

# Nuclear Physics and Cosmic Physics (in English)

National Research Nuclear University MEPhI (Moscow Engineering Physics Institute)

Degree or qualification is awarded: **Master degree**

Language of study: **English**

Mode of study: **full-time**

Duration: **2 years**

Availability of free education: **yes**

Price: **207 610 rubles per semester**

Programme curator: **Valeriy V. Dmitrenko**

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**Field of study:** "Nuclear Physics and Technology".

**Duration of training:** 2 years, 120 credits.

**Course delivery language:** russian & english.

**Basic department:** Experimental Nuclear Physics and Cosmic Physics (No. 7).

Information about the leader of the program: M. Danilov, Head of the Department, corresponding member of the Russian Academy of Sciences, Doctor of Sciences, Professor, Deputy Director of Research of the Institute for Theoretical and Experimental Physics.

The goal of the program (brief description of the program), focused on solving problems of the industry. The purpose of the program is the staffing, scientific and innovative provision of the nuclear industry and other high-tech industries in the field of experimental nuclear physics and cosmic physics for the real world of large-scale physics experiments with the use of modern information technology with open access to experimental equipment and received data. It is planned to train highly qualified scientific personnel with robust engineering skills to work at Rosatom enterprises, institutes of the Russian Academy of Sciences, the Russian Federal Space Agency, and Ministry of Defense organizations, and to continue education in a graduate school.

Competitive advantages of the program. Highly efficient preparation of masters at the department provides tight integration of science and education, and promotion on its basis of effective educational and research activities; aiming at ensuring the effective transfer of technologies to the economy; and conduct of fundamental and applied research in a wide range of priority areas of science, technology, and critical equipment in the Russian Federation. Education is based on the organic combination of teaching and research work of students in the real world of modern physics experiments in the priority areas of basic and applied research. The Master's Program provides information and imparts skills on the use of methodological advances in the field of nuclear physics, accelerator physics, high-energy cosmic physics, and space physics research. Obtained in the course of the study, competence allows graduates to conduct research in interdisciplinary areas (non-accelerator high-energy physics, monitoring of geophysical and heliophysical environments by nuclear physics methods, medical physics and radiology). The curriculum contains the study of basic and special courses in nuclear physics and cosmic physics, including subjects in English language, in addition to lectures, seminars and laboratory works, participation in real scientific research and R & D department in the SEC "Micro- and Cosmic Physics" named after V. G. Kirillov-Ugryumov, in other parts of MEPhI and research and production facilities. Training at leading research centers in Italy, France, the United States, and Japan is provided as part of joint scientific works.

Characteristics of the scope and objects of professional activity of graduates. The sphere of professional activity of graduates is the design, development, and metrology of equipment for detection of hard electromagnetic and corpuscular radiation for use under extreme conditions (at nuclear facilities and in open space, deep exploration, nuclear medicine, etc.). The objects of future career of Masters can be organizations and enterprises of Rosatom, the

Russian Academy of Sciences, the Russian Federal Space Agency, the Ministry of Defense, the Ministry of Education and Science, and Russian Federal Research Centers and also postgraduate studies in the field of 01.04.01 and 01.04.16 specialties. Graduates will be able to model, design and build devices and equipment for carrying out experiments in nuclear and cosmic physics, collect, process and analyze results of such experiments.

Brief description of the curriculum (specify the features, benefits). The curriculum includes the study of basic and advanced courses in the field of nuclear physics and cosmic physics, including, in addition to lectures, seminars and laboratory works, participation in real scientific research and R&D in the SEC "Micro- and space physics" named after V.G. Kirillov-Ugryumov, in other parts of MEPhI, as well as leading scientific and manufacturing facilities in various fields of science and industries.

The base of industrial and/or scientific practice. The bases of the industrial and scientific practices are the Institute of Space Physics (INCOS), the Institute of Astrophysics (INASTRO), REC NEVOD, Laboratory of Fundamental Interactions, Radiation Laboratory, members of the SEC "Micro- and space physics", other units of MEPhI, as well as enterprises of Rosatom (Dukhov All-Russia Research Institute of Automatics, Russian Federal Nuclear Center – All-Russia Research Institute of Experimental Physics, Russian Federal Nuclear Center – All-Russia Research Institute of Technical Physics), the Russian Academy of Sciences (Lebedev Physical Institute, Space Research Institute, and Institute for Nuclear Research), Alikhanov Institute for Theoretical and Experimental Physics, Research and Production Corporation "Space Monitoring Systems, Information & Control and Electromechanical Complexes" named after A. G. Iosifian, etc.

## **Specializations within this programme**