


University	National University of Science and Technology MISIS
English proficiency	C1
Postgraduate program	Physics Specialization: Physics of condensed matter and applied physics
List of research projects	Participated in the implementation of research on 7 grants, including the head of research on three grants: RFBR (No 97-02-26706-3, No 01-01-00403-a, No 05-01-00215-a) and four grants: 97-0-4 3-185, RFBR (No. 97-02-26563-3, No. 98-01-00617-a).
List of possible research topics	<p>1. Selective laser processing of optically transparent materials in order to increase their optical and mechanical strength under high-power laser radiation.</p> <p>2. Formation of specified physical and mechanical properties of thin ribbons and films of amorphous and amorphous-nanocrystalline metal alloys by exposure to short-pulse laser radiation.</p> <p>3. Selective laser treatment of the surface of structural titanium metal alloys to form the required physical and mechanical properties of the surface.</p> <p>4. Formation of surface properties of materials for use in various conditions: radiation-resistant materials; biocompatible materials; corrosion resistant materials.</p>
 <p>Research supervisor: Ivan V. Ushakov, Doctor of Technical Science (Higher Attestation Commission of the Russian Federation); Corresponding member of the Russian Academy of Natural Sciences</p>	Physics of condensed matter
	<p><u>Supervisor's research interests:</u></p> <p>Selective laser processing of optically transparent materials in order to increase their optical and mechanical strength under high-power laser radiation. Selective laser action and control of processes in solid transparent materials.</p>
	<p>Formation of specified physical and mechanical properties of thin ribbons and films of amorphous and amorphous-nanocrystalline metal alloys by exposure to short-pulse laser radiation. Selective laser action on inhomogeneous nano- and microscale regions.</p>
	<p>Selective laser treatment of the surface of structural titanium metal alloys for the formation of the required physical and mechanical properties of the surface.</p> <p>Formation of surface properties of solid materials for use in various conditions: radiation-resistant materials; biocompatible materials; corrosion resistant materials.</p> <p><u>Research highlights</u></p> <p>1) The program provides for the acquisition of practical skills in working on modern unique experimental equipment.</p> <p>2) The opportunity to take part in joint projects with the participation of leading Russian scientists.</p> <p>3) Unique methods for strengthening amorphous and amorphous-nanocrystalline metal alloys during their processing by nanosecond laser pulses.</p>

	<p>Supervisor's specific requirements:</p> <ul style="list-style-type: none"> • <i>The ability to use common programs for modeling physical processes, for example, AutoCad, Comsol, StartFlow</i> • <i>Knowledge of the basic course of physics, chemistry, materials science.</i> • <i>To know and be able to apply the basic methods of physical and chemical quality control of materials</i> <p>Supervisor's main publications: 8 publications</p> <ul style="list-style-type: none"> • <i>«Directed changing properties of amorphous and nanostructured metal alloys with help of nanosecond laser impulses» CIS Iron and Steel Review 2021</i> • <i>Safronov, I. S., Ushakov, I. V., & Minaev, V. I. (2022). Influence of environment at laser processing on microhardness of amorphous-nanocrystalline metal alloy doi:10.4028/p-wjsns4 Retrieved from www.scopus.com</i> • <i>«Formation of surface properties of VT18u titanium alloy by laser pulse treatment» Ushakov, I., Simonov, Y. Materials Today: Proceedings, 2019, 19, cmp. 2051–2055</i> • <i>«Targeted Alternation in Properties of Solid Amorphous-Nanocrystalline Material in Exposing to Nanosecond Laser Radiation» Solid State Phenomena: Defect and Diffusion Forum 2021</i> • <i>«Mechanical Properties of Laser Treated Thin Sample of an Amorphous-Nanocrystalline Metallic Alloy Depending on the Initial Annealing Temperature» Solid State Phenomena: Defect and Diffusion Forum 2021</i>
	<p>Results of intellectual activity</p> <p>«Directed changing properties of amorphous and nanostructured metal alloys by nanosecond laser impulses» in Collective monograph “Prospective areas of research in science and technologists” International Nobel Information Center Publishing House “Nobelistics”.</p> <p>Program for computers № 2012615576.</p> <p>Program for computers № 2018665482.</p> <p>Patent № 2494039 RU.</p> <p>Patent № 2018145595 RU.</p>