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LEGEND: The Future of Neutrinoless Double-Beta Decay Searches with 76-Ge-enriched Germanium Detectors

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he observation of neutrinoless double beta $(0\nu\beta\beta)$ decay would establish the Majorana nature of neutrinos and explicitly show that lepton number conservation is violated. In their search for the rare decay in the isotope ⁷⁶Ge, the {\sc Gerda} and {\sc Majorana Demonstrator} (MJD) experiments have achieved the lowest backgrounds and the best energy resolution in the signal region of interest of any $0\nu\beta\beta$ decay experiment. Building on the successful results of these experiments, the Large Enriched Germanium Experiment for Neutrinoless Double Beta Decay (LEGEND) Collaboration aims to develop a phased $0\nu\beta\beta$ decay experimental program with the discovery potential at a half-life beyond 10^{28} years. To achieve this goal, the enriched Ge detector mass has to be increased up to the tonne-scale and the backgrounds have to be reduced further. The first phase of LEGEND, a 200\kg measurement utilizing the existing {\sc Gerda} infrastructure at LNGS in Italy, is expected to start in 2021. This talk will give an overview of LEGEND and discuss its envisioned first phase LEGEND-200. In particular, the plans and physics reach of LEGEND together with the various ongoing R&D efforts will be presented.

Primary author(s): EDZARDS, Frank (Max Planck Institute for Physics)Presenter(s): EDZARDS, Frank (Max Planck Institute for Physics)Session Classification: Plenary

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