

Initial results and status of the Majorana Demonstrator experiment

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Neutrinoless double-beta decay (NLDBD) is a hypothesized process where two neutrons decay into two protons and two electrons simultaneously without emitting neutrinos. This decay is possible only if neutrinos are Majorana particles, i.e. fermions that are their own antiparticles. NLDBD is the only experimentally feasible way to establish the Majorana nature of neutrinos. Neutrinos being Majorana particles would explicitly violate lepton number conservation, and hence may point to a way to understand the matter-antimatter asymmetry in the universe.

Located at the 4850' level of the Sanford Underground Research Facility, the Majorana Demonstrator experiment is an ultra-low background experiment searching for neutrinoless double-beta decay in Ge-76. The technical goal of the experiment is to demonstrate a background rate at or below 3 counts/(ton-year) in the region of interest (ROI) around the 2039 keV NLDBD Q-value. The Demonstrator is comprised of 44 kg (30 kg enriched in Ge-76) of high purity Ge (HPGe) detectors separated into two modules. Construction and commissioning of both modules completed in Summer 2016 and both modules are now acquiring physics data. In this talk, I will discuss the status of the Demonstrator and some initial results from recent physics runs.

Summary

This is on behalf of the Majorana Collaboration

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