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Predicting Cosmogenically Activated Isotopes in Ge-76 Detectors in the MAJORANA DEMONSTRATOR Neutrinoless Double-Beta Decay Experiment[1] RILEY FERGUSON, North Carolina State University, MAJORANA COLLABORATION — The Majorana Demonstrator is an array of point-contact Ge detectors fabricated from Ge isotopically enriched in 76Ge to search for neutrinoless double beta decay, an as yet unobserved form of nuclear decay requiring neutrinos to be Majorana particles (their own antiparticles). Extending half-life limits beyond those already demonstrated requires careful control of radioactive contaminants that contribute backgrounds to $0\nu\beta\beta$ searches. Cosmogenic activation of germanium, the production of radioisotopes through exposure to cosmic-rays, is a potential source of background in the Demonstrator, and for this reason efforts were taken to limit the exposure of germanium material and detectors (through shielding and underground storage) to cosmic rays throughout the construction process. Exposure was tracked throughout this process and recorded in a database; we have developed a database parser and activation calculation toolkit based in python, and are using it to calculate expected levels of cosmogenic activation based on these database records. An overview of the software suite, our calculations of expected activation rates, and preliminary background estimates will be presented. Impacts for the next-generation LEGEND experiment will also be considered.

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