University	Peter the Great St. Petersburg Polytechnic University
Level of English proficiency	Upper-Intermediate (B2)
Educational program and field of the educational program for which the applicant will be accepted	1.3.5. Physical electronics 1.3.8. Condensed matter physics ENGINEERING & TECHNOLOGY 2.2.3. Technology and equipment for electronics manufacturing
List of research projects of the potential supervisor (participation/leadership)	•Development of an operating algorithm and creation of a mock-up of a control unit for optical pollution sensors. Development of a mock-up of a stand for assessing the impact force of water droplets in a nozzle spray torch, with the company Turbotect SPb. (leadership); • Development of ultra-sensitive thin-film sensors based on multilayer nanostructures, with Shanghai MiaoSheng Intelligent Technology Co., Ltd, (leadership); • Implementation of SmartFoil technology in the manufacture of electronics using ceramic, piezoceramic and metal SMD elements, with the company HengE (Shanghai) Medical Technology Co., Ltd (participation); • Development of the technology of using SmartFoil material in the installation of piezoceramic elements with the JSC Concern Central Research Institute Elektropribor (participation); • Development of technology for using SmartFoil material in the installation of piezoceramic elements. Creation of experimental samples of piezoceramic bags fastened using SmartFoil technology with the SRI STT company (participation); • Creation of a series of samples of 'SmartFoil' material with the company HengE (Shanghai) Medical Technology Co., Ltd " (participation)
List of the topics offered for the prospective scientific research	•Sensors based on thin-film nanostructures • Carbon nanostructures in electronic engineering • Field emitters based on nanostructured objects • Electrical properties of thin-film nanostructures • Self-organization of nanostructures and their electronic properties

Research supervisor:

Pavel G. Gabdulin

PhD in physics and mathematics *(Peter the Great St. Petersburg Polytechnic University)*

Engineering and technology 2.05. Materials engineering
Materials science, coatings & films

Supervisor's research interests

Surface, thin films, nanostructures, carbon nanostructures, field emission, materials for electronics, thermoelectricity, multilayer nanosystems

Research highlights

Research will be carried out on the basis of unique latest equipment owned by the laboratory "Self-organizing high- temperature nanostructures." The laboratory has equipment that carries out a full cycle of research work: from designing and creating samples of nanostructures (PVD and SVD) to their research using a set of advanced facilities.
Graduate students will work in collaboration with:
• Shanghai Institute of Technical Physics Chinese Academy of Sciences, Shanghai, China;
• University of Trieste and Director of CNR-IOM, Italy;
• National Academy of Sciences of Belarus, Minsk, Belarus;
• Tsinghua University, Beijing, China.

Additional funding for graduate students will occur in the framework of many research and development efforts. These works are held in the laboratory regularly.

Supervisor's specific requirements:

Possible areas of preparation:
• Electronics and Nano-Electronics;
• Nanotechnology;
• Technical Physics;
• Physics;
• Physical chemistry;
• Instrument making and electronics;
• and the like.

Background Discipline:
• General classical physics;
• Mathematical analysis;
• Probability theory;
• Basics of working with electronic devices;
• Work in any software packages for modeling and / or design

Supervisor's main publications

	• A.V. Arkhipov, A.M. Zhurkin, O.E. Kvashenkina, V.S. Osipov, P.G. Gabdullin, Electron overheating during field emission from carbon island films due to phonon bottleneck effect // Nanosystems: Physics, Chemistry, Mathematics, 2018, Vol. 9(1), P. 110-113. Основные публикации потенциального научного руководителя DOI 10.17586/2220-8054-2018-9-1-110-113 IF 1.25; http://nanojoumal.ifmo.ru/en/wp-content/uploads/2018/02/NPCM91P110-113 .pdf • Andronov, A., Budylina, E., Shkitun, P., Gabdullin, P., Gnuchev, N., Kvashenkina, O., Arkhipov, A. Characterization of thin carbon films capable of low-field electron emission // (2018) Journal of Vacuum Science and Technology B: Nanotechnology and Microelectronics, 36 (2), статья № 02C108,. DOI: 10.1116/1.5009906 IF 1.314, SJR2017 0.467; Q2 https://avs.scitation.Org/doi/full/l 0.1116/1.5009906 • Arkhipov, A.V., Gabdullin, P.G., Gordeev, S.K., Zhurkin, A.M., Kvashenkina, O.E. Photostimulation of conductivity and electronic properties of field-emission nanocarbon coatings on silicon // (2017) Technical Physics, 62 (l),pp. 127-136.DOI: 10.1134/S1063784216120045, IF 0.707, SJR2017 0.390; Q2 https://link.springer.eom/article/l 0.1134%2FS 1063784216120045 • Bizyaev, I.S.; Gabdullin, P.G.; Arkhipov, A.V.; Babyuk, V.Y. Study of surface topography and emission properties of thin Mo and Zr films. (2019) Journal of Physics Conference Series, Vol. 1236, #012019 DOI: 10.1088/1742-6596/1236/1/012019 IF 0.51; Q3 https://i0pscience.i0p.0rg/article/l 0.1088/1742-6596/1236/1/012019 • Osipov, V.S.; Besedina, N.A.; Gabdullin, P.G.; Kvashenkina, O.E.; Arhipov, A.V. Study of nanocarbon thin-film field-electron emitters by Raman spectroscopy. (2019) Journal of Physics Conference Series, Vol 1236, # 012005.
	Results of intellectual activity 1. China patent: CN108265258 date May 08, 2020, The method of producing multilayer reactive nanostructures 2. EUR patent: EAPO 035213 date may 18 2020, The method used to attach PCBs to various materials 3. EUR patent: EAPO 035216 date may 18 2020, The method used for fixing piezoceramic materials in various materials