Abstract Submitted
for the DPP10 Meeting of
The American Physical Society

The effect of the initial hohlraum fill gas density on laser propagation in NIF hohlraums RICHARD BERGER, Lawrence Livermore National Laboratory, D.A. CALLAHAN, L. DIVOL, O. JONES, R.A. LONDON, N.B. MEEZAN, P. MICHEL, J.D. MOODY, L.J. SUTER, R.P. TOWN, S.H. GLENZER, D.E. HINKEL, W.L. KRUER, A.B. LANGDON, M.D. ROSEN, C.H. STILL, D.J. STROZZI, E.A. WILLIAMS — Stimulated Raman (SRS) and Brillouin backscatter (SBS) from gas-filled hohlraums are measured from two quads of laser beams at the National Ignition facility. The time history and the spatial distribution in the near field are measured for the outer beams at 50 and the inner beams at 30 to the hohlraum axis. The time-dependent SRS spectrum, the radiation flux, and the symmetry of the imploded capsule support the use in Lasnex and Hydra of weakly flux-limited electron heat transport and atomic physics models that convert a large fraction of the laser energy absorbed in high-Z material to x-rays. The initial density of the gas filling the hohlraum has been shown to affect the amount of SBS but has little effect on the amount of SRS. We have shown that the scaling of SBS can be understood given the plasma parameters from these radiation-hydrodynamic simulations. Motivated by that success, we explored more generally how the initial fill density affects the plasma properties at peak power when the laser plasma instabilities are most potent.

Richard Berger
Lawrence Livermore National Laboratory

Date submitted: 15 Jul 2010 Electronic form version 1.4