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Numerical studies of the use of thin high-Z layers for reducing laser imprint in direct-drive inertial-fusion targets[1] JASON BATES, ANDREW SCHMITT, MAX KARASIK, STEVE OBENSCHAIN, U.S. Naval Research Laboratory — Using the FAST code, we present numerical studies of the effect of thin metallic layers with high atomic number (high-Z) on the hydrodynamics of directly-driven inertial-confinement-fusion (ICF) targets. Previous experimental work on the NIKE Laser Facility at the U.S. Naval Research Laboratory demonstrated that the use of high-Z layers may be efficacious in reducing laser non-uniformities imprinted on the target during the start-up phase of the implosion. Such a reduction is highly desirable in a direct-drive ICF scenario because laser non-uniformities seed hydrodynamic instabilities that can amplify during the implosion process, prevent uniform compression and spoil high gain. One of the main objectives of the present work is to assess the utility of high-Z layers for achieving greater laser uniformity in polar-drive target designs planned for the National Ignition Facility. To address this problem, new numerical routines have recently been incorporated in the FAST code, including an improved radiation-transfer package and a three-dimensional ray-tracing algorithm. We will discuss these topics, and present initial simulation results for high-Z planar-target experiments planned on the NIKE Laser Facility later this year.

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