

Carbon photonics (Laser 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**

Programme curator: **Prof. Votaly Konov**

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The purpose of the program: Formation of highly qualified personnel with deep knowledge of the physical laws of interaction of optical radiation with carbon and carbon like materials, including various types of nanostructures and photonic crystals, as well as knowledge of methods of synthesis and study of these materials and skills to use them in the given conditions.

Area of professional activity: Laser micro- and nano technologies, interaction of radiation with carbon and carbon like materials, optics, spectroscopy, and colloid chemistry, photonics.

Objects of professional activity: In recent years, with the development of plasma-chemical, and other technologies it has become possible to synthesize of known forms of carbons, such as diamond, the superior or novel properties and at lower cost, or to create previously unknown optical carbon materials. They called the new carbon materials, and these include, first and foremost, and synthetic poly and single crystal CVD diamond films and plates, single-walled carbon nanotubes, graphene, and nanodiamonds.

Studies of these materials in recent years has rapidly developed in the print appear hundreds of publications annually, while industrial production and use only unfold. The most promising prospects for the practical use of new carbon materials have as elements and electronic devices, photonics, mechanical engineering, medical technology. This demonstrated that the laser light is a unique tool for micro- and nanostructuring, modifying the properties of such materials.

All this leads to the need for training of highly qualified personnel, able to carry out the synthesis of a variety of carbon materials and structures of various methods of laser processing, as well as the subsequent diagnostics by optical and electron microscopic methods.

Features of the curriculum: The educational process is based on a combination of deep fundamental physical and mathematical and engineering preparation. Ph.D. program along with a mandatory component of the base includes a unique author's specific courses that meet the advanced level of science. Educational, scientific and graduation qualifying work carried out on the modern, including the unique technological equipment. To teaching and Ph.D. scientific advising attracted leading scientists base organization - the Center of Natural Sciences of A. M. Prokhorov General Physics Institute of Russian Academy of Sciences. The Ph.D. students have an excellent opportunity to participate in numerous international conferences, research projects, internships at leading foreign research centers, as well as realize itself in terms of the implementation of their results in the creation of new elements, devices and equipment via a network of small innovative enterprises related to basic organization and headed its senior staff.

The list of enterprises for practice and employment of graduates: A. M. Prokhorov General Physics Institute, P. A. Lebedev Physics Institute and other institutes of RAS, leading research universities and medical centers.

Specializations within this programme