Abstract Submitted
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Direct Observation of Neutron Scattering in MoNA Scintillator Detectors[1] W. F. ROGERS, Indiana Wesleyan University, S. MOSBY, Los Alamos National Laboratory, N. FRANK, Augustana College, A.N. KUCHERA, Davidson College, M. THOENNESSEN, NSCL, Michigan State University, MONA COLLABORATION — Monte Carlo simulations provide an important tool for the interpretation of neutron scattering data in the MoNA and LISA arrays at NSCL. Neutron energy and trajectory are determined by time of flight and position of first light produced in the array. Neutrons elastically scattered from H and inelastically from C typically produce light above detector threshold, while those elastically scattered from C produce light below threshold ("dark scattering") and are redirected in flight, thus lowering energy and trajectory resolution. In order to test the effectiveness of our Geant4/MENATE_R simulations, we conducted an experiment at the LANSCE facility at Los Alamos National Laboratory to observe scattering of individual neutrons with well defined energy and trajectory in 16 MoNA detector bars arranged in two different stack geometries. Neutrons with energies ranging from 0.5 to 800 MeV emerged from a 3 mm collimator in the 90m shed on the WNR 4FP15L flight path to enter the array at a well defined point. Several features of neutron scattering are compared with simulation predictions, including hit multiplicity, scattering angle, mean distance between scatters, and the effect of dark scatter redirection. Results to date will be presented.

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