

Abstract Submitted  
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**Elastic and Inelastic Scattering of Neutrons using a CLYC array<sup>1</sup>**

TRISTAN BROWN, E. DOUCET, P. CHOWDHURY, C.J. LISTER, G.L. WILSON, UMass Lowell, M. DEVLIN, S. MOSBY, LANL — CLYC scintillators, which have dual neutron and gamma response, have recently ushered in the possibility of fast neutron spectroscopy without time-of-flight (TOF) [1-3]. A 16-element array of 1" x 1" <sup>6</sup>Li-depleted CLYC crystals, where pulse-shape-discrimination is achieved via digital pulse processing, has been commissioned at UMass Lowell. In an experiment at LANSCE, high energy neutrons were used to bombard <sup>56</sup>Fe and <sup>238</sup>U targets, in order to measure elastic and inelastic neutron scattering cross sections as a function of energy and angle with the array. The array is placed very close to the targets for enhanced geometrical solid angles for scattered neutrons compared to standard neutron-TOF measurements. A pulse-height spectrum of scattered neutrons in the detectors is compared to the energy of the incident neutrons, which is measured via the TOF of the pulsed neutrons from the source to the detectors. Recoil corrections are necessary to combine the energy spectra from all the detectors to obtain angle-integrated elastic and inelastic cross-sections. The detection techniques, analysis procedures and results will be presented.

[1] N. D'Olympia et al., NIM A694, 140 (2012);

[2] N. D'Olympia et al., NIM A714, 121 (2013);

[3] N. D'Olympia et al., NIM A763, 433 (2014)

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