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# JINR

## Human Resource Development

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# Outline

International Student Practice

Summer Student Programme

More opportunities

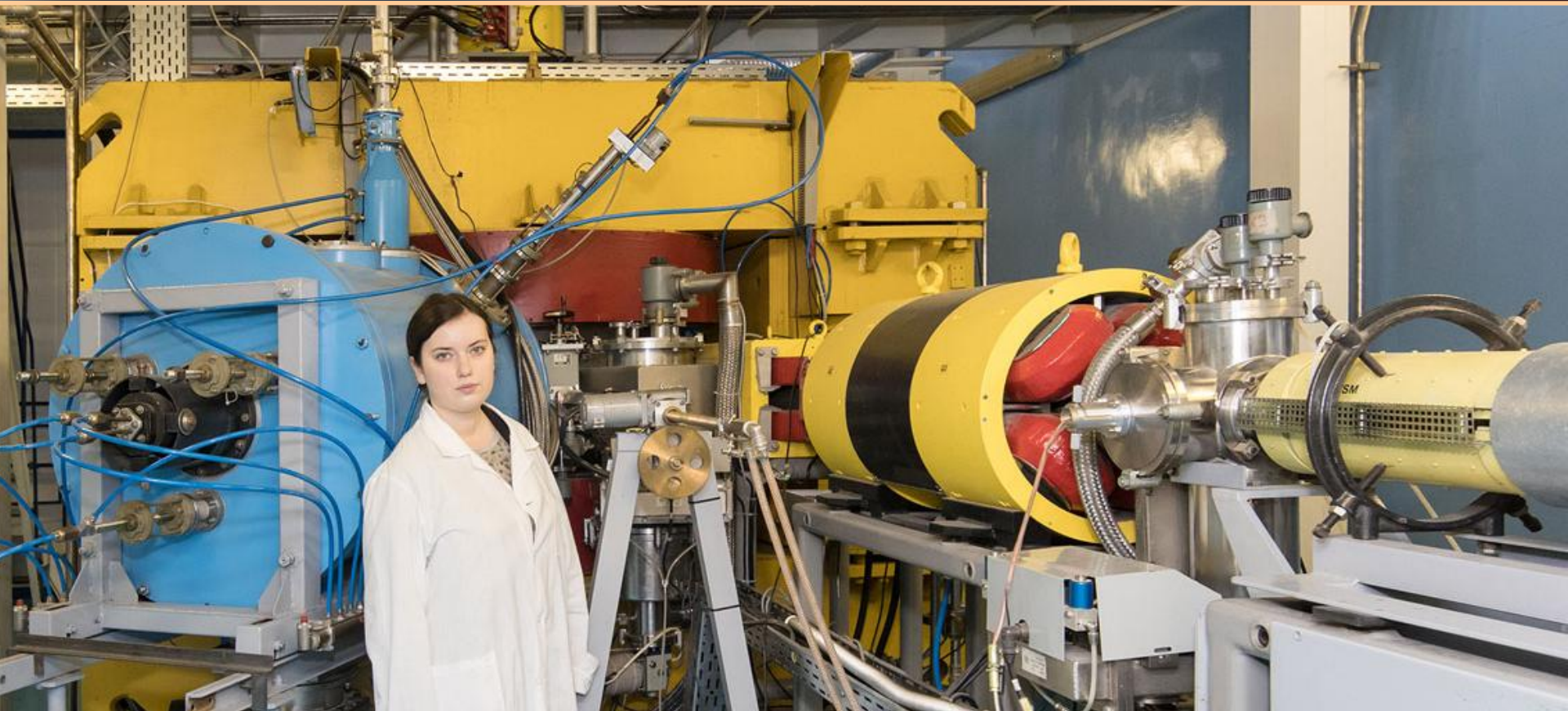
Practice and training for researchers and engineers

JINR outreach programmes

Science brings nations together

# Start your career at JINR

- World-class scientific research
- Wide range of research areas
- Qualified supervision
- Fruitful contacts
- International collaboration
- Variety of training programmes



# 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



# International Student Practice at JINR



## 1<sup>st</sup> STAGE, May

South Africa



## 2<sup>nd</sup> STAGE, July

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

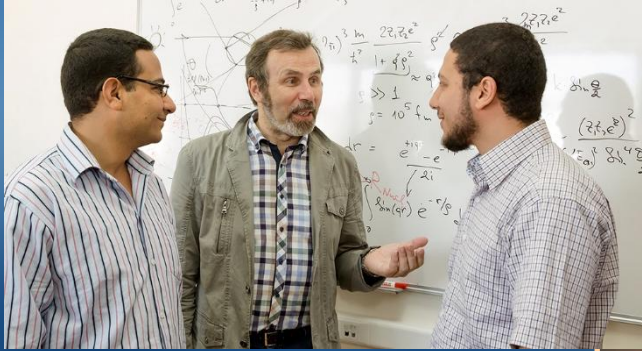


## 3<sup>rd</sup> STAGE, September

Egypt, Belarus, Cuba, Serbia, Mongolia



# JINR provides



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

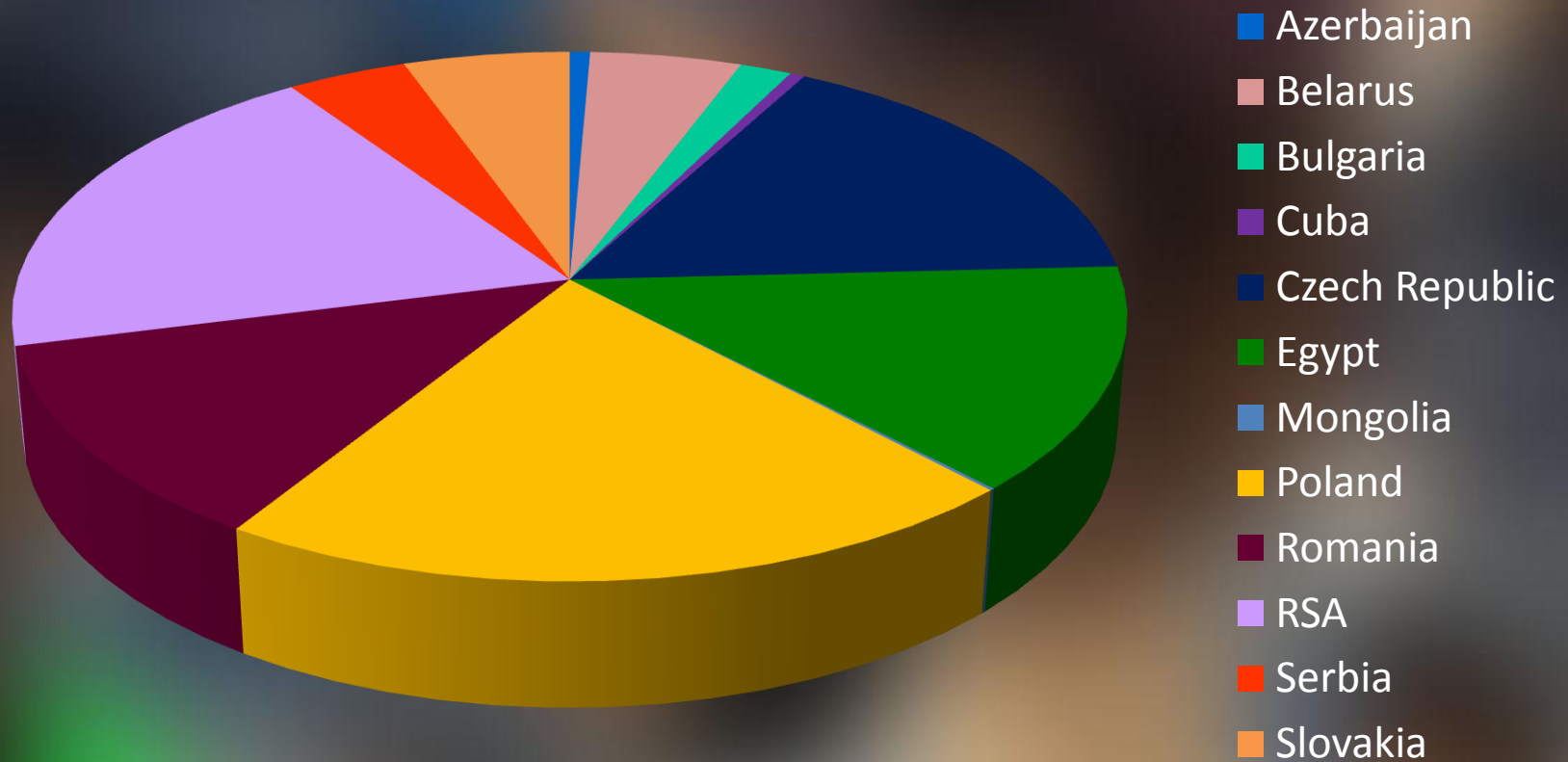
# JINR fields of research

- 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

# Practice participants representation



Total number of participants since 2004 – **1627** (including Stage 3'2018)



# International Student Practice activities

3 weeks

- Introductory lectures
- Work on the projects in international scientific groups
- Final presentation of the projects



# Introductory lectures

# Work on the projects

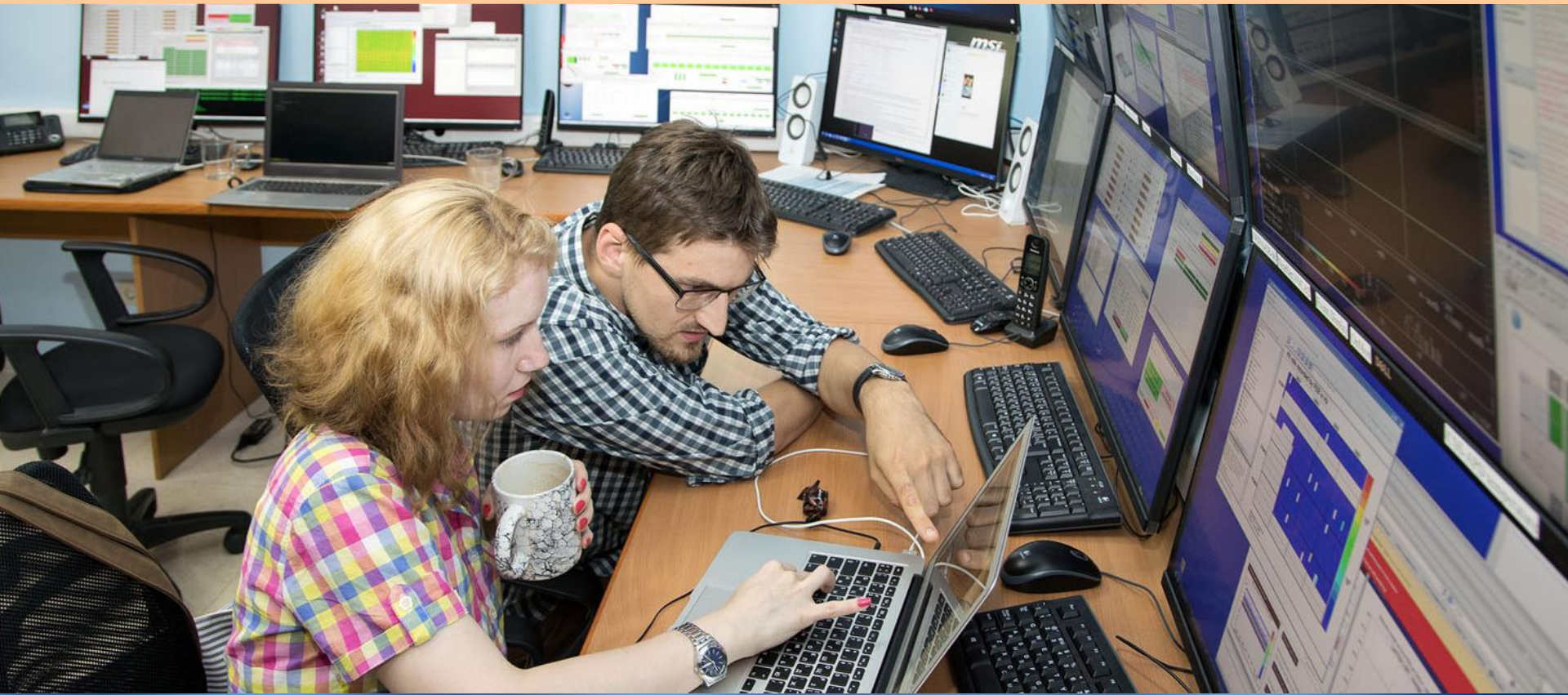


# Work on the projects





# Summer Student Programme



# 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](http://students.jinr.ru)
- Highlight the spheres of interest

**63 students were selected for the JINR SSP-2017**

# 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 scientists from Member States on a common scientific projects.

## Program Dates

The Summer Student Program is held in the Institute for scientific groups and within the year.

## Program Participants

Participants of the program are young scientists, students or PhD students from various organizations of the JINR.

## Application Procedure

To participate in the selection process, you need to

## Neutron Physics

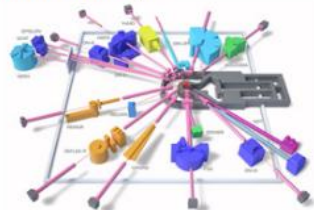


On the basis of the JINR Laboratory of Neutron Physics, two neutron sources are operated: fast neutron pulsed reactor IBR-2 and intense resonance neutron source IREN. These facilities allow conducting research on the breaking of fundamental symmetries in nuclear interactions, studying the physics of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



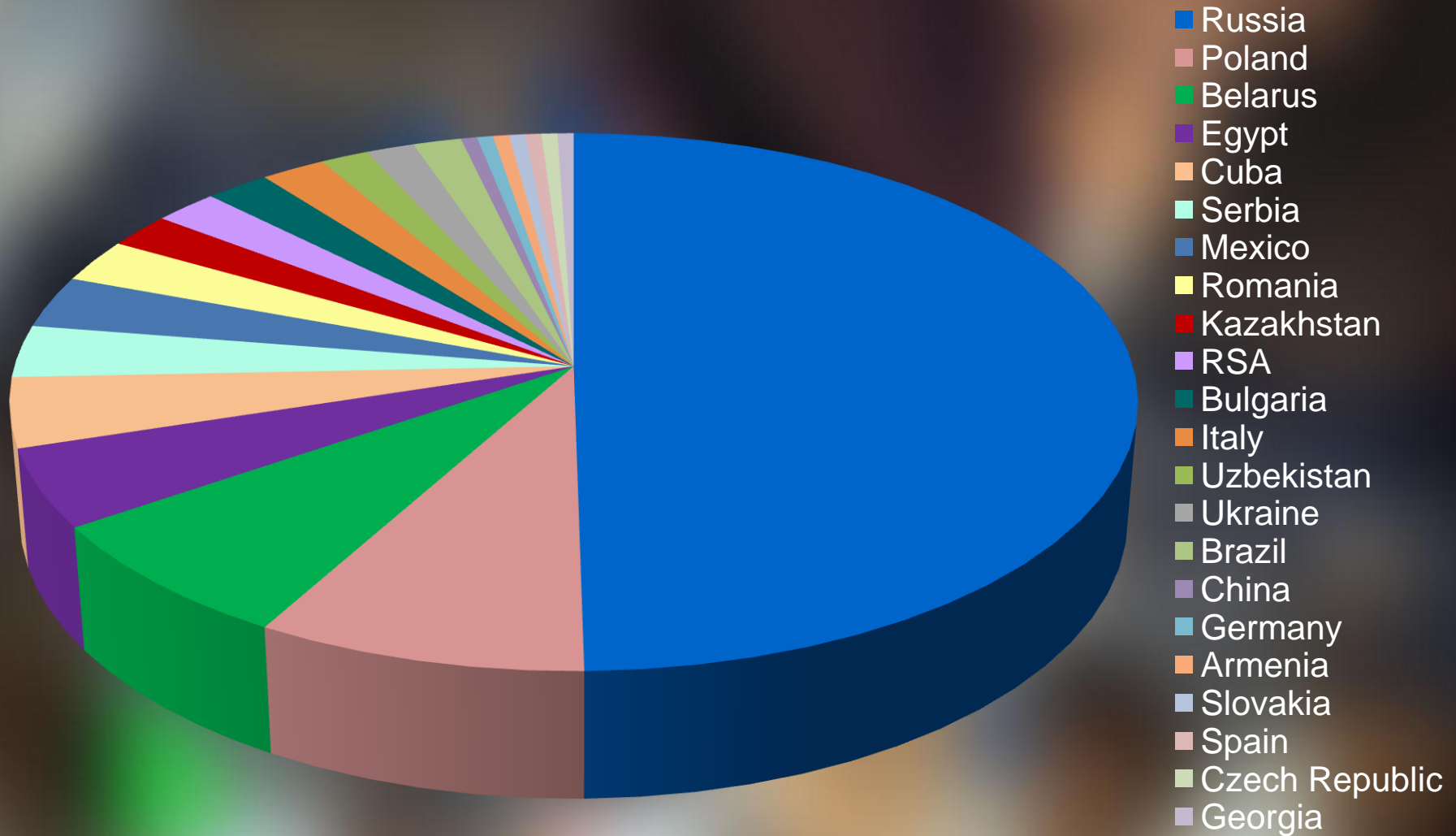
In the JINR Laboratory of Radiobiology, theoretical and experimental issues of biological effects of heavy charged particles of different energies are studied. Cosmic dust and organic compounds in meteorites and ancient terrestrial rocks are also investigated by nuclear physics methods. It allows obtaining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

# 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

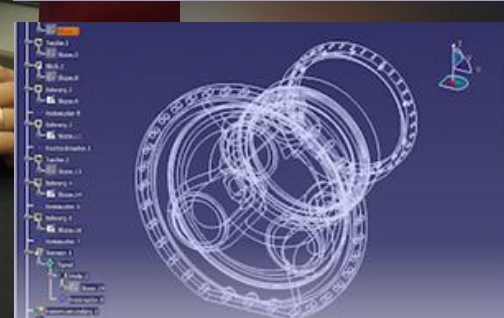
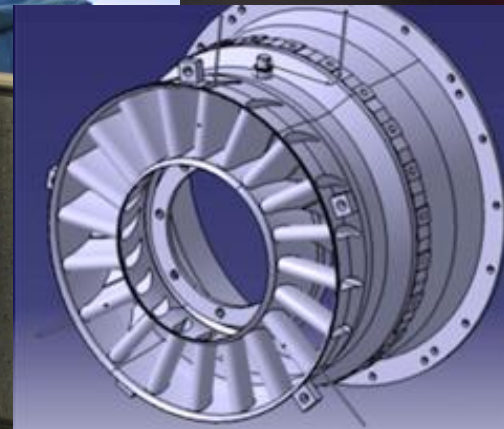
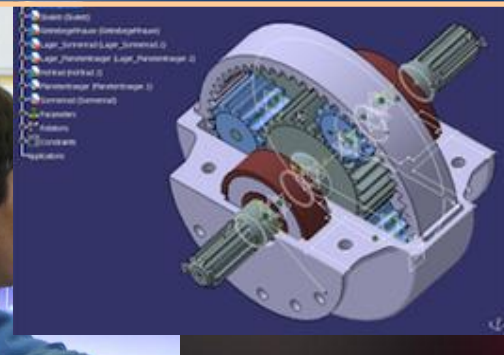
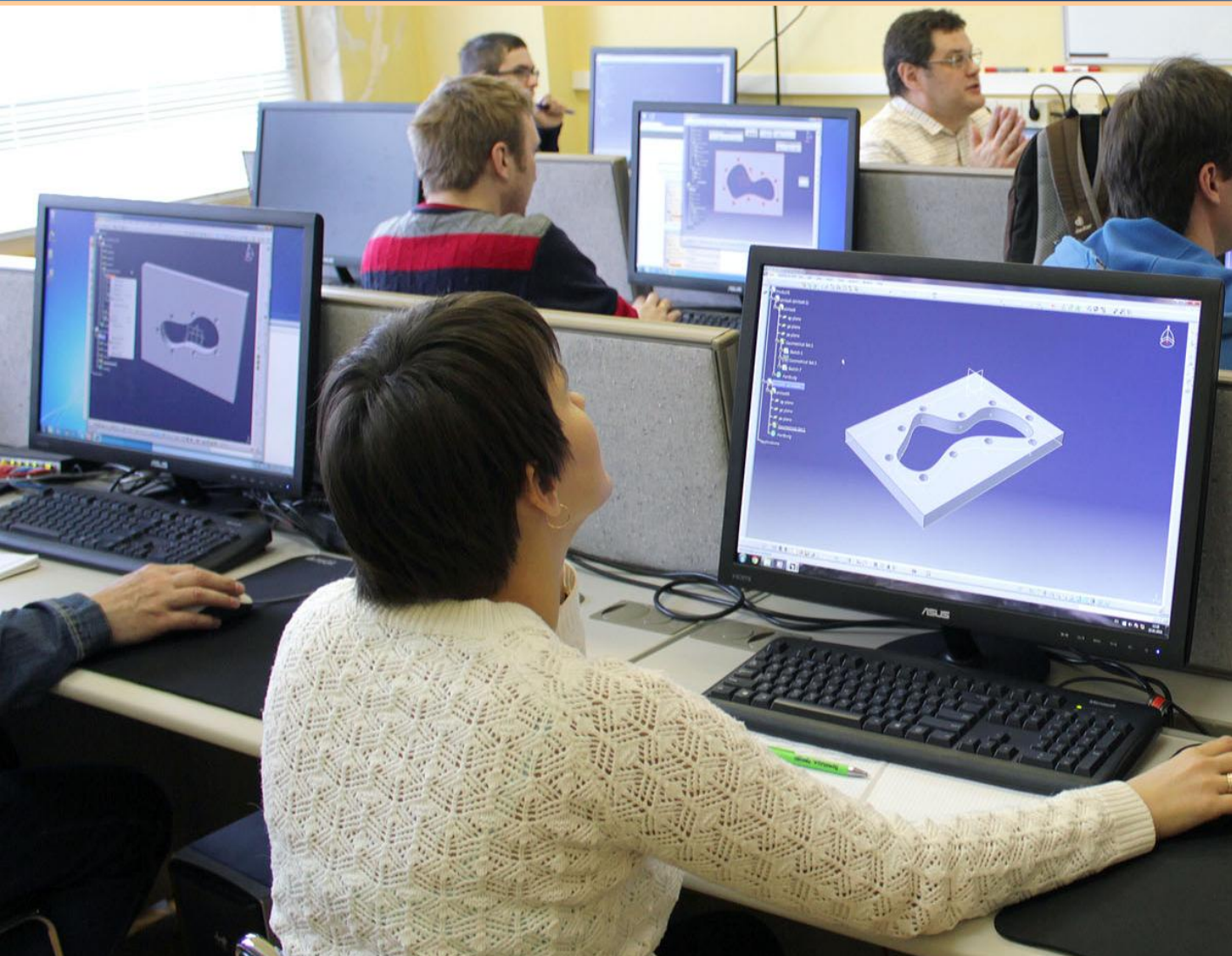


ADAM MICKIEWICZ  
UNIVERSITY  
IN POZNAŃ

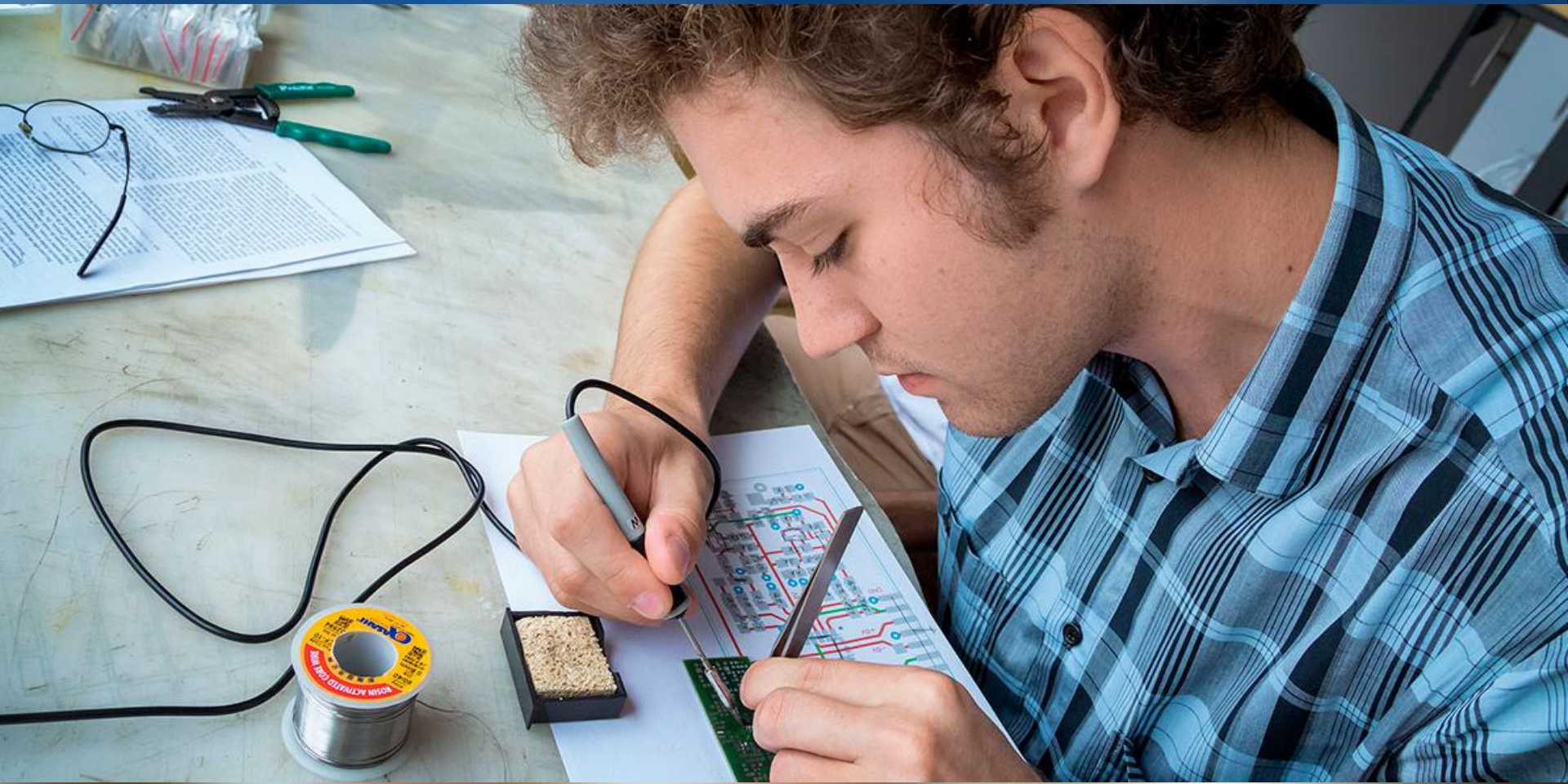


Faculty of Physics Adam Mickiewicz University in Poznań  
Poznań, Poland, June 24 – July 4, 2015

# 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

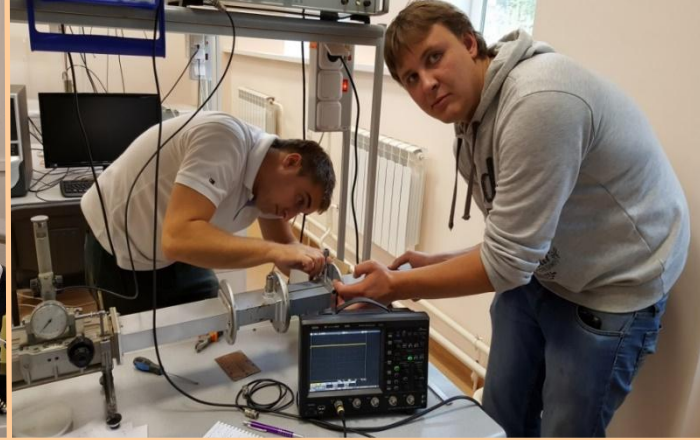
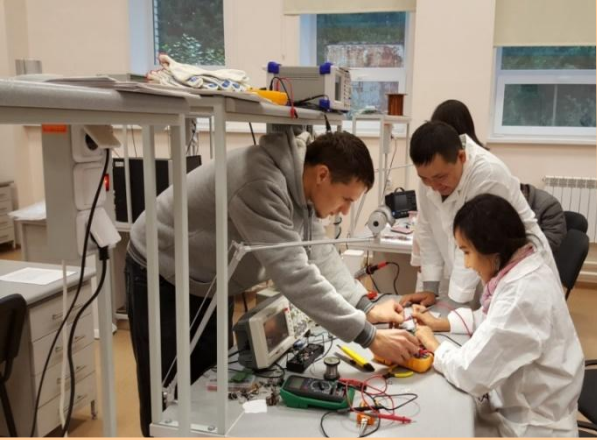
## **Advanced laboratory works**

- 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



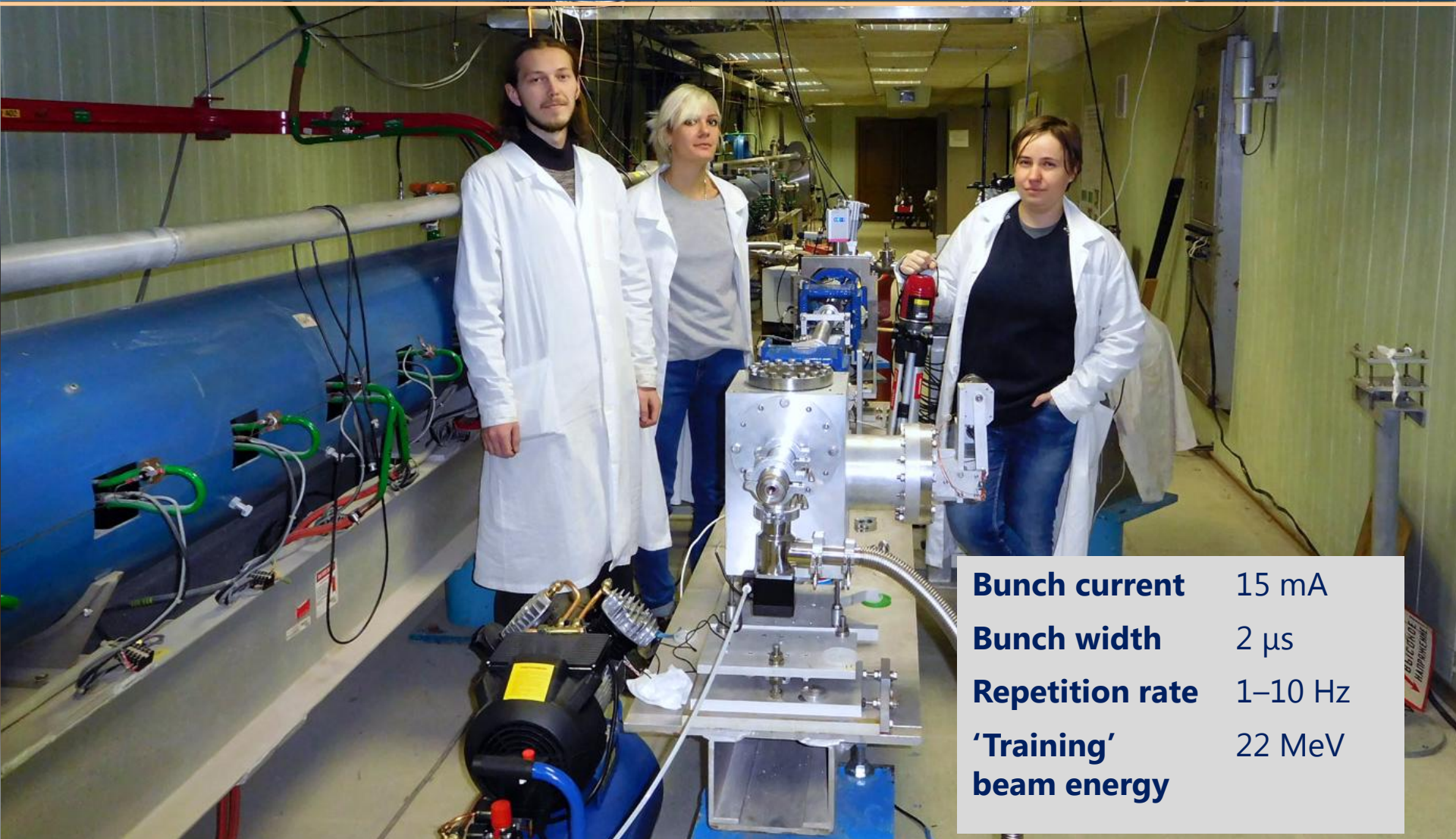
# Engineering Training Lab





# Scientific and Engineering Group

## LINAC 200 electron accelerator



<b>Bunch current</b>	15 mA
<b>Bunch width</b>	2 $\mu$ s
<b>Repetition rate</b>	1–10 Hz
<b>'Training' beam energy</b>	22 MeV

# 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.



Заключение действительно до 08.02.2022 г.  
Главный государственный санитарный врач  
(заместитель главного государственного санитарного врача)

  
Н.К. Губанева  
Ф.И.О., подпись, печать

**№ 2563632**

# 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.



# Bringing Science closer to School

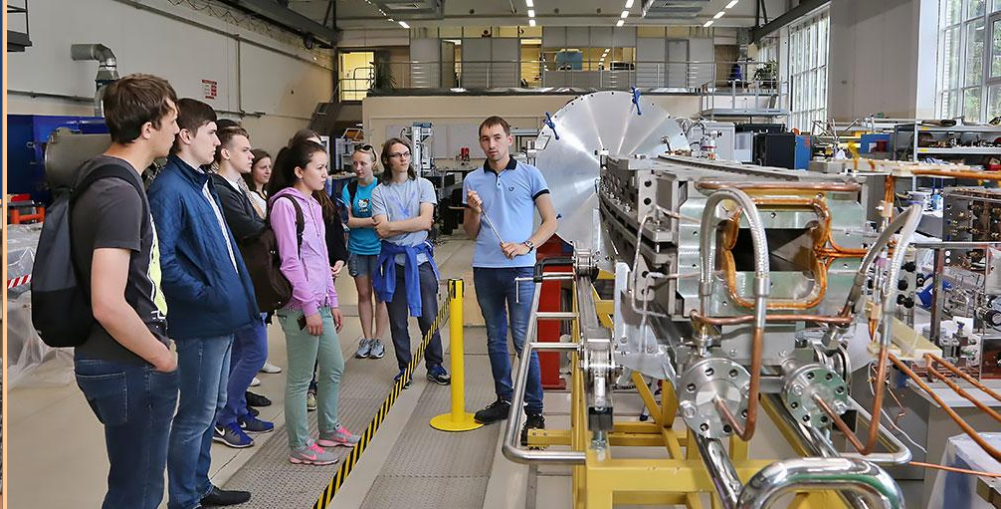
## Schools at JINR



## Schools at CERN



# Visits to the JINR labs



for students and teachers



# Festivals of science and Days of Physics in Dubna



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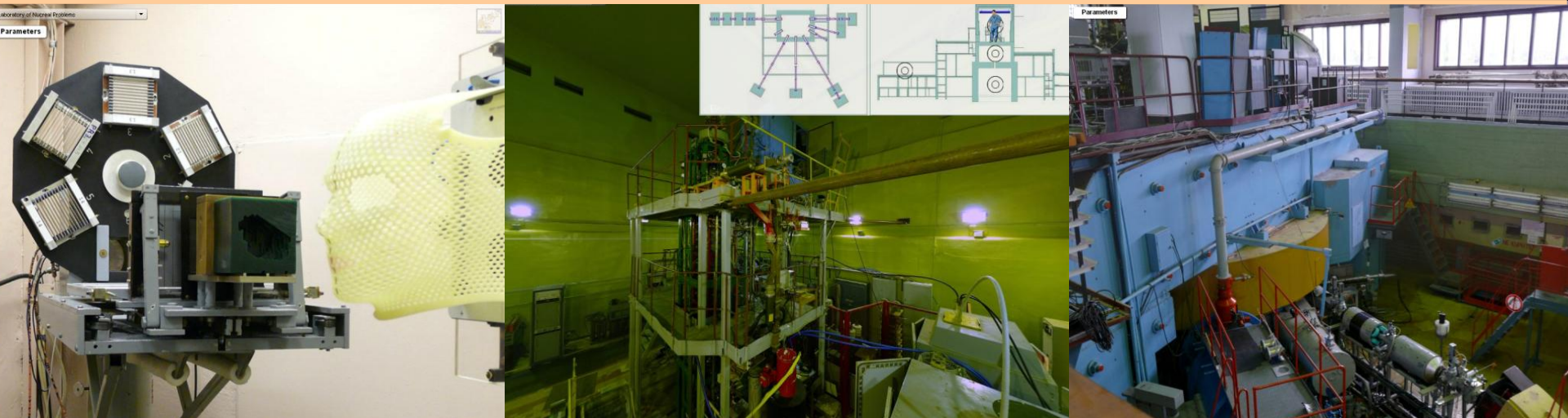
Nuclotron – Superconducting heavy ion synchrotron	
Circumference, m	251.5
Ions	from p up to A>100
Maximum magnetic rigidity, T m	43
Maximum energy	12 GeV for protons, 6 GeV/u for A/Z = 1/2
Intensity, particles per pulse	from 10 <sup>5</sup> (heavy ions) up to 5 · 10 <sup>10</sup> (d)
Magnetic field ramp,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



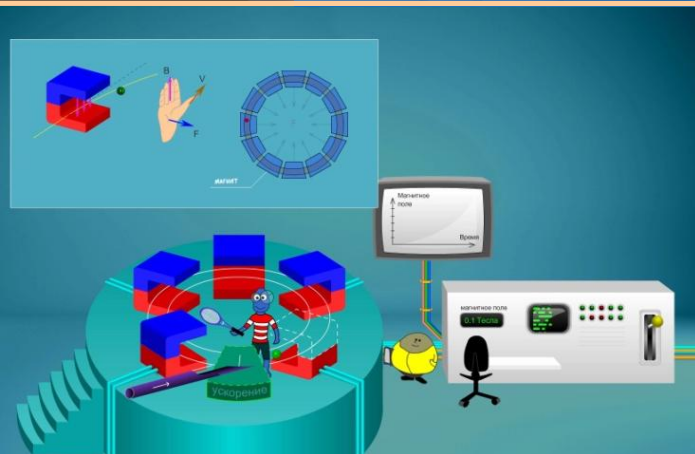
Parameters



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

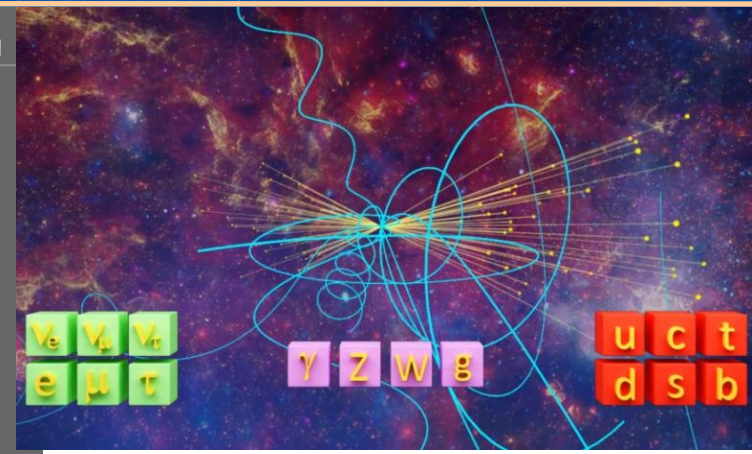


# 'NICA Mega-science project' video lesson



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



# Videoconferences with JINR for schools



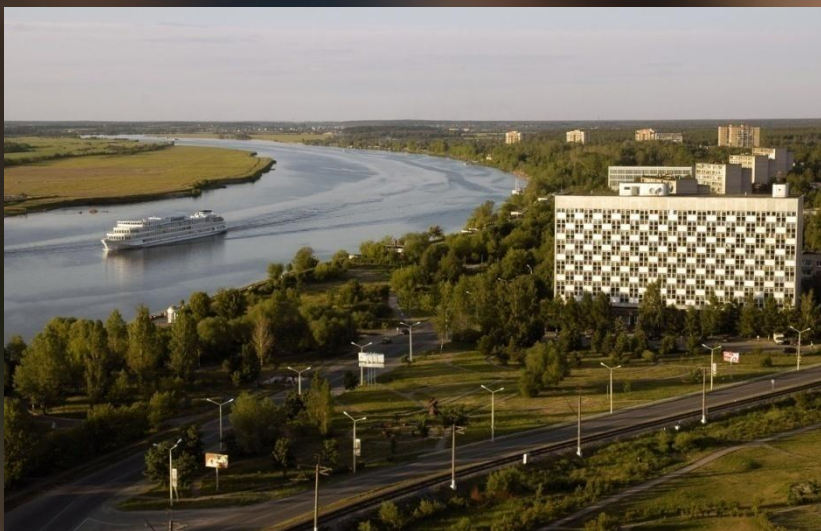
# Science brings nations together



# Science brings nations together



# Thank you for your attention



Welcome  
to Dubna