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**Hugoniot and opacity measurements of polystyrene and carbon up to 80 TPa from radiography of converging shocks at the National Ignition Facility** A.L. KRITCHER, T. DOEPPNER, D.C. SWIFT, B. BACHMANN, Lawrence Livermore National Laboratory, D. KRAUS, University of California - Berkeley, J. HAWRELIAK[1], J. GAFFNEY, G. COLLINS, Lawrence Livermore National Laboratory, S. GLENZER, SLAC, D. CHAPMAN, S.D. ROTHMAN, AWE Aldermaston, S. ROSE, Imperial College, R.W. FALCONE, University of California - Berkeley — Converging shocks were induced with hohlraum-driven x-ray radiation on spherical samples of poly alpha-methyl styrene and diamond. The time-history of density profiles through the sample was measured by x-ray radiography using a laser-heated backlighter and a streak camera, viewing a diameter across the sample through slots in the hohlraum wall. Profile-matching in radius and time was used to increase the accuracy of density inferred from the transmission. The shock temperature reached several hundred eV, causing ionization which significantly reduced the opacity to the 9 kV x-ray energy. The opacity change at the shock was inferred from the change in apparent mass inside a radiographic marker layer. The speed and compression of the shock were measured from the density profiles. The shock pressure increased with convergence, so a range of Hugoniot states was obtained from each experiment. Shock states were measured between 10 and 80 TPa.

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