

Abstract Submitted
for the DPP12 Meeting of
The American Physical Society

Measurements and interpretation of TT and down-scattered DT neutron spectra at OMEGA and the NIF M. GATU-JOHNSON, D.T. CASEY, J. FRENJE, C. LI, F. SÉGUIN, R. PETRASSO, MIT, V. GLEBOV, J. KNAUER, T.C. SANGSTER, LLE, R. BIONTA, J. EDWARDS, S. GLENZER, S. HATCHETT, O. LANDEN, A. MACKINNON, D. MCNABB, D. MUNRO, J. PINO, S. SEPKE, P. SPRINGER, LLNL, J. KILKENNY, GA — The Magnetic Recoil neutron Spectrometers (MRS) on OMEGA and the National Ignition Facility (NIF) have been used to measure inertial confinement fusion (ICF) neutron spectra above $E_n \approx 4$ MeV from DT and THD implosions with varying fuel composition and areal density (ρR). In the high- ρR DT implosions at the NIF, multiple-neutron scattering in the fuel is observed for the first time. In implosions with high tritium content, the TT neutron spectrum dominates and can be distinguished from other components in the neutron spectrum. In this work, we use an ensemble of measurements with varying conditions to separate the TT and down-scattered DT contributions and to improve our understanding of the shape of the TT spectrum and the source of DT down-scatter. The work motivates the need for high-resolution measurements of the ICF neutron spectrum at low energies ($E_n < 5$ MeV). This work was supported in part by the U.S. DOE, LLNL and LLE.

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Date submitted: 12 Jul 2012

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