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Direct Observation of Neutron Scattering in BC408 Scintillator for Comparison with SImulation[1] W. F. ROGERS, J. E. BOONE , A. WANTZ, Indiana Wesleyan University, N. FRANK, Augustana College, A. N. KUCHERA, Davidson College, S. MOSBY, Los Alamos National Laboratory, M. THOENNESSEN, NSCL/Michigan State University, MONA COLLABORATION — Monte Carlo simulation provides an important tool for the interpretation of neutron scattering data in the Modular Neutron Array (MoNA) and the Large multi-Institutional Scintillator Array (LISA), each located at the NSCL facility at MSU and consisting of 144 stacked 2-m long organic plastic scintillator bar detectors. Energy and trajectory for unbound state decay neutrons are determined by time of flight and location of first light produced in the array. While most neutrons scattering elastically from protons and inelastically from C nuclei produce light above detector threshold, those scattered elastically from C remain below threshold ("dark scatter"), altering neutron trajectories, thus decreasing energy and momentum resolution. To test the accuracy of ourGeant4/MENATE_R simulations, we observed neutrons scattering from 16 MoNA bars arranged in two stack geometries at the LANSCE facility at Los Alamos National Laboratory. Spallation neutrons ranging in energy from 0.5 to 800 MeV emerged from a 3 mm collimator in the 90m shed on WNR flight path 4FP15L and struck the array along a well defined path. Results for neutron hit multiplicity, scattering dynamics, and dark scatter redirection are compared with simulation.

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