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The Majorana Neutrinoless Double-Beta Decay Experiment

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The observation of neutrinoless double-beta decay would establish that the neutrino is a Majorana particle, would help determine the absolute mass scale of the neutrino, and could provide insight into understanding lepton-number-violating processes. The Majorana Collaboration plans to search for this process in 76Ge using high-purity germanium detectors in an ultra-low-background environment. The experiment will proceed in a phased approach with the eventual goal to scale to a 1-tonne experiment. The first phase, the Majorana Demonstrator, will deploy 60 kg of detectors to test the Klapdor-Kleingrothaus result (Modern Physics Letters A, Vol. 21, No. 20 (2006)1547-1566) and to establish backgrounds low enough to enable scaling to 1 tonne (1 count/tonne-year in the double-beta decay region of interest). Achieving this background goal is being addressed with efforts including low-mass front-end electronics development, copper electroforming, and low-capacitance, low-noise detector development. This presentation will provide an outline of the experiment and an update on current status.

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