

11.06.01 Electronics, Radio Engineering and Communication Systems

Solid-State Electronics, Radioelectronic Components, Quantum-Effect Micro- and Nanoelectronic Devices

Graduation department: Department of Electronic Measurement Systems (№26)

Program objectives

Targeted training of high-qualified specialists to resolve the issues of the Federal Targeted Program "Development of Electronic Component Base and Radio Electronics".

Research and professional activities:

- research and development in the field of modern nanotechnology of electronics for creation electronic components, including planar technology of formation of multilayer metallization, plasma chemical deposition and etching technologies of dielectric coatings, nanolithography, atomic layer deposition, cluster planarization; research and development in the field of current transport and radiative processes in the organic semiconductor structures;
- realization of experimental research in the field of promising micro- and nanoelectronic devices, functional electronics, including based on the new principles - spintronics, single-electronics, functional electronics; development of mathematical functional models and parameters of electronic devices, taking into account the scattering and ballistic processes in the short-channel nanotransistors;
- quantum design of semiconductor heterostructures and devices of microwave electronics - nanotransistors, resonant tunneling diodes, etc .;
- development of epitaxial growth technologies of heterostructures for microwave, functional and optoelectronics, magnetic field sensors, temperature;
- research in the physics of radiation exposure and the effects of heavy charged particles on the materials and electronic devices;
- simulation and design of radiation-resistant electronic components of silicon, silicon-on-insulator and heterostructure electronics;
- design of specialized microcontrollers.

Curriculum ideological foundations:

1. Physics, technology and tools underlying in the creation of a modern electronic components are one of the most modern and high-tech areas of development, including the level of development of the state, are responsible for defense and security.
2. Development of scientific and human potential, their own high technologies in the field of materials and devices of modern electronics with the use of nanotechnology is an important priority for meeting the critical technologies of the Russian Federation, catching up the domestic technologies of world level.
3. In the Centre of nanostructured electronics a unique research-scale production line is formed for the creation of materials, technology development and pilot production prototypes of microwave devices, power and functional electronics based on non-silicon heterostructure materials, equipped with the latest technology and research equipment that provides the formation of a unique educational process with practical competence of graduates, conducting scientific research on the best world level.
4. Comprehensive training school for graduates, based on knowledges of the fundamental solid state physics, semiconductor structures, knowledge and skills to use modern nanotechnology in the production of electronic components, design skills and modeling studies of the properties of microwave devices, power and functional electronics is based.

Practical training and career opportunities

- State Corporation ROSATOM organizations
- institutes of the Russian Academy of Sciences
- NRC "Kurchatov Institute"
- companies, which manufacture and develop electronic components of micro- and nanoelectronics

companies that specialize and radiation-resistant electronics, including microwave electronics based on heterostructures (OJSC "Russian electronics")