Abstract Submitted
for the DPP06 Meeting of
The American Physical Society

Driven Plasma Waves Relevant to Stimulated Raman Scattering[1]

JAY FAHLEN, B. WINJUM, J. TONGE, F.S. TSUNG, V. DECYK, W.B. MORI, UCLA — In fully self-consistent particle-in-cell (PIC) simulations the saturation of Stimulated Raman Scattering (SRS) is quite complicated. To better understand, we study the excitation of plasma waves by imposing an external ponderomotive force in 1D electrostatic PIC simulations. By varying the phase velocity, the drive frequency (detuning), and the amplitude of the driving wave, several saturation mechanisms are explored, including fluid and kinetic nonlinear frequency shifts, sideband generation, and particle trapping. The simulations indicate that simple frequency shift models are inadequate in describing the wave saturation. Wave harmonics are also observed and these can contribute to the non-linear frequency shift. In addition to these "fluid" (harmonics) frequency shift effects the distribution function changes during the growth and saturation of the wave, indicating that kinetic frequency shift calculations (Morales and O'Neil PRL **28** 417 (1972)) depending only on the initial distribution function f_0 need updating. Sidebands will also be discussed along with comparisons to electromagnetic OSIRIS PIC simulations.

[1]Work supported by DOE grants DE-F52-03NA00065:A004,DE-FG02-03ER54721 and NSF-Phy-0321345.

Jay Fahlen
UCLA

Date submitted: 25 Jul 2006 Electronic form version 1.4