Abstract Submitted
for the DPP12 Meeting of
The American Physical Society

Analysis and Description of the Sources of Nuclear Signals from ICF Capsules[1] SCOTT SEPKE, CHARLES CERJAN, ANDREA KRITCHER, MICHAEL MARINAK, PAUL SPRINGER, Lawrence Livermore National Laboratory, JOHAN FRENJE, MARIA GATU JOHNSON, ALEX ZYLSTRA, Massachusetts Institute of Technology, GARY GRIM, HANS HERRMANN, Los Alamos National Laboratory — Using the ALE multiphysics code HYDRA, a detailed accounting of the various nuclear processes and their relative importance in ICF plasmas is made for each of the main target platforms used at the National Ignition Facility (NIF): symcaps and layered THD and DT capsules. Special attention is given to the individual features observed in calculated and measured neutron spectra and images. These arise primarily from thermonuclear reactions, elastic scattering, and the D(n,2n) reaction. Under NIF conditions, a significant fraction of the neutrons undergo multiple scattering events before escaping the capsule. We examine the signatures of multiple scattering events, their dependence upon ρR and the solid angle sampled by the detector. Generation of protons both by D-^{3}He fusion during the shock flash in a symcap and from knock on reactions in the plastic ablator in all three platforms is discussed. Models for calculating the proton energy spectrum observed outside of the hohlraum are presented. Finally, the energy spectrum of gamma rays generated within a plastic ICF capsule is presented for both Si and Ge doped capsules.

[1]This work (LLNL-ABS-563472) performed under the auspices of the U.S. Department of Energy by Lawrence Livermore National Laboratory under Contract DE-AC52-07NA27344.

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Date submitted: 09 Jul 2012 Electronic form version 1.4