HYDRODYNAMIC INSTABILITY MEASUREMENTS IN DT-LAYERED ICF CAPSULES USING THE LAYERED HYDRO-GROWTH RADIOGRAPHY PLATFORM[†]

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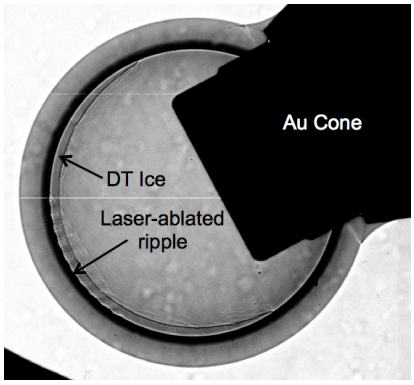
During an ICF implosion, the interface between DT fuel and ablator material can mix due to the Richtmyer-Meshkov and Rayleigh-Taylor instabilities. Excessive mixing at this interface reduces the compression of the fuel and degrades hot-spot conditions. A target platform has been developed at the National Ignition Facility (NIF) to study instability growth at the fuel-ablator interface.

The Hydro-growth Radiography (HGR) platform [1,2,3] has been used successfully to study ablation front growth in gas-filled plastic symmetry capsules (symcaps) in an indirect-drive configuration. For this work, this target platform was extended to include a layer of cryogenic DT on the inside of the ablator in two NIF experiments. The first experiment used the same perturbations on the outside of the capsule as in a previous symcap experiment. This experiment confirmed the surrogacy of ablation front growth between symcaps and layered capsules. The second experiment included a pre-imposed perturbation on the inner surface of the capsule, between the ice and the ablator (see figure). The growth of this interface perturbation was 2x larger than pre-shot predictions. This paper presents results and post-shot modeling from these first two experiments and discusses future plans for this first of its kind target platform.



[1] V.A. Smalyuk et al., Phys. Rev. Lett. **112**, 185003 (2014)
[2] D.T. Casey et al., Phys. Rev. E **90**, 011102 (2014)
[3] K.S. Raman et al., Phys. Plasmas **21**, 072710 (2014)

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