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Study Plasma Stagnation in Laser-Driven Hohlraums C.K. LI, J.A. FRENJE, F.H. SEGUIN, R.D. PETRASSO, MIT, S.C. WILKS, P.A. AMENDT, LLNL, P.E. MASSON-LABORDE, S. LAFFITE, V. TASSIN, CEA, R. BETTI, E.M. CAMPBELL, T.C. SANGSTER, LLE, G. GREGORI, A. BOTT, U. Oxford —
Understanding plasma stagnation in laser-driven hohlraums is important for inertial confinement fusion. It has been realized that the use of conventional single-species-averaged hydrodynamic codes for modelling stagnation is largely responsible for some disagreements between the experimental results and numerical simulations. A number of mechanisms which play important roles in this process have been missed in hydrodynamic simulations, including ion interpenetration and diffusion. Self-generated fields and plasma instabilities observed in connection with plasma blow-off seen at hohlraum laser entrance holes provides additional compelling experimental evidence of non-hydrodynamic processes. To explore such phenomena, a series of experiments was performed at the Omega laser facility. Data obtained from several diagnostics, including monoenergetic-proton radiography and x-ray imaging, are compared with modified three-dimensional hydrodynamic simulations, providing new insight into hohlraum stagnation and a more complete physical picture of hohlraum dynamics. This work was supported in part by US DOE, LLNL and LLE.

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