

Prospective laser and plasma systems and radio photonics

National Research Nuclear University MEPhI (Moscow Engineering Physics Institute)

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

Language of study: **Russian**

Mode of study: **full-time, part-time**

Duration: **4 years**

Availability of free education: **yes**

Price: **316 290 rubles per semester**

Programme webpage at the university website:

http://eis.mephi.ru/AccGateway/index.aspx?report_url=/Accreditation/program_annotation&report_param_pid=73

Programme curator: **Alexey P. Menushenkov**

Tel.: **Contact name: Olga N. Petukhova, Phone number. +74957885699, ext. 8045**

E-mail: ONPetukhova@mephi.ru

Field of study: "Nuclear Physics and Technologies".

Duration of training: 4 years, 240 credits.

Course delivery language: russian.

Basic department: Physics of Solid State and Nanosystems (No. 70).

Goal of the Bachelor Program: training of specialists in condensed matter physics, including solid state physics, physics of superconductivity, physics of semiconducting devices, physics of nanostructures, laser physics, spintronics, photonics.

The area of professional activity of the graduates of the Bachelor Program "Solid State Physics and Photonics" includes scientific research, project activity, engineering, manufacturing, and managerial activities at institutes and enterprises of the Ministry of Education and Science, the Ministry of Defense, the Russian Academy of Sciences, National Research Centre "Kurchatov Institute", Troitsk Institute for Innovation and Fusion Research, and MEPhI, as well as at innovative science intensive business enterprises.

The programs for which the training of personnel is planned: "Training of Personnel for Scientific Centers", "Nuclear Power Technologies of New Generation for the Period of 2010-2020", "Program of Innovation Development of the State Atomic Energy Corporation "Rosatom", "National Technological Base", etc.

The curriculum of the Bachelor Program includes serious fundamental training in physics and mathematics and is focused on training of students to work both at leading research centers and institutes of the industry (enterprises of State Atomic Energy Corporation "Rosatom", Ministry of Defense, Russian Academy of Sciences) and in small high-tech business. Professional activity of bachelors is concerned with the study and application of new solid state phenomena, development of high-power laser facilities, study of the structural, electronic, and optical properties of new materials and heterostructures, pico- and femtosecond spectroscopy; sensors of ultralow concentrations of chemicals. For this purpose, the curriculum of the Bachelor Program includes a wide range of both theoretical courses and laboratory practical works on solid state physics, laser physics and physics of nanosystems. The computer practical training provides the skills of numerical solution of modern problems of condensed matter physics and the skills of a competent presentation of their results in the form of scientific publications. Among the courses are "Condensed Matter Physics", "Magnetic Properties of Solids", "Theoretical Solid State Physics", "Photonics", "Wave Optics", "Spectroscopy", "Fiber Optic Communication Lines", and "Experimental Methods for Studying Nanostructures".

The practices include:

- educational activity (during the weeks of theoretical education at the 7th semester);
- practical training (2 weeks: from June 29 to July 12 at the 3rd year of the Bachelor study);

- pregraduation experience (3 weeks: 11 May to 31 May at 4th year of the Bachelor study).

The list of institutions for practices include:

- National Research Centre "Kurchatov Institute", Troitsk Institute for Innovation and Fusion Research, as well as innovative science intensive business enterprises.
- Rosatom enterprises: Dukhov All-Russia Research Institute of Automatics, Russian Federal Nuclear Center – All-Russia Research Institute of Experimental Physics (Sarov); Institutes of the Russian Academy of Sciences: Lebedev Physical Institute, Prokhorov Institute of General Physics, Shubnikov Institute of Crystallography, Joint Institute for High Temperatures, Physico-technological Institute, Institute of Solid State Physics, Institute of Radio Electronics, etc.
- Organizations of the Ministry of Education and Science and the Ministry of Defense.

Specializations within this programme

Nuclear Physics and Technologies

The objects of the professional activity of the graduates are, among others, actual problems of condensed-matter physics and superconductivity; physics of nanosystems; nanoelectronics and spintronics; interaction of laser radiation with matter; physics of laser plasma; photonics, nonlinear optics, fiber-optical systems, pico- and femtosecond spectroscopy; physics of systems with strong electron correlations, physics of semiconductors and dielectrics; alloys with shape memory effect; and sensors of ultra-small concentrations of various chemicals.