Abstract Submitted
for the SHOCK09 Meeting of
The American Physical Society

Measuring the volume of a fluid in a diamond anvil cell using a confocal microscope GABRIEL HANNA, MATTHEW MCCLUSKEY, Washington State University Dept of Physics and Institute for Shock Physics — Confocal microscopy is a potentially powerful technique for obtaining equation-of-state (EOS) data for fluids in a diamond anvil cell. Unlike conventional microscopy, a confocal microscope scans the cell in three dimensions. From the intensity profile of the reflected laser light, we calculated the index of refraction and optical thickness of the sample contained in the cell. These measurements, combined with the cross-sectional area of the sample, enabled us to calculate the volume. As a test of the experimental technique and analysis, we produced a pressure-volume curve for liquid water at 300K. The results agree with published EOS data within experimental error. We have also applied the technique to measure the pressure-volume curve for fluid argon at 300K.

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Date submitted: 20 Feb 2009 Electronic form version 1.4