

Abstract Submitted
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Fast Neutron Spectroscopy using a CLYC array¹ EMERY DOUCET, T. BROWN, P. CHOWDHURY, C.J. LISTER, G.L. WILSON, UMass Lowell, M. DEVLIN, S. MOSBY, LANL — A new inorganic scintillator, Cs₂LiYCl₆, or CLYC, has recently shown great promise as a dual gamma-neutron detector [1-3], where neutron-gamma discrimination is achieved through digital pulse shape processing. The ³⁵Cl(n,p) reaction allows fast neutrons to be measured with an energy resolution of ≈10%. Following initial tests with natural Li, ⁶Li-depleted crystals were chosen to reduce the strong thermal capture response of ⁶Li. A 16-element array of 1" x 1" ⁶Li-depleted CLYC crystals is being tested in a variety of applications. A VME-based digital DAQ is used for pulse shape discrimination and extracting energies. The array was deployed at the LANSCE WNR facility, to measure elastic and inelastic scattering cross sections of neutrons on ⁵⁶Fe and ²³⁸U. The data acquisition and analysis software were originally based on Python. The sorting codes were re-written in C, which sped up the analysis by two orders of magnitude. Most of the sorting code is within the framework of the CERN-ROOT software. Details of the detector array and the analysis 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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