Abstract Submitted
for the DPP14 Meeting of
The American Physical Society

Using the outgoing shock wave to characterize low mode ablator symmetry[1] ARTHUR PAK, LAURENT DIVOL, TILO DOEPPNER, JOHN FIELD, ANDREA KRITCHER, TAMMY MA, LAURA BENEDETTI, DEBBIE CALLAHAN, DENISE HINKEL, LAURA BERZAK HOPKINS, OMAR HURRICANE, SHAHAB KHAN, NOBUHIKO IZUMI, ANDREW MACKINNON, NATHAN MEEZAN, BRIAN SPEARS, RICHARD TOWN, DAVID BRADLEY, Lawrence Livermore National Laboratory, LAWRENCE LIVERMORE NATIONAL LABORATORY TEAM — At the National Ignition Facility, experiments are being conducted to optimize the performance of indirectly driven inertial confinement fusion implosions. To ignite the fuel in this scheme, a cascade of nuclear reactions must first be triggered by achieving a central hot spot pressure of several hundred Gbar over a duration $\sim$ 100 ps. Low mode asymmetries in the shape of the assembled fuel and ablator are indicative of momentum asymmetries that reduce the transfer of kinetic energy to hot spot internal energy, thus reducing the hot spot yield and overall implosion performance. Here details of a new method that utilizes the x-ray emission created by the outgoing shock to probe the low mode asymmetry of the ablator at radius of 100 μm and time of $\sim$ 150 ps after stagnation will be presented. This signal can provide information on the shape of the ablator at convergence ratios $\sim$ 2X higher than current area-backlight radiographs and can be made in-situ on layered cryogenic implosions that require all the laser beams. Experimental results of the inferred ablator shape from implosions performed with cryogenic thermonuclear fuel will be compared to radiation hydrodynamic calculations.

[1]This work performed under the auspices of the USDoE by LLNL under Contract DE-AC52-07NA27344. LLNL-ABS- 656467

Arthur Pak
Lawrence Livermore National Laboratory

Date submitted: 11 Jul 2014 Electronic form version 1.4