

Abstract Submitted  
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**Experimental determinations of the sound speed and the Grüneisen coefficient of liquid Deuterium along the principal Hugoniot using a first order perturbation analysis** DAYNE FRATANDUONO, PETER CELLIERS, DAMIAN HICKS, Lawrence Livermore National Laboratory, TOM BOEHLY, Laboratory for Laser Energetics, DAVID MUNRO, GILBERT COLLINS, Lawrence Livermore National Laboratory — Using a first order perturbation analysis, we have measured the sound speed and Grüneisen coefficient of liquid Deuterium along the principal Hugoniot. Experiments were conducted at the OMEGA laser facility in which perturbations in the drive were measured at the shock front in both the transparent standard (Quartz) and liquid Deuterium sample. Since the EOS of the transparent standard is well known, a first order perturbation analysis enables extraction of the sound speed and Grüneisen coefficient through the correlation of events on the shock front in both materials. These measurements, represent the first high-pressure ( $>100$  GPa) dynamic measurements of Deuterium EOS derivatives which will further advance EOS modeling capabilities important to astrophysics, planetary physics and ICF. This work performed under the auspices of the U.S. Department of Energy by Lawrence Livermore National Laboratory under Contract DE-AC52-07NA27344.

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