SUPERCONDUCTING SPINTRONICS

Moscow Institute of Physics and Technology (National Research University)

Degree or qualification is awarded: **PhD (Candidate of Science)**

Language of study: **English**
Mode of study: **full-time**
Duration: **4 years**
Availability of free education: **yes**
Price: **375 000 RUB**

Programme webpage at the university website: https://eng.mipt.ru/programs/superconducting-spintronics/

Programme curator: **Denis Ustyuzhaninov**
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Entry requirements:

- Master's degree / equivalent in a related field
- B2 level of English
- Good track record of publications related to the topic of the intended research
- Strong research proposal 1,500 - 3,500 words

Research supervisor:
Irina Bobkova
PhD

Supervisor's research interests:
Quantum condensed matter theory, including quantum materials based on hybrid structures under equilibrium and nonequilibrium conditions, superconducting spintronics, magnetization dynamics, magnonics and caloritronics.

Research highlights:
Our group have intense working relationships with leading research groups in the field (Finland, Germany, Norway). Students are rapidly involved into active research and international scientific cooperation, present their work at various international conferences.

Supervisor's specific requirements:
We are looking for strongly motivated candidates. Knowledge of a standard university course of quantum mechanics is necessary, and skills of numerical computations are desirable.

Main publications:

- V. Bobkova, A. M. Bobkov, "Injection of nonequilibrium quasiparticles into Zeeman-split superconductors: A way to create long-range spin imbalance", Phys. Rev. B 93, 024513 (2016).
- V. Bobkova, A. M. Bobkov, Alexander A. Zyuzin, and Mohammad Alidoust, "Magnetoelectrics in disordered topological insulator Josephson junctions", Phys. Rev. B 94, 134506 (2016).
- I.V. Bobkova, A.M. Bobkov, and M.A. Silaev "Gauge theory of the long-range proximity effect and spontaneous currents in superconducting heterostructures with strong ferromagnets", Phys. Rev. B 96, 094506 (2017).
- D.S. Rabinovich, I. V. Bobkova, A. M. Bobkov, and M. A. Silaev, "Chirality selective spin interactions mediated by the moving superconducting condensate", Phys. Rev. B 98, 184511 (2018).
- D. S. Rabinovich, I. V. Bobkova, A. M. Bobkov, and M. A. Silaev, "Resistive State of Superconductor-Ferromagnet-Superconductor Josephson Junctions in the Presence of Moving Domain Walls" Phys. Rev. Lett. 123, 207001 (2019).

Specializations within this programme