Abstract Submitted
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Analysis of Electronic Noise in the Majorana Dark Matter Detector[1] GREG DOOLEY, CENPA University of Washington — The Majorana Experiment seeks to detect neutrinoless double beta decay of ^{76}Ge with an array of customized ultra pure germanium detectors. It will simultaneously operate in a search for dark matter through direct detection of nuclear recoils with particles in a DM halo. Its ultimate DM goal is to probe down to masses of <1 KeV/c^2 in a 120 kg Ge detector. Rather than distinguish between nuclear and electron recoil events, the detector will achieve such high sensitivity through extreme reduction of noise and background. Background radiation will be blocked by deploying the device deep underground in the Sanford Underground Laboratory in Lead, SD. Limitations on and methods to reduce electronic noise are explored in this project. The frequency response and total noise of each component is modeled using SPICE. Raw electronic noise signals are taken from the Cogent detector and resolved into series, parallel, and 1/f noise. This procedure is used to help identify ways to improve novel pre-amplifier designs and optimize pulse shaping parameters. It is also used to produce accurate simulations of noise to aid in pulse shape analysis.

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