

Abstract Submitted
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Simulation studies of muon-produced background events deep underground and consequences for double beta decay experiments¹ RALPH MASSARCZYK, Los Alamos National Laboratory, MAJORANA COLLABORATION — Cosmic radiation creates a significant background for low count rate experiments. The MAJORANA DEMONSTRATOR experiment is located at the Sanford Underground Research Facility at a depth of 4850ft below the surface but it can still be penetrated by cosmic muons with initial energies above the TeV range. The interaction of muons with the rock, the shielding material in the lab and the detector itself can produce showers of secondary particles, like fast neutrons, which are able to travel through shielding material and can produce high-energy γ -rays via capture or inelastic scattering. The energy deposition of these γ rays in the detector can overlap with energy region of interest for the neutrino-less double beta decay. Recent studies for cosmic muons penetrating the MAJORANA DEMONSTRATOR are made with the GEANT4 code. The results of these simulations will be presented in this talk and an overview of the interaction of the shower particles with the detector, shielding and veto system will be given. This material is based upon work supported by the U.S. Department of Energy, Office of Science, Office of Nuclear Physics, the Particle Astrophysics Program of the National Science Foundation, and the Sanford Underground Research Facility.

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