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Simulations of Foils Irradiated by Finite Laser Spots[1] LEE PHILLIPS, Naval Research Laboratory — Recent proposed designs (Obenchain et al., Phys. Plasmas 13 056320 (2006)) for direct-drive ICF targets for energy applications involve high implosion velocities with lower laser energies combined with higher irradiances. The use of high irradiances increases the likelihood of deleterious laser plasma instabilities (LPI) that may lead, for example, to the generation of fast electrons. The proposed use of a 248 nm KrF laser is expected to minimize LPI, and this is being studied by experiments on NRL's NIKE laser. Here we report on simulations aimed at designing and interpreting these experiments. The 2d simulations employ a modification of the FAST code to ablate plasma from CH and DT foils using laser pulses with arbitrary spatial and temporal profiles. These include the customary hypergaussian NIKE profile, gaussian profiles, and combinations of these. The simulations model the structure of the ablating plasma and the absorption of the laser light, providing parameters for design of the experiment and indicating where the relevant LPI (two-plasmon, Raman) may be observed.

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