Abstract Submitted
for the DPP08 Meeting of
The American Physical Society

Investigation of Stimulated Raman Scattering Using Short-Pulse Diffraction Limited Laser Beam near the Instability Threshold J.L. KLINE, D.S. MONTGOMERY, L. YIN, K.A. FLIPPO, B.J. ALBRIGHT, R.P. JOHNSON, T. SHIMADA, H.A. ROSE, LANL, C. ROUSSEAUX, V. TASSIN, CEA, S.D. BATON, F. AMIRANOFF, LULI, R.A. HARDIN, WVU — Short pulse laser plasma interaction experiments using diffraction limited beams provide an excellent platform to investigate the fundamental physics of Stimulated Raman (SRS) and Stimulated Brillouin (SBS) Scattering. Detailed understanding of these laser plasma instabilities impacts the current inertial confinement fusion ignition designs and could potentially impact fast ignition when higher energy lasers are used with longer pulse durations ($>$ 1 kJ and $>$ 1 ps). Using short laser pulses, experiments can be modeled over the entire interaction time of the laser using PIC codes to validate our understanding. Experiments have been conducted at the Trident laser and the LULI to investigate SRS near the threshold of the instability using 527 and 1064 nm laser light respectively with 1.5 – 3 ps pulses. In the case of both experiments, the interaction beam was focused into a pre-ionized He gasjet plasma. Measurements of the reflectivity as a function of intensity and k?$_D$ were completed at the Trident laser. At LULI, a 300 fs Thomson scattering probe is used to directly measure the density fluctuations of the driven electron plasma and ion acoustic waves. Details of the experimental results will be presented.

John Kline
Los Alamos National Laboratory

Date submitted: 19 Jul 2008 Electronic form version 1.4