

# Condensed Matter Physics

## Far Eastern Federal University

Degree or qualification is awarded: **Candidate of Sciences**

Language of study: **Russian**

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

Duration: **4 years**

Availability of free education: **yes**

Price: **320 000 rub a year (full-time) / 160 000 rub a year (part-time)**

Programme webpage at the university website:

<https://www.dvfu.ru/upload/medialibrary/a06/%D0%9F%D0%B5%D1%80%D0%B5%D1%87%D0%B5%D0%BD%D1%8C%20%D0%BF%D1%80%D0%BE%D0%B3%D1%80%D0%B0%D0%BC%D0%BC%20%D0%B0%D1%81%D0%BF%D0%B8%D1%80%D0%B0%D0%BD%D1%82%D1%83%D1%80%D1%8B,%20%D0%BE%D0%B1%D1%8A%D1%8F%D0%B2%D0%BB%D0%B5%D0%BD%D0%BD%D1%8B%D1%85%20%D0%B2%20%D0%BD%D0%B0%D0%B1%D0%BE%D1%80%202020%20%D0%B3%D0%BE%D0%B4%D0%B0.pdf>

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The purpose of the educational program is to acquire the level of competencies necessary for the implementation of professional activities and preparation for the defense of a scientific qualification work (dissertation) for the degree of candidate of sciences, preparation of a graduate student for independent implementation of research activities in the field of condensed matter physics.

Tasks.

1. To develop the ability to critically analyze and evaluate modern scientific achievements, to generate new ideas in solving research and practical problems.
2. To train graduate students in the methods of research activities, the peculiarities of presenting the results of scientific activities in oral and written form.
3. To teach graduate students to choose and apply mathematical methods, computer modeling methods, as well as experimental research methods necessary to describe physical processes.

The area of professional activity of graduates who have mastered the postgraduate program includes solving problems that require the application of fundamental knowledge in the field of physics and astronomy, in the field of condensed matter physics, the physics of magnetic phenomena and the physics of nanosystems.

The objects of professional activity of graduates who have mastered the postgraduate program are: physical systems of various scales and levels of organization, the processes of their functioning, physical, engineering and physical, biophysical, physicochemical, physicomical and environmental technologies, physical examination and monitoring, physical systems of various scale and levels of the organization, the processes of their functioning. Particular attention in the training program is paid to nanostructured magnetic systems.

The types of professional activities for which the graduates who have mastered the postgraduate program are prepared: research activities in the field of physics and astronomy; teaching activities in the field of physics and astronomy. The postgraduate program is aimed at mastering all types of professional

activities for which the graduate is preparing. Already in the early stages of experimental and theoretical research, magnetic materials were used in practical applications. Nowadays, many dielectric ferrimagnets are widely used in radio electronics, microwave and computer technology. The currently intensively studied reversal of magnetization in thin films and the accompanying various physical phenomena are also of interest for the development of new technologies. Multiple reversals of magnetization in ferrimagnets with a complex type of exchange interaction open up prospects for the implementation of new principles of magnetic recording. The discovery of magnetization reversal in canted antiferromagnets stimulated the development of theoretical studies in the field of weak ferromagnetism. The peculiarities of the behavior of some magnetic objects may be useful for the interpretation of phenomena of a planetary scale; to explain the reversal of the magnetization of minerals and rocks, in addition to attracting such a global factor as the reversal of the Earth's magnetic poles, one should also take into account relatively simple physicochemical processes that can be modeled, including and computer, in laboratory conditions.

The choice of disciplines of the variable part (Physical foundations of condensed matter formation, Modern methods of experimental research, Physics of condensed matter, Magnetic properties of nanodispersed magnets, Physics of magnetic nanostructures, Theory of phase transitions) is justified by their scientific capacity, since they include all the advanced knowledge that is required modern scientist in his scientific work.

The peculiarity of the proposed program is that the maximum attention is paid to precisely these problems. Graduates of postgraduate studies will be in demand in the research institutes of the Russian Academy of Sciences and universities of the country. Specific organizations include the laboratories of nanostructures at Moscow State University, MEPhI; at MIPT, these are laboratories of quantum nanostructures and a laboratory for theoretical nanophysics.

### **Specializations within this programme**