Abstract Submitted
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Improved analysis of converging shock experiments for absolute equation of state and opacity[1] DAMIAN SWIFT, AMY LAZICKI, ANDREA KRITCHER, MADISON MARTIN, NATALIE KOSTINSKI, BRIAN MADDOX, TILO DOEPPNER, HEATHER WHITLEY, ALISON SAUNDERS, JOSEPH NILSEN, Lawrence Livermore Natl Lab — We have previously reported absolute shock Hugoniot and opacity deduced from radiographic measurements of spherically-converging shocks, by describing the radius-time density distribution using analytic functions and performing iterative optimization to match the measured radiograph. The form of the density distribution was not guided by the physics of the experiment, other than by the known density ahead of the shock. We have recently investigated the variation of shock density and sound speed with shock speed for a variety of equations of state, and the variation of opacity with shock pressure. These quantities are closely related to the experimental observables, and we find that parameterizing the problem in this way leads to a more efficient and robust analysis with smaller uncertainties. Similar results can be obtained with parameterized relations between shock speed and particle speed, and Grueneisen parameter and density. In either case, the experiments can now be used to obtain isentropic derivative data along the Hugoniot, as well as the Hugoniot data. We show example results for diamond.

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