Abstract Submitted
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Development of converging-shock experiments for higher pressures, higher-Z samples, and off-Hugoniot states[1] D.C. SWIFT, A.L. KRITCHER, T. DOEPPNER, R. KRAUS, J. GAFFNEY, B. BACHMANN, D. FRATANDUONO, P. CELLIERS, A. LAZICKI, J. NILSEN, G. COLLINS, LLNL, G. KYRALA, LANL, J. HAWRELIAK, WSU, D. KRAUS, B. MILITZER, R. FALCONE, UC-Berkeley — We are extending our converging-shock platforms at the National Ignition Facility and the Omega laser to reach pressures in the PPa range, to study samples that are opaque to x-ray backlighters available for streak radiography, and to determine states along isentropes produced by compression and release behind the initial shock. Given a radiographic marker layer outside the region of interest in a 1D converging shock, the displacement field inside can be deduced. The continuum dynamics equations then give the sound speed, pressure, and energy. A planar shock of high pressure can be generated by Mach reflection of a converging shock in conical geometry; this is one avenue for measuring shock states when radiography is not practicable. Mach reflection from a rigid boundary was calculated for arbitrary equations of state, enabling efficient studies above the peak compression for a single shock. Our existing converging-shock platform can be extended to PPa pressures in several ways. The hohlraum temperature can be increased and the drive history optimized for each sample.

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