

EXPERIMENTAL SEARCH FOR NEUTRINOLESS DOUBLE BETA DECAY OF ⁷⁶Ge

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:

Duration: **4 years**

Availability of free education: **yes**

Price: **375 000 RUB**

Programme webpage at the university website:

<https://eng.mipt.ru/programs/experimental-search-for-neutrinoless-double-beta-decay-of-76ge/>

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:

[Konstantin Gusev](#)

PhD

Supervisor's research interests:

The LEGEND experiment is designed to search for neutrinoless double beta ($0\nu\beta\beta$) decay of ⁷⁶Ge. LEGEND will operate with bare germanium semiconductor detectors (enriched in Ge-76) directly immersed in liquid argon instrumented to readout argon scintillations for vetoing background events. Thanks to this approach in the predecessor GERDA experiment the background level was reduced down to the unprecedented value of 10-3 counts keV⁻¹ kg⁻¹ yr⁻¹. In order to further reduce any background interruptions in LEGEND experiment, the R&D for novel germanium detector types, new ultra-low background construction materials and the effective methods of argon scintillation readout is being constantly performed by our JINR group together with our international collaborators. Our group has solid experience achieved at the design, preparation and integration phases of the GERDA experiment as well as during operating of the experiment and the analysis of data. This will help the JINR group to keep the strong position in the LEGEND project. However, we are willing to enlarge the analysis part of our group - so we are looking for the candidate who will work mainly for the modelling and data analysis. Research highlights: LEGEND is truly world-wide collaboration includes about 240 scientists from 47 institutions. The especially good connection our group has with The Technical University of Munich (Germany) and Max Planck Institute for Nuclear Physics, Heidelberg (Germany), so some working visits there are expected as well as to Gran Sasso National Laboratory in Italy, where the first phase of LEGEND will take place. The successful candidate is expected to join the international LEGEND data analysis team.

Supervisor's specific requirements:

- Candidates are expected to hold a master degree in particle or nuclear physics.
- Programming experience is highly recommended.
- The experience with data analysis is an advantage.
- Good communication skills (English) and readiness to travel are mandatory.

Main publications:

- "Probing Majorana neutrinos with double- β decay", Science 365 (2019) 1445.
- "Improved Limit on Neutrino less Double- β Decay of ^{76}Ge from GERDA Phase II", PRL 120 (2018) 132503.
- "Upgrade for Phase II of the GERDA Experiment", EPJC 78 (2018) 388.
- "Background-free search for neutrino less double- β decay of ^{76}Ge with GERDA", Nature 544 (2017) 47.

Specializations within this programme