

# QUANTUM COHERENT PHENOMENA AT NANOSCALE

## 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: **no**

Price: **375 000 RUB**

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:

[Andrew Semenov](#)

PhD

### Supervisor's research interests:

Quantum mesoscopic physics of hybrid metallic and superconducting nanostructures. Interplay between interactions, disorder and quantum coherence in electronic transport phenomena. Application of modern quantum field theory methods to condensed matter physics and related topics.

### Research highlights:

Combination of modern theoretical approaches with deep physical understanding of the considered systems.

### Supervisor's specific requirements:

- Deep knowledge of quantum mechanics, quantum field theory and statistical physics.
- Basic computer skills.
- Motivation.

### Main publications:

- Andrew G. Semenov and Andrei D. Zaikin. "Full counting statistics of quantum phase slips." *Physical Review B* 99.9 (2019): 094516.
- Andrew G. Semenov and Andrei D. Zaikin. "Persistent currents in quantum phase slip rings." *Physical Review B* 88.5 (2013): 054505.
- Andrew G. Semenov and Andrei D. Zaikin. "Quantum phase slip noise." *Physical Review B* 94.1

(2016): 014512.

- Andrew G. Semenov and Andrei D. Zaikin. "Supercurrent dephasing by electron-electron interactions." *Physical Review B* 91.2 (2015): 024505.
- Andrew G. Semenov. "On the macroscopic quantization in mesoscopic rings and singleelectron devices." *Physics Letters A* 380.24 (2016): 2111-2115.

## **Specializations within this programme**