Abstract Submitted
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Hydrodynamic Stability of Beryllium Ignition Targets for Indirect Drive NIF Experiments[1] S.A. YI, A.N. SIMAKOV, D.C. WILSON, J.L. KLINE, Los Alamos National Laboratory, J.D. SALMONSON, D.S. CLARK, J.L. MILOVICH, M.M. MARINAK, D.A. CALLAHAN, Lawrence Livermore National Laboratory — Beryllium ablators have the advantage of higher ablation rate, pressure, density and velocity than plastic ablators. We present a new NIF beryllium target design that takes into account recent experimental assessment of hohlraum performance, as well as the new DCA atomic configuration model. Herein, we employ the radiation-hydrodynamics code HYDRA and use 2D capsule-only simulations driven by a frequency dependent source (FDS) to assess the hydrodynamic stability properties of our target capsule. Our FDS has been derived from integrated 2D simulations for a 1.8 MJ, 520 TW laser drive and a 5.75 mm holhraum with a 15% backscatter loss and a 15% power loss in the main laser pulse. We show that in our capsule the initial fuel layer surface roughness is the dominant source of instability growth and hotspot distortion. Rarefaction waves transmit the inner ice roughness to the outer surface, where it grows due to the ablative Rayleigh-Taylor (RT) instability. The instability growth is quantified and strategies to mitigate this type of RT instability seeding are discussed.

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