

# Physics of Nonequilibrium Atomic Systems and Composites

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: **196 820 rubles per semester**

Programme curator: **Vladimir D. Borman**

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**The objectives:** to prepare graduates to research and industrial activities in the field of physics of kinetics phenomena; at the stage of study, to provide novel natural sciences and professional knowledge, specialized competencies; and to give graduate skills in the professional field and prepare for admission to the graduate school.

## **Specialty areas:**

- numerical modeling of heat transfer in a multi-stage selective separation units;
- design of molecular-selective devices;
- design, development, and characterization of advanced nano-structured materials for the separation, analysis of materials with mass spectrometric and optical methods;
- development of working drawings, installation, commissioning and maintenance of experimental facilities;
- metrological support of measurements.

## **The objects of professional activity:**

- technologies of the nuclear fuel cycle and isotope separation technology and simulation of processes occurring in them;
- membrane modules;
- numerical simulation of heat transfer in a multi-stage selective separation units, materials and technology of separation systems;
- new composite materials.

## **Brief description of the curriculum.**

The curriculum retains the traditional fundamental knowledge principles of engineers training and includes physical, mathematical and engineering disciplines. It also includes a lot of special disciplines, for example, "Physical kinetics of atomic processes in nanostructures", "Numerical methods in fluid dynamics", "Methods of studying the structure of porous media", "Surface Physics", "Laser and plasma isotope separation methods". Part of the curriculum is also implemented in English. Essential significance in the learning process is assigned to scientific research, in which students gain experience in seeking and analyzing scientific and technical information on the subject of research, modeling processes and objects using the standard programs for computer design and research, carrying out experiments and developing techniques of research, describing and analyzing research results; and developing physical models of the processes under study. Particular attention is paid to the preparation of research results for compiling reviews, reports and scientific publications, patenting and implementation of results of research and development into practice.

## **Organizations for practice:**

- National Research Nuclear University MEPhI;
- National Research Centre "Kurchatov Institute";
- Russian Federal Nuclear Center – Zababakhin All-Russia Research Institute of Technical Physics;
- Topchiev Institute of Petrochemical Synthesis of the Russian Academy of Sciences;

- Dukhov All-Russia Research Institute of Automatics;
- National Research Institute of Physicotechnical and Radio Engineering Measurements;
- Leading Research Institute of Chemical Technology;
- State Scientific Center of the Russian Federation "Central Research Institute of Chemistry and Mechanics".

**Information about the leader of the program:** V.D. Borisevich, Doctor of Sciences, Professor of Molecular Physics Department

## **Specializations within this programme**