

Comparison of indirect drive target performance using different ablator materials on the NIF

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The material properties of an inertial Confinement Fusion (ICF) capsule ablator sets key design considerations for indirectly driven targets. For instance, the mass ablation rate determines the ablative stabilization properties influencing choices between parameters such as radiation drive, the final thickness of the compressed capsule, and the initial drive of the laser picket. The mass ablation rate also affect implosion symmetric control due to interference of the plasma blow-off from the capsule with the propagation of laser beams. Thus, the different ablator materials allow unique trade-offs for target designs. The US national indirect drive ICF program is exploring three ablator materials: Plastic (CH), High Density Carbon (HDC), and Beryllium (Be). While each ablator uses a low gas-fill hohlraum design, the other parameters such as the hohlraum size, the laser pulse length and shape, beam pointings, and radiation drive are quite different. Each campaign is exploring different target design space to identify paths to high yield implosions that are the most promising and the foreseen issues solvable. This presentation discusses recent progress, potential for solving key challenges, and open issues for each ablator material.

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