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

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Fifty years ago, Ettore Fiorini and collaborators published the first results of a ^{76}Ge based search for neutrinoless double beta decay (0νββ). In the ensuing five decades, the sensitivity for 0νββ 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 0νββ region of interest of any 0νββ 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 0νββ 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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