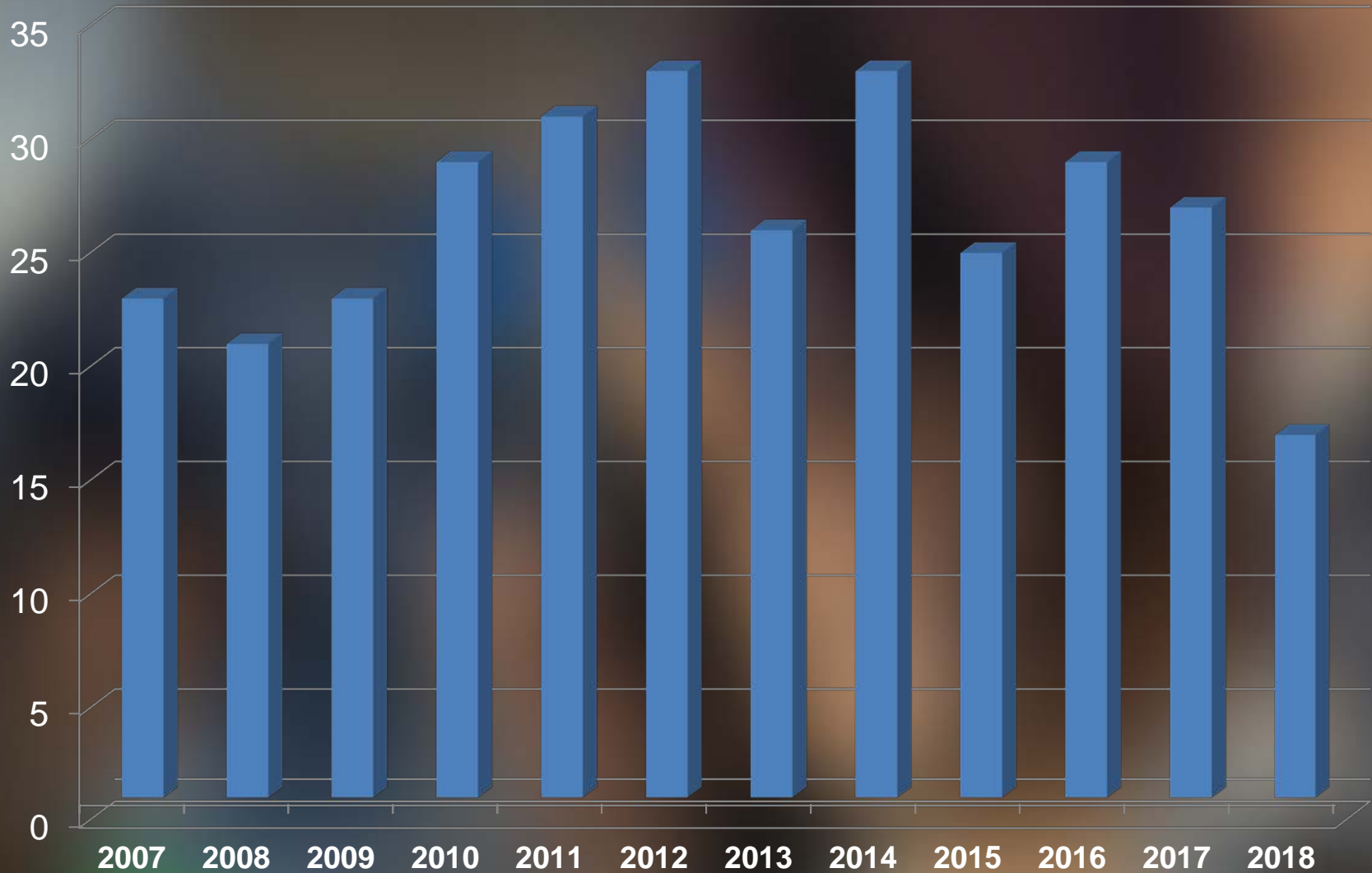
JINR fields of research

- Theoretical physics
- Particle physics
- Relativistic nuclear physics
- Heavy ion physics
- Low and intermediate energy physics
- Nuclear neutron physics
- Condensed matter physics
- Radiation biology and radiobiological investigation
- Information technologies
and modern computational techniques

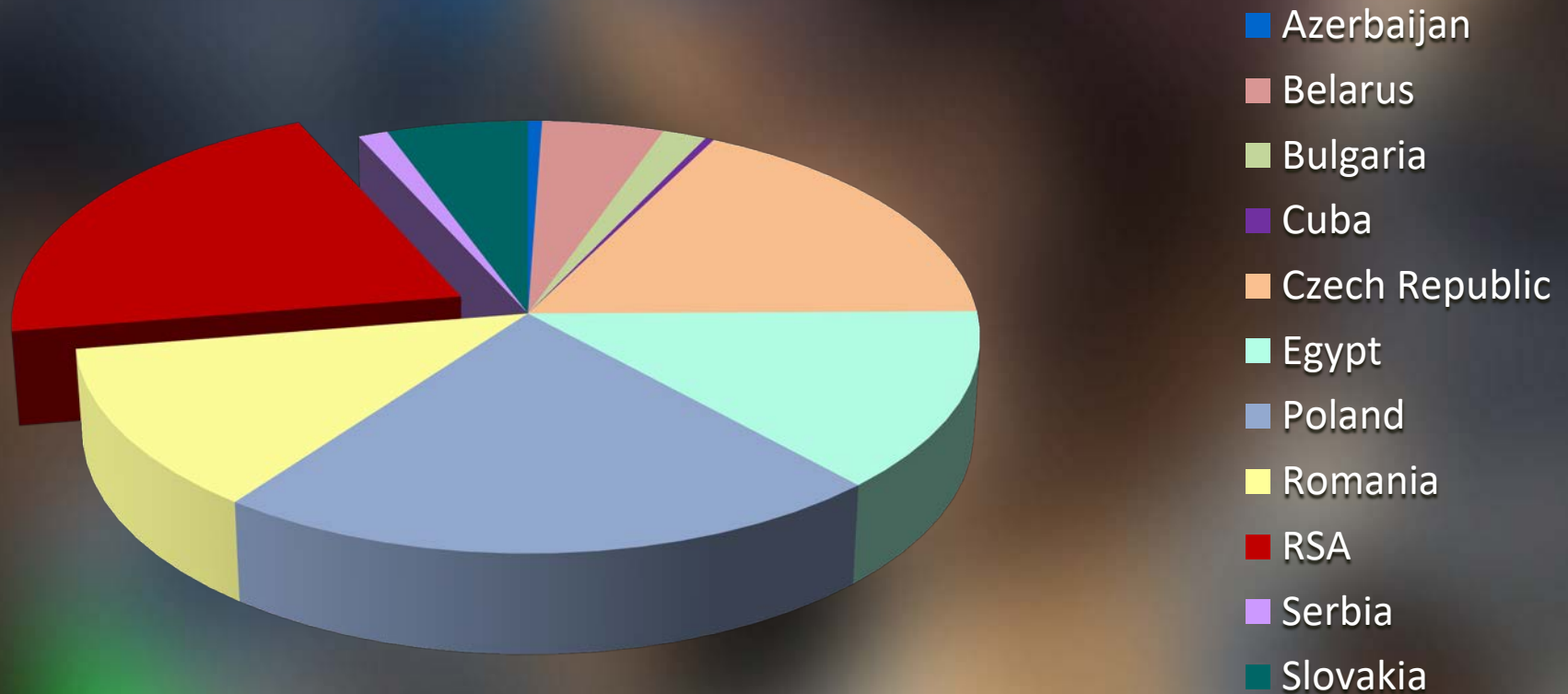


Attracting YOUth
to Science

Number of students from RSA by year



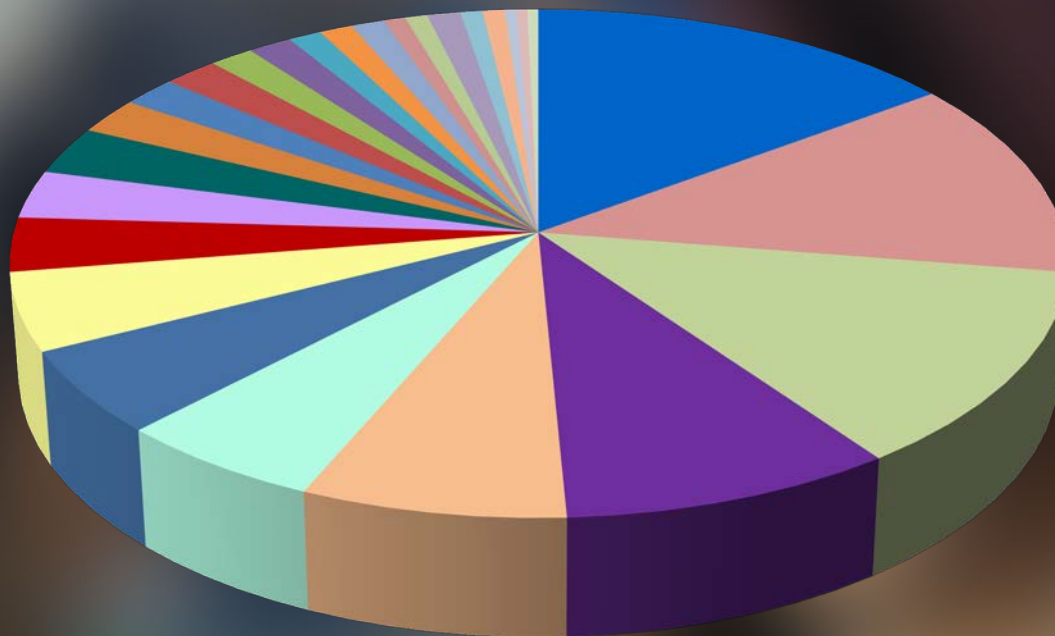
Practice participants representation



Total number of participants since 2004 – **1442**

Total number of participants from RSA since 2007 – **300 + 17 in 2018**

RSA representation by universities



- University of Western Cape
- Stellenbosch University
- University of Fort Hare
- Walter Sisulu University
- University of Pretoria
- University of Cape Town
- North-West University
- University of South Africa
- University of Venda
- iThemba LABS/UWC
- University of Zululand
- University of the Free State
- University of Johannesburg
- NECSA
- University of Limpopo
- Nelson Mandela Metropolitan University
- Sefako Makgatho Health Sciences University
- South African Nuclear Energy Corporation
- Council for Scientific and Industrial Research
- University of KwaZulu-Natal
- Military Academy
- University of The Witwatersrand
- Tshwane University of Technology
- Vaal University of Technology
- Cape Peninsula University of Technology
- ARC
- SABS

International Student Practice activities

3 weeks

- Introductory lectures
- Visits to the labs
- Work on the projects in international scientific groups
- Final presentation of the projects
- Cultural programme



Introductory lectures





Visits to the JINR labs





Work on the projects

Work on the projects



Work on the projects





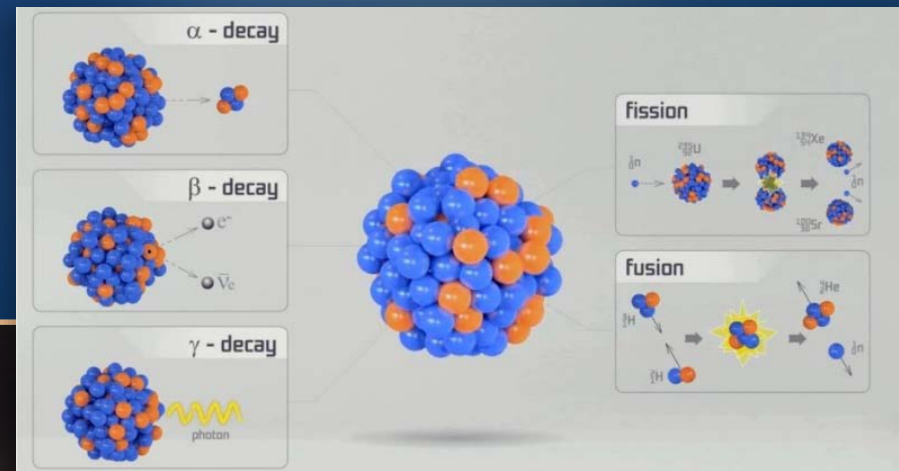
Work on the projects

Work on the projects



Virtual Laboratory of Nuclear Fission

- Theory
- Experiment
- Electronics
- Data acquisition system
- Data analysis

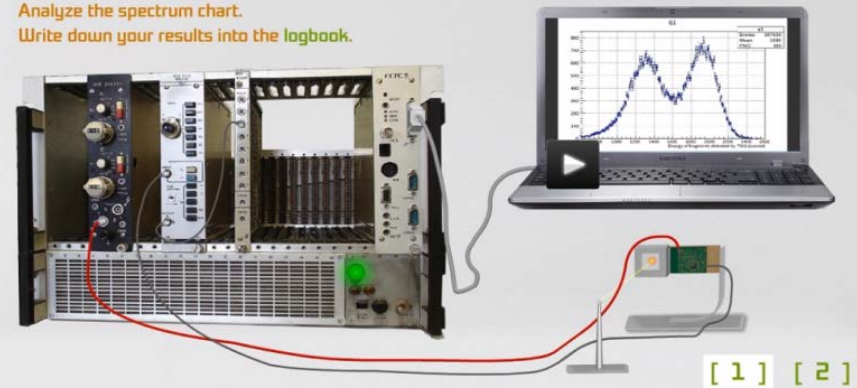


The study of the spectrum of fission fragments

There are the structural elements of the experimental setup. Assemble the experimental setup out of structural elements and analyze the obtained data.

Analyze the spectrum chart.

Write down your results into the logbook.

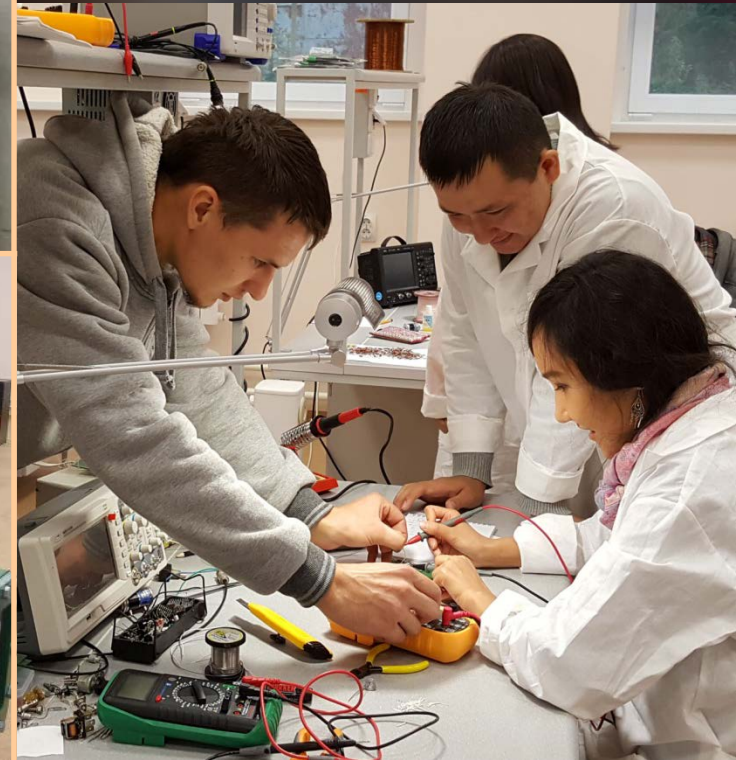


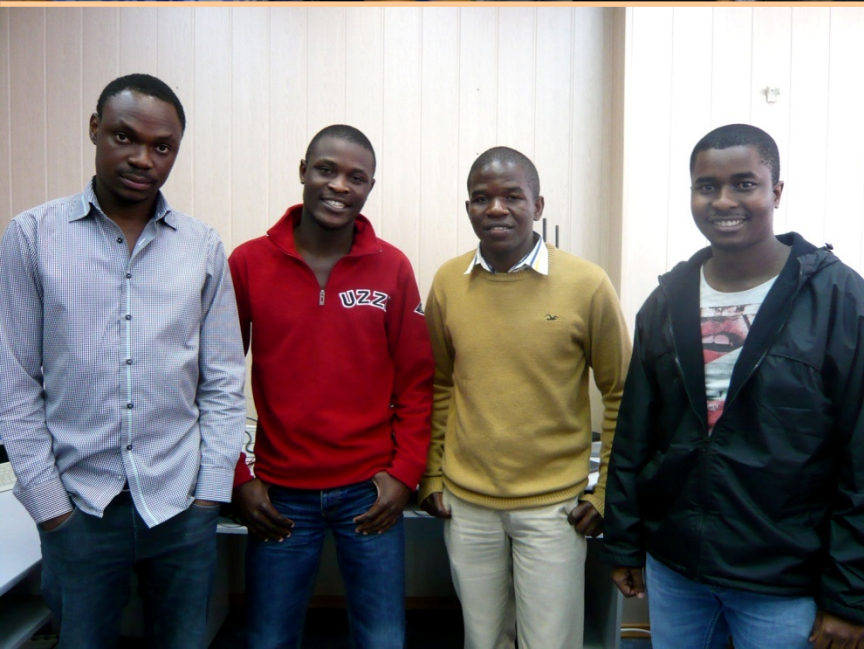
Hands-on labworks for engineers



Linac-200 at JINR

- Basics of nuclear physics
- Radiation protection and safety
- Particle detectors
- Vacuum technology
- Radio frequency technology
- Magnets
- Electronics and automation







Final project presentation

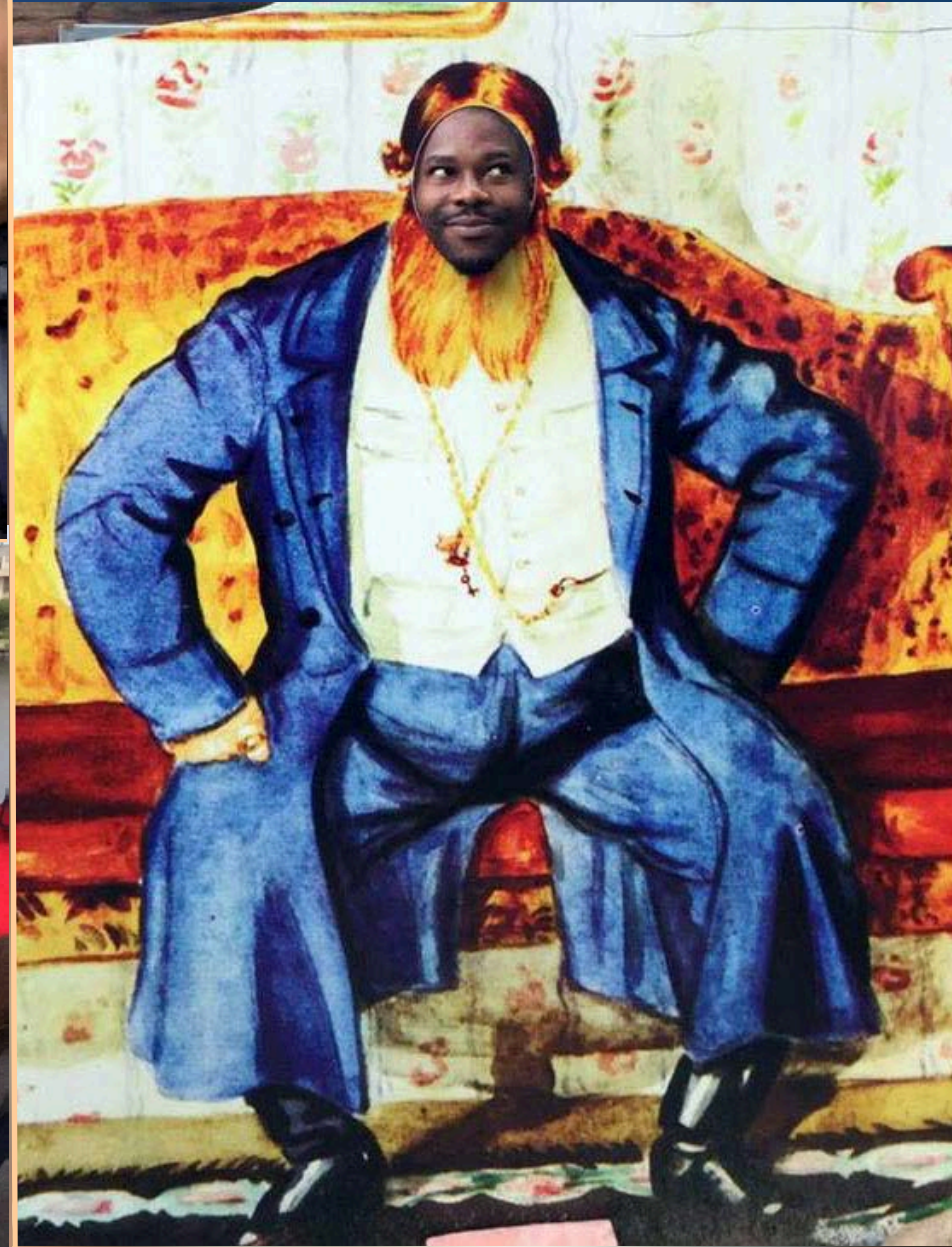




Social events



Cultural programme



Feedback



All goals were achieved, new friends were made, Russia was our new SA. As they say knowledge is power. I agree... We represented our country very well.



...it has been a great pleasure having to spend some quality time in Russia (Dubna) with scientists from all over the World: Cuba, Serbia, Belarus, Egypt and South Africa. We had so much fun together and learned a lot from each other and hopefully our relationship will not end here.



What's next?



Summer Student Programme

Launched in 2014

Programme

- Work in international scientific groups
- Duration 6 – 8 weeks

Funding & conditions

- Free accommodation in JINR hostel
- Reimbursement of all travel expenses
- Daily allowance

Participants

- Bachelor students finishing their 3rd year
- Master students
- PhD students of the 1st year

How to apply

- Fill in the application form on students.jinr.ru
- Highlight the spheres of interest

63 students were selected for the JINR SSP-2017

International Student Practice vs Summer Student Programme

September

June-October

RSA since 2007

RSA since 2015

3 weeks

6-8 weeks

Introduction to JINR
research fields

More profound research
at JINR

Students arrive as a group

Students arrive separately

Selection by RSA

Selection by JINR

Projects from the list *uc.jinr.ru*

Scientific areas of interest

Final presentations of projects

Final written reports
published on *students.jinr.ru*

SSP fields of research

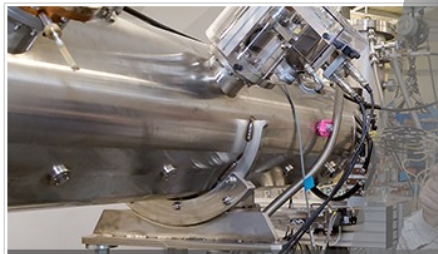
Summer Student Program

at Joint Institute for Nuclear Research

HOME

ABOUT JINR

PARTICIPANTS



It's neither a school nor a conference. It's pure practice

Applications admission closed

Applications review and selection by supervisors: 21 Apr 2017, 21:00

Participants list publication: 25 Apr 2017, 19:00

SUMMER PROGRAM - 2017

[Fields of research](#)

Contacts

Sponsors

How to get

Organizers

News

Submit news

Purpose and Imp

About the Program

Program Purpose

The main purpose of the program is to provide an opportunity for students from Member States on a collaborative projects.

Program Dates

The Summer Student Program is organized by scientific groups and working groups.

Program Participants

Participants of the program are PhD students and young scientists from organizations of the JINR member states.

Application Procedure

To participate in the selection process, you need to submit an application form.

Neutron Physics

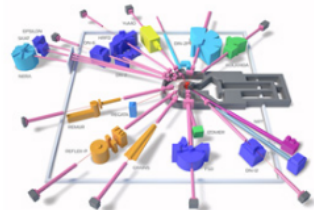


On the basis of the JINR Laboratory of Neutron Physics, two neutron sources are operated: fast neutron pulsed reactor IBR-2 and intense resonance neutron source IREN. These facilities allow conducting research on the breaking of fundamental symmetries in nuclear interactions, studying the physics of ultra-cold neutrons, developing application methods in neutron nuclear physics.

Investigations of Neutron Nuclear Interactions and Properties

Development of Experimental Facilities for Condensed Matter Investigations with Beams of the IBR-2 Facility
Development of the IBR-2 Facility with a Complex of Cryogenic Neutron Moderators

Condensed Matter Physics



In the laboratories of the Institute, theoretical and experimental research in condensed matter physics is carried out. It includes spectroscopic studies of hydrogen bonding; behavior of surfactants, polymers and their mixtures in the volume and on the surface; study of plasmonic nanostructures in the pores of silicon oxide using Raman, SERS and CARS spectroscopy methods; structural analysis of complex nano- and micromaterials using small-angle neutron scattering; computer simulation of the tunnel characteristics of superconducting nanostructures, etc.

Investigations of Condensed Matter by Modern Neutron Scattering Methods
Multimodal Platform for Raman and Nonlinear Optical Microscopy and Microspectroscopy for Condensed Matter Studies

Networking, Computing, Computational Physics



JINR Laboratory of Information Technology ensures creation and further development of the JINR information and computer infrastructure, methods, algorithms and software for the modeling of physics systems, mathematical processing and analysis of experimental data. The following areas are being developed: monitoring of distributed information and computer systems; data storage systems and technologies; parallel programming technologies MPI, OpenMP, CUDA, MPI+CUDA; hybrid architectures; Big Data; cloud technologies; development of information systems; development and analysis of mathematical models of quantum computing and quantum information; information methods of data and social networks analysis; computational methods in physics; mathematical methods for simulation of complex physics systems; development of algorithms of parallel computing; mathematical methods and software for

processing of experimental data.

Information and Computing Infrastructure of JINR
Methods, Algorithms and Software for Modeling Physical Systems, Mathematical Processing and Analysis of Experimental Data

Radiobiology

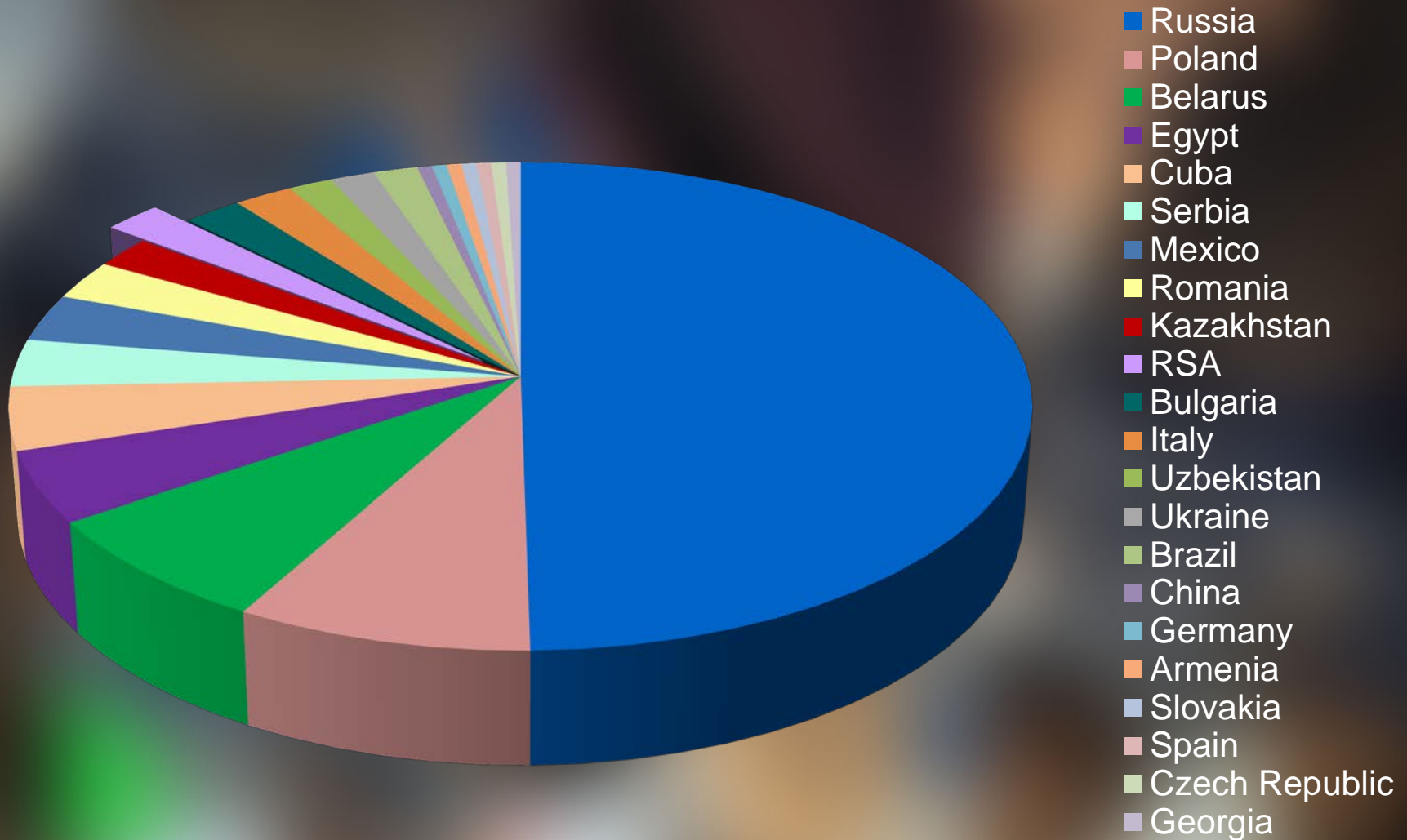


In the JINR Laboratory of Radiobiology, theoretical and experimental issues of biological effects of heavy charged particles of different energies are studied. Cosmic dust and organic compounds in meteorites and ancient terrestrial rocks are also investigated by nuclear physics methods. It allows obtaining data that may reveal the background of the origin of terrestrial and extraterrestrial life.

Research on the Biological Effect of Heavy Charged Particles with Different Energies
Research on Cosmic Matter on the Earth and in Nearby Space; Research on the Biological and Geochemical Specifics of the Early Earth

- Theoretical and Mathematical Physics
- Particle Physics
- Nuclear Physics
- Neutron Physics
- Condensed Matter Physics
- Networking, Computing, Computational Physics
- Radiobiology
- Accelerators Physics
- Particle Detectors
- Applied Research Using Nuclear Physics Methods

JINR SSP participants representation



Total number of participants 2014-2018 – **191**

Summer Student Programme participants



Bonginkosi Richard Zikhali, University of Zululand

Supervisor: Dr. S.Shakour, Laboratory of Nuclear Problems
2015, Project: Calibration procedure of hybrid pixel detectors with GaAs: Cr sensor and Timepix readout chip



Christiaan Petrus Brits, Stellenbosch University

Supervisor: Dr. V.Golovatyuk, Laboratory of High Energy Physics
2015, Project: Study of time over threshold method using simulations and experimental verification



Marius Maximian Hromnik, University of Cape Town

JINR Student Practice 2011 and 2014 participant

Supervisor: A.Ayriyan, Laboratory of Information Technologies
2015, Project: GPU (graphics processing unit) acceleration of the computation of cross sections of particle processes in high energy physics interactions



Sinoyolo Ngongo, Nelson Mandela Metropolitan University

JINR Student Practice 2013 participant

Supervisor: Dr. Skuratov, Laboratory of Nuclear Reactions
2016, Project: Swift heavy ions irradiation of titanium zirconium nitride layer on a zirconium alloy at different temperatures for application in nuclear fuel cladding



Science bringing
nations together



Science bringing nations together



More opportunities



International Student Summer Schools



Organized by JINR

International School on

Nuclear Methods for Environmental and Life Sciences



Montenegro, Budva, Becici

April 22-28, 2018

TOPICS:

- Nuclear and related techniques for the environmental studies
- Nuclear medicine: radioisotopes and hadron therapy
- Nuclear detectors in medicine
- Radioecology
- Radiogenetics

Organizing Committee:

Chairman: Victor Matveev
Co-Chairmen: Stanislav Pakulyak
Vadim Bednyakov
Secretary: Tatyana Donskova
Members: Otilia Culicov
Marina Frontasyeva
Andrey Khrgian
Julia Rybachuk
Konstantin Vergel
Alexey Zhemchugov

The 8th International Student Summer School «Nuclear Physics – Science and Applications» (NUCPHYS – SC & APPL)



26 July – 4 August 2017
Brasov, Romania

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



DUBNA

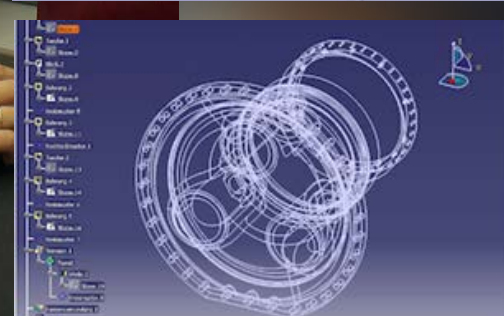
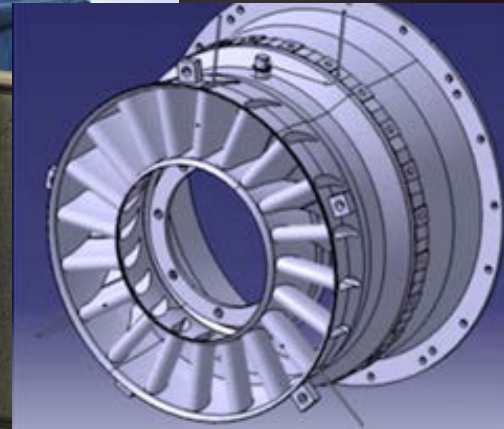
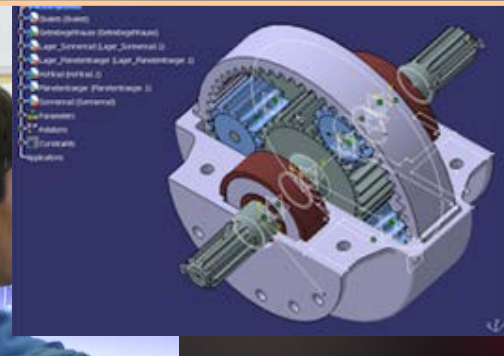
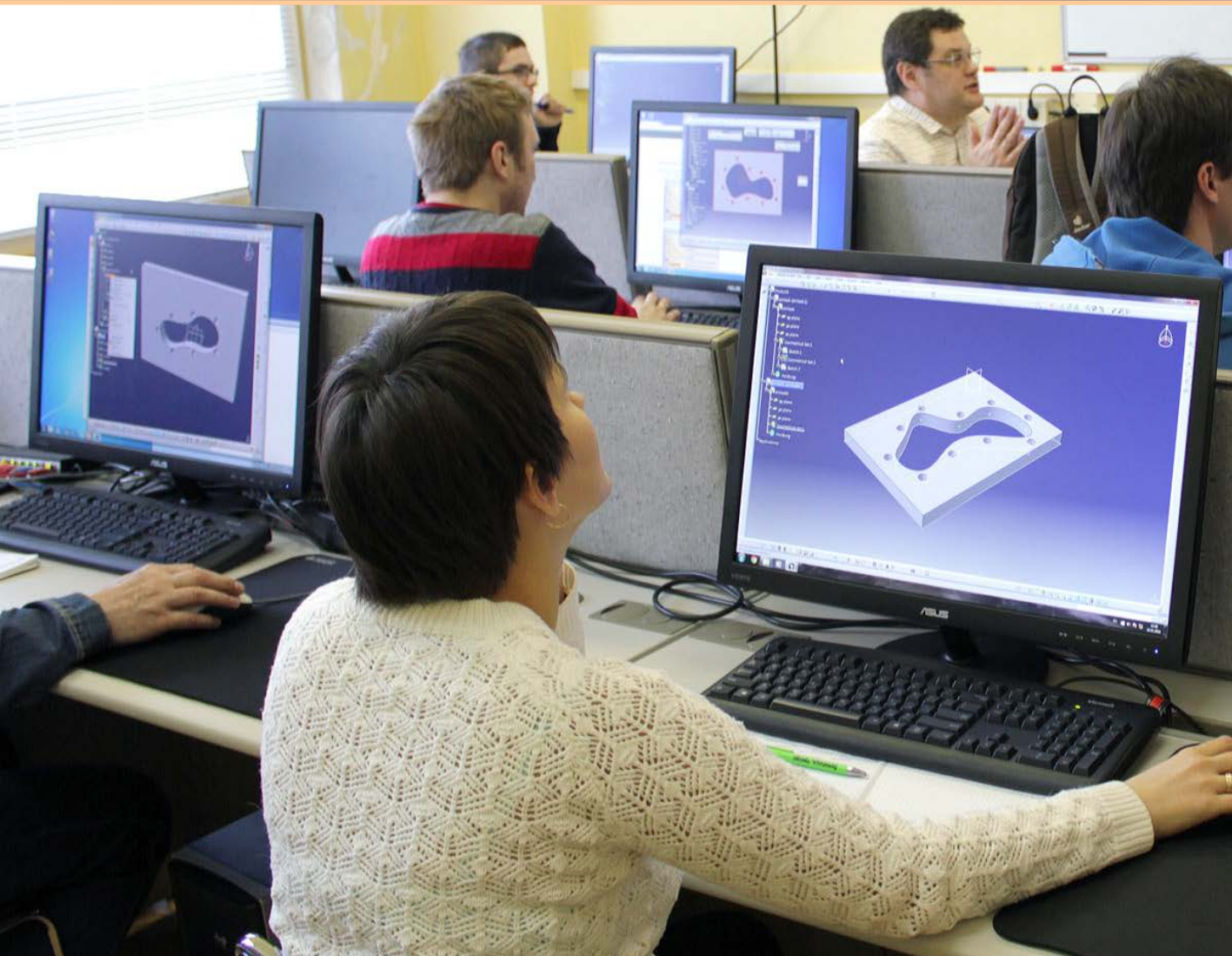


ADAM MICKIEWICZ
UNIVERSITY
IN POZNAŃ



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

Training course in CATIA-GDML Geometry Builder



Practice and training for researchers and engineers



Dedicated training centre at JINR (since 2014)

Motivation

- Modern research requires both practical skills and theoretical knowledge.
- JINR provides an opportunity to obtain access to radioactive materials, working accelerators, giant experimental setups etc.

Usus est optimus magister

Scope of the training

Basic laboratory works (since 2016)

- Nuclear physics and cosmic rays
- Electronics
- Vacuum technology

Advanced laboratory works

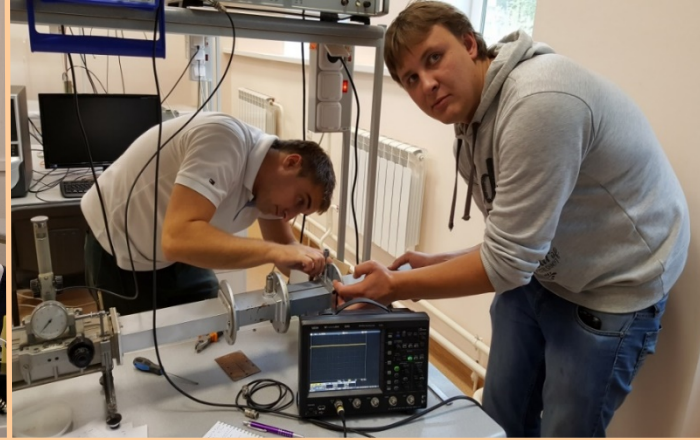
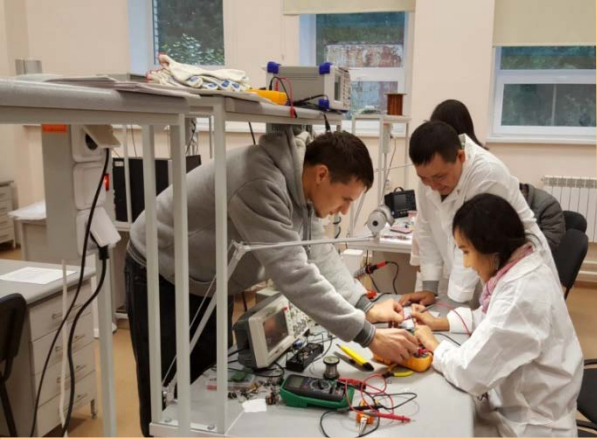
- Radiation protection and safety
- Controls and automation
- RF technology
- Advanced electronics
- Magnets
- Particle detectors
- Neutron physics, metrology etc.



Laboratory works at the Linac-800 accelerator

(will be available after Linac-800 commissioning)

- Accelerator operation and beam diagnostics
- Detector characterization using particle beams
- and more



Training Lab at Building 118



Safety permit to work with radioactive materials

obtained in March 2017



**ФЕДЕРАЛЬНАЯ СЛУЖБА ПО НАДЗОРУ
В СФЕРЕ ЗАЩИТЫ ПРАВ ПОТРЕБИТЕЛЕЙ И БЛАГОПОЛУЧИЯ ЧЕЛОВЕКА**
Межрегиональное управление №21 ФМБА РОССИИ

(наименование территориального органа)

САНИТАРНО-ЭПИДЕМИОЛОГИЧЕСКОЕ ЗАКЛЮЧЕНИЕ

№ 50.21.01.000.М.000006.03.17 от 02.03.2017 г.

Настоящим санитарно-эпидемиологическим заключением удостоверяется, что производство (заявленный вид деятельности, работы, услуги) (перечислить виды деятельности (работ, услуг), для производства — виды выпускаемой продукции; наименование объекта, фактический адрес):
условия выполнения работ при осуществлении деятельности в области использования источников ионизирующего излучения - проведение исследовательских работ учебно-научным центром ОИЯИ по адресу: Московская область, г. Дубна, ул. Жолио - Кюри, 20, здание №118, помещение 121 согласно приложению.

Заявитель (наименование организации-заявителя, юридический адрес)
Объединенный институт ядерных исследований (ОИЯИ), г. Дубна, Московская область, ул. Жолио-Кюри, 6. Тел. (7-49621) 65-059, факс (7-495) 632-78-80 (Российская Федерация)

СООТВЕТСТВУЕТ (НЕ СООТВЕТСТВУЕТ) государственным санитарно-эпидемиологическим правилам и нормативам (ненужное зачеркнуть, указать полное наименование санитарных правил)
СП 2.6.1.2612-10 "Основные санитарные правила обеспечения радиационной безопасности (ОСПОРБ-99/2010)", СанПиН 2.6.1.2523-09 "Нормы радиационной безопасности (НРБ-99/2009)", СанПиН 2.2.4.3359-16 "Санитарно-эпидемиологические требования к физическим факторам на рабочих местах"

Основанием для признания условий производства (вида деятельности, работ, услуг) соответствующими (не соответствующими) государственным санитарно-эпидемиологическим правилам и нормативам являются (перечислить рассмотренные документы):
экспертное заключение ФГБУЗ ЦГиЭ № 9 ФМБА №1 от 31.01.2017г.


330316152

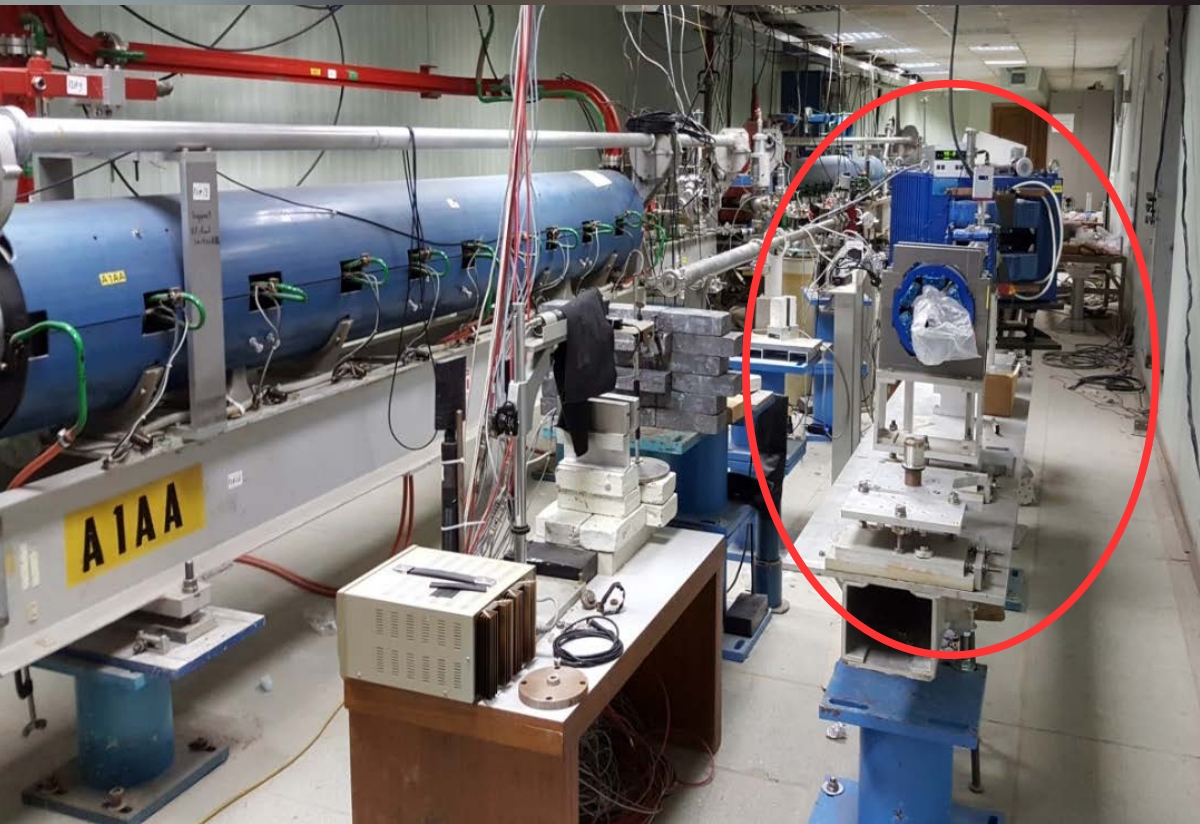
Заключение действительно до 08.02.2022 г.

Главный государственный санитарный врач
(заместитель главного государственного санитарного врача)


Н.К. Губанова
Ф. И. О.; подпись, печать

№ 2563632

Linac-800 at JINR



- Linac:
240 MeV electrons now,
800 MeV by 2020
Current in bunch 15 μA
- Bunch width 2 μs
- Bunch frequency
10-250 Hz
- Focal spot ~ 1 mm,
can be defocused
up to 20 mm
- 'Training' beam: 22 MeV

Part of refurbished 800 MeV linac MEA from NIKHEF

Key organisation ideas

- Thematical blocks of courses, 3-15 days each.
- Safety is the top priority.
- The main goals: develop practical skills, encourage unaided work.
- Permanent technical assistance.
- Regular discussions with qualified scientists and engineers.
- E-Learning materials available.
- Working language is English.
- Teaching materials in English and Russian.

Outreach programmes



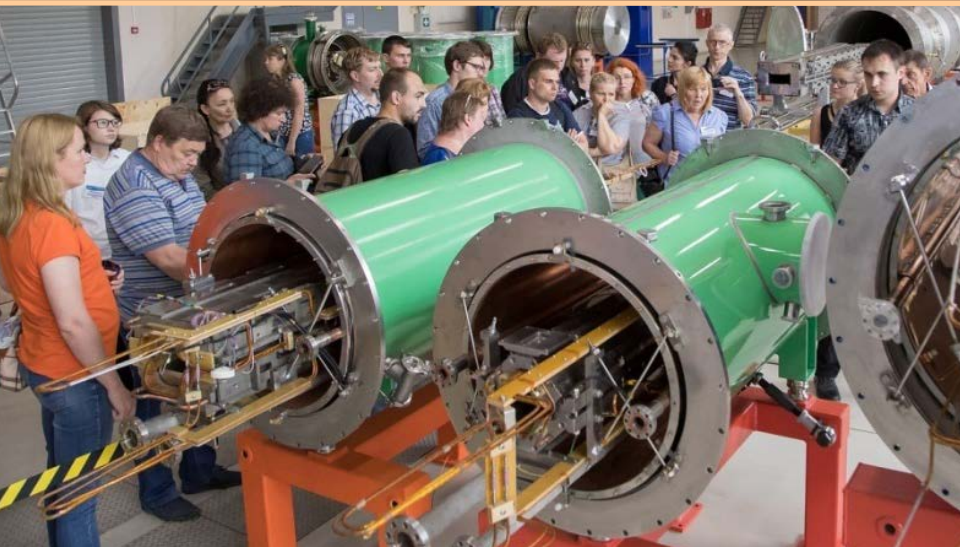
International scientific schools for physics teachers at JINR and CERN

What do we want to achieve?

- Raise and maintain the interest of students in modern science.
- Motivate students to study science and engineering at universities.
- Prepare the future generation of scientists and engineers.
- Show that **Science is alive!**

Basic components:

- Visits to experimental facilities;
- Lectures;
- Hands-on activities;
- Meetings with research physicists;
- Communication with colleagues from different regions.



Videoconferences with JINR for schools



Parameters

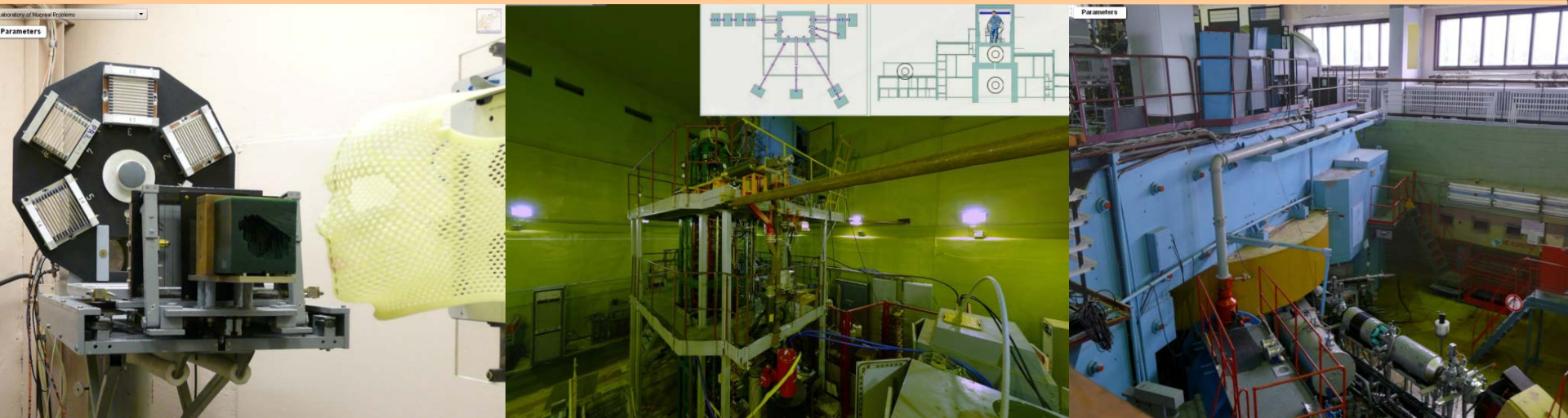
Nuclotron – Superconducting heavy ion synchrotron	
Circumference, m	251.5
Ions	from p up to A>100
Maximum magnetic rigidity, T m	43
Maximum energy	12 GeV for protons, 6 GeV/u for A/Z = 1/2
Intensity, particles per pulse	from 10 ⁵ (heavy ions) up to 5 · 10 ¹⁰ (d)
Magnetic field ramp, T/s	up to 2
Slow extraction spill duration, s	up to 10
Alvarez-type DTL LU-20	
Length of the cavity, m	14.5
Maximum fore-injector voltage, kV	700
Output proton energy, MeV	20
Output ion (Z/A ≥ 1/3) energy, MeV/u	5
Peak current, mA	10
RF frequency, MHz	150

3D tours around JINR basic facilities



uc.jinr.ru, '3D visit' section

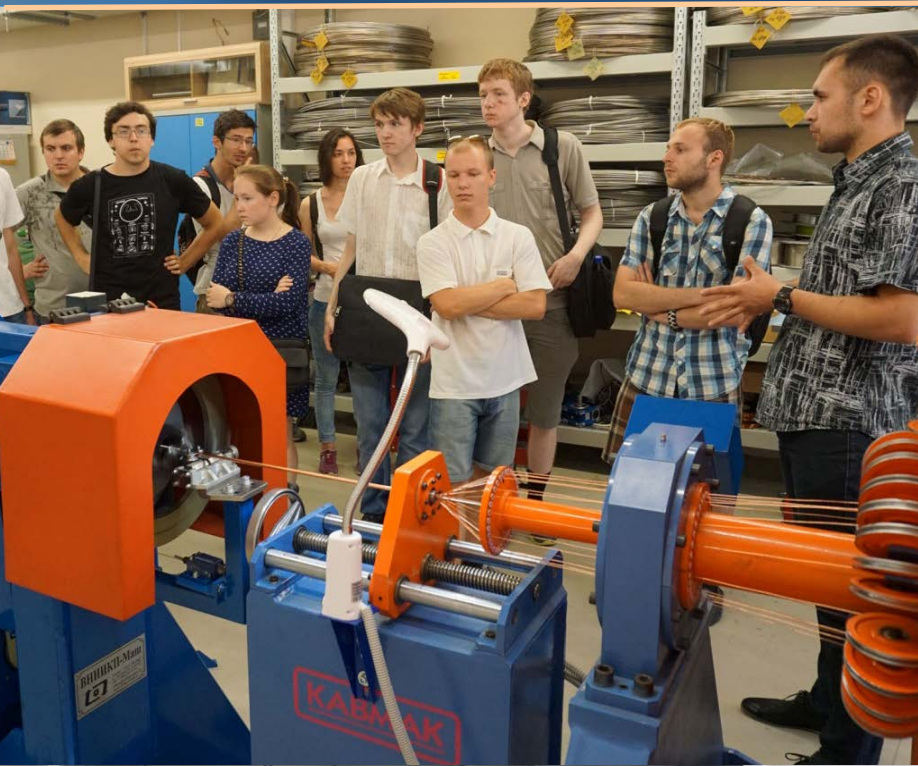
JINR: Nuclotron - Internal target - 2014



Festivals of science and Days of Physics in Dubna



Visits to the JINR labs

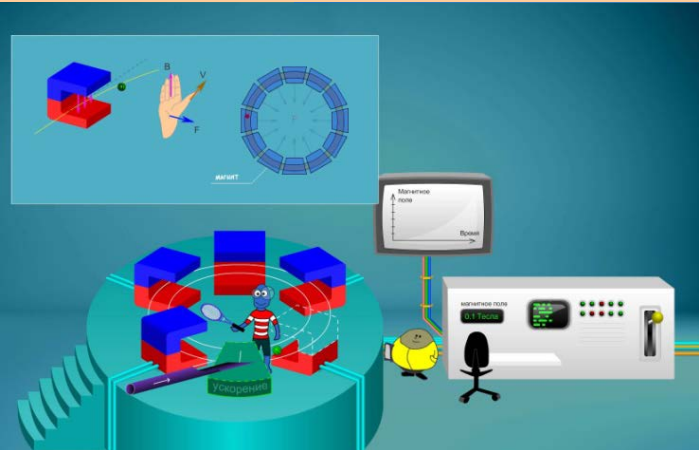


for students and teachers





'NICA Mega-science project' demo lesson



ОБЪЕДИНЕННЫЙ ИНСТИТУТ ЯДЕРНЫХ ИССЛЕДОВАНИЙ

КОЛЛАЙДЕР NICA



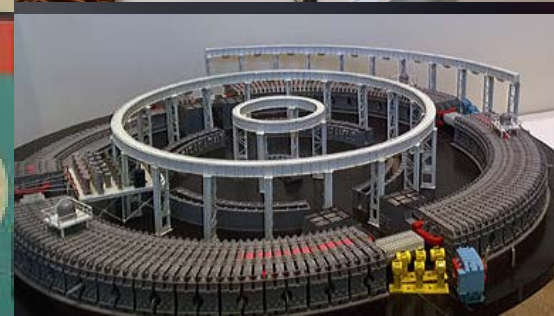
Popular lectures on modern science



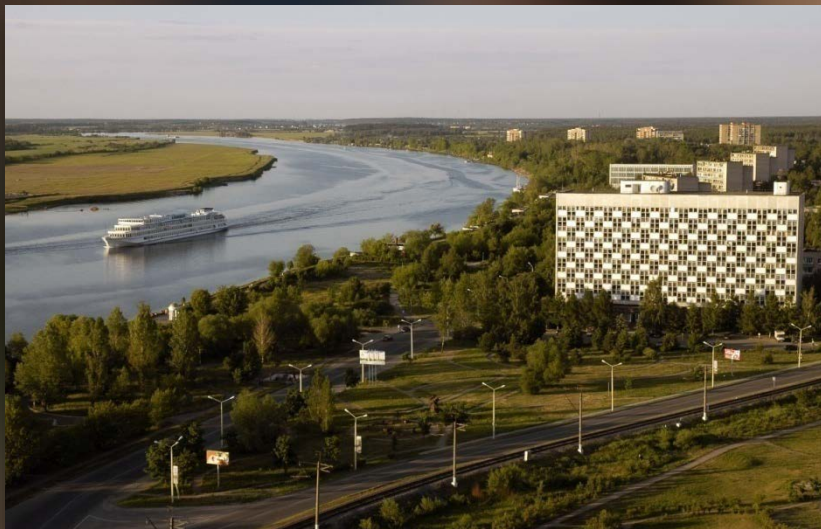
- Modern science in simple words
- Entertaining particle physics for school students
- Lab work using real experimental data



Renovated JINR museum



Thank you for your attention



Welcome
to Dubna