Abstract Submitted
for the DPP14 Meeting of
The American Physical Society

Observation of variations in the T+T neutron spectrum with varying center-of-mass energy M. GATU JOHNSON, J.A. FRENJE, A. ZYLSTRA, R.D. PETRASSO, MIT, C. FORREST, V. YU. GLEBOV, J.P. KNAUER, F.J. MARSHALL, T. MICHEL, T.C. SANGSTER, W. SEKA, W. SHMAYDA, C. STOECKL, LLE, D. SAYRE, J.A. CAGGIANO, D.T. CASEY, R. HATARIK, D.P. MCNABB, J.E. PINO, LLNL, A. BACHER, Indiana University, H. HERRMANN, Y. KIM, LANL, J-.L. BOURGADE, O. LANDOAS, B. ROSSE, CEA — C. BRUNE, Ohio University – The T+T fusion reaction, which produces two neutrons and an alpha particle in a 3-body final state, has been studied in a series of direct-drive, T2-gas-filled thin (~ 3 μm) glass-capsule implosions at OMEGA. The shapes of the reaction product spectra are dictated by the final-state interactions between n-α (^{5}He in the ground- and excited states) and n-n (di-neutron interaction). The theory behind final-state interactions is not well understood and detailed study of the reaction product spectra can teach us about the intricacies of the nuclear theory involved. In this presentation, measured neutron spectra are interpreted in terms of the sequential decay through ^{5}He in the ground- and excited states. A clear energy dependence in relative reaction-channel strength at low center-of-mass energy (18-55 keV) is observed in the data. The role of the di-neutron interaction could be more clearly deduced through study of the alpha particle spectrum. In the presentation, we also identify steps required to successfully measure the T+T alpha spectrum in future experiments. This work was supported in part by the U.S. DOE, NLUF, LLNL and LLE.

Fredrick Seguin
Massachusetts Institute of Technology

Date submitted: 10 Jul 2014 Electronic form version 1.4