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The MAJORANA DEMONSTRATOR Neutrinoless Double-Beta Decay Experiment

Neutrinoless double-beta decay is the only experimentally viable process which can distinguish whether the neutrino is Majorana or Dirac in nature. Observation of this rare decay would prove that the neutrino mass is generated, at least in part, by Majorana mass terms. This implies that the neutrino is its own antiparticle, and that lepton number is not a conserved quantity. The MAJORANA collaboration is constructing the DEMONSTRATOR to search for neutrinoless double-beta decay in germanium-76 at the 4850-foot level of the Sanford Underground Research Facility in Lead, South Dakota. The DEMONSTRATOR is an array of both natural and ^{76}Ge-enriched HPGe detectors assembled using low-background components, situated within layers of active and passive shielding. The modular cryostat design has allowed physics runs with the first module of enriched detectors to begin while construction proceeds on the second module. Presented here is an overview of the experiment, focusing on the current status and potential physics reach of the DEMONSTRATOR.

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