



Contribution ID: 51

Type: **Contributed Talk**

## LEGEND: $0\nu\beta\beta$ decay search with germanium detectors

*Tuesday, September 30, 2025 5:20 PM (20 minutes)*

The LEGEND experiment searches for the neutrinoless double-beta ( $0\nu\beta\beta$ ) decay of Ge-76 using isotopically-enriched high-purity germanium (HPGe) detectors with the ultimate discovery sensitivity beyond a half-life of  $10^{28}$  years. The project is conducted in stages. The first one, LEGEND-200, was steadily accumulating physics data at LNGS (Laboratori Nazionali del Gran Sasso, Italy) for more than one year with 140 kg of HPGe detectors. In 2024 the Collaboration unblinded the first data to check the sensitivity of the experiment and study the composition of the LEGEND-200 background, which was slightly higher than predicted based on screening measurements of the components. The detector array was subsequently disassembled to investigate the source of the elevated background, with nearby components undergoing re-cleaning and/or replacement as necessary. LEGEND-200 is scheduled to resume data taking in 2025. In this talk we will present the performance of the ongoing experiment and give an update on the status of its second phase: LEGEND-1000.

This work is supported by the U.S. DOE and the NSF, the LANL, ORNL and LBNL LDRD programs; the European ERC and Horizon programs; the German DFG, BMBF, and MPG; the Italian INFN; the Polish NCN and MNiSW; the Czech MEYS; the Slovak RDA; the Swiss SNF; the UK STFC; the Canadian NSERC and CFI; the LNGS and SURF facilities.

### Neutrino Properties

yes

### Neutrino Telescopes & Multi-messenger

no

### Neutrino Theory & Cosmology

no

### Data Science and Detector R&D

no

**Author:** Dr GUSEV, Konstantin (TUM)

**Presenter:** Dr GUSEV, Konstantin (TUM)

**Session Classification:** Neutrino Physics

**Track Classification:** Neutrino Properties