Abstract Submitted
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Shock wave equation of state experiments at multi-TPa pressures on NIF[1] P.M. CELLIERS, D.E. FRATANDUONO, J.L. PETERSON, N.B. MEEZAN, A.J. MACKINNON, D.G. BRAUN, M. MILLOT, J. FRY, K.J. BOEHM, P.A. STERNE, G.W. COLLINS, A. NIKROO, Lawrence Livermore Natl Lab, P. FITZSIMMONS, General Atomics — The National Ignition Facility provides an unprecedented capability to generate steady, planar, ultra-high pressure shock waves (up to 10 TPa or more) in solid samples. Building on successful laser shock equation of state experiments performed on a variety of other laser facilities, we have designed and fielded experiments to perform impedance match experiments on samples of C, Be, SiO_2 and CH, in the range of 3 to 7 TPa. The experiments use a line-imaging VISAR as the primary diagnostic to measure the shock velocity in an Al reference standard and in an array of the four samples. Initial tests with the line-imaging VISAR show that the NIF is capable of driving shocks that are steady to better than 2% in velocity for several ns, with smooth planar breakout patterns over a 2 mm diameter spot. Hugoniot data points will be compared to current equation-of-state models for the various materials under study.

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