

The $\{sc\}$ Majorana Demonstrator search for neutrinoless double-beta decay

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An observation of neutrinoless double-beta decay ($0\nu\beta\beta$) identifies the neutrino as a Majorana particle and constrains the absolute mass scale of neutrinos. The $\{sc\}$ Majorana collaboration is constructing an array of high purity germanium detectors that are isotopically enriched in ^{76}Ge that will serve as both a source and detector of $0\nu\beta\beta$. In the presence of backgrounds, the half-life sensitivity is inversely proportional to the square root of the background rate and energy resolution. Hence this search benefits from the intrinsic radio-purity of the germanium detectors as well as their high energy resolution. Also, the experiment operates within a compact shield constructed from lead and high purity copper that increase in purity toward its center. Pulse shape discrimination capabilities of the p-type point contact detectors can further filter out background events. The $\{sc\}$ Majorana Demonstrator plans to achieve backgrounds at the level of 3 counts per tonne – year in the region of interest to demonstrate the feasibility of a tonne-scale Ge experiment. Cryostat modules containing strings of Ge detectors are currently being assembled and commissioned at the Sanford Underground Laboratory in Lead, SD. Here we give an overview of the project and present the current status.

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