Abstract Submitted
for the DPP11 Meeting of
The American Physical Society

Analysis of the First NIF Neutron Images D.C. WILSON, S. BATHA, G.P. GRIM, N. GULER, J.L. KLINE, G.A. KYRALA, F.E. MERRILL, G.L. MORGAN, N.S. VINYARD, P.L. VOLEGOV, Los Alamos National Laboratory, D.K. BRADLEY, D.S. CLARK, S.N. DIXIT, D.N. FITTINGHOFF, S.M. GLENN, S. GLENZER, N. IZUMI, O.S. JONES, S. LE PAPE, T. MA, Lawrence Livermore National Laboratory, A.J. MACKINNON, S.M. SEPKE, B.K. SPEARS, R. TOMMASINI, Lawrence Livermore National Laboratory, P. MCKENTY, Laboratory for Laser Energetics — Neutron imaging at the National Igntion Facility obtained its first images from both directly laser driven and X-radiation driven implosions. A directly driven DT filled glass microballoon gave an oblate image (P2/P0=-45%) whose size (P0=70μm) fit within the X-ray images. Simulations using the polar direct drive laser pointing give a round image of P0 $\sim$95μm. However as the electron flux limiter is reduced from 0.06 to 0.03 the image becomes oblate. The observed asymmetry can be reproduced by transferring $\sim$10% of the energy from the outer laser beams to the inner. Radiation driven implosions of ignition capsules with 20%D, and 50%D produced $\sim$ 30μm radius oblate images in 12-15 MeV neutrons. Images in 10-12 MeV neutrons, which have experienced one scattering in the fuel and number $\sim$ 4% of the primaries, showed larger images ($\sim$44-56 μm). Image sizes indicate the compression of the fuel and are consistent with observed 10-12/13-15MeV yield ratios. Work funded by the USDOE at LANL, LLNL, NSTEC and LLE.

D.C. Wilson
Los Alamos National Laboratory

Date submitted: 05 Jul 2011 Electronic form version 1.4