Abstract Submitted
for the DPP14 Meeting of
The American Physical Society

Constraining the Rocket Efficiency in Hydrodynamic Simulations of Direct-Drive Cryogenic Implosions by Simultaneous Measurements of the CD Burnthrough and the Shell Trajectory D.T. MICHEL, A.K. DAVIS, R. EPSTEIN, V.N. GONCHAROV, S.X. HU, I.V. IGUMENSHCHEV, D.D. MEYERHOFER, T.C. SANGSTER, D.H. FROULA, Laboratory for Laser Energetics, U. of Rochester — Time-resolved imaging of the soft x rays emitted by the coronal plasma of a directly driven imploding cryogenic target on the OMEGA Laser System is used to measure the shell trajectory and the time to ablate the outer CD layer. These simultaneous measurements constrain both the shell velocity and the mass ablation rate. Two simulations have been performed and compared to the measurements: (1) including cross-beam energy transfer (CBET) and nonlocal thermal transport models and (2) using a flux limiter adapted to match the measured shell trajectory. Good agreement with both the trajectory and mass ablation rate is found with CBET and nonlocal models. While the modified flux limiter matches the trajectory (by construction), the CD burnthrough occurs $\sim$ 200 ps later than in experiments. This demonstrates that by adapting a flux limiter, both the shell velocity and the mass ablation rate cannot be reproduced simultaneously. This material is based upon work supported by the Department of Energy National Nuclear Security Administration under Award Number DE-NA0001944.

D.H. Froula
Laboratory for Laser Energetics, U. of Rochester

Date submitted: 09 Jul 2014 Electronic form version 1.4