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Hydrodynamic Stability of Direct-Drive Targets with High-Z Ablators M. LAFON, R. NORA, R. BETTI, Laboratory for Laser Energetics and Fusion Science Center, U. of Rochester — In direct-drive inertial confinement fusion, the perturbations seeded by the laser irradiation nonuniformities and target fabrication defects grow during the acceleration stage of the shell implosion, seeding hydrodynamic instabilities, and degrading target performance. High-Z ablators have been shown to suppress the generation of hot electrons from two-plasmon-decay instability.[1] A set of moderate-Z ablators ranging from carbon to silicon have been used to design both hot-spot and shock-ignition targets at laser energies relevant to the National Ignition Facility. The hydrodynamics of these ablators is studied though single and multimode simulations. Hydro-instabilities exhibit complex behavior in these ablators because of the presence of a double ablation front (thermal and radiative) and a classically unstable interface. The width of the double ablation front growths with Z and the Rayleigh–Taylor instability becomes more localized near the radiative front and the classical interface, while it is fully stabilized at the thermal ablation front. It is shown that ignition target designs with reasonably good hydrodynamic properties using moderate-Z ablators are possible for both shock and hot-spot ignition. This work was supported by the U.S. Department of Energy Office of Inertial Confinement Fusion under Cooperative Agreement No. DE-FC52-08NA28302.

[1]V. A. Smalyuk *et al.*, Phys. Rev. Lett. **104**, 165002 (2010).

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