Neutron Multiplicity Discrimination in MoNA[1] W.F. ROGERS, J. GILLETTE, M. GARDNER, A. REED, Westmont College, S. MOSBY, NSCL, Michigan State University, MONA COLLABORATION — The Modular Neutron Array (MoNA) is a high-efficiency neutron detector at the National Superconducting Cyclotron Laboratory at MSU, used in conjunction with the NSCL/FSU sweeper magnet to investigate the loss of one or more neutrons from particle-unbound nuclei near and beyond the neutron drip-line. In order to properly analyze data from these experiments it is important to distinguish neutron multiplicity in MoNA. We've developed an algorithm that produces scatter plots of neutron velocity change vs. scattering angle and energy deposition vs. scattering angle, each of which results in a locus of events corresponding (largely) to single neutron multiple-scatter events, and each of which can be used to gate the other for cross-correlation. Challenges to accurate neutron trajectory mapping include sub-threshold neutron scattering from carbon (which changes neutron trajectories in unpredictable ways) and the discrete nature of the array, which (especially for shorter scattering lengths) results in scattering angles not necessarily reflective of actual neutron trajectories. Results for experiments involving one and two neutron decays will be presented.

Warren F. Rogers
Westmont College

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