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Using Symmetry Capsules to Study Ablation Front Rayleigh-Taylor Instability Growth in ICF Implosions[1] DEBRA CALLAHAN, DANIEL CLARK, BRUCE HAMMEL, DENISE HINKEL, MICHAEL KEY, PRAV PATEL, STEPHEN WEBER, LLNL, LAURENT MASSE, CEA — Controlling Rayleigh-Taylor instability growth in ignition capsules involves trading-off growth at the ablation front with growth at the fuel-ablator interface. Mid-Z dopants, such as silicon or germanium, are added to the plastic ablator to prevent high energy x-rays from preheating the inside edge of the ablator causing an unfavorable Atwood number at the fuel-ablator interface. By controlling the dopant, this interface can be kept stable. The dopant, however, tends to cause a steeper ablation front, which results in more growth at the ablation front. Symmetry capsules, in which the fuel is replaced by an equivalent mass of additional plastic, have similar ablation front growth to an ignition capsule, but without the fuel-ablator instability. We will present neutron yield, ion temperature, x-ray yield data, and inferred mix from a variety of symmetry capsule experiments as we change dopant, capsule thickness, and laser power.

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