

Abstract Submitted
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Ultrafast lattice dynamics of FeRh¹ D.A. WALKO, E.C. LANDAHL, JIN WANG, Argonne National Laboratory, J.-U. THIELE, E.E. FULLERTON, Hitachi Global Storage Technologies — FeRh undergoes magnetic and structural phase transitions at $\sim 100^\circ$ C where a transition from antiferromagnetic to ferromagnetic orders occurs upon heating. Commensurate with this magnetic transition is a $\sim 1\%$ expansion in the lattice parameter. Recent optical measurements have shown that the magnetic transition can be quite fast, i.e., on the picosecond or sub-picosecond time scales [1,2]. We have used ultrafast x-ray diffraction techniques at the Advanced Photon Source to probe the speed of the corresponding structural transition. An epitaxial FeRh thin film on a MgO(001) substrate was driven through the phase transition by ultrafast laser excitation, and the response of the lattice was directly observed via picosecond-time-resolved x-ray diffraction. The temporal evolution of the FeRh lattice is reported as a function of laser fluence. [1] J.-U. Thiele *et al.*, Appl. Phys. Lett. 85, 2857 (2004). [2] G. Ju *et al.*, Phys. Rev. Lett. 93, 192301 (2004).

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