DPP09-2009-000318

Abstract for an Invited Paper
for the DPP09 Meeting of
the American Physical Society

Asymmetrically-Driven Implosions

KELLY VAUGHAN, Atomic Weapons Establishment

Techniques to achieve uniform, near-spherical symmetry of radiation drive on a capsule in a laser-heated hohlraum have received detailed attention in the context of ICF. However, much less attention has been paid to the understanding of the hohlraum physics in cases where the radiation drive departs significantly from spherical symmetry. In recent work at the OMEGA laser, AWE has carried out a series of experiments to study the implosion dynamics of a capsule irradiated by a deliberately asymmetric X-ray drive. The experimental data provide a sensitive test of radiation transport in which drive symmetry is modulated by the use of variable albedo layers and asymmetric laser-beam timing. Data from foam-ball and thin-shell capsule experiments are presented, together with modelling using consecutively linked Lagrangian and Eulerian, as well as single-step ALE, calculational schemes. The thin-shell capsules exhibit much stronger sensitivity to asymmetry than foam balls resulting in the formation of a well-defined polar jet. These data are shown to challenge computational modelling in this highly asymmetric, strongly convergent regime.