

Abstract Submitted
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Depth & Shielding Requirements for mini-CLEAN¹ DONG-MING MEI, Los Alamos National Laboratory/University of South Dakota, ANDREW HIME, Los Alamos National Laboratory, CLEAN COLLABORATION, DEAP COLLABORATION — Neutron-induced nuclear recoil represents an irreducible background in detectors aimed at the direct detection of WIMP dark matter. Muon-induced neutrons can be adequately suppressed by staging experiments sufficiently deep underground, however, it is also critical to suppress neutron production via (α, n) interactions due to naturally occurring radioactivity in detector construction materials. We present the results of simulations for the mini-CLEAN detector under development to search for WIMP dark matter using 100 kg of liquid argon or liquid neon as the target material. We show that neutron backgrounds can be sufficiently suppressed in a conceptually simple detector using the coincidence between the prompt nuclear recoil signal and the delayed neutron capture gamma ray. The shielding of (α, n) neutrons that are produced in rock as a function of thickness of polyethylene is modeled.

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