Abstract Submitted
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C^7LYC Scintillators and Fast Neutron Spectroscopy[1] P. CHOWDHURY, T. BROWN, E. DOUCET, C.J. LISTER, G.L. WILSON, UMass-Lowell, N. D'OLYMPIA, Passport Systems Inc., M. DEVLIN, S. MOSBY, LANL — Cs_2LiYCl_6 (CLYC) scintillators detect both gammas and neutrons with excellent pulse shape discrimination. At UML, fast neutron measurements with a 16-element 1"x1" CLYC array show promise for low energy nuclear science. CLYC detects fast neutrons via the ^{35}Cl(n,p) reaction (resolution <10% at <8 MeV). In our ^{7}Li-enriched C^7LYC, the thermal neutron response from the ^{6}Li(n,α)t reaction is virtually eliminated [1]. The low intrinsic efficiency of CLYC for fast neutrons ($< 1\%$) is offset by increased solid angle with the array placed near the target, since TOF is not needed for energy resolution. The array was tested at LANL for measuring elastic and inelastic neutron scattering on ^{56}Fe. The incident energy from the white neutron source was measured via TOF, and the scattered neutron energy via the pulse height in CLYC. The array was also tested at CARIBU for measuring beta-delayed neutrons. Larger CLYC crystals are now a reality. Measurements with the first 3" x 3" C^7LYC crystal are in progress at UML. Results will be discussed in the context of constructing a C^7LYC array at FRIB for reaction and decay spectroscopy of neutron-rich fragments.
1. N. D'Olympia et al., Nucl. Inst. Meth. A694, 140 (2012), and A763, 433 (2014).

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