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Characterizing ICF Neutron Scintillation Diagnostics on the nTOF line at SUNY Geneseo[1] PAT LAWSON-KEISTER, JONAH PADAWAR-CURRY, HANNAH VISCA, KURT FLETCHER, STEPHEN PADALINO, SUNY Geneseo, T. CRAIG SANGSTER, SEAN REGAN, Laboratory for Laser Energetics — Neutron scintillator diagnostics for ICF and HEDP can be characterized using the neutron time-of-flight (nTOF) line on Geneseo's 1.7 MV tandem Pelletron accelerator. Neutron signals can be differentiated from gamma signals by employing coincidence methods. A 1.8-MeV beam of deuterons incident on a deuterated polyethylene target produces neutrons via the $^{2}H(d,n)^{3}He$ reaction. Neutrons emerging at a lab angle of 88° have an energy of 2.96 MeV; the ^{3}He ions associated with these neutrons are detected at a scattering angle of 43° using a surface barrier detector. The time of flight of the neutron can be measured by using the ^{3}He detection as a "start" signal and the scintillation detection as a "stop" signal. This time of flight requirement is used to identify the 2.96-MeV neutron signals in the scintillator. To measure the light curve produced by these monoenergetic neutrons, two photomultiplier (PMT) tubes are attached to the scintillator. The full aperture PMT establishes the nTOF coincidence. The other PMT is fitted with a pinhole to collect single events. The time between the full aperture PMT signal and the arrival of the signal in the pinhole PMT is used to determine the light curve for the scintillator. This system will enable the neutron response of various scintillators to be compared.

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