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Improved Rocket Efficiency in Direct-Drive Implosions Using Different Ablator Materials D.T. MICHEL, V.N. GONCHAROV, I.V. IGUMENSHCHEV, D.H. FROULA, Laboratory for Laser Energetics, U. of Rochester — A set of experiments varied the ratio of the atomic number over the atomic mass (A/Z) of the ablator to increase both the ablation pressure and the mass ablation rate and improve the rocket efficiency.[1] A 20% increase in the implosion velocity was observed when using a Be ablator ($A/Z = 2.25$) compared to C ($A/Z = 2$) and CH ($A/Z = 1.85$) ablators. These measurements are consistent with hydrodynamic simulations that predicted an increase in the hydrodynamic efficiency of 18% for Be and 7% for C compared to CH ablator. A comparable amount of unabsorbed laser power was measured for the three materials (∼30%) that shows that the increase in implosion velocity for Be ablator is a result of the increase in the rocket efficiency, not an increase in absorption. This material is based upon work supported by the Department of Energy National Nuclear Security Administration under Award Number DE-NA0001944.

[1]W. M. Manheimer, D. G. Colombant, and J. H. Gardner, Phys. Fluids **25**, 1644 (1982).

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