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Simulations of the late-phase of NIF capsule implosions using a LES code[1] CHRISTOPHER WEBER, DANIEL CLARK, ANDREW COOK, Lawrence Livermore National Laboratory — Detailed simulations of Inertial Confinement Fusion (ICF) implosion experiments attempt to provide a complete description of the imploding capsule by using measured capsule geometry and perturbations and a 3D model of the radiation source. These simulations can match many experimental observables but the yield remains several times higher than measured. Speculation about greater-than-predicted mixing and the possibility of turbulence have motivated the use of the Miranda code to closely compare with the existing HYDRA simulations. Miranda is a Eulerian radiation-hydrodynamics code with high-order accuracy, physical viscosity and diffusion, and Large Eddy Simulation (LES) modeling of sub-grid scale turbulent dissipation. In this work, HYDRA is used to simulate the capsule of specific NIF experiments in 3D up until the shock has nearly reached the center of the capsule. The subsequent evolution is carried out in both codes. Without viscosity, both codes show very similar results for the assembled fuel with significant low-mode asymmetries and fine-scale, high-velocity flows in the hot spot center. With viscosity, however, Miranda simulations show a significant dissipation of hot spot turbulent kinetic energy that is absent in the inviscid HYDRA simulations.

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