

Progress toward a two-neutrino double-beta decay measurement for the MAJORANA DEMONSTRATOR

The MAJORANA DEMONSTRATOR is a ^{76}Ge -based neutrinoless double-beta decay ($0\nu\beta\beta$) experiment. Staged at the 4850' level of the Sanford Underground Research Facility, the DEMONSTRATOR operates an array of high-purity p-type point contact Ge detectors deployed within a graded passive shield and an active muon veto system. The present work concerns the two-neutrino double-beta decay mode ($2\nu\beta\beta$) of ^{76}Ge . For Ge detectors, with superior energy resolution (0.1%), this mode poses negligible background to the $0\nu\beta\beta$ mode, even for a ton-scale experiment. However, a precision measurement of the $2\nu\beta\beta$ shape allows for searches for new physics such as Majoron-accompanied $0\nu\beta\beta$. The measurement of the $2\nu\beta\beta$ mode also allows for careful systematic checks of pulse shape discrimination cuts related to both the $0\nu\beta\beta$ and $2\nu\beta\beta$ decay modes. Work is underway to construct a full experimental background model enabling a Bayesian fit to the measured energy spectrum and extraction of a precise $2\nu\beta\beta$ spectrum and half-life determination.

Primary author: GILLISS, Thomas (University of North Carolina at Chapel Hill)

Presenter: GILLISS, Thomas (University of North Carolina at Chapel Hill)

Session Classification: Poster Session

Track Classification: Neutrinos