Abstract Submitted
for the DPP07 Meeting of
The American Physical Society

SRS modeling of NIF ignition designs using pF3D[1] EDWARD WILLIAMS, DENISE HINKEL, LAURENT DIVOL, A. BRUCE LANGDON, PIERRE MICHEL, C.H. STILL, Lawrence Livermore National Lab — The laser plasma interaction code pF3d is used to model the propagation of high intensity laser beams through plasma, including filamentation and stimulated Raman and Brillouin scattering. Making these calculations feasible for ignition-related applications require that the equations for the light and Langmuir waves be enveloped in both space and time in a "paraxial" approximation. For the SRS light, the time dependence is enveloped around the peak of the (anticipated) spectrum. The Langmuir wave is enveloped around the corresponding parametric matching frequency and wave-number. For homogeneous plasmas, one can arrange for the properties (frequency, damping rate, group velocity, ponderomotive response) of the Langmuir wave, modeled by an enveloped fluid equation, to match those of a kinetic model. This is no longer the case when the plasma conditions span a large range of electron density and temperature. Some compromise is required. In this paper we describe modifications to our pF3d SRS model and compare them with benchmarks. We show simulations of the inner beam of NIF ignition designs, focusing on the behavior of SRS.

[1]This work was performed under the auspices of the U.S. Department of Energy by the University of California,

Edward Williams
Lawrence Livermore National Lab

Date submitted: 23 Jul 2007 Electronic form version 1.4