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First experiment using an hydrodynamic growth radiograph platform at LMJ

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Understanding and mitigating the effects of hydrodynamic instabilities on indirect drive inertial confinement fusion implosions has been crucial for achieving ignition at the National Ignition Facility (NIF). It is essential to develop experimental capabilities to measure and quantify the growth of any perturbations. We present here the first experimental results from a new hydrodynamic growth X-ray radiography platform developed at the Laser Mégajoule (LMJ). This platform, similar to the one at NIF, utilizes a gold cone (keyhole geometry) to radiograph the growth through an imploded plastic capsule driven by the X-ray bath generated in a rugby-shaped hohlraum. These initial experiments aim to measure the growth of engineering features such as fill tubes. Three different fill tube diameters are tested, each with three different glue plugs. By adding two well-characterized divot perturbations on the side of the fill tube features, we can measure the capsule convergence over time. The results show that while the fill tube diameter is an important parameter, the volume of glue is also a key factor.

Reference:

[1] V. Smalyuk *et al.*, Phys. Plasmas **21**, 056301 (2014).