Abstract Submitted
for the MAR13 Meeting of
The American Physical Society

Phase transition dynamics in high-pressure VO_2 WEN-PIN HSIEH, Stanford Institute for Materials and Energy Sciences, Stanford University and SLAC National Accelerator Laboratory, MARIANO TRIGO, Stanford PULSE Institute, SLAC National Accelerator Laboratory, ZHAO ZHAO, Department of Physics, Stanford University, DAVID A. REIS, Stanford PULSE Institute, SLAC National Accelerator Laboratory and Department of Applied Physics, Stanford University, WENDY L. MAO, Stanford Institute for Materials and Energy Sciences, SLAC National Accelerator Laboratory and Geological & Environmental Sciences, Stanford Univ. — Vanadium dioxide VO_2 is a prototypical strongly correlated material which presents an insulator-metal transition at both ambient and high pressures. We use synchrotron X-ray diffraction combined with a diamond anvil cell to determine the pressure-temperature phase diagram of VO_2. We also use ultrafast coherent phonon spectroscopy to study its phase transition dynamics at high pressure. We find that, in contrast with ambient pressure experiments where strong photoexcitation promptly changes the lattice potential symmetry, at pressures as high as P=11 GPa the coherent phonons are still observed upon the photo-driven phase transition to the metallic state. The mechanism of the phase transition dynamics will be discussed.

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Date submitted: 18 Nov 2012 Electronic form version 1.4