

Abstract Submitted
for the APR21 Meeting of
The American Physical Society

Prompt and Delayed Cosmic-Ray Muon Induced Neutron Backgrounds in Direct Detection Dark Matter Searches SAGAR SHARMA POUDEL, University of Houston, TX, USA, GADMC (THE GLOBAL ARGON DARK MATTER COLLABORATION) COLLABORATION — Direct detection experiments try to detect low energy scattering of dark matter off the atomic nuclei target. Neutrons are an important background to the WIMPs (Weakly Interacting Massive Particles) dark matter searches in underground detectors. I will talk about two class of neutron backgrounds that arise from the cosmic-ray muon and the resulting interactions, 1) Prompt cosmogenic neutron backgrounds which have the neutron interaction in coincidence with the original muon or muon-induced shower, and 2) Delayed neutron backgrounds from the cosmogenic activation in materials and/or induced radioactivity. In this presentation, I will talk about my FLUKA-simulations based study of the backgrounds of cosmic-ray muon induced (cosmogenic) neutrons for WIMP searches with the DarkSide-20k, the liquid-argon based direct detection dark matter experiment to be commissioned by GADMC (The Global Argon Dark Matter Collaboration). The FLUKA-simulations based study was carried out to estimate the efficiency of DarkSide-20k's detector system to veto/shield cosmogenic neutrons, and to estimate the cosmogenic neutron background rate for WIMP dark matter searches.

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Date submitted: 11 Jan 2021

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