Abstract Submitted
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Thin Shell Model for NIF capsule stagnation studies[1] J.H. HAMMER, M. BUCHOFF, S. BRANDON, J.E. FIELD, J. GAFFNEY, A. KRITCHER, R.C. NORA, J.L. PETERSON, B. SPEARS, P.T. SPRINGER, Lawrence Livermore National Laboratory — We adapt the thin shell model of Ott, et. al.[2] to asymmetric ICF capsule implosions on NIF. Through much of an implosion, the shell aspect ratio is large so the thin shell approximation is well satisfied. Asymmetric pressure drive is applied using an analytic form for ablation pressure as a function of the x-ray flux, as well as time-dependent 3D drive asymmetry from hohlraum calculations. Since deviations from a sphere are small through peak velocity, we linearize the equations, decompose them by spherical harmonics and solve ODE's for the coefficients. The model gives the shell position, velocity and areal mass variations at the time of peak velocity, near 250 microns radius. The variables are used to initialize 3D rad-hydro calculations with the HYDRA and ARES codes. At link time the cold fuel shell and ablator are each characterized by a density, adiabat and mass. The thickness, position and velocity of each point are taken from the thin shell model. The interior of the shell is filled with a uniform gas density and temperature consistent with the 3/2PV energy found from 1D rad-hydro calculations. 3D linked simulations compare favorably with integrated simulations of the entire implosion. Through generating synthetic diagnostic data, the model offers a method for quickly testing hypothetical sources of asymmetry and comparing with experiment.

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[2]D. Colombant, W. Manheimer, E. Ott, PRL, **53** (1984) 446.

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