Abstract Submitted
for the DPP12 Meeting of
The American Physical Society

A Two-Sided Indirect/Direct-Drive Hybrid Target for the National Ignition Facility[1] L. JOHN PERKINS, DONALD BLACKFIELD, GEORGE ZIMMERMAN, Lawrence Livermore National Laboratory — We report on a new hybrid concept for a high-gain ignition target for the National Ignition Facility that combines the symmetry advantages of indirect-drive assembly with the efficiency of radial-direct-drive shock ignition in a capsule with thick fuel layers. A slow, thick 240-deg spherical shell segment of DT is assembled on a Au guide cone by indirect-drive in a one-sided hohlraum at 0.7MJ/150TW/250eV. It is then shock ignited on the opposite side by direct-drive on a 120-deg fuel segment inside the cone at 0.5MJ/230TW. Given the latter is radial direct-drive it will not require a polar direct drive qualification campaign or new phaseplates and should minimize cross beam transfer. We discuss 2-D LASNEX optimizations of synching the two laser drives, such that the indirect-drive compression pulse should commence some 8ns before the start of the direct-drive pulse. The burn history (rate of fusion energy production) exhibits a double maximum as the smaller, faster direct-drive side ignites and then burns into the main fuel mass on the other side. Critical issues include demonstrating adequate symmetry in a one-sided hohlraum during the low velocity compression phase and minimizing high-Z/DT mix from the Au cone that separates the two in-flight fuel segments during assembly.

[1]This work performed under the auspices of U.S. DOE by LLNL under Contract DE-AC52-07NA27344.

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Date submitted: 18 Jul 2012 Electronic form version 1.4