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Mitigation of R-T and R-M instabilities in ICF targets through the use of high-Z overcoats and prepulses[1] LEE PHILLIPS, Naval Research Laboratory — We report on simulations of direct-drive ICF targets incorporating a thin, high-Z (metallic) overcoat. The overcoat converts incident UV laser energy to soft X-rays, which produce a higher ablation velocity and consequently a lower Richtmeyer-Meshkov instability amplitude. The reduced R-M amplitude results in a smaller seed for the Rayleigh-Taylor instability that occurs during target acceleration, which leads to a more stable target implosion. The R-T growth rate is also reduced due to the shaping of the ablator density (and adiabat) by the penetration of X-rays into the ablator. Similar adiabat shaping can also be produced by the use of laser prepulses or spikes, as has been widely reported. Here we explore new target designs that combine the use of overcoats with laser spikes in an attempt to both reduce the seed for the R-T instability as well as its growth rate. We examine in detail as well the situations in which both overcoats and prepulses can increase target instability in order to arrive at a set of constraints for optimal target design.

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