MAJORANA DEMONSTRATOR: Prototype Module Commissioning

CHRISTOPHER O’SHAUGHNESSY, Univ of NC - Chapel Hill, MAJORANA COLLABORATION — The MAJORANA DEMONSTRATOR is designed to explore the feasibility of operating a tonne-scale search for neutrinoless double beta decay by utilizing germanium detectors enriched in the isotope $^{76}$Ge as both a source and detector. A key goal of the DEMONSTRATOR is to achieve a background of 3 counts per tonne-year in the region of interest using a compact copper and lead shield. Meeting such a stringent background limit necessitates the custom design of components from materials known to be clean. Most notable are the inner shield, the strings that hold the enriched detectors, and the module cryostats that contain the strings. These are fabricated from ultra-high purity copper that has been electro-formed underground. A prototype module with strings of natural Ge detectors has been operated using a cryostat and components fabricated from commercial copper. Here we will highlight the performance of the prototype module and its role in assembly of the ultra-pure modules.

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