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Characterizing ICF Neutron Diagnostics on the nTOF line at SUNY Geneseo ANGELA SIMONE, STEPHEN PADALINO, ETHAN TURNER, MARY KATE GINNANE, NATALIE DUBOIS, KURTIS FLETCHER, MICHAEL GIORDANO, PATRICK LAWSON-KEISTER, HANNAH HARRISON, HANNAH VISCA, State University of New York at Geneseo, CRAIG SANGSTER, SEAN REGAN, Laboratory for Laser Energetics — Charged particle beams from the Geneseo 1.7 MV tandem Pelletron accelerator produce nuclear reactions that emit neutrons in the range of 0.5 to 17.9 MeV via the d(d,n)3He and 11B(d,n)12C reactions. The neutron energy and flux can be adjusted by controlling the accelerator beam current and potential. This adjustable neutron source makes it possible to calibrate ICF and HEDP neutron scintillator diagnostics. However, gamma rays which are often present during an accelerator-based calibration are difficult to differentiate from neutron signals in scintillators. To identify neutrons from gamma rays and to determine their energy, a permanent neutron time-of-flight (nTOF) line is being constructed. By detecting the scintillator signal in coincidence with an associated charged particle (ACP) produced in the reaction, the identity of the neutron can be known and its energy determined by time of flight. Using a 100% efficient surface barrier detector to count the ACPs, the absolute efficiency of the scintillator as a function of neutron energy can be determined. This is done by determining the ratio of the ACP counts in the singles spectrum to coincidence counts for matched solid angles of the SBD and scintillator. Funded in part by a LLE contract through the DOE.

Angela Simone
State University of New York at Geneseo

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