University	Peter the Great St. Petersburg Polytechnic University
Level of English proficiency	Advanced
Courses and fields of studies offered for applicants	*03.06.01 Physics and astronomy (educational program)* *03.06.01_11 Laser physics (field of the educational program)*
Projects for potential academic supervision	Spectral interferometric platform for multimodal biomedical endoscopic diagnostic systems based on optical coherence tomography and optical fiber sensors, 2023-2026
Topics offered for prospective researches	Beamforming in optical fiber distributed vibration sensors Non-destructive inspection of photonic components by means of optical coherence tomography Optical coherence elastography system with integrated optical fiber pressure sensor Motionless image formation in optical coherence tomography systems Optical coherence elastography system with integrated optical fiber temperature sensor Fiber-optic communication links optimization with the use of quantum annealing Quantum error correction codes synthesis by means of quantum machine learning
 Research supervisor: Nikolai A. Ushakov, Doctor of Science, SPbPU	Physics/Optics/Photonics
	Supervisor's research interests *My research interests include spectral interferometry, distributed fiber-optic sensors, low-cost techniques for optical fiber sensors interrogation, biomedical applications of fiber-optic sensors, optical coherence tomography and elastography, quantum sensing, quantum computing, and signal processing.*
	Study program highlights *(при наличии)* *The applicant will have access to a well-equipped optical lab, including various lasers, photodetectors, light modulators, single photon detectors. We collaborate with leading fiber optics and quantum optics research groups in Russia and abroad.*
	Supervisor's specific requirements: *The applicant must possess sound understanding of wave optics, including free-space and guided light propagation and interferometry.* *Hands-on experience in the field of optics and optoelectronics is desirable.* *The applicant must be familiar with Matlab/Python and LabVIEW.* *Oral and written English communication skills are required. Experience in scientific writing is an advantage.*
	Supervisor's publications *Указывается общее количество публикаций в журналах, индексируемых Web of Science, Scopus, RSCI за последние 5 лет,* *[1] C. Yang et al., "Portable optical fiber biosensors integrated with smartphone: technologies, applications, and challenges [Invited]," Biomed. Opt. Express, vol. 15, no. 3, pp. 1630–1650, Mar. 2024, doi: 10.1364/BOE.517534.* *[2] N. A. Ushakov, T. A. Makovetskaya, A. A. Markvart, and L. B. Liokumovich, "Theoretical Foundations of Quantum Spectral-*

	Domain Optical Coherence Tomography with Frequency Scanning," JETP Lett., vol. 117, no. 1, pp. 24–31, Jan. 2023, doi: 10.1134/S0021364022602871. *[3] N. A. Ushakov, A. A. Markvart, and L. B. Liokumovich, "Pulse Wave Velocity Measurement with Multiplexed Fiber Optic Fabry-Perot Interferometric Sensors," IEEE Sensors Journal, vol. 20, no. 19, pp. 11302–11312, May 2020, doi: 10.1109/jsen.2020.2997465.* *[4] N. Ushakov, A. Markvart, and L. Liokumovich, "Singlemode-Multimode-Singlemode Fiber-Optic Interferometer Signal Demodulation Using MUSIC Algorithm and Machine Learning," Photonics, vol. 9, no. 11, Art. no. 11, Nov. 2022, doi: 10.3390/photonics9110879* *[5] A. H. Hartog et al., "The use of multi-frequency acquisition to significantly improve the quality of fibre-optic-distributed vibration sensing," Geophysical Prospecting, vol. 66, pp. 192–202, 2018, doi: 10.1111/1365-2478.12612.*