## Abstract Submitted for the DNP15 Meeting of The American Physical Society

Elastic and Inelastic Neutron Scattering with a C<sup>7</sup>LYC Array<sup>1</sup> G.L. WILSON, T. BROWN, P. CHOWDHURY, E. DOUCET, C.J. LISTER, UMass Lowell, N. D'OLYMPIA, Passport Systems, Inc., M. DEVLIN, S. MOSBY, LANL — A scintillator array of 16 1" x 1" Cs<sub>2</sub>LiYCl<sub>6</sub> (CLYC) detectors has been commissioned for low energy nuclear science. Standard CLYC crystals detect both gamma rays and neutrons rays with excellent pulse shape discrimination, with thermal neutrons detected via the  ${}^{6}\text{Li}(n,\alpha)$ t reaction. Our discovery of spectroscopy-grade response of CLYC for fast neutrons via the <sup>35</sup>Cl(n,p) reaction, with a pulse height resolution of under 10% in the < 8 MeV range, led to our present array of <sup>7</sup>Li enriched C<sup>7</sup>LYC detectors, where the large thermal neutron response is essentially eliminated [1]. While the intrinsic efficiency of C<sup>7</sup>LYC for fast neutron detection is low, the array can be placed near the target since a long TOF arm is no longer needed for neutron energy measurement, thus recovering efficiency through increased solid angle coverage. The array was recently deployed at Los Alamos to test its capability in measuring differential scattering cross sections as a function of energy for <sup>56</sup>Fe and <sup>238</sup>U. The incident energy from a white neutron source was measured via TOF, and the scattered neutron energy via the pulse height. Techniques, analysis and first results will be discussed.

[1] N. D'Olympia et al., NIM A694 (2012) 140, and NIM A763 (2014) 433.

<sup>1</sup>Supported by the NNSA Stewardship Science Academic Alliance Program under Grant DE-NA00013008.

Partha Chowdhury UMass Lowell

Date submitted: 01 Jul 2015 Electronic form version 1.4