

The Large Enriched Germanium Experiment for Neutrinoless Double Beta Decay (LEGEND)

Tuesday 25 July 2017 13:45 (15 minutes)

Fifty years ago, Ettore Fiorini and collaborators published the first results of a ^{76}Ge based search for neutrinoless double beta decay ($0\nu\beta\beta$). In the ensuing five decades, the sensitivity for $0\nu\beta\beta$ searches using ^{76}Ge has increased by five orders of magnitude, from the 1967 limit of $T_{1/2} \geq 3 \times 10^{20}$ years to GERDA's recent result of $T_{1/2} \geq 5.3 \times 10^{25}$ years. The current generation ^{76}Ge experiments, GERDA and the MAJORANA DEMONSTRATOR, have now achieved the lowest backgrounds in the $0\nu\beta\beta$ region of interest of any $0\nu\beta\beta$ experiments. These results, coupled with the intrinsic superior energy resolution of Ge (0.1%) demonstrate that germanium is an ideal isotope for a large next generation experiment. The LEGEND collaboration, with 220 members from 47 institutions around the world, has been formed to pursue a ton scale ^{76}Ge experiment. Building on the successes of GERDA and the MAJORANA DEMONSTRATOR, the LEGEND collaboration aims to develop a phased $0\nu\beta\beta$ experimental program with discovery potential at a half-life significantly longer than 10^{27} years, using existing resources as appropriate to expedite physics results. This talk will present an overview of LEGEND and discuss its envisioned first phase, a 200 kg measurement utilizing the existing GERDA cryostat at LNGS.

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Session Classification: Neutrino Parallel

Track Classification: Neutrinos