

DENIS V. KHOMITSKY

University	National Research Lobachevsky State University of Nizhny Novgorod
Level of English proficiency	Advanced
Educational program and field of the educational program for which the applicant will be accepted	1.3. Physical sciences 1.3.8. Condensed Matter Physics
List of research projects of the potential supervisor (participation/leadership)	1. State assignment of the Ministry of Science and Higher Education of the Russian Federation "Nanostructured semiconductors, Dirac materials and crystals of biologically active substances for photonics, spintronics, quantum computing and biomedicine", project No. 0729-2020-0058 (2020-2022) (participant) 2. State assignment of the Ministry of Science and Higher Education of the Russian Federation "Quantum structures for quantum technologies", project No. FSWR-2023-0035 (2023-2025) (participant)
List of the topics offered for the prospective scientific research	1) Spin dynamics in quantum dots in nonstationary electric field; 2) Quantum dots in topological insulators formed by magnetic barriers; 3) Quantum states and spin polarization of corner states in two-dimensional topological insulators 4) Spin and optical properties of heterostructures with quantum wells and magnetic atom layers.
 <p>Research supervisor:</p> <p>Denis V. Khomitsky</p> <p>Doctor of Science/PhD (Lobachevsky State University of Nizhny Novgorod)</p> <p>Professor of the Department of Theoretical Physics, Faculty of Physics</p>	Condensed Matter Physics
	Supervisor's research interests Spintronics, topological insulators, spin, optical, magnetic and transport properties of nanostructures.
	Research highlights Theoretical modeling of quantum states, spin textures, optical and transport properties of semiconductor nanostructures such as quantum wells, nanowires and quantum dots with spin-orbit coupling. Tunneling and external field driving effects on the spin evolution. Quantum dot formation in topological insulators by magnetic barriers. Modeling of edge-localized states in two-dimensional topological insulators Regular and irregular dynamics of tunneling and spin in nonstationary fields applied to nanostructures.
	Supervisor's specific requirements Well-developed skills in basic methods of quantum mechanics; Well-developed skills in solid state physics; Good skills in programming of problems in quantum mechanics, mathematical physics and linear algebra.
	Supervisor's main publications 17 papers in WoS, Scopus and RSCI during 2020-2025, including: [1] D.V. Khomitsky, M.V. Bastrakova, D.S. Pashin. Spin flip locking by the tunneling and relaxation in a driven double quantum dot with spin-orbit coupling // Physical Review B. – 2025 – V.111. – P.085427. [2] D.V. Khomitsky, M.V. Bastrakova, V.O. Munyaev, N.A. Zaprudnov, and S.A. Studenikin. Controllable single-spin

	<p>evolution at subharmonics of electric dipole spin resonance enhanced by four-level Landau-Zener-Stückelberg-Majorana interference // Physical Review B. – 2023 – V.108. – P.205404.</p> <p>[3] D.V. Khomitsky and S.A. Studenikin, Single-spin Landau-Zener-Stückelberg-Majorana interferometry of Zeeman-split states with strong spin-orbit interaction in a double quantum dot // Physical Review B. – 2022. – V.106. – P.195414.</p> <p>[4] D.V. Khomitsky, A.A. Konakov and E.A. Lavrakhina. Formation of bound states from the edge states of 2D topological insulator by macroscopic magnetic barriers // Journal of Physics: Condensed Matter. – 2022. – V.34. – P.405302.</p> <p>[5] M.V. Dorokhin, M.V. Ved, P.B. Demina, D.V. Khomitsky, K.S. Kabaev, M.A.G. Balanta, F. Ikawa, B.N. Zvonkov, and N.V. Dikareva, Role of resident electrons in the manifestation of a spin polarization memory effect in Mn delta-doped GaAs heterostructures // Physical Review B. – 2021. – V.104. – P.125309.</p>
	<p>Results of intellectual activity</p> <p>-</p>