

University	<i>National University of Science and Technology «MISIS»</i>
Level of English proficiency	<i>B</i>
Educational program and field of the educational program for which the applicant will be accepted	<i>1.3.8 Condensed matter physics. (Solid state physics)</i>
List of research projects of the potential supervisor (participation/leadership)	<p><i>Grants:</i></p> <ol style="list-style-type: none"> <i>1. RFFI No. 94-02-06929 (1994, participation)</i> <i>2. RFFI No.96-02-26084 (1996, participation)</i> <i>3. FCP "Integration" 1.6-K1018 (1998-2000, participation).</i> <i>4. FCP "Integration" 1.4-P0043 (2002, participation).</i> <i>5. RFFI No.02-02-17875-a (2002, participation).</i> <i>6. RFFI No.05-08-50241-a (2005, participation).</i> <i>7. RFFI No.08-08-98007 r_sibir_a (2008, participation)</i> <p><i>Research projects:</i></p> <ol style="list-style-type: none"> <i>1. Computer simulation of thermally activated transformations occurring at antiphase and interphase boundaries. Dissertation ... candidate of Physical and Mathematical Sciences : 04/01/07 (2000, leadership)</i> <i>2. Modeling of thermally activated structural adjustment in binary alloys and heterophase systems : dissertation ... candidate of Physical and Mathematical Sciences : 04/01/07 (1998, leadership)</i> <i>3. Modification of the surface of aramid fibers and tissues during photoactivation by low-power laser radiation. Development and creation of a surface treatment plant ("startup as a graduation project"/leadership)</i> <i>4. Modeling and analysis of the evolution of the structure of a carbon nanotube beam based on them under various types of deformation depending on loading conditions (within the framework of the state assignment of the Ufa University of Science and Technology (No 075-03-2024-123/1) participation)</i> <i>5. Study of the effect of laser radiation on biological tissues, fluids and gallstones (participation)</i>
List of the topics offered for the prospective scientific research	<ol style="list-style-type: none"> <i>1. Modeling of structural transformations of nanotube packages under various mechanical loads in order to develop devices for absorbing impact energy</i> <i>2. The influence of external factors on the structure and physico-mechanical properties of CNT and graphene conglomerates during deformation.</i> <i>3. Computer simulation of thermally activated processes of restructuring the atomic structure of thin films of metals and bulk alloys.</i> <i>4. The effect of packaging defects on the kinetics of the "order-disorder" phase transformation process in binary or ternary alloys.</i> <i>5. Investigation of the structure of secondary conglomerates formed when exposed to laser radiation on bile and urinary concretions.</i> <i>6. The effect of coherent radiation on the physical and mechanical properties of aramid fibers and special-purpose materials based on them</i>

	7. Development of a method for processing and modifying the surface of aramid materials in order to improve and/or restore their physical and mechanical properties
 <p>Research supervisor: Olga V. Andrukhova, Candidate of Science (Polzunov Altai State Technical University)</p>	01.01.UR Physics, Mathematical, 01.03.UK Physics, Condensed Matter, 01.03.UB Physics, Applied
	<p>Supervisor's research interests:</p> <p><i>Computer modeling of the kinetics of the ordering/disordering process, the evolution of the structure (nano, micro, meso levels) and the order-disorder phase transition (FPPB) in multicomponent thin metal films. Analyzed: 1) mechanisms that play a significant role in FPPB; 2) the influence of temperature, internal stresses, and the extent of the potential of interatomic interaction on the kinetics of the process and the equilibrium states of the simulated samples; 3) the role of defective structures (dislocations, antiphase and twin boundaries, grain boundaries), etc.;</i></p> <p><i>Modeling the evolution of the structure and physical and mechanical properties of CNT packages and their conglomerates with graphene under various external influences.</i></p> <p><i>Experimental studies of the interaction of laser radiation with matter: selective laser treatment of the surface of materials; the effect of coherent electromagnetic radiation on organic and inorganic materials, biological tissues, physiological fluids, blood, gallstones and urinary stones, etc.</i></p>
	<p>Research highlights:</p> <p><i>research work involves the use of high-precision and unique equipment and sufficient computing power;</i></p> <p><i>participation in NUST MISIS research projects and international RCF projects;</i></p>
	<p>Supervisor's specific requirements:</p> <ul style="list-style-type: none"> • <i>physical and technical, engineering education;</i> • <i>knowledge of the basic course of physics, chemistry, materials science, condensed matter physics, fundamentals of methods of mathematical physics and computer (numerical) modeling;</i> • <i>knowledge of methods of experimental research of materials and skills in conducting physical and mechanical tests of materials (microscopy, X-ray diffraction analysis; tests for rupture, bending, toughness, etc.);</i> • <i>skills in working with programs for modeling physical and mechanical processes, mathematical data processing programs and office programs;</i> • <i>sufficient level of spoken Russian and/or English;</i> • <i>basic academic writing skills (the ability to express cause-and-effect relationships in the text),</i>
	<p>Supervisor's main publications</p> <p>1. <i>The single-wall nanotube beam's structure evolution under compressive deformation / O. V. Andrukhova, A. A. Ovcharov, and [et.al.] // Izvestiya RAN. MTT, 2025, № 2. - C 119-136.</i> https://doi.org/10.31857/S1026351925020071</p>

	<p>2. <i>Evolution of the Single-Wall Carbon Nanotubes Bundle Structure under Compressive Deformation</i> / O. V. Andrukhova, A. A. Ovcharov, and [et.al.] // <i>Mechanics of Solids</i>, 2025, Vol. 60, No. 2, pp. 872–882. DOI:10.1134/S0025654424605695</p> <p>3. <i>Parametric Characteristics of Nano- and Micropores Affecting Their Healing During Selective Laser Treatment</i> / Safronov, I. S., Ushakov, A. I., & Andrukhova, O. V. // <i>Applied Mathematics & Physics</i>, 2024, 56(3), 226-233. https://doi.org/10.52575/2687-0959-2024-56-3-226-233</p> <p>4. <i>Physical Mechanism of Nanocrystalline Composite Deformation Responsible for Fracture Plastic Nature at Cryogenic Temperatures</i> / J. Qiao, I. V. Ushakov, I. S. Safronov [et al.] // <i>Nanomaterials</i>. – 2024. – Vol. 14, No. 8. – P. 723. – DOI 10.3390/nano14080723</p> <p>5. <i>The role of the atom-atomic interactions depth on the metallic nanofilms structure evolution/</i> Andrukhova O., Andrukhova T., Lomskikh N. [et al] // <i>E3S Web of Conf.</i>, 531 (2024) 01037 - DOI: 10.1051/e3sconf/202453101037</p> <p>6. <i>Study of the effect of coherent radiation on the properties of aramid fibers and fabrics</i> / O. V. Andrukhova, S. V. Ovechkin, T. V. Andrukhova [et al.] // <i>Fundamental'nye Problemy Sovremennogo Materialovedenia</i>. – 2022. – Vol. 19, No. 1. – P. 125-131. – DOI 10.25712/ASTU.1811-1416.2022.01.014</p> <p>7. <i>Thermomechanical properties of carbon nanotube forest</i> / Galiakhmetova, L., Andrukhova, O., Ovcharov, A., Dmitriev, S. // <i>AIP Conference Proceedings</i>. - 2022, 2533. 020052. 10.1063/5.0098855.</p> <p>8. <i>Andrukhova, O. V. The structure of secondary conglomerates formed when exposed to laser radiation on gallstones</i> / O. V. Andrukhova, T. V. Andrukhova, A. Y. Filimonova // <i>Proceedings of the Altai State University</i>. – 2019. – № 4(108). – Pp. 18-26. – DOI 10.14258</p>
	Results of intellectual activity (при наличии)