Abstract Submitted
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The effect of metallic overcoats on imprint and perturbation growth in ICF targets[1] LEE PHILLIPS, JOHN GARDNER, STEPHEN OBENSCHAIN, ALEXANDER VELIKOVICH, M. KARASIK, Naval Research Laboratory, Y. AGLITSKIY, SAIC — A series of 2d simulations using NRL's FAST radiation hydrodynamics code (J.H. Gardner et al., Phys. Plasmas 5, 1935 (1998)) were performed on CH foils accelerated by laser ablation. Without a strategy to counteract the Rayleigh-Taylor instability, the growth of either applied small perturbations or nonuniformities arising from the laser irradiation are amplified and eventually destroy the target. We show that the application of a thin metallic overcoat on the front of the foil can be effective in reducing the perturbation growth rate dramatically, in agreement with experiments conducted at the NRL NIKE laser facility. Also in agreement with these experiments, we show that the growth of perturbations is enhanced if the overcoat is below a critical thickness. Comparison with fluid theory demonstrates that the principal stabilizing mechanism is the increase in ablation velocity resulting from conversion of laser energy to x-rays by the high-Z overcoat. It is found that the degree of stabilization in the simulations is fairly sensitive to initial conditions, and in order to predict the strong stabilization seen in experiment, a realistic initial density profile is required. These results on planar foils are applied to the design of high-gain direct-drive ICF targets.

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