Abstract Submitted
for the DPP20 Meeting of
The American Physical Society

Simulations of Laser Plasma Interactions for Moderate to High Laser Intensities[1] B. J. WINJUM, R. LEE, F. S. TSUNG, W. B. MORI, University of California, Los Angeles — Stimulated Raman scattering (SRS) and Brillouin scattering (SBS) have been important topics throughout ICF history. For NIF-relevant regimes, there has been a pressing need to accurately model and avoid these instabilities, and there has grown a rich collection of simulation studies focusing on the details of kinetic physics and nonlinear interactions that influence SRS and SBS. Even though the driving laser frequency for ICF was decreased from 1ω to 3ω in an attempt to decrease the growth rate of these detrimental instabilities, there are many fundamentally interesting topics in the LPI dynamics of lasers with longer wavelengths and/or higher intensities ($I\lambda_0^2 \approx 10^{16} - 10^{17}$ W μm^2/cm^2) driving high-energy density plasmas similar to NIF plasmas ($n_e \approx$ 5-20% n_{cr}, and T_e of order keV). In these regimes, LPI can be strongly driven but nonlinearly saturate, multiple scattering instabilities can co-exist, SRS and SBS may be in the strongly driven regime, and other instabilities like Compton scattering might arise. We present theory and particle-in-cell simulations from this regime.

[1]The authors gratefully acknowledge support from the DOE under Grant No. DE-NA0003842.

Benjamin Winjum
University of California, Los Angeles

Date submitted: 29 Jun 2020 Electronic form version 1.4