



Contribution ID: 14

Type: **Oral Presentation**

# Background Mitigation Techniques in LEGEND

*Friday, June 17, 2022 11:50 AM (15 minutes)*

LEGEND (Large Enriched Germanium Experiment for Neutrinoless double beta Decay) uses High Purity Germanium detectors to search for lepton number violation in the neutrino sector with a multi-stage strategy. The HPGe detectors are isotopically enriched with Ge76 and immersed in high purity liquid argon, which serves simultaneously as a coolant, radiation shield and scintillation detector.

LEGEND-200 is the first stage and is currently being installed. It is designed to achieve a factor of 3 decrease in background to  $2e-4$  cts/kg/keV/yr (@2039 keV) compared to the previous generation experiments GERDA and MJD. LEGEND-1000, the second stage, aims at decreasing the background further to  $1e-5$  cts/kg/keV/yr, projecting a quasi background-free dataset of 10 tonne x yr.

The technological improvements necessary to achieve the ambitious background goals include underground liquid argon, electroformed copper, ultra-clean cables and electronics, as well as powerful event discrimination techniques and careful active shield designs. This talk presents the overall projected background budgets in L200 and L1000 as well as the radio-purity techniques and analysis strategies required to achieve them.

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 SRDA; the Swiss SNF; the UK STFC; the Russian RFBR; the Canadian NSERC and CFI; the LNGS and SURF facilities.

**Primary author:** LEHNERT, Bjoern (Berkeley Lab)

**Presenter:** LEHNERT, Bjoern (Berkeley Lab)

**Session Classification:** LRT 2022 - presentations

**Track Classification:** Experiment Backgrounds, Models, Simulations