Abstract Submitted
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Symmetry Tuning with Cone Powers for Defect Induced Mix Experiment Implosions[1] N. KRASHENINNIKOVA, M. SCHMITT, T. MURPHY, J. COBBLE, I. TREGILLIS, G. KYRALA, P. BRADLEY, P. HAKEL, S. HSU, R. KANZLEITER, K. OBREY, J. BAUMGAERTEL, S. BATHA, LANL, DIME TEAM — Recent DIME campaigns have demonstrated the effectiveness of cone power tuning to control the implosion symmetry in PDD configuration. DIME aims to assess the effects of mix on thermonuclear burn during a thin-shell capsule implosion. Plastic shell capsules doped with mid-Z material and filled with 5 atm of DD, are ablatively driven in a PDD laser configuration to a CR of ~ 7. Time-gated, spectrally and spatially resolved, dopant emission images characterize mix and temperature morphology during the implosion, while neutron diagnostics concurrently give the information about burn. Symmetry should be maintained throughout the implosions to achieve high neutron yield and optimum spectroscopic signal. 2D and 3D computer simulations using code HYDRA were performed to validate and optimize implosion symmetry using cone power tuning. In particular, Omega campaign confirmed P2 tunability with cone powers while experiments on NIF demonstrated that by reducing the energy in polar cones P2 was reduced to $< 1\%$. However, during NIF campaigns, self-emission images revealed a complex internal structure around the equator, which was not seen in HYDRA simulations and could be attributed to LPI effects. Subsequent DIME campaigns on NIF were able to eliminate this equatorial feature by reducing the laser drive substantiating the LPI hypothesis.

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