Abstract Submitted
for the DPP15 Meeting of
The American Physical Society

Non-hydrodynamic mix at the fuel-shell interface in shock-driven ICF implosions[1] H. SIO, H.G. RINDERKNECHT, C.K. LI, A. ZYLSTRA, M. GATU JOHNSON, J.A. FRENJE, R.D. PETRASSO, MIT, P. AMENDT, S.C. WILKS, LLNL, C. BELLEI, CELIA — It is well-understood that unmitigated hydrodynamic instability growth at the fuel-shell interface significantly degrades ICF implosion performance. Other ion transport mechanisms due to long mean-free-path effects across an interface, such as diffusion or shock-front transport of ions, are less well-understood. A new non-hydrodynamic mixing mechanism across the fuel-shell interface was explored using thin-CD shell targets filled with 3He gas on OMEGA. Laser conditions were varied to adjust the level of non-hydrodynamic mixing across the CD-3He interface, and nuclear diagnostics were used to measure the reaction histories and spatial profile of the 14.7 MeV D3He-p created from mixing of the D in the shell into the 3He gas. Preliminary results indicate substantial fuel-shell mix prior to the deceleration phase, at a time during which hydrodynamic instability growth is expected to be negligible. Comparison to radiation-hydrodynamic simulations with and without ion diffusion models, as well as expectations from fully kinetics LSP simulations, will be discussed.

[1]This work was supported in part by the NLUF, LLE, and DOE-NNSA-SSGF.

Fredrick Seguin
MIT

Date submitted: 24 Jul 2015 Electronic form version 1.4