

# Mathematical Physics and Mathematical Modeling

National Research Nuclear University MEPhI (Moscow Engineering Physics Institute)

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

Language of study: **Russian**

Mode of study: **full-time**

Duration: **2 years**

Availability of free education: **yes**

Price: **155 610 rubles per semester**

Programme curator: **Sergey V. Ivliev**

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**Objectives:** Prepare Master able to work successfully in the field of theoretical and mathematical physics, with general and subject-specialized competences, contributes to their social mobility and stability in the labor market.

**Terms of development of the program:** the internal form of training: on the basis of a bachelor degree or specialties - 2 years.

**Basic departments:** "The Department of Theoretical Nuclear Physics» (№ 32); Popov YP program leader, Dr., Professor, Corresponding Member of the Russian Academy of Sciences.

**The area of professional activity of graduates:** research work in physics, based on the wide use of methods of theoretical and mathematical physics and mathematical modeling, theoretical studies of the physical laws in the natural and technical systems, numerical experiment, interpretation and planning of modern numerical experiment, engineering calculations .

**Objects of professional activity:** models, methods and tools for fundamental and applied research and development in the field of mathematics, physics and other natural sciences on the subject of activity profiles; atoms, molecules and nanostructures, atomic nucleus, classical and quantum fields, elementary particle and plasma condensed state of matter, lasers and applications, mathematical models for theoretical and numerical study of phenomena and laws of physics in the areas mentioned above.

**Features of the curriculum:** The main feature of the educational process of preparation is the fundamental physical and mathematical and engineering preparation, which allows you to master the main basic and special disciplines. Part of the curriculum is also implemented in English.

**The research work of students** is carried out in close connection with the work carried out at the department and research organizations State Corporation "Rosatom" and the Russian Academy of Sciences. The curriculum includes subjects of fundamental theoretical physics, continuing education program for Bachelor's trajectory, "Theoretical physics", research, scientific, educational and pre-diploma practice and preparation of the master's thesis. Disciplines fundamental course of theoretical physics studied by 1-2 semester graduate include the theory of elementary particles, the methods of statistical physics, additional chapters of quantum field theory and general relativity, as well as courses on mathematical and computational methods of modern theoretical physics, "Topological methods in physics ", " Modern problems of nuclear physics "and" Computer modeling in theoretical physics. " Special courses of the Master's program includes theory and numerical methods in plasma physics and astrophysics, computational methods of gas dynamics, quantum-statistical model of the dense plasma, wave propagation in random media and nonlinear electrodynamics.

**The list of enterprises for practical training and employment of graduates:** Russian scientific centers; Rosatom; RAS institutes, such as the VNIIEF, VNIITF, Kurchatov Institute, Research Institute of Automatics. NL Dukhov, LPI, ITEP and others. Graduates of the Master's, successfully mastered the program, they will be required in research institutes and research centers involved in experimental and theoretical research in the field of solid state physics, plasma, laser physics, physics of combustion and explosion, astrophysics and cosmology.

## **Specializations within this programme**

### **Applied Mathematics and Physics**

Objects of professional activity:

Models, methods and tools for basic and applied research and development in the fields of mathematics, physics and other natural sciences on profiles of objective activity; atoms, molecules and nanostructures, atomic nucleus, classical and quantum fields, elementary particles and plasma, condensed matter, lasers and their applications, mathematical models for the theoretical and numerical studies of phenomena and laws in the above mentioned fields of physics.