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Status of Ignition Hydro-Equivalent Implosion Performance on OMEGA T.C. SANGSTER, V.N. GONCHAROV, P.B. RADHA, R. BETTI, T.R. BOEHLY, C.J. FORREST, D.H. FROULA, V.YU GLEBOV, S.X. HU, I.V. IGUMENSHCHEV, F.J. MARSHALL, R.L. MCCRORY, P.W. MCKENTY, D.D. MEYERHOFER, D.T. MICHEL, C. STOECKL, Laboratory for Laser Energetics, U. of Rochester, J.A. FRENJE, M. GATU-JOHNSON, PSFC, MIT — Demonstrating ignition hydro-equivalence with symmetric implosions on OMEGA is a likely prerequisite for proceeding with a polar-drive–ignition campaign on the National Ignition Facility. Ignition hydro-equivalent performance is defined by using metrics such as the peak pressure in the core, the primary neutron yield, and the fuel areal density during the burn. Hydrodynamic and laser-driven instabilities limit implosion performance with cryogenic DT fuel on OMEGA. Hydro instabilities are seeded by laser imprint and imperfections on the various target surfaces; these perturbation seeds can largely be controlled. Laser-driven instabilities including cross beam and two-plasmon decay reduce the drive pressure and compressibility of the fuel, respectively. Understanding and mitigating these laser–plasma instabilities will be required to reach full-ignition, hydro-equivalent performance on OMEGA. The latest results from cryogenic DT implosions will be presented and discussed in terms of the primary design parameters and current mitigation efforts for hydro and laser-driven instabilities. This material is based upon work supported by the Department of Energy National Nuclear Security Administration under Award Number DE-NA0001944.

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