



Contribution ID: 127

Type: Oral Presentation

#1-127 Results of the LEGEND-200 experiment in the search for $0\nu\beta\beta$

Wednesday, June 11, 2025 12:20 PM (20 minutes)

The LEGEND experiment is looking for the extremely rare neutrinoless double beta decay of ^{76}Ge using isotopically-enriched high-purity germanium (HPGe) detectors. The detection of this process would imply that the neutrino is a Majorana particle and the total lepton number would not be conserved, which could be related to the cosmological asymmetry between matter and antimatter through leptogenesis. The LEGEND technology consists of a core of germanium detectors arranged in vertical strings within a surrounding volume containing 64 m^3 of liquid argon. Scintillation light produced by interactions in the liquid is detected by SiPMs, which are coupled to wavelength-shifting fibers arranged in two barrels. The cryostat is housed within an ultra-pure water tank equipped with PMTs that serve as a shield against external neutrons and gamma radiation and as a Cherenkov detector for muon rejection. This way the experiment is designed to maximize the background rejection. LEGEND is being developed in phases. The first phase, LEGEND-200, has been collecting physics data at Gran Sasso National Laboratory in Italy for more than a year with 140 kg of HPGe detectors. Additional germanium detectors are being installed, and increased exposure is anticipated in the coming months. The collaboration has been focused on analyzing the initial LEGEND-200 data, evaluating sensitivity, and characterizing residual backgrounds. The ultimate goal is the construction of LEGEND-1000, which will operate with 1 ton of germanium detectors and is planned to run for 10 years. In this talk, a detailed overview of the LEGEND-200 experiment and its analysis will be presented. The current observed background levels in the region of interest, the performance of the experiment in terms of background rejection and signal acceptance will be covered. Lastly, an update on the status of the future LEGEND-1000 phase will be provided. 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.

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