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9.4 Simultaneous visualization of wall motion, drive beam propagation, and implosion symmetry by using hohlraums with thin-wall patches at the National Ignition Facility

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To achieve a symmetric implosion with indirect drive, it is crucial to understand the dynamic behavior of laser transport in the hohlraum. This is particularly important in targets with lower initial gas-fill density since the region of the hohlraum wall irradiated by the outer cone beams bulges into the gas and can impair the propagation of the inner cone beams. Similarly, material ablated off the capsule surface can absorb the inner cone laser power before it reaches the hohlraum wall where it is converted to x-ray drive. We have developed a thin-walled hohlraum target which we use in a series of experiments to characterize laser beam propagation and hohlraum wall motion. We observe the bulge of the hohlraum wall with an x-ray framing camera positioned on the hohlraum axis. Time dependent power delivery to the equator is observed as x-ray emission through a thin-wall patch on the hohlraum. The self-emission x-ray image of the imploded core shows the cumulative effect of the asymmetric drive up to the maximum x-ray emission time. By changing the hohlraum fill density, the drive pulse shape (strength of the picket) and the capsule size, we study how those conditions affect the power delivery and asymmetry of the implosion.

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