

Abstract Submitted
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Equation of state measurement of shock-released carbon KATERINA FALK, JOHN F. BENAGE, ROBERT G. WATT, DAVID S. MONTGOMERY, JAMES R. WILLIAMS, DEREK W. SCHMIDT, Los Alamos National Laboratory, ELISEO J. GAMBOA, PAUL A. KEITER, R. PAUL DRAKE, University of Michigan, CHAD MCCOY, TOM R. BOEHLI, University of Rochester, P-24 TEAM, DRAKE RESEARCH LAB TEAM, LABORATORY FOR LASER ENERGETICS TEAM — We present results of equation of state (EOS) measurement of carbon at a range of conditions falling into the warm dense matter (WDM) regime, solid density at temperatures $\sim 1 - 10$ eV. These conditions were created within diamond and graphite targets at the Omega laser facility. We employed a novel technique of laser driven shock and release, which produces different conditions from the Hugoniot states typically studied at high power laser facilities. These experiments take advantage of precise equation of state (EOS) measurements of shocked low density SiO_2 aerogel foam used as pressure standard, which will also be presented. A simultaneous measurements of density, temperature and ionization state within the release wave were obtained from spatially resolved x-ray Thomson scattering, while the density and temperature measurements were bracketed by independent diagnostics including velocity interferometry, optical pyrometry and radiography, providing a full EOS measurement. Results will be compared with EOS models.

Katerina Falk
Los Alamos National Laboratory

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