Abstract Submitted
for the DPP09 Meeting of
The American Physical Society

Scaling Stimulated Brillouin Scattering from OMEGA gas-filled hohlraums to NIF hohlraums with gold-boron layers RICHARD BERGER, LAURENT DIVOL, DUSTIN FROULA, SIEGFRIED GLENZER, RICHARD LONDON, NATHAN MEEZAN, LAURENCE SUTER, Lawrence Livermore National Laboratory — The long laser pulse length required to achieve ignition on the National Ignition Facility (NIF) creates long scalelength, hot, high-Z plasma inside the hohlraum from which stimulated Brillouin scatter (SBS) is predicted to be 20-40%. Adding ∼40% Boron to a thin layer of the high-Z wall reduces the predicted SBS to less than a percent. A number of experiments at the OMEGA laser facility have tested elements of the physics of SBS in gold-boron and the modeling tools. The damping rates for pure gold plasma and plasmas with various gold-boron mixtures can be duplicated with mixtures of CO_2 and hydrocarbon gasses. By combining the rad-hydro code HYDRA to compute bulk plasma parameters and the paraxial-wave-solver pF3d to compute backscatter, levels of stimulated Brillouin backscatter that agree with the measurements have been predicted in advance of the experiments. Although the SBS increases with the calculated average gain as expected, closer examination shows that, for the same gain, plasmas with very weakly damped ion acoustic waves Brillouin scatter light more strongly than plasmas with more strongly damped ion acoustic waves. We present theory and simulations to explain this behavior in the OMEGA and NIF experiments.

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Date submitted: 18 Jul 2009 Electronic form version 1.4