Abstract Submitted
for the APR08 Meeting of
The American Physical Society

Particle-in-Cell (PIC) Simulations of Laser Plasma Interactions in Underdense Plasmas[1] F.S. TSUNG, J. FAHLEN, B.J. WINJUM, J. TONGE, W.B. MORI, University of California, Los Angeles — In underdense plasmas, an incident laser can decay into a backward going electromagnetic wave and a forward going plasma wave (backward stimulated Raman scattering, or BSRS), or two counterpropagating plasma waves (2ωp instability). These laser-plasma instabilities (LPI) can potentially reduce ICF yields either by preheating the target (through fast electrons generated by large amplitude plasma waves), or by reflecting the incident laser and thereby reducing the driver energy. We have studied these instabilities self-consistently using the electromagnetic PIC code OSIRIS, as well as with the electrostatic PIC code BEPS1 with external drivers. In this poster, we will present simulation results which address numerous kinetic aspects of these LPI under plasma parameters relevant to the National Ignition Facility (NIF), such as particle trapping due to large amplitude plasma waves, nonlinear frequency shifts which can detune and saturate the three wave interactions, and sideband instabilities resulting from trapped particles.

[1]Work supported by DOE and NSF.

Abstract APS

Date submitted: 20 Feb 2008 Electronic form version 1.4