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# Modeling Backgrounds for the MAJORANA DEMONSTRATOR

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The MAJORANA DEMONSTRATOR is a neutrinoless double-beta decay ($0\nu\beta\beta$) experiment containing ~30 kg of p-type point contact germanium detectors enriched to 88% in $^{76}$Ge and ~14 kg of natural germanium detectors. The detectors are housed in two electroformed copper (EFCu) cryostats and surrounded by a graded passive shield with active muon veto. An extensive radioassay campaign was performed prior to installation to insure the use of ultra-clean materials. The DEMONSTRATOR achieved one of the lowest background rates in the region of the $0\nu\beta\beta$ Q-value, $11.9 \pm 2.0$ cts/(FWHM t y) from the low-background configuration of the initial 26 kg-yr exposure. Nevertheless this background rate is a factor of four higher than the projected background rate. This discrepancy arises from an excess of events from the $^{232}$Th decay chain. Background model fits aim to understand this deviation from assay-based projections, potentially determine the source(s) of observed backgrounds, and allow a precision measurement of the two-neutrino double-beta decay half-life. The fits agree with earlier simulation studies, which indicate the origin of the $^{232}$Th excess is not from a near-detector component and have informed design decisions for the next-generation LEGEND experiment. Recent findings have narrowed the suspected locations for the excess activity, motivating a final simulation and in-situ assay campaign to complete the background model.

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