Abstract Submitted
for the DPP08 Meeting of
The American Physical Society

Assessing SRS-induced electron trapping in ignition hohlraums[1]
D.J. STROZZI, E.A. WILLIAMS, LLNL, H.A. ROSE, LANL, A.B. LANGDON, D.E. HINKEL, LLNL — Electron trapping can cause important nonlinearities in stimulated Raman scattering (SRS), including kinetic inflation[1,2], a nonlinear frequency shift[3], and Langmuir-wave bowing and self-focusing[4]. We quantify the likelihood of such nonlinearity with the number of bounce orbits[2], $N_B \equiv \tau_{de}/\tau_B$, that a resonant electron undergoes during a typical detrapping time τ_{de} ($\tau_B \equiv 2\pi[\delta n/n_e]^{1/2}/\omega_{pe}$ is the bounce period). We calculate N_B, with linear theory, for the detrapping processes of speckle sideloss and collisions (both pitch-angle scattering and parallel diffusion). For typical NIF ignition designs, sideloss is the most effective detrapping process. We use NB to analyze simulations of NIF designs with the paraxial, enveloped propagation code pF3D. We find that trapping should not occur on the outer beams. However, it may occur on the inner beams near the hohlraum wall, where pF3D predicts SRS reflectivities of several percent. In addition, comparison of kinetic simulations with various reduced models of trapping nonlinearities will be presented. [1]H. X. Vu et al., PRL **86**, 4306 (2001). [2]D. J. Strozzi et al., PoP **14**, 013104 (2007). [3]G. J. Morales, T. M. O'Neil, PRL **28**, 417 (1972). [4]L. Yin et al., PRL **99**, 265004 (2007)

[1]Prepared by LLNL under Contract DE-AC52-07NA27344.

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Date submitted: 22 Jul 2008 Electronic form version 1.4