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Thin Shell evolution of NIF capsule with asymmetric drive and the resulting neutron diagnostics MICHAEL BUCHOFF, JIM HAMMER, Lawrence Livermore National Laboratory — One of the major impediments to achieving ignition via ICF is the non-spherical implosion arising from small asymmetries in the drive forcing the collapse of the capsule. Likewise, an experimental diagnostic for quantifying the characteristics of the implosion asymmetry is the final state neutrons, whose number and velocity distributions are not experimentally consistent with the expectation of a spherical implosion. In principle, connecting these initial and final state asymmetries could be solved via hydrodynamic simulations, but due to the multiple scales traversed throughout this process, these calculations are difficult and expensive, leaving much of the potential drive asymmetry profiles unexplored. In this work, we solve the resulting analytic equations from the thin-shell model proposed by Ott et. al. to evolve the capsule over a range of different drive asymmetries from its initial state (when the shell aspect ratio is much greater than 1) to a radius of roughly 250 microns, consisting of a layer of dense CH, a cold layer of dense DT, and a warm core of sparsely distributed DT. At this stage, more tractable hydrodynamical simulations are performed in the ARES code suite, determining the distribution of neutron from thermonuclear yield. These and future results allow for a multitude of tests of asymmetric sources to compare with and potentially guide experiment. This work was performed under the auspices of the U.S. Department of Energy by Lawrence Livermore National Laboratory under Contract DE-AC52-07NA27344.

Michael Buchoff
Lawrence Livermore National Laboratory

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