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Finite Atwood Number Effects on Deceleration-Phase Instability in Room-Temperature Direct-Drive Implosions S. MILLER, J.P. KNAUER, P.B. RADHA, V.N. GONCHAROV, Laboratory for Laser Energetics, U. of Rochester — Performance degradation in direct-drive inertial confinement fusion implosions can be caused by several effects, one of which is Rayleigh–Taylor (RT) instability growth during the deceleration phase. In room-temperature plastic target implosions, this deceleration-phase RT growth is enhanced by the density discontinuity and finite Atwood numbers at the fuel–pusher interface. For the first time, an experimental campaign at the Omega Laser Facility systematically varied the ratio of deuterium-to-tritium (D-to-T) within the DT gas fill to change the Atwood number. The goal of the experiment was to understand the effects of Atwood number variation on observables like apparent ion temperature, yield, and variations in areal density and bulk fluid motion, which lead to broadening of neutron spectra along different lines of sight. Simulations by the hydrodynamic codes *LILAC* and *DRACO* were used to study growth rates for different D-to-T ratios and identify observable quantities effected by Atwood number variation. Results from simulations and the experiment are presented. 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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