

High energy physics

National Research Nuclear University MEPhI (Moscow Engineering Physics Institute)

Degree or qualification is awarded: **Researcher. Lecturer-researcher**

Language of study: **Russian, English**

Mode of study: **full-time**

Duration: **4 years**

Availability of free education: **yes**

Price: **325 000 rubles per year**

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The purpose of the program: the training of highly qualified specialists familiar with the high-energy physics (including particle physics, physics of high-energy processes in the early and modern Universe), capable of carrying out scientific research (i) for experiments at accelerators, including their preparation for specific scientific task and interpretation of their results (data analysis) (ii) on the solution of the fundamental problems of cosmology and particle physics related to the description of the early universe, dark matter and dark energy, etc.

Research work may include:

- development and improvement of experimental techniques in the field of high energy physics, preparation and carrying out of the experiment in this field, the interpretation of its results;
- addressing the fundamental problems of cosmology and particle physics related to the description of the early universe, dark matter and dark energy, and others.

MEPhI divisions for training: Department of Experimental Nuclear and Cosmic Physics (№7), Department of Experimental Methods for Nuclear Physics (№11), Department of Elementary Particle Physics (№40), Center NEVOD (№607)

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

Objects of professional activity: elementary particle physics and cosmology with a focus mainly on experiments at accelerators (Large Hadron Collider, etc.), physics of the early Universe, the nature of dark matter and dark energy, the theory of gravity including extra dimensions, as well as the development of instruments and methods for relevant research.

Features of the curriculum: The curriculum, in addition to the mandatory humanities, contains a special course on "High Energy Physics", consisting of three independent parts: "Astrophysics and Cosmology" (introduction to the modern state of the knowledge about the evolution and structure of the Universe, the physics of stars and their evolution, cosmic ray astrophysics), "Fundamental interactions" (introduction to the current state of research in the physics of fundamental interactions of elementary particles) "Experiment" (introduction to modern methods and tools of experimental research in the field of high energy physics at accelerators, also to the main current and past experiments). PhD-students have the opportunity to select the direction of training, focused on experimental or theoretical research. Experimental area relates mainly to experiments at accelerators (Large Hadron Collider, etc.). Theoretical direction is connected with the research on the physics of the early universe, dark matter and dark energy, the theory of gravity.

List of enterprises for practical training: Moscow Engineering Physics Institute, the International Centre for Particle Physics CERN (Switzerland), BNL (USA), Research Center "Kurchatov Institute", an international laboratory of

Gran-Sasso (Italy), JINR (Dubna), SIC CI IHEP (Protvino) and ITEP, LPI, DESY (Germany) and others.

Specializations within this programme