Abstract Submitted
for the DPP20 Meeting of
The American Physical Society

Quantifying sources of low mode 3D asymmetries in indirect drive implosions at the National Ignition Facility[1] B MACGOWAN, O LANDEN, D CASEY, C YOUNG, P MICHEL, D CALLAHAN, J-M DI NICOLA, E HARTOUNI, R HATARIK, M HOHENBERGER, D MARISCAL, T MA, J MILOVICH, A NIKROO, R NORA, A MOORE, P PATEL, J SATER, D SCHLOSSBERG, M STADERMANN, B VAN WONTERGHEM, S YANG, Lawrence Livermore Natl Lab, H RINDERKNECHT, LLE Rochester, C KONG, H HUANG, General Atomics — Low mode 3D drive asymmetries (l = 1 and 2) are important degradation mechanisms for indirect drive implosions. A static view factor model is used to assess sources of drive asymmetry including laser variation in the foot and peak, laser/target positioning errors, target diagnostic window losses, Cross Beam Energy Transfer, and Stimulated Brillouin Scattering (SBS). Each source can produce l = 1 drive asymmetries of M_1/M_0 ~0.5%. and in combination imploded hotspot velocities of 100km/s. Asymmetries in the thickness and composition of the capsule ablator also contribute to hotspot velocity. We compare the drive and target asymmetries from the laser diagnostics and target metrology, with measurements from the hotspot velocity, shape and SBS diagnostics. These studies illuminate systematic trends in the facility and target performance that can be used to understand impacts on experiments and potential mitigations.

[1]This work was performed under the auspices of the U.S. Department of Energy by LLNS, LLC, under Contract No. DE-AC52- 07NA27344. LLNL-ABS-812038

Brian MacGowan
Lawrence Livermore Natl Lab

Date submitted: 01 Jul 2020 Electronic form version 1.4