Abstract Submitted
for the DPP17 Meeting of
The American Physical Society

Impact of flows on ion temperatures inferred from neutron spectra in asymmetrically driven OMEGA DT implosions M. GATU JOHNSON, J. FRENJE, B. LAHMANN, F. SEGUIN, R. PETRASSO, MIT, B. APPELBE, J. CHITTENDEN, C. WALSH, Imperial College, J. DELETTREZ, I. IGUMENSHCHEV, J.P. KNAUER, V.YU. GLEBOV, C. FORREST, W. GRIMBLE, F. MARSHALL, T. MICHEL, C. STOECKL, LLE, B.M. HAINES, A.B. ZYLSTRA, LANL — Ion temperatures (T_{ion}) in Inertial Confinement Fusion (ICF) experiments have traditionally been inferred from the broadening of primary neutron spectra. Directional motion (flow) of the fuel at burn, expected to arise due to asymmetries imposed by e.g. engineering features or drive non-uniformity, also impacts broadening and may lead to artificially inflated "T_{ion}" values. Flow due to low-mode asymmetries is expected to give rise to line-of-sight variations in measured T_{ion}, as observed in OMEGA cryogenic DT implosions but not in similar experiments at the NIF. In this presentation, we report on OMEGA experiments with intentional drive asymmetry designed for testing the ability to accurately predict and measure line-of-sight differences in apparent T_{ion} due to low-mode asymmetry-seeded flows. The measurements are contrasted to CHIMERA, RAGE and ASTER simulations, providing insight into implosion dynamics and the relative importance of laser drive non-uniformity, stalk and offset as sources of asymmetry. The results highlight the complexity of hot-spot dynamics, which is a problem that must be mastered to achieve ICF ignition. This work was supported in part by the U.S. DOE, NLUF and LLE.

F. Seguin
Massachusetts Institute of Technology

Date submitted: 18 Jul 2017 Electronic form version 1.4