Abstract Submitted
for the DPP19 Meeting of
The American Physical Society

Petascale kinetic simulations of laser plasma interactions relevant to inertial fusion energy (IFE)[1] FRANK TSUNG, University of California, Los Angeles, HAN WEN, LLE/University of Rochester, ROMAN LEE, W. J. WINJUM, W. B. MORI, University of California, Los Angeles — Understanding the roles laser plasma interactions (LPI) play on inertial fusion energy (IFE) experiments is critical for the success of current experiments around the world. And although the physics of Raman and Brillouin scattering is predominantly in one dimension (i.e., the incident and the scattered lights all propagates along the same axis), higher dimensional effects, such as the self-focusing of the plasma waves, or the transverse effects of the lasers due to laser non-uniformities can be important and higher dimensional simulations with kinetic effects are necessary to capture the richness of the LPI problem under IFE relevant conditions. In the past year, we have made numerous improvements to the particle-in-cell code OSIRIS to allow it to perform large simulations with ever increasing realism in 2D, quasi-3D, and 3D. These modifications have allowed us to perform kinetic simulations of laser plasma interactions (including stimulated Raman scattering (SRS), two plasmon decays (TPD) and stimulated Brillouin scattering (SBS)) with ever increasing realism, including phase plates, and temporal smoothing. We will present present and future plans to modify OSIRIS to perform multi-speckle simulations in 2D and 3D with realistic beam smoothing and present 2D and quasi-3D simulations of multi-speckle simulations of the TPD/HFHI instability under shock-ignition relevant conditions.

[1]This work is supported by DOE, NSF, and LLNL

Frank Tsung
California State University, Los Angeles

Date submitted: 03 Jul 2019 Electronic form version 1.4