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Modeling polar-direct-drive implosions at the NIF using HYDRA[1] S.M. FINNEGAN, M.J. SCHMITT, I.L. TREGILLIS, Los Alamos National Laboratory, Los Alamos, NM 87545 — 2D, HYDRA [M. M. Marinak et al., Phys. Plasmas **3**, 2070 (1996)] simulations of polar-direct-drive (PDD) implosions of NIF symmetry capsules are presented. Direct-drive implosions of symmetry capsules at the National Ignition Facility (NIF), may provide a path to validating inertial-confinement-fusion (ICF) modeling capability in the presence of high mode number features. One particular complication facing PDD validation experiments, is the development of hydrodynamic instabilities, driven unstable by spatial inhomogeneities in laser power deposition across the surface of the target, that dominate the effects of imposed features (e.g. non-symmetric laser drive, surface irregularities etc.). In order to make experimentally relevant predictions of PDD implosion characteristics, the laser ray source is modeled using a beam (cone) geometry which matches the laser pointing at the NIF. The ray power comprising of each beam (cone) is distributed over a super-Gaussian ellipse in the focal plane, with exponent chosen to match empirical phase plate data for the intensity distribution. Here, we study the effects of spatial inhomogeneity in the laser drive resulting from laser pointing and ray noise on implosion symmetry, and instability growth.

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