Abstract Submitted
for the DPP20 Meeting of
The American Physical Society

Non-concentricity of HDC ablator layers can provide additional sources of mode-1 asymmetries on implosions at the National Ignition Facility[1] JOSE MILOVICH, DANIEL CASEY, BRIAN MACGOWAN, OTTO LANDEN, Lawrence Livermore Natl Lab — Achieving ignition at the National Ignition Facility (NIF) requires the kinetic energy of an imploding capsule to be maximally transferred to the central fuel to initiate thermonuclear burn. Deviation from sphericity at stagnation may significantly reduce the energy available leading to performance degradation. Current implosions at the NIF, using high-density-carbon (HDC) have shown residual hot-spot velocities in the direction of low areal density, suggesting the presence of mode-1 asymmetries [1]. From analysis of several DT shots, the asymmetries can be correlated to beam-to-beam laser delivery variations, target features (such as diagnostic windows) and recently ablator thickness variations [2,3]. However, some variability remains indicating other sources may be at play. Recent measurements have indicated that the of the individual ablator layers that make the HDC shell may have larger thickness variations than expected. We have used the code HYDRA to study these non-uniformities and found that implosions show sensitivity to thickness variations of the doped layer even for constant ablator thickness. [1] H. Rinderknecht et al., Phys. Rev. Lett. 124, 145002 (2020) [2] B. McGowan et al. Paper presented at IFSA 2019 [3] D. Casey et al. Paper submitted Phys. Rev. Lett.

[1]Prepared by LLNL under Contract DE-AC52-07NA27344

Jose Milovich
Lawrence Livermore Natl Lab

Date submitted: 23 Jun 2020 Electronic form version 1.4