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**A High-Resolution Integrated Model of the NIC Cryogenic Layered Experiments**[1]

OGDEN JONES, Lawrence Livermore National Laboratory

We have developed a capability to do very high spatial resolution 2D integrated hohlraum-capsule simulations using the Hydra code. Surface perturbations for all ablator layer surfaces and the DT ice layer are typically calculated explicitly through mode 60, and for some calculations up to mode 100. Separate calculations have shown that mode 60 has the highest growth rate at the ablator-fuel interface. The higher angular resolution also leads to finer zoning in the hohlraum where laser absorption and x-ray production are occurring. The effects of the fill tube, grooves in the ice layer, and surface defects on the ablator are included via models extracted from higher resolution calculations. High wave number mix can be included through a mix model that has been extracted from capsule-only calculations that include up to mode 2000. Measured backscatter and a model for crossbeam energy transfer are included to enable a best estimate of the drive asymmetry for each shot. We have applied this model to National Ignition Campaign (NIC) symmetry capsule and cryogenic layered tritium-hydrogen-deuterium (THD) experiments. We have also included some adjustments to our standard physics models to bring the calculations into better agreement with the experimental measurements from several NIC experimental campaigns. Radiation drive multipliers for the first three shocks were derived to match the experimental shock timing data. The opacity of the Ge-doped plastic was increased, and the opacity of the undoped plastic ablator was decreased in order to match the measured peak shell velocity. We compare the simulated diagnostic signatures extracted from the integrated high-resolution calculations to the measured x-ray and neutron diagnostic signatures from a number of THD experiments in order to assess the fidelity of this model and gain insight into the implosion performance.

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