QUANTUM EFFECTS IN STRONGLY CORRELATED AND QUANTUM MATERIALS

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/quantum-effects-in-strongly-correlated-and-quantum-materials/

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:
Leonid Morgun
PhD

Supervisor's research interests:
Quantum materials (DSM, WSM, TI), strongly correlated electrons in Si MOSFET, low temperature transport and thermodynamic properties of superconductors.

Research highlights:
The research will be done in Ginzburg Center for High-Temperature Superconductivity and Quantum Materials of Lebedev Physical Institute that seven Nobel prize winners worked in. The experimental facilities include the nanofabrication technology line in the clean room and vast variety of measurement facilities implying low-temperature (below to 10 mK) and high magnetic field (up to 21 T) experiments.

Supervisor's specific requirements:
The applicant should be familiar with experimental methods of solid-state investigation and confident in condensed matter physics, especially with such topics as:

- Superconductivity or Topological matter.
- Electronic band structure.
- Quantum physics.

Data acquisition and processing techniques are strongly advised (Python, OriginLab).

Main publications:

- Observation of subkelvin superconductivity in Cd3As2 thin films. Phys. Rev. B 99, 094512 (2019).
- Probing Spontaneous Spin Magnetization and Two-Phase State in Two-Dimensional Correlated Electron System. JSNM volume 30, pages 783–787(2017).
- Novel energy scale in the interacting twodimensional electron system evidenced from transport and thermodynamic measurements. Phys. Rev. B 93, 235145 (2016).

Specializations within this programme