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Capturing the Magnetic and Structural Phase Transition of Ferh using Extreme Ultraviolet Light[1] DMITRIY ZUSIN, PATRIK GRYCHTOL, CHRISTIAN GENTRY, MARGARET MURNANE, HENRY KAPTEYN, JILA, University of Colorado, Boulder, CO 80309, SOPHIE CANTON, Max-Lab, Lund University, SE-223 63 Lund, Sweden, RONNY KNUT, JUSTIN SHAW, HANS NEMBACH, THOMAS SILVA, Electromagnetics Division, National Institute of Standards and Technology, Boulder, CO 80305, ALEJANDRO CEBALLOS, CATHERINE BORDEL, PETER FISCHER, FRANCES HELLMAN, University of California, Berkeley, CA 94720 — The temperature dependent transition from the anti-ferromagnetic to the ferromagnetic phase in FeRh is accompanied by a modification of its crystal lattice. The interplay between the magnetic and the structural transition is a matter of strong debate. It is important to better understand the mechanism(s) of the transition since it can be induced by femtosecond laser pulses and, unlike slower (nanosecond) magnetic phase transitions, does not seem to be limited by heat transfer. In this work, we use extreme ultraviolet light generated by a tabletop high harmonics source to perform element-selective investigations of the temperature-dependent magneto-optical response of a thin film FeRh sample. We study the optically induced phase transition using two ultrafast pump-probe spectroscopy approaches: by monitoring the time-resolved transversal magneto-optical Kerr effect (T-MOKE) and the transient change in reflectivity.

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Dmitriy Zusin
JILA, University of Colorado, Boulder, CO 80309

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