Abstract Submitted
for the DPP05 Meeting of
The American Physical Society

Gas Filled Halfraums on the First NIF Quad – Radiation Hydrodynamics, Filamentation, and Spatial Diagnostics[1] S.R. GOLDMAN, J.C. FERNANDEZ, N.M. HOFFMAN, J.L. KLINE, H.A. ROSE, E.S. DODD, J.P. GRONDALSKI, G.D. POLLAK, W.J. POWERS, M.J. SCHMITT, Los Alamos National Laboratory, D.G. BRAUN, D.E. HINKEL, L.J. SUTER, Lawrence Livermore National Laboratory — The Los Alamos gas-filled halfraum series on the first quad of NIF consisted of 4 laser shots at energies close to 15 kJ with nominal cylindrical symmetry. Lasnex modeling of halfraums with CO_2 as well as propane (C_3H_8) gas fill is consistent with peak power Dante experimental detector results. At the peak laser intensities of the shot ($> 2 \times 10^{15} W/cm^2$), filamentation is theoretically predicted, and more detailed simulations have suggested the possibility of conversion of the original f/8 laser beam profile into a beam with f-number as low as f/2. Simulations with laser beam profiles of f/8, f/4, f/3, and f/2 are available for both gas fills. Gated X-ray images of emission at energies above 10 keV probe the laser interaction with gold ablated from the rear wall of the halfraum. For CO_2, the axial variation in emission lies between the calculated results for the f/4 and f/8 simulations. For propane, the f/4 simulation provides the best fit to the data. Comparison at lower laser intensities, where the laser beam is expected to be f/8, clarifies the qualitatively different axial structuring observed for the two gases.

[1]This work was sponsored by the NNSA of DOE.

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Date submitted: 13 Jul 2005 Electronic form version 1.4