



JINR

Educational Programmes

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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 and Azerbaijan



3rd STAGE, September

Egypt, Belarus, Cuba and Serbia

Main goals

- Educate 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)

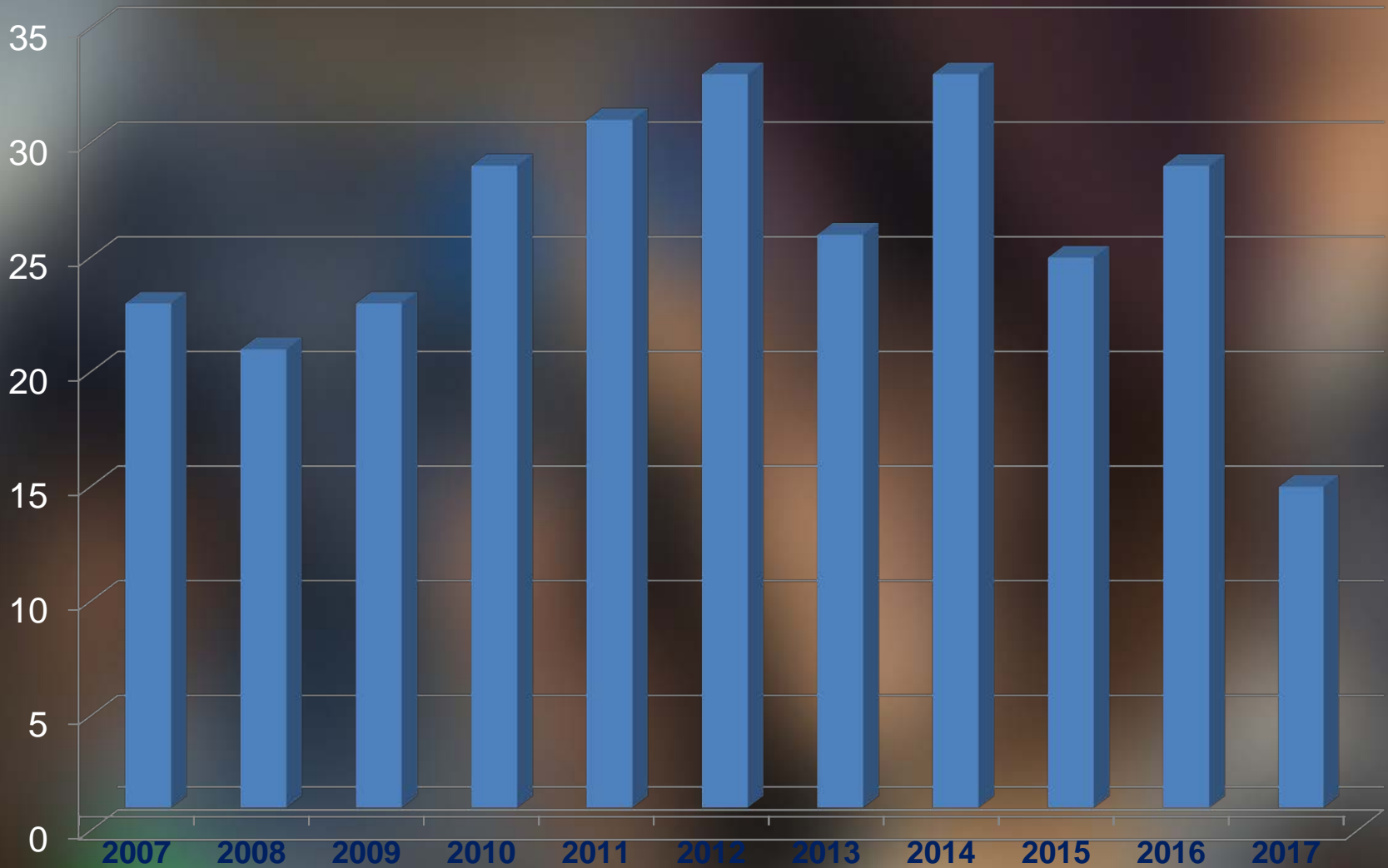
JINR fields of research

- 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

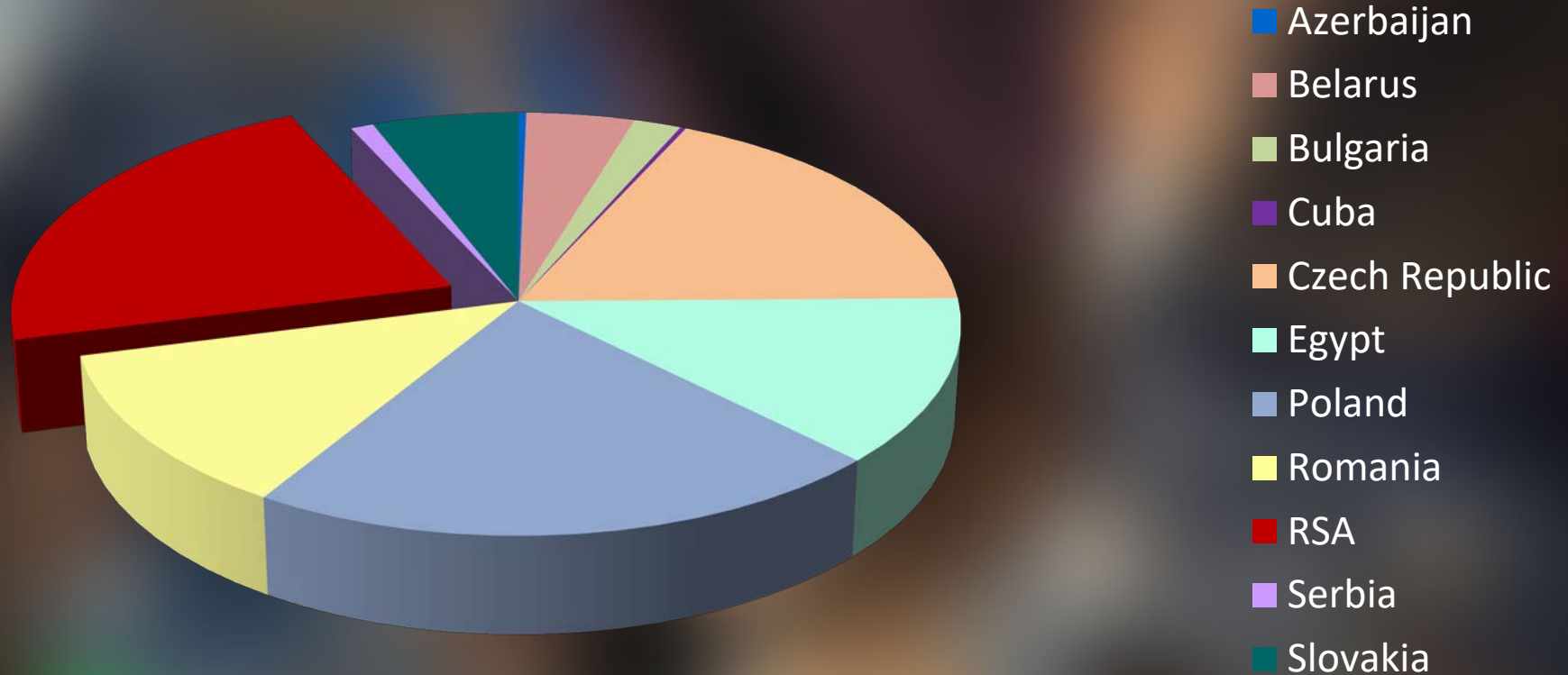


Attracting YOUth
to Science

Number of students from RSA by year



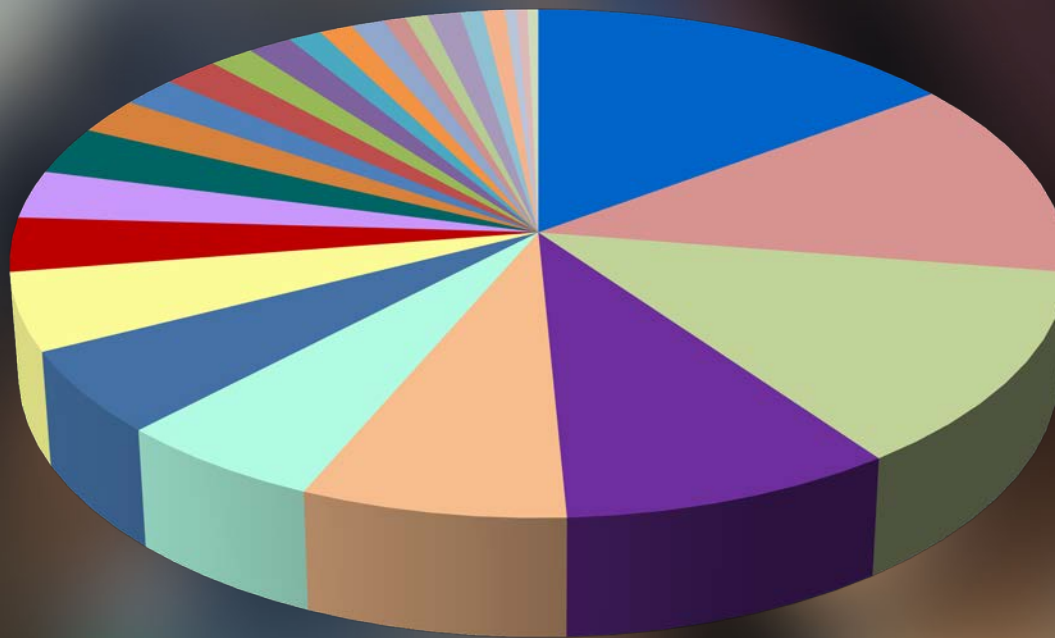
Practice participants representation



Total number of participants since 2004 – **1296**

Total number of participants from RSA since 2007 – **288**

RSA representation by universities



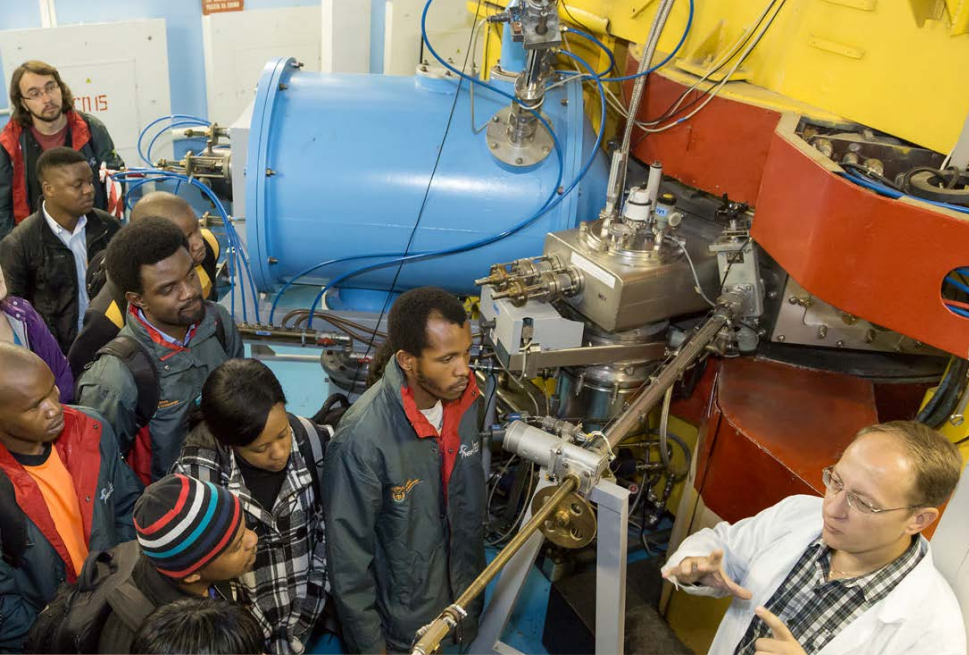
- University of Western Cape
- Stellenbosch University
- University of Fort Hare
- Walter Sisulu University
- University of Pretoria
- University of Cape Town
- North-West University
- University of South Africa
- University of Venda
- iThemba LABS/UWC
- University of Zululand
- University of the Free 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

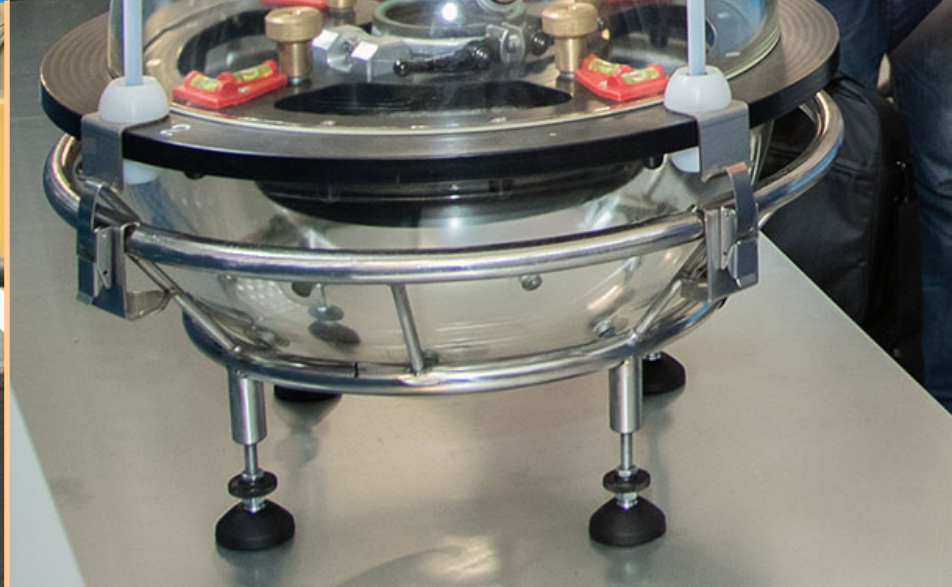
3 weeks

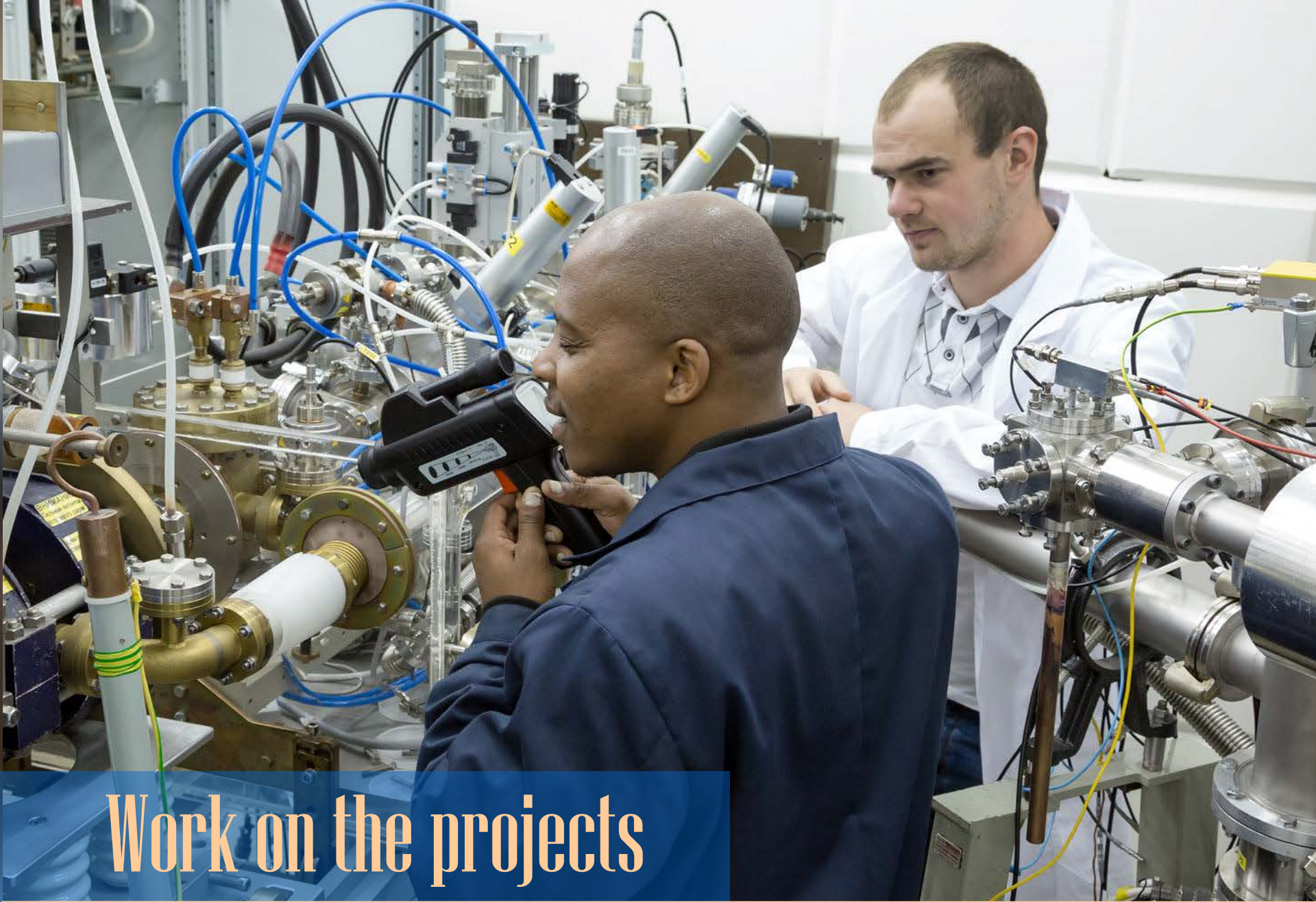
- Introductory lectures
- Visits to the labs
- Work on the projects in international scientific groups
- Final presentation of the projects
- Social events
- Cultural programme





Visits to JINR labs





Work on the projects

Work on the projects



Work on the projects





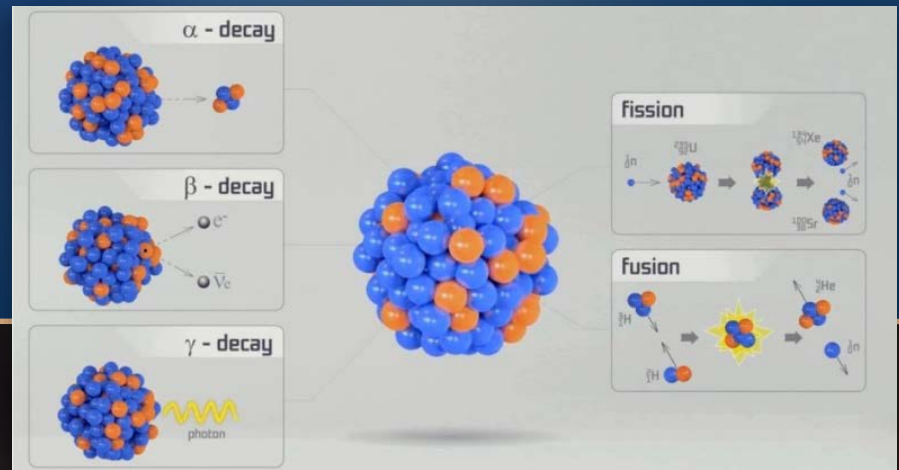
Work on the projects

Work on the projects



Virtual Laboratory of Nuclear Fission

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

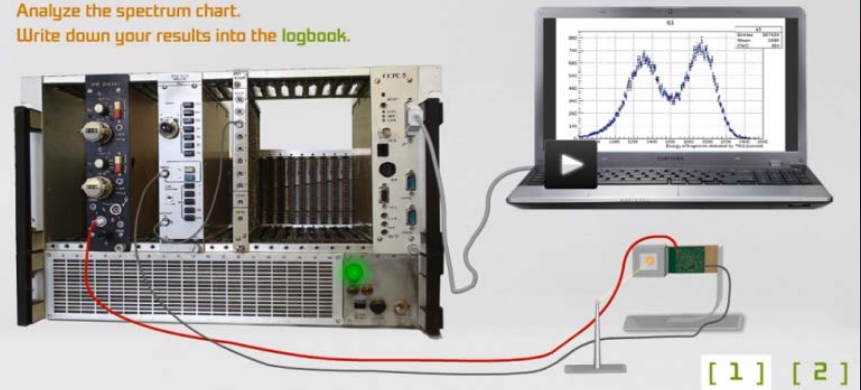


The study of the spectrum of fission fragments

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.

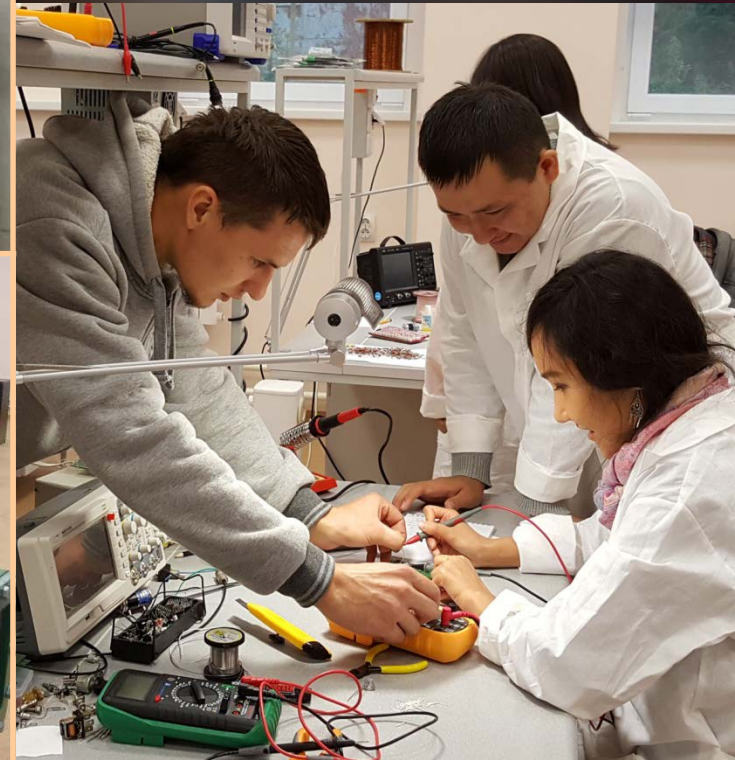


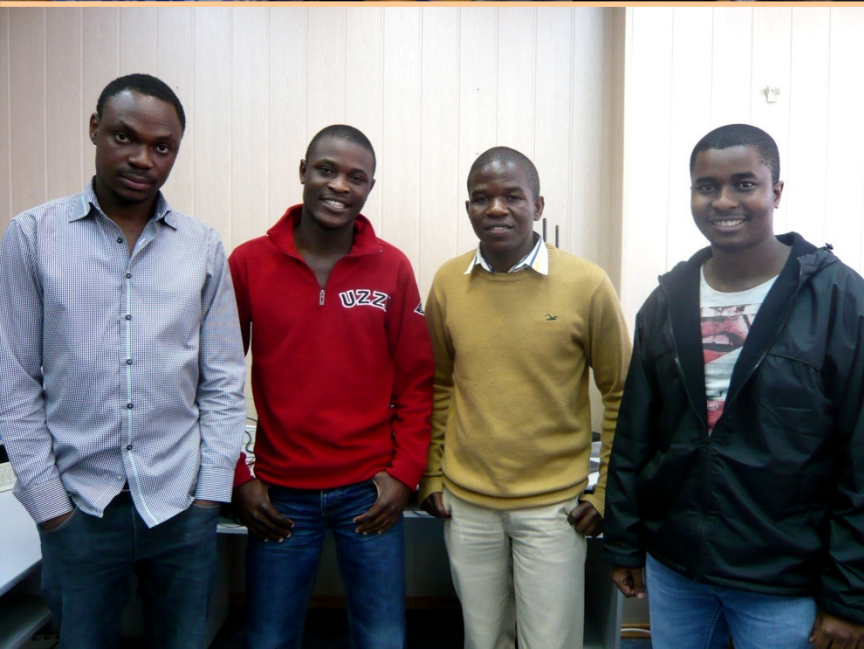
Hands-on labworks for engineers



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

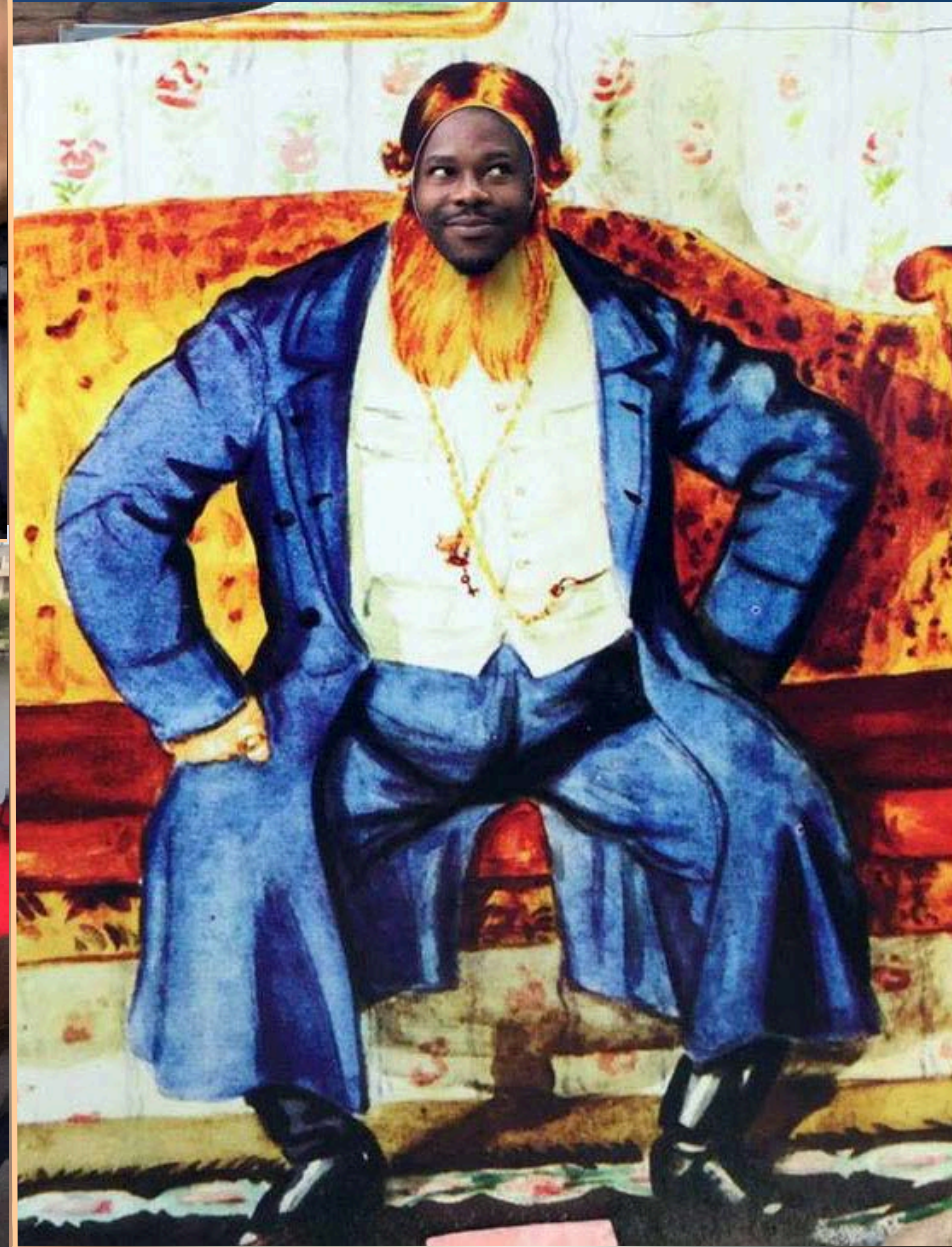




Social events



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

49 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*

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



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

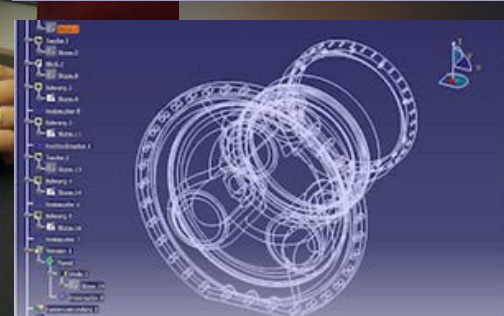
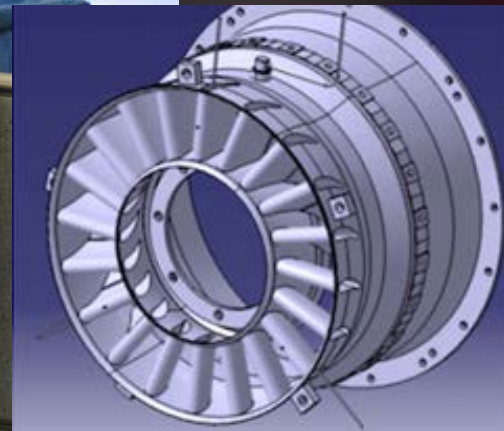
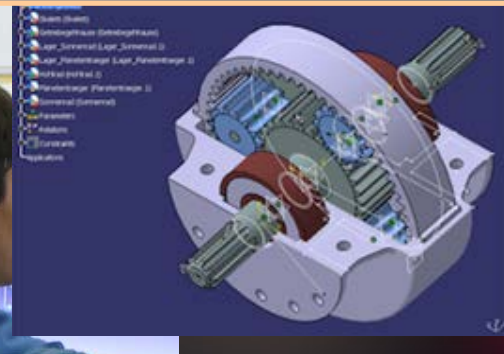
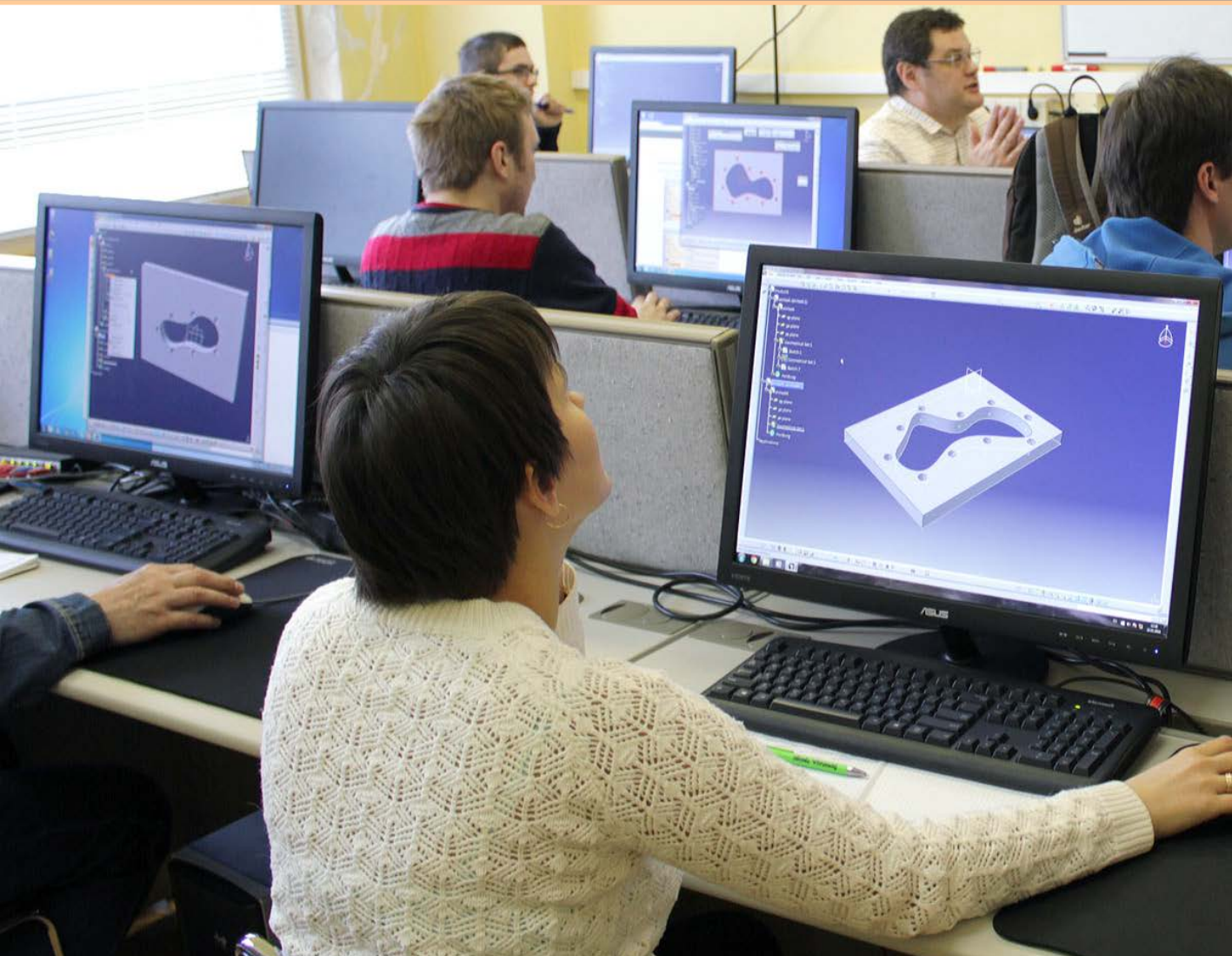
The 8th International Student Summer School
«Nuclear Physics – Science and Applications»
(NUCPHYS – SC & APPL)



26 July – 4 August 2017
Brasov, Romania



Training course in CATIA-GDML Geometry Builder



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



Festivals of science and Days of Physics in Dubna



Parameters

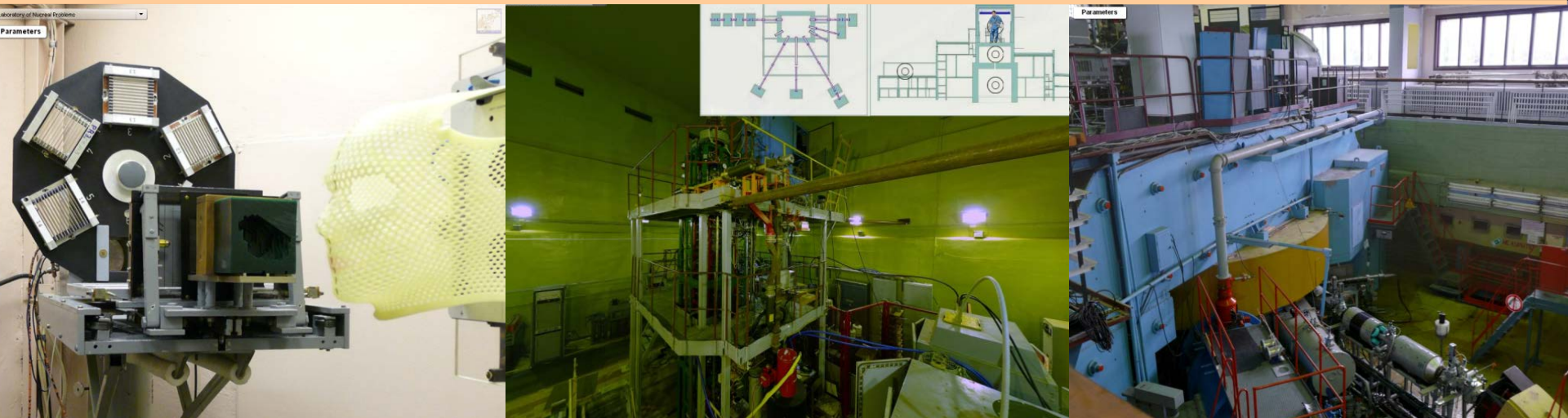
Nuclotron – Superconducting heavy ion synchrotron	
Circumference, m	251.5
Ions	from p up to A>100
Maximum magnetic rigidity, T m	43
Maximum energy	12 GeV for protons, 6 GeV/u for A/Z = 1/2
Intensity, particles per pulse	from 10 ⁵ (heavy ions) up to 5 · 10 ¹⁰ (d)
Magnetic field ramp, T/s	up to 2
Slow 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



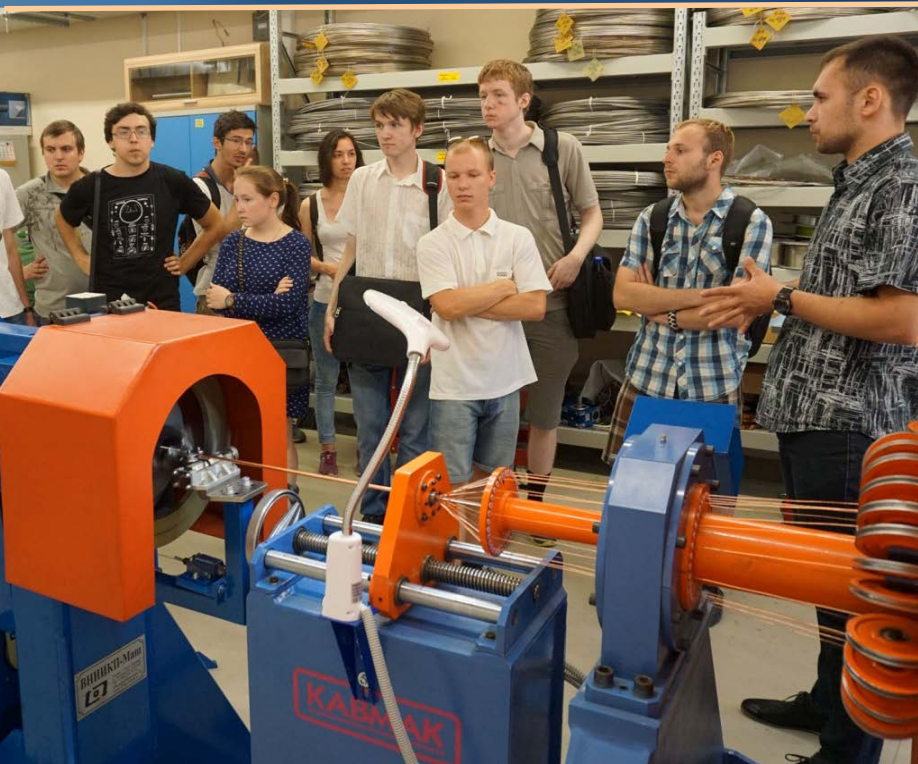
uc.jinr.ru, '3D visit' section

JINR: Nuclotron - Internal target - 2014



Parameters

Visits to the JINR labs

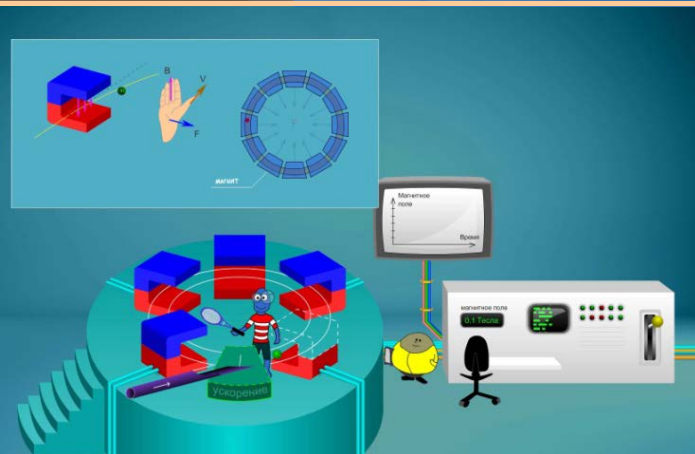


for students and teachers





'NICA Mega-science project' demo lesson



ОБЪЕДИНЕННЫЙ ИНСТИТУТ ЯДЕРНЫХ ИССЛЕДОВАНИЙ

КОЛЛАЙДЕР NICA



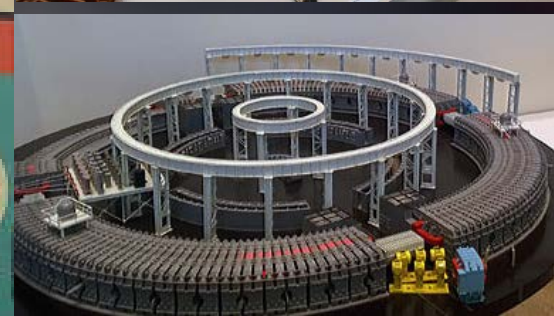
Popular lectures on modern science



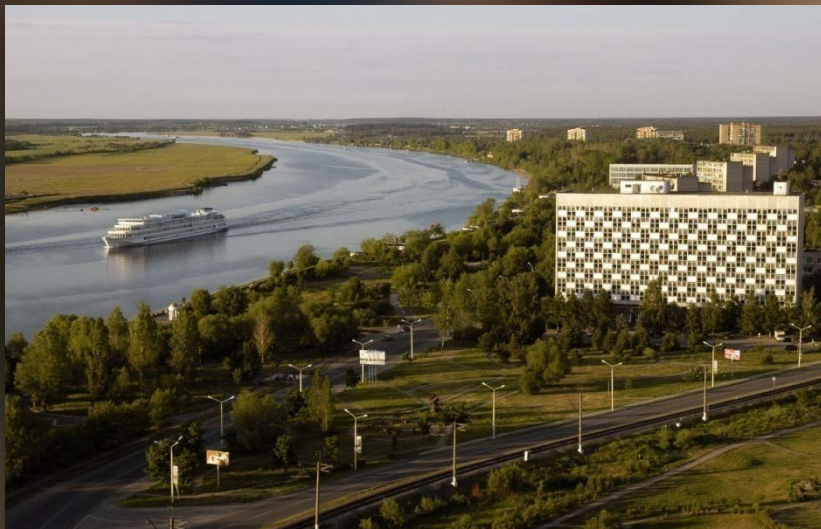
- Modern science in simple words
- Entertaining particle physics for school students
- Lab work using real experimental data



Renovated JINR museum



Thank you for your attention



Welcome
to Dubna