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Active Neutron Shielding R&D for Dark Matter Searches SHAWN HENDERSON, JOCELYN MONROE, PETER FISHER, Massachusetts Institute of Technology, DMTPC COLLABORATION — Neutrons are a dangerous background to direct dark matter detection searches because they can mimic exactly the signal signature. For this reason, it is desirable to measure the neutron flux directly at underground sites where dark matter experiments are active. We have developed a liquid scintillator-based neutron detector for this purpose, which is currently underground and taking data at the Waste Isolation Pilot Plant (WIPP) in NM. Before being commissioned underground, the response of this detector to neutrons with kinetic energies from 50 MeV to 800 MeV was determined in a beam test at the Los Alamos Neutron Science Center (LANSCE) in NM. The goal of this R&D is to (i) demonstrate the feasibility of a large scale active and passive neutron shield for dark matter searches and (ii) to measure the neutron energy spectrum underground at WIPP above 50 MeV neutron kinetic energies.

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