

12.03.03 Photonics and Optical Informatics

Physics of Meta-Materials and Low-Dimensional Systems

Program objective:

training specialists to develop and apply new optical phenomena and materials in optoelectronics, mathematical modeling and experimental research of relevant phenomena and processes in nonlinear optics and solid state physics.

Research and training subject areas:

- Theoretical basis for non-linear optics of metamaterials and low dimensional systems;
- Physics of meta-materials and low-dimensional systems;
- Application and development of synchrotron methods for solving current problems of physics and technologies of condensed media;
- Laser fusion of functional materials and multilayer structures;
- Quantum modeling of condensed media;
- Energy-saving technologies of energetics with applying high-temperature superconductors;
- Shape-memory alloys: functional materials and micromechanical devices.

Curriculum features

- fundamental training in physics and mathematics;
- 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;
- laboratory practical training on solid state physics, laser physics and physics of nanosystems;
- computer practical training on numerical solution of topical challenges of condensed matter physics

an opportunity to publish research results and present them at national and international conferences scientific publications.