New methods for advancing NIF hohlraum science

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Indirect drive (ID) implosions on the National Ignition Facility (NIF) use hohlraums to convert laser power to a temporally shaped x-ray drive that implodes the fuel capsule. The mission of hohlraum science is to develop focused physics understanding of the hohlraum behavior and to guide improvements in hohlraum design and modeling predictability. New experimental techniques have enabled advances in hohlraum plasma characterization and visualization. These include local Te and macroscopic plasma drift measurements using spectroscopy [1] and visualization of the exploding wall and ablator [2] via thin-walled hohlraum imaging. Results from these techniques are improving understanding of heat and particle transport and how expansion of the wall and ablator etch away the inner-cone laser power reaching the hohlraum waist [3]. Efforts to delay loss of inner beam power include testing hohlraums with foam-lined walls, increased gas-fill, modified laser pointing, and different sized ablators. Application of controlled B-fields on NIF experiments [4] for laser-plasma interaction suppression, mitigating wall blow-in [5], and assisting ignition [6] are also being explored. This talk will discuss details of each of these efforts and how the experiments and interpretation are providing better understanding of hohlraum physics and leading to hohlraum improvement.

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