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Hydrodynamic Scaling Relations for OMEGA Cryogenic Implosions DHRUMIR PATEL, RICCRADO BETTI, University of Rochester, KA MING WOO, Laboratory for Laser Energetics — Understanding of hydrodynamic scaling is necessary to assess the relative performance of OMEGA cryogenic implosions. We present the results of 1-D radiation-hydrodynamic code *LILAC* simulations, performed to study the hydrodynamic scaling of OMEGA cryogenic implosions in the absence of alpha heating. Scaled implosions were simulated only for the deceleration phase to maintain identical energy coupling and to have an ensemble of simulations. The no-alpha yield scaling with size was found to be dependent on implosion time, defined as $R/V_{\rm i}$. We show that this is a direct consequence of the physics of electron–ion temperature equilibration, which does not hydro scale. The no-alpha scaling exponent for yield varies between 4 for very fast implosions ($V_{\rm i}$ >500 km/s) and 4.3 for slower implosions ($V_{\rm i}$ <350 km/s) Additionally, the 2-D radiation hydrodynamic code *DEC2D* was used to study hydrodynamic scaling for nonuniform implosions for shot 90288. We show that, as a consequence of non-scaling physics of thermal conduction, implosions degraded by mid-modes (_= 12) show a worse scaling with size than when degraded by a low mode (_= 2,4). This material is based upon work supported by the Department of Energy National Nuclear Security Administration under Award Number DE-NA0003856.

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