

Abstract Submitted
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Isotopic Studies of Hydrogen and Deuterium Phase IV at Multi-Megabar Pressures EUGENE GREGORYANZ, CHRISTOPHE GUILLAUME, THOMAS SCHELER, ROSS HOWIE, Centre for Science at Extreme Conditions and School of Physics, University of Edinburgh — The recent discovery of the mixed atomic and molecular phase IV of hydrogen (deuterium) is exemplary of how the studies of hydrogen at multi-megabar pressures is constitutive to the understanding of simple systems at extreme compressions [1]. Through a series of high pressure Raman spectroscopic experiments we have conducted an isotopic comparison between hydrogen and deuterium in phase I. Isotopic studies not only reveal differences in phase stability, imposing constraints on the P-T phase diagram, but also provide strong evidence for structural phenomena, such as proton (deuteron) tunnelling [2,3]. New data will be presented over a wide temperature range.

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[2] R.T. Howie, T. Scheler, C.L Guillaume, and E. Gregoryanz, Phys. Rev. B., **86**, 214104 (2012).

[3] A.F. Goncharov, J.S. Tse, H. Wang, J. Yang, V.V. Struzhkin R.T. Howie and E. Gregoryanz, Phys. Rev. B., **87**, 024101, (2013).

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