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A Study of Internal Perturbation Evolution in Inertial Confinement Fusion Implosions[1] SAMUEL MILLER, VALERI GONCHAROV, RADHA BAHUKUTUMBI, Laboratory for Laser Energetics, University of Rochester — Performance degradation in direct-drive inertial confinement fusion (ICF) implosions can be caused by several effects, one of which is Rayleigh–Taylor (RT) instability growth. Defects in ICF targets like inner-surface voids and surface roughness create seeds for RT growth during the initial phase of implosions. Perturbations created by these defects are propagated along acoustic waves that reverberate within the shell. The presence of an ablator–ice interface creates reflected rarefaction and compression waves that can amplify these initial seeds and perturbations. The reflected rarefaction wave launched by the interface in picket-pulse designs has been shown to create an acoustic trap for perturbations near the outer edge of the shell that can create instability seeds later in the implosion. A comprehensive understanding of the evolution of these particular waves and perturbations is required to characterize the influence of these internal defects. The interplay of shell defects and acoustic wave propagation and its impact on implosion performance will be presented.

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