

Abstract Submitted
for the DPP17 Meeting of
The American Physical Society

Equation of state measurements of shocked carbon foam using x-ray Thomson scattering PATRICK BELANCOURT, PAUL KEITER, PAUL DRAKE, University of Michigan, WOLFGANG THEOBALD, SUXING HU, SEAN REGAN, Laboratory for Laser Energetics, University of Rochester, PAWEL KOZLOWSKI, West Virginia University — Simulating experiments of foams under high-energy-density physics (HEDP) conditions have been challenging due to the uncertainty of the equation of state (EOS) of foams in this regime. This motivated a recent experiment on the OMEGA EP laser system to measure the EOS of shocked 150 mg/cc carbonized resorcinol formaldehyde (CRF) foam. One OMEGA EP beam drives a shock into the CRF foam package, while the remaining three beams are used to create a nickel-He-alpha, x-ray probe. The x-ray probe penetrates the shocked foam and the imaging x-ray Thomson spectrometer (IXTS)¹ measures the scattered x-rays from the probe. The IXTS spectrally resolves the scattered x-ray beam while imaging in 1-D. This results in a temperature and ionization measurement at the shock front from the scattered x-ray spectrum and a density measurement from the imaging component. Preliminary results from this experiment will be shown. This work is funded by the U.S. Department of Energy, through the NNSA-DS and SC-OFES Joint Program in High-Energy-Density Laboratory Plasmas, grant number DE-NA0002956, and through the Laboratory for Laser Energetics, University of Rochester by the NNSA/OICF under Cooperative Agreement No. DE-NA0001944.

¹E. Gamboa, **Rev. Sci. Inst.**, 2012

Patrick Belancourt
Univ of Michigan - Ann Arbor

Date submitted: 14 Jul 2017

Electronic form version 1.4