Abstract Submitted
for the DNP13 Meeting of
The American Physical Society

Development of a New Fast Neutron/Gamma Spectrometer Array Using CLYC[1] NATHAN D'OLYMPIA, PARTHA CHOWDHURY, CHRISTOPHER LISTER, University of Massachusetts Lowell — Neutron physics has long suffered from a lack of detectors that provide spectroscopic information without the need for inefficient time-of-flight techniques. Any headway made towards a spectrometer with good energy resolution and neutron/gamma pulse-shape discrimination represents an important step forward in the field. Recent investigations at the University of Massachusetts Lowell with Cs_2LiYCl_6 (CLYC) scintillators have demonstrated their potential for direct pulse-height measurements via the ^{35}Cl(n,p) reaction. From this work, it was recognized that CLYC could be optimized for fast neutron detection by growing ^{6}Li-depleted crystals to suppress the overwhelming thermal neutron response. A project is now underway to develop a versatile array of 16 1"x1" ^{6}Li-depleted CLYC detectors for measurements in nuclear astrophysics, reactor data, homeland security, and nuclear structure. Initial measurements of interest include prompt fission neutrons, β-delayed neutrons, and scattering cross sections. Characterizations of the neutron and gamma-ray response for the first two detectors of the array are being carried out at various facilities with both mono-energetic and continuous fast neutron beams.

[1]Supported by the U.S. Department of Energy under grant #DE-FG02-94ER40848.

Nathan D'Olympia
University of Massachusetts Lowell

Date submitted: 28 Jun 2013 Electronic form version 1.4