

Abstract Submitted
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Estimate of expected shot-to-shot shock timing variations on NIF and their impact on implosion margin¹ HARRY ROBEY, LLNL — Ignition implosions planned for the National Ignition Facility (NIF) require a laser pulse shape with a carefully tuned series of steps, which launch a series of shocks into the DT fuel. The relative timing of these shocks must be tuned to better than +/- 100ps to maintain the fuel on a sufficiently low adiabat. Shot-to-shot variations in shock timing will result from a large number of sources. Variations in target parameters (ablator layer thicknesses, densities, dopant concentrations, etc.) that are within required specifications but below the measurement resolvability will give rise to measurable variations in shock timing. Similarly, in-spec variations in the laser drive (timing and levels of steps in the laser power history) will cause shock-timing variations. To estimate the impact of these variations on shock timing, a large number of single and multiple variable sensitivity studies have been performed. Variations in shock-timing measurable quantities are related to corresponding entropy variations to quantify their allowable limits and their impact on implosion margin.

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