Abstract Submitted
for the DPP17 Meeting of
The American Physical Society

The Effect of Laser Imprint in OMEGA Cryogenic Implosions P.B. RADHA, S.X. HU, R. BETTI, E.M. CAMPBELL, C.J. FORREST, V.N. GONCHAROV, J.P. KNAUER, R.L. MCCRORY, D.T. MICHEL, S.P. REGAN, T.C. SANGSTER, C. STOECKL, Laboratory for Laser Energetics, U. of Rochester, J.A. FRENJE, M. GATU JOHNSON, R.D. PETRASSO, PFSC, MIT — Single laser beam nonuniformity (laser imprint) can potentially compromise direct-drive implosion performance. Rayleigh–Taylor growth of short-wavelength nonuniformity imposed by laser speckle can grow during the acceleration phase of an implosion, resulting in a tenuous in-flight shell. Significant laser imprint can result in a thicker in-flight shell; reduced fusion yield, areal density, and ion temperature; wider burn; and a larger hot-spot radius than a stable shell. Simulations with the hydrodynamic code *DRACO* are presented for OMEGA cryogenic implosions spanning a range in adiabat and implosion velocity. These simulations include a three-dimensional ray trace. These simulations also include the effect of nonlocal heat conduction and cross-beam energy transfer. Signatures of laser imprint in cryogenic implosions are identified and comparisons to experimental observables are presented. This material is based upon work supported by the Department of Energy National Nuclear Security Administration under Award Number DE-NA000194.

P.B. Radha
Laboratory for Laser Energetics, U. of Rochester

Date submitted: 18 Jul 2017 Electronic form version 1.4