Abstract Submitted for the DPP11 Meeting of The American Physical Society

Optimization of Shielded Scintillator for Neutron Detection PATRICK BELANCOURT, The Ohio State University, JOHN MORRISON, KRAMER AKLI, RICHARD FREEMAN, HIGH ENERGY DENSITY PHYSICS TEAM — The High Energy Density Physics group is interested in the basic science of creating a neutron and gamma ray source. The neutrons and gamma rays are produced by accelerating ions via a laser into a target and creating fusion neutrons and gamma rays. A scintillator and photomultiplier tube will be used to detect these neutrons. Neutrons and photons produce ionizing radiation in the scintillator which then activates metastable states. These metastable states have both short and long decay rates. The initial photon count is orders of magnitude higher than the neutron count and poses problems for accurately detecting the neutrons due to the long decay state that is activated by the photons. The effects of adding lead shielding on the temporal response and signal level of the neutron detector will be studied in an effort to minimize the photon count without significant reduction to the temporal resolution of the detector. MCNP5 will be used to find the temporal response and energy deposition into the scintillator by adding lead shielding. Results from the simulations will be shown. Optimization of our scintillator neutron detection system is needed to resolve the neutron energies and neutron count of a novel neutron and gamma ray source.

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Date submitted: 14 Jul 2011 Electronic form version 1.4