

University	Peter the Great St. Petersburg Polytechnic University
Level of English proficiency	Fluent
Courses and fields of studies offered for applicants	1.3.11. Semiconductor physics
Projects for potential academic supervision	Currently, the head of the Russian Science Foundation grant «23-12-00036 Optical phenomena in semiconductor micro- and nanostructures in strong electric fields» and a participant in 4 grants/projects.
Topics offered for prospective researches	“Creation of fundamental principles of new semiconductor sources of terahertz radiation based on GaAs/AlGaAs quantum wells, micro- and nanostructures based on GaN”, “Theoretical and applied studies of GeSi quantum dots in the infrared and terahertz spectral regions”, “Research of InAs nanowhisker for modern flexible electronics”
 <p>Research supervisor: Vinnichenko Maksim Yakovlevich, PhD (Peter the Great St. Petersburg Polytechnic University)</p>	<i>Physics, applied</i>
	Supervisor’s research interests Optical phenomena and nonequilibrium charge carriers in semiconductors and nanostructures. Development of new optoelectronic devices (sources and detectors) in the mid-infrared and terahertz spectral ranges
	Study program highlights Features of the research include deep fundamental knowledge of the physical processes being studied, as well as applied work on modern equipment
	Supervisor’s specific requirements: The necessary knowledge requirements for future graduate students are the presence of basic knowledge in the fields of theoretical physics, electronics, and solid state physics. Knowledge in the areas of mathematical modeling and programming, modeling of physical processes is also encouraged
	Supervisor’s publications 34 Web of Science, Scopus publications over the last 5 years. Articles from the first quartile (Q1): Mastaliev V. et al. “Second harmonic generation and broadband photoluminescence in mesoporous Si/SiO ₂ nanoparticles,” <i>Nanophotonics</i> 2024, 0218, https://doi.org/10.1515/nanoph-2024-0218 Kaveev A. et al. “Growth, Crystal Structure, and Photoluminescent Properties of Dilute Nitride InAsN Nanowires on Silicon for Infrared Optoelectronic,” <i>ACS Appl. Nano Mater.</i> 2024, 7(3), 3458-3467 https://pubs.acs.org/doi/abs/10.1021/acsnm.3c06295 Fedorov V. et al. “Non-Uniformly Strained Core-Shell InAs/InP Nanowires for Mid-Infrared Photonic applications,” <i>ACS Appl. Nano Mater.</i> 2023, 6(7), 5460-5468 https://doi.org/10.1021/acsnm.2c05575 Mitin D. et al. "Tuning the Optical Properties and Conductivity of Bundles in Networks of Single-Walled Carbon Nanotube," <i>J. Phys. Chem. Lett.</i> 2022, 13, 8775–8782 https://doi.org/10.1021/acs.jpcclett.2c01931

	<p>Mkrtchyan M. et al. "Effects of an External Magnetic Field on the Interband and Intraband Optical Properties of an Asymmetric Biconvex Lens-Shaped Quantum Dot," <i>Nanomaterials</i> 2022, 12(1), 60 https://doi.org/10.3390/nano12010060</p> <p>Shalygin V. et al. "Far-infrared spectroscopy of folded transverse acoustic phonons in 4H-SiC," <i>Appl. Phys. Lett.</i> 117, 202105 (2020) https://doi.org/10.1063/5.0031064</p>
	<p>Impacts of Supervisor's research (<i>при наличии</i>) <i>Certificate of state registration of computer program No. 2023616529 dated 03/29/2023 Bulletin No. 4 "Program for calculating the parameters of semiconductor solid solutions".</i> <i>Patent No. 2793120 dated 03/29/2023 Bulletin No. 10 "Elastic LED matrix".</i></p>