BEHAVIOR OF GAS-ABLATOR INTERFACE MIXING VS CONVERGENCE RATIO IN A 1-D IMPLOSION PLATFORM

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The 2-Shock platform at the National Ignition Facility (NIF) is a non-igniting indirect-drive target designed to produce a near 1D-like implosion for hydro-code validation. This is accomplished with a sub-scale (675 μm radius) capsule in a nominal (2.875 mm radius) hohlraum, providing a case-to-capsule ratio 63% larger that that of a standard ignition target. Additionally, the low aspect ratio (3.9) of the capsule shell combined with the temperature of the foot pulse essentially eliminates ablation front instability growth. The result is a platform that is well suited to the study of mixing at the gas-ablator interface without the complicating factors of low-mode asymmetries or higher-mode shell perforations due to ablation front instability feed-through.

Applying the CD Symcap [1] technology, i.e. a layer of CD plastic on the inner 3 μm of the CH capsule shell with a fill of a mixture of hydrogen and tritium, to the 2-Shock platform allows us to infer the mixture of ablator material into the gas through the ratio of DT to TT neutron production. The 1-D nature of the implosion makes this type of experiment ideal for testing models of mixing of the gas and ablator during the implosion. Additionally, the effects of convergence on this mixing will be studied by varying the gas fill pressure to allow the ratio of initial to final gas radius to span the range from 15 to ~30. Simulations of these implosions will be compared with mixing inferred from the data for various convergence ratios.

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[1] D.T. Casey et al, Phys. Plasmas **21**(9), 092705 (2014)