National Research Nuclear University MEPhI
(Moscow Engineering Physics Institute)

Institute of Nuclear Physics and Engineering

Modern detectors for cosmic irradiation

Direction: **03.06.01 Physics and Astronomy**
Scientific specialty: **01.04.01 Instrumentation and methods of experimental physics**
Program: **Modern detectors for cosmic irradiation**
Certificate, degree or qualification: **Researcher, Lecturer-researcher**
Language of instruction: **English**
Duration and mode of study: **4 years, full-time**
Program curator: **Konstantin Belotsky**

Graduation department: Department of Experimental Nuclear Physics and Cosmophysics (#7); Department of Experimental Methods of Nuclear Physics (#11); Department of Elementary Particle Physics (#40); Scientific and educational center NEVOD (607)

The purpose of the program: is preparation of highly qualified specialists familiar with modern experimental nuclear physics, holding methodology and experimental skills to work with modern scientific equipment and capable of carrying out research work in different cosmic, colliders and accelerators experiments, including the preparation of the experiment under a specific scientific problem and its conduction, interpretation of the results (data analysis) as well as having a universal and subject-specialized competencies, promoting social mobility and stability in the labor market.

Scientific work can include:

- development and improvement of methods and techniques of physical experiments in the field of medium- and high-energy physics;
- preparation and carrying out of the experiments in this field, the interpretation of their results;
- addressing the fundamental problems of astrophysics and particle physics related to space physics, dark matter and "dark energy" and others.

Area of of professional activity: the training of PhD-students is focused on their research work in the field of particle physics, astrophysics and cosmophysics. PhD-students can participate in the preparation and carrying out of various international experiments in particle physics and cosmic rays, including physical analysis. They can also take part in theoretical research in the field of particle registration at accelerators and in the interpretation of experiments (at accelerators, in astrophysics. etc)

Objects of professional activity: experimental nuclear and elementary particle physics, cosmophysics, with a focus on the experiments at nuclei and elementary particles accelerators, such as the Large Hadron Collider (Geneva, Switzerland), Russia's new collider the NICA (Dubna, JINR), T2K (Japan) and others, as well as the development of instruments and methods for the respective research purposes.

Features of the curriculum: the curriculum, in addition to the mandatory humanities, includes the special courses "Setting and conducting experiments on accelerators and colliders" (an introduction to modern methods and tools of experimental research in the field of accelerator high energy physics, with the largest current and past experiments), "Special experimental data treatment methods "(introduction to the basic statistical approaches and specific experimental data processing algorithms), as well as the basic course "Modern particle detectors " (in-depth study of the principles of operation and application of modern gas, scintillation, semiconductor, Cerenkov radiation detectors in experimental nuclear physics, elementary particle physics and high energy physics). Graduate students have the opportunity to choose specialization training, focused on the development of methods and equipment for research and development of data processing methods.

List of enterprises for practical training: Moscow Engineering Physics Institute, the International Centre for Particle Physics CERN (Switzerland), BNL (USA), Research Center "Kurchatov Institute", INR RAS, JINR (Dubna), SIC CI IHEP (Protvino) and ITEP, LPI, DESY (Germany), Institute of Cosmic Explorations and others.