OFF-HUGONIOT CHARACTERIZATION OF ALTERNATIVE INERTIAL CONFINEMENT FUSION ABLATOR MATERIALS

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The attainment of self-propagating fusion burn in an inertial confinement target at the National Ignition Facility will require the use of an ablator with high rocket-efficiency and ablation pressure. The current ablation material, a glow-discharge polymer (GDP), does not couple as efficiently as simulations indicated to the multiple-shock inducing radiation drive environment created by laser power profile [1].

In an effort to evaluate the performance of other possible ablators that could be suitable for achieving self-propagating fusion burn we have inferred the ablation performance of two possible ablators, boron carbide (B_4C) and high-density carbon (HDC) compared to the performance of GDP under the same hohlraum conditions. Ablation performance is determined through measurement of the shock speed produced in planar samples of ablator materials subjected to a multiple-shock inducing radiation drive environment similar to a generic three-shock ignition drive.

We present the platform used, velocity measurements used to infer the ablation response, and matching simulations to show the relative performance of boron carbide, high-density carbon and the performance of the currently used glow-discharge polymer ablator.

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