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Building and characterizing strings of Ge detectors for the Majorana Demonstrator

The Majorana collaboration is currently constructing the Demonstrator, which will search for neutrinoless double beta decay ($0\nu 2\beta$) in germanium-76. The experiment will consist of 40 kg of germanium, 30 kg of which will be 87% enriched in ^{76}Ge . The material will be divided into individual p-type point contact (PPC) detectors, each around 1 kg. The detectors are to be deployed as ‘strings’ of four to five in a vertical stack, with seven strings inside each cryostat. Because the Demonstrator aims for a stringent background limit of < 3 counts/tonne-year in the 4-keV-wide region of interest for $0\nu 2\beta$, the collaboration has developed a rigorous procedure for string building using radiopure materials in a glove box maintained as a class 10 clean room environment with a liquid nitrogen boil-off radon purge. Once assembled, each string in the Demonstrator will undergo a set of characterization measurements, meant to ensure that backgrounds, resolutions, and thresholds are within acceptable limits. This poster will describe string building and present characterization data for the strings currently in commissioning for the first stage of the Demonstrator.

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