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Contamination Control and Assay Results for the MAJORANA DEMONSTRATOR Ultra Clean Components

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The MAJORANA DEMONSTRATOR is a neutrinoless double beta decay experiment utilizing enriched Ge-76 detectors in 2 separate modules inside of a common compact shield at the Sanford Underground Research Facility. The DEMONSTRATOR has developed specialized processes for producing ultra-pure copper and plastic components and world leading assay sensitivities to validate their cleanliness. The experiment is now operating, and initial data provides new insights into the success of cleaning and processing. Post production copper assays after the completion of Module 1 showed an increase in U and Th contamination in finished parts compared to starting bulk material. A revised cleaning method and additional round of surface contamination studies prior to Module 2 construction provided evidence that more rigorous process control can reduce surface contamination. This talk will describe assay results, comparison to MAJORANA DEMONSTRATOR data, and discuss further studies proposed to take advantage of assay capabilities for the purpose of ultra clean fabrication and process design.

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Primary author: CHRISTOFFERSON, Cabot-Ann (South Dakota School of Mines and Technology)

Presenter: CHRISTOFFERSON, Cabot-Ann (South Dakota School of Mines and Technology)

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