ABSTRACT OF SCIENTIFIC SPECIALTY

1.3.4. RADIO PHYSICS

It provides for the study of the physical foundations and special issues of radiophysics in such areas as the development and research of devices for spin-wave electronics and radio photonics. It also describes how to use devices for processing and generating microwave signals.

Includes the following areas of research:

Development of new instruments for generating, amplifying and converting oscillations and waves of various nature (electromagnetic, acoustic, plasma, mechanical), as well as for studying autowaves in non-equilibrium chemical and biological systems. Development of new highly efficient sources of coherent radiation in the millimeter, submillimeter and optical ranges, technical development of new frequency and power ranges.

Development of new instruments and methods for studying linear and nonlinear processes of radiation, propagation, diffraction, scattering, interaction and transformation of waves in natural and artificial media.

Development and creation of new electrodynamic systems and devices for generating and transmitting radio signals: resonators, waveguides, filters and antenna systems in the radio, optical and IR ranges.

Development of new methods and creation of new instruments for the analysis of fluctuations, noise, random processes and fields in lumped and distributed stochastic systems (statistical radiophysics). Creation of new methods and instruments for the analysis and statistical processing of signals under interference conditions. Development of statistical methods for information transfer. Development of research methods for nonlinear dynamics, space-time chaos and self-organization in non-equilibrium physical, biological, chemical and economic systems.

Development of new methods and principles of active and passive remote diagnostics of the environment, based on modern methods for solving inverse problems. Creation of systems for remote monitoring of the geo-, hydrosphere, ionosphere, magnetosphere and atmosphere. Development of new methods for radio astronomical research of near and far outer space.

Development of new methods and creation of new wave technologies for the modification and processing of materials.

Development of new methods for creating communication systems, navigation, active and passive location systems based on the use

radiation and reception of wave fields of various physical nature and the development of new frequency ranges.

Development of the physical foundations for the generation, amplification and transformation of oscillations and waves of various nature (electromagnetic, acoustic, plasma, mechanical), as well as autowaves in non-equilibrium chemical and biological systems. Search for ways to create highly efficient sources of coherent radiation in the millimeter, submillimeter and optical ranges, technical development of new frequency and power ranges.

Studying linear And non-linear processes radiation, propagation, diffraction, scattering, interaction and transformation of waves in natural and artificial media.

Development and research of new electrodynamic systems and devices for generating and transmitting radio signals: resonators, waveguides, filters and antenna systems in the radio, optical and IR ranges.

Study of fluctuations, noise, random processes and fields in concentrated and distributed stochastic systems (statistical radiophysics). Creation of new methods of analysis and statistical processing of signals under interference conditions. Development of statistical bases for information transfer. Study of nonlinear dynamics, space-time chaos and self-organization in non-equilibrium physical, biological, chemical and economic systems.

Development of scientific bases and principles of active and passive remote diagnostics of the environment based on modern methods for solving inverse problems, as well as methods for remote monitoring of the geo-, hydrosphere, ionosphere, magnetosphere and atmosphere. Radio astronomical investigations of near and far outer space.

Development physical fundamentals new wave technologies modification and processing of materials.

Development of theoretical foundations for new methods and communication systems, navigation, active and passive location systems based on the use of radiation and reception of wave fields of various physical nature and the development of new frequency ranges.