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Abstract Submitted
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Crystal structure and atomic vibrations of laser ramp-compressed Pb to 600 GPa[1] A. LAZICKI, Lawrence Livermore National Laboratory, J. R. RYGG, University of Rochester, F. COPPARI, R. G. KRAUS, C. E. WEHRENBERG, R. F. SMITH, D. E. FRATANDUONO, D. G. BRAUN, D. C. SWIFT, Lawrence Livermore National Laboratory, G. W. COLLINS, University of Rochester, J. H. EGGERT, Lawrence Livermore National Laboratory — Laser ramp-compression is an increasingly popular means for accessing high pressure states in a solid far out of the range of traditional static-compression experiments, for the purpose of probing the phase diagram and testing first-principles predictions. However, the effects of nanosecond compression rates on the kinetics of high pressure phase transformations and on the temperature are poorly constrained. Using x-ray diffraction at the NIF and Omega laser facilities, we have explored these effects for the Pb system, which has two well-known high pressure phase transitions and a melting curve established by previous static experiments [1,2]. We will present the results of diffraction measurements exploring the effect of dynamic compression on the phase boundaries by measuring in-situ crystal structure and constraining the mean squared atomic displacement, which has a direct correlation with temperature, using the Debye-Waller attenuation of diffraction peak intensities at high angle. [1] Vohra et al., PRB 42, 8651 (1990). [2] Dewaele et al., PRB 76, 144106 (2007).

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