

Abstract Submitted  
for the DPP15 Meeting of  
The American Physical Society

**Kinetic simulation of direct-drive capsule implosions and its comparison with experiments and radiation hydrodynamic simulation<sup>1</sup>**

THOMAS KWAN, ARI LE, MARK SCHMITT, HANS HERRMANN, STEVE BATHA, Los Alamos National Laboratory — We have carried out simulations of direct-drive capsule implosion experiments conducted on Omega laser facility at the Laboratory of Laser energetics of the University of Rochester [1]. The capsules had a glass shell ( $\text{SiO}_2$ ) with D, T, He-3 fills at various proportions. One-dimensional radiation hydrodynamic calculations and kinetic particle/hybrid simulations with LSP were carried out for the post-shot analysis to compare neutron yield, yield ratio, and shell convergence in assessing the effects of plasma kinetic effects. The LSP simulations were initiated with the output from the rad-hydro simulations at the end of the laser-drive. The electrons are treated as a fluid while all the ion species by the kinetic PIC technique. Our LSP simulations clearly showed species separation between the deuterons, tritons and He-3 during the implosion but significantly less after the compression. The neutron yield, gamma bang-time and -width from the LSP simulations compared favorably with experiments. Detail comparison among the kinetic simulations, rad-hydro simulations, and experimental results will be presented.

[1] H. W. Herrmann, et al., Phys. Plasmas Vol. 16 056312 (2009)

<sup>1</sup>Work performed under the auspices of the US Department of Energy by Los Alamos National Laboratory under Contract No. W-7405-ENG-36.

Thomas Kwan  
Los Alamos National Laboratory

Date submitted: 20 Jul 2015

Electronic form version 1.4