Abstract Submitted
for the DPP19 Meeting of
The American Physical Society

Density Measurements of the Inner Shell Release[1] DAN HABERBERGER, ALEX SHVYDKY, SUXING HU, JIM KNAUER, STEVE IVANCIC, VALERI GONCHAROV, DUSTIN FROULA, Laboratory for Laser Energetics — In inertial confinement fusion implosions, the release of plasma off the inner surface of the target shell after the shock breakout is important to the performance of the design. If the release has a higher density or longer scale length than that predicted by hydrodynamic simulations, the mass increase in the hot spot can decrease its compressibility and reduce performance compared to what is expected from the simulations. Experiments on OMEGA EP at the Laboratory for Laser Energetics were performed to measure the plasma expanding on the back side of a CH shell driven by two UV laser beams with a total of 6 kJ of energy in a 5-ns pulse focused to a 750-?m spot. The peak position of the driven shell was tracked using x-ray radiography streaked over 4 ns. The low-density plasma expanding off the undriven side of the shell after the shock breaks through was measured using the 4? interferometer and angular filter refractometer. Comparison between the experimental data and hydrodynamic simulations indicates that a decompression of the initial neutral CH shell results in an increased expansion of the plasma on the back side of the shell after the shock breaks out. The implication to inertial confinement fusion performance will be discussed.

[1]This material is based upon work supported by the Department of Energy National Nuclear Security Administration under Award Number DE-NA0003856.

Daniel Haberberger
Laboratory for Laser Energetics

Date submitted: 26 Jun 2019 Electronic form version 1.4