

Abstract Submitted  
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**Combined Laser Ultrasonics, Laser Heating and Raman Scattering in Diamond Anvil Cell System**<sup>1</sup> PAVEL ZININ, University of Hawaii, VITALI PRAKAPENKA, University of Chicago, SHOKO ODAKE, KATHERINE BURGESS, University of Hawaii — We developed a unique and multifunctional in-situ measurement system under high pressure equipped with laser ultrasonics system,<sup>2</sup> Raman device, and laser heating system (LH-LU-DAC) at the University of Hawaii. The system consists of four components: (1) LU-DAC system (probe and pump lasers, photodetector, and oscilloscope); (2) a fiber laser (1064 nm), which is designed to allow precise control of the total power in the range from 2 to 100W by changing the diode current, for heating samples; (3) a spectrometer for measuring the temperature of the sample (using Black body radiation), fluorescence spectrum (spectrum of the ruby for pressure measurement), and Raman scattering measurements inside DAC under high pressure and high temperature (HPHT) conditions; and (4) an optical system for focusing laser beams (pump, probe, and 100W CW lasers) on the sample in DAC and for imaging a sample inside the DAC. The system allows us to: (a) measure acoustical properties of materials under HPHT; (b) synthesize new phases under HPHT; and (c) measure Raman scattering under HPHT conditions for detection of phase transition.

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<sup>2</sup>N. Chigarev, P. Zinin, M. Li-Chung, G. Amulele, A. Bulou, V. Gusev, *Appl. Phys. Lett.* **93**, 181905 (2008).

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