



JINR

PROGRAMMES ON ACADEMIC TRAINING



Outreach
activities



Skill
improvement



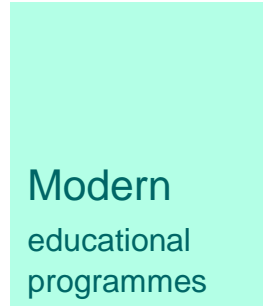
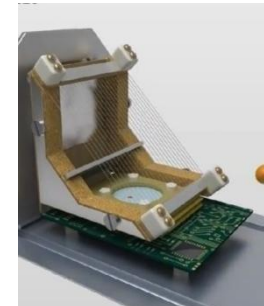
School
teachers



Students &
postgraduates



Training
of engineers



Modern
educational
programmes

Joint Institute for Nuclear Research

Research fields

- Theoretical physics
- Particle physics
- Nuclear and heavy ion physics
- Neutron physics
- Condensed matter physics
- Radiation biology and medical physics
- IT and high performance computing





STUDENTS & POSTGRADUATES

International Student Practices
uc.jinr.ru (*events*)



Summer Student Programme
students.jinr.ru



Bachelor's, Master's & PhD
theses at JINR

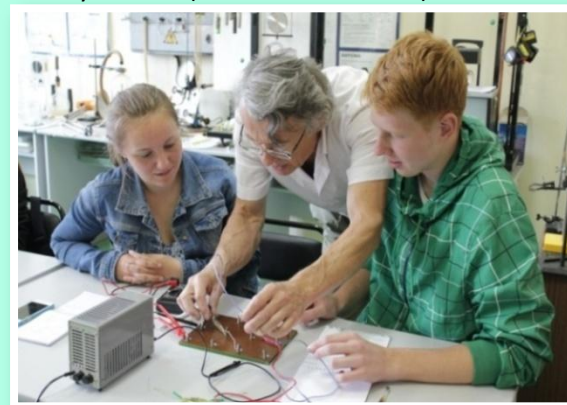
OUTREACH ACTIVITIES

International Scientific Schools
for Physics Teachers at JINR and
CERN
teachers.jinr.ru



For School Students

- Visits
- Video conferences
- Days of Physics
- Interschool Course of Physics and Maths
- Physics Lab (hands-on activities)





Bachelor's, Master's & PhD theses at JINR

JINR has the departments of the following universities

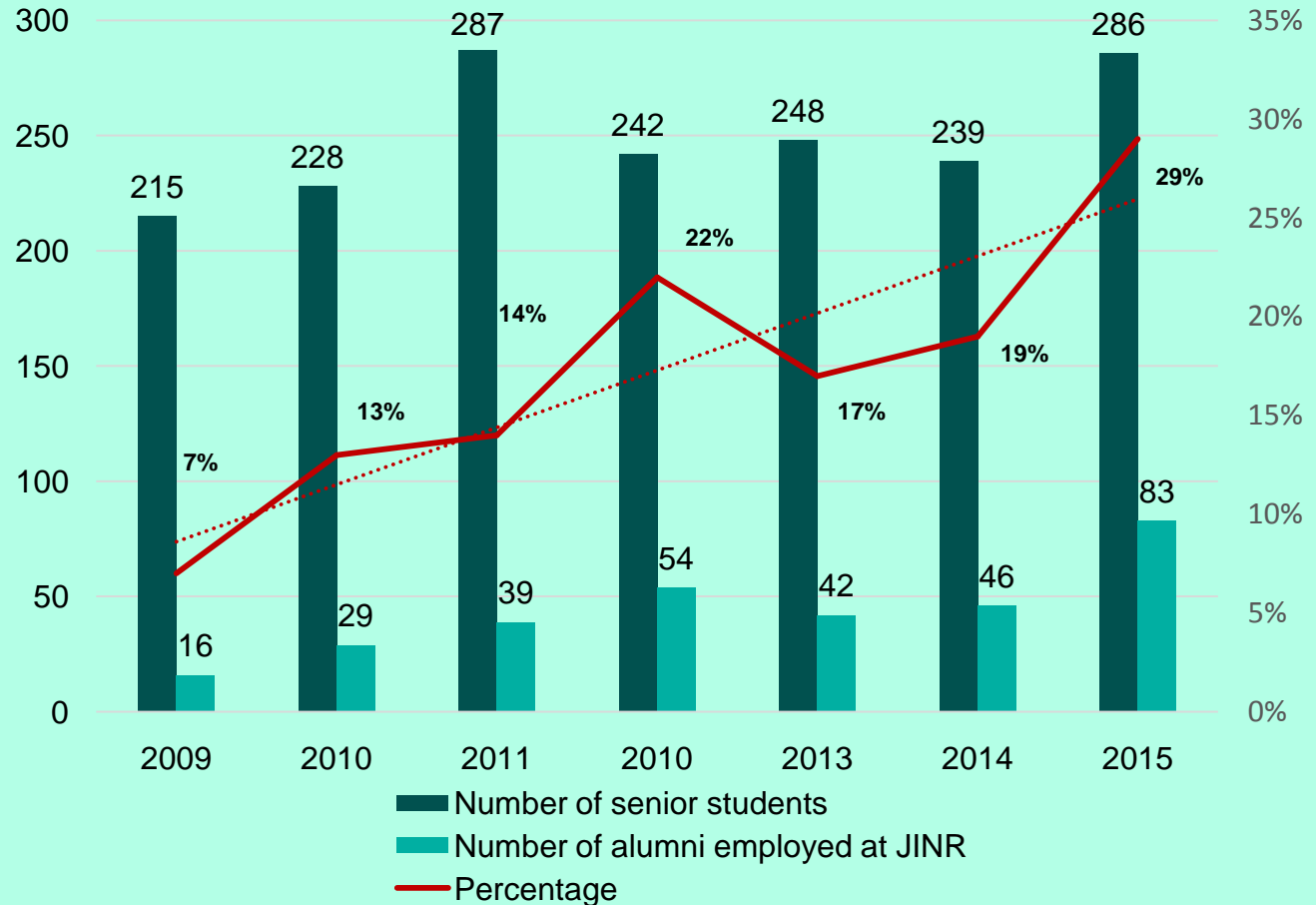


SAINT PETERSBURG
STATE UNIVERSITY

We enable students and postgraduates from the Member States Universities to prepare their qualifying papers at JINR

Students at JINR. Statistics

Comparison of the number of senior students with the number of alumni employed at JINR



Individual Education Plan

PRODZIEKAN ds. NAUCZANIA
Wydziału Fizyki PW
Rutkowska
dr hab. inż. Katarzyna Rutkowska

Approved
Vice-Dean of the Faculty of Physics
Warsaw University of Technology
Rutkowska K.
Rutkowska
« 23 » 11 2016r.



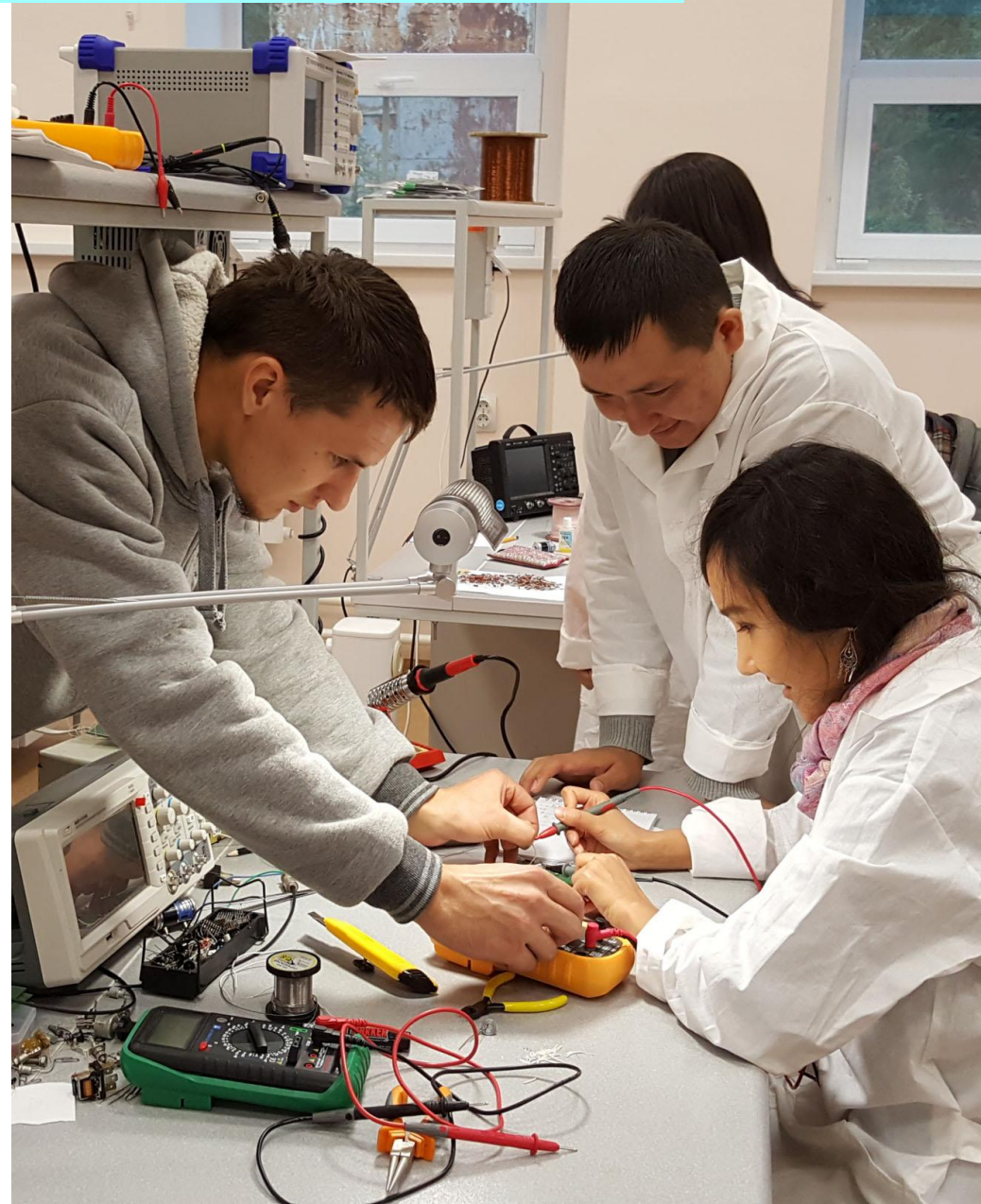
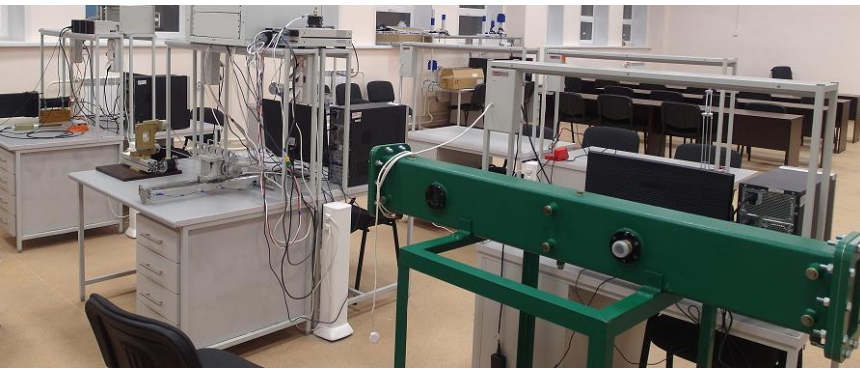
Approved
Director of the JINR University Centre
Pakulyak S. Z.
Pakulyak
« 26 » 10 2016r.

Individual Teaching Plan
Autumn semester 2016/2017.
Second-year student of the Faculty of Physics, Warsaw University of Technology
Dąbrowski Daniel

Course	Examination form (exam/test)	Substitute course	Teacher	Examination form (exam/test)
Physics of nuclei and elementary particles (Fizyka jądra i cząstek elementarnych)	exam	Theory of atomic nuclei and atomic models (Теория атомных ядер и атомные модели)	Jolos R. V.	exam
Laboratory of nuclear physics and technology (Laboratorium fizyki i techniki jądrowej)	test	Methodology of gamma spectroscopy (Методика гамма-спектроскопии)	Sobolev Ju. G.	test
New solutions in nuclear energetics (Nowe rozwiązania w energetyce jądrowej)	exam	Nuclear reactors and nuclear energetics (Атомные реакторы и ядерная энергетика)	Kiselev M. S.	exam
Elective course (Przedmiot obieralny)	test	Vacuum Technology (Вакуумная техника)	Nozdrin M. A.	test
Elective course (Przedmiot obieralny)	test	Accumulation and processing of experimental data in particle physics (Накопление и обработка экспериментальных данных в физике частиц)	Rogachevsky O.V.	test

Hands-on workshop for future engineers

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



Main directions:

- Development of training programmes
- Acquisition of practical skills
- Enhanced training

Linac-200 at JINR



100 MeV electrons now
800 MeV by 2020

Current in bunch – **15 μ A**

Bunch width – **2 μ s** Bunch frequency – **10-250 Hz**

Focal spot ~ **1 mm** can be defocused up to **20 mm**

'Training' beam – **22 MeV**

Future plans: Series of training courses at Linac-200

- Accelerator and beamline operation
- Beam diagnostics
- Magnet optics
- Detector response to the electron beam and gamma rays

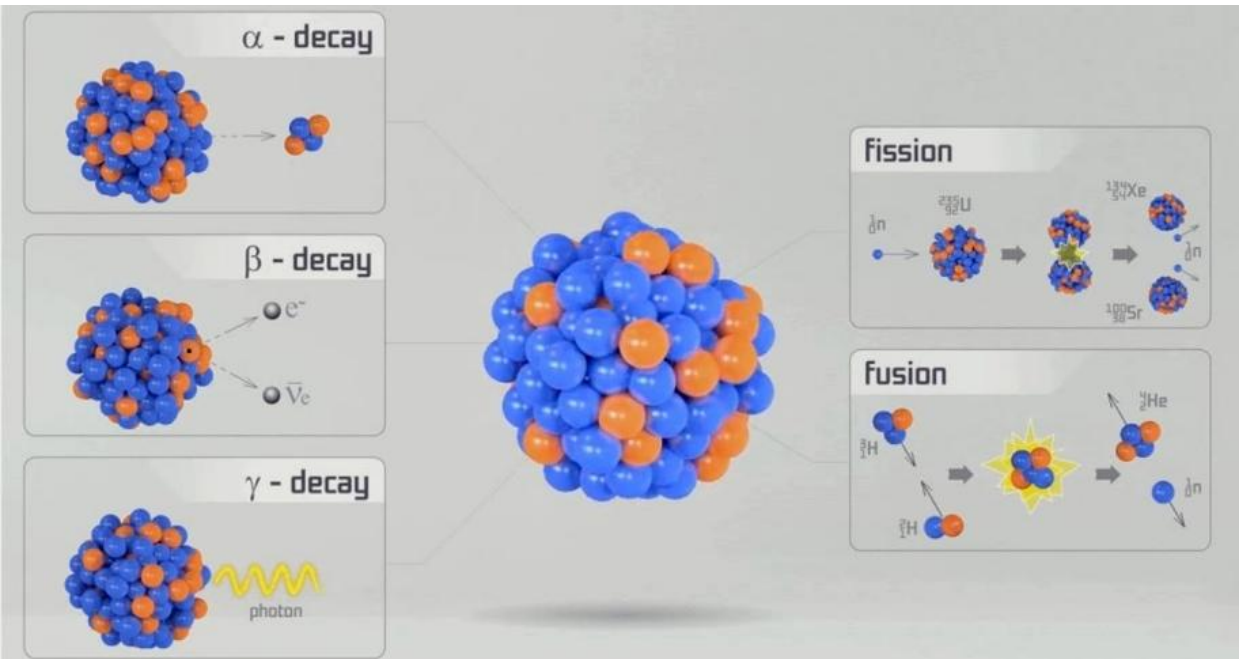
Key ideas:

- Thematical blocks lasting 1-3 weeks
- Online booking available
- Creative unsupervised work encouraged
- Discussion sessions with the qualified scientists and engineers
- Technical assistance provided
- Use of e-Learning techniques
- All the materials available both in English and Russian

Perspectives:

- Synchrotron radiation (provided the Linac energy raises up to 800 MeV)
- Radiation processing technology and materials science, radiobiology
- 'Toy' physics experiments: study of giant dipole resonance, electron scattering in atomic nuclei, nuclear form-factors, etc.

Virtual Laboratory of Nuclear Fission



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

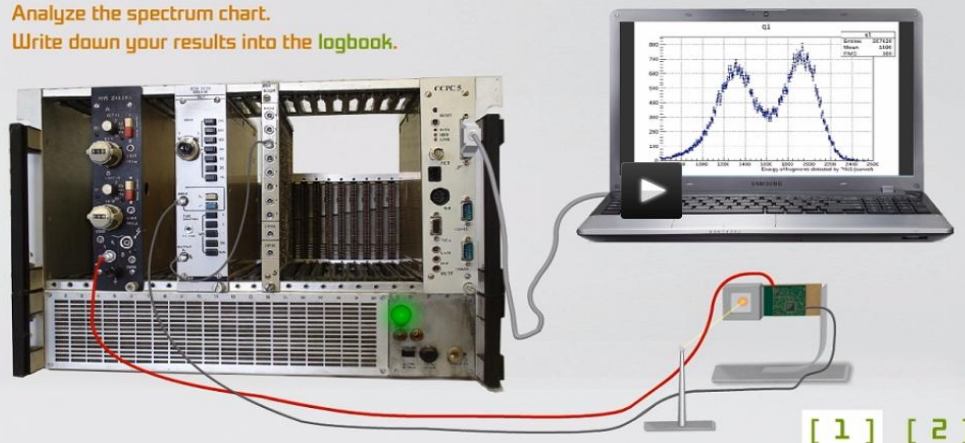
Virtual and online laboratory research

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.

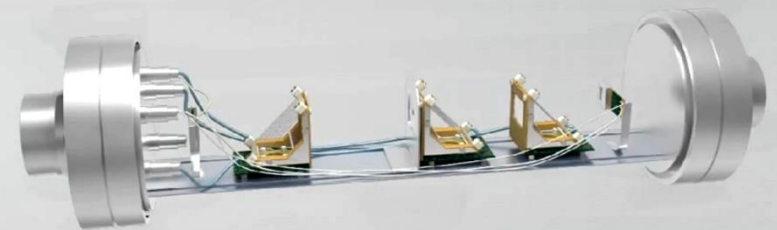
Analyze the spectrum chart.

Write down your results into the logbook.



Virtual Laboratory of Nuclear Fission

Light Ion Spectrometer (LIS)



International 3-week student practices

Started in **2004**

Total number
of participants – **1267**

Practice participants

- build a picture of the JINR fields of research
- can work at the basic facilities of the Institute under supervision of the leading experts
- have an opportunity to choose a future research supervisor
- make fruitful contacts
- enjoy the Russian culture



1 stage, May
Egypt, RSA

2 stage, July
Bulgaria, Poland,
Romania, Slovakia,
Czech republic, Azerbaijan

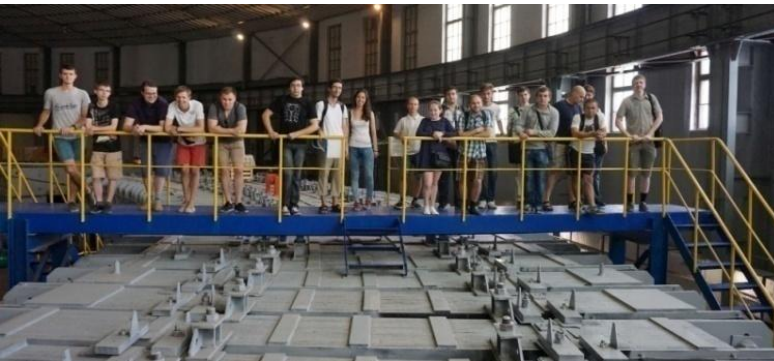
3 stage, September
RSA, Egypt, Belarus,
Cuba, Serbia

Summer student programme

Started in **2014**

Total number
of participants – **79**

- Competitive selection
- Longer term (6-8 weeks)
- Advanced level of projects



International scientific schools for physics teachers at JINR and CERN

Basic components:

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

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!**



Schools at JINR



Bringing Science
closer to School



Schools at CERN



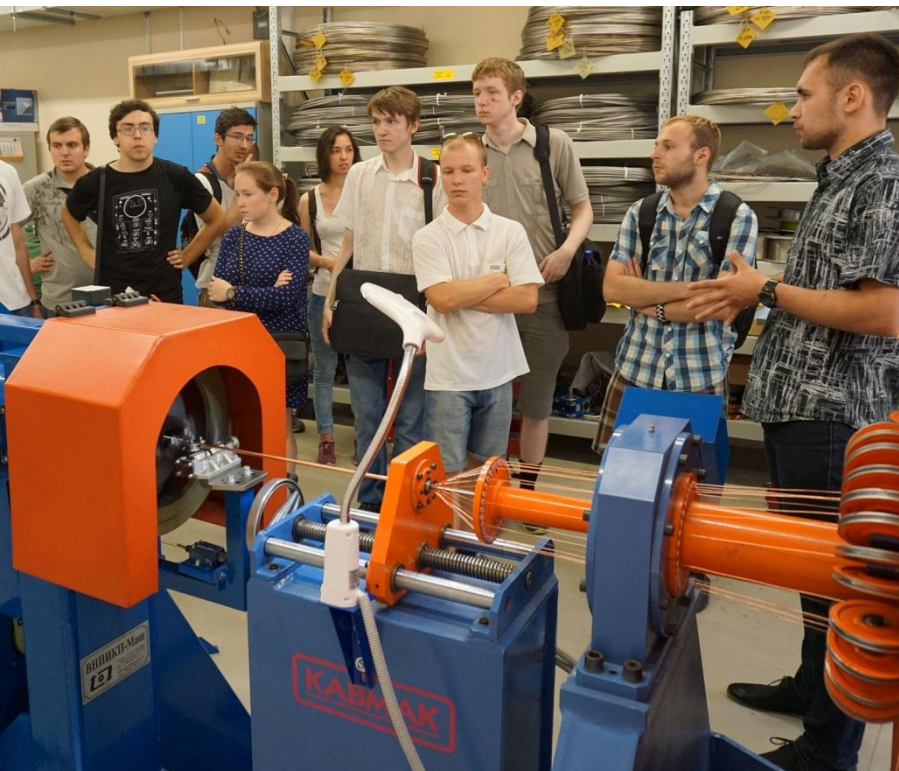
Popular lectures on modern science



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



Visits to the JINR labs



for students and teachers



Executive Summary

- International Student Practice – a good opportunity to get familiar with JINR, to find a research direction you like and to get in touch with your future supervisor
 - and a perfect opportunity to communicate with your colleagues from other countries!
- If you want to come in future to JINR to prepare your BSc/MSc/PhD thesis, first contact the Plenipotentiary of your country
 - second, please contact the University Centre
- If you have any brilliant ideas/suggestions/just comments on JINR's education activities (including Outreach) please, tell us about that 😊