Contribution ID: **823** Type: **Parallel**

Search for neutrinoless double-beta decays in Ge-76 in the LEGEND experiment

Saturday, 7 July 2018 17:00 (15 minutes)

The search for neutrinoless double-beta decay is the most sensitive technique to establish the Majorana nature of neutrinos. Two operating experiments that look for such decays in ⁷⁶Ge —GERDA and MAJORANA DEMONSTRATOR —have achieved the lowest backgrounds and the best energy resolution in the signal region. These are two of the most important detector characteristics for sensitive searches of this undiscovered decay. The Large Enriched Germanium Experiment for Neutrinoless Double Beta Decay (LEGEND) Collaboration has been formed to pursue a tonne-scale ⁷⁶Ge experiment that integrates the best technologies from these two experiments and others in the field. The Collaboration is developing a phased experimental program that uses existing resources as appropriate to expedite physics results, with the ultimate discovery potential at a decay half-life beyond 10²⁸ years. In this talk, we will present the physics case, R&D efforts and implementation strategies of the LEGEND experiment.

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Session Classification: Neutrino Physics

Track Classification: Neutrino Physics