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Bulk electronic structure of FeRh undergoing metamagnetic transition via hard x-ray photoemission ALEXANDER GRAY, Stanford Institute for Materials and Energy Sciences, SLAC National Accelerator Laboratory, DAVID COOKE, Department of Physics, University of California, Berkeley, PETER KRUGER, CNRSUniversité de Bourgogne, CATHERINE BORDEL, Department of Physics, University of California, Berkeley, ERIC FULLERTON, Center for Magnetic Recording Research, University of California, San Diego, SHIGENORI UEDA, KEISUKE KOBAYASHI, NIMS Beamline Station at SPring-8, FRANCES HELLMAN, Department of Physics, University of California, Berkeley, CHARLES FADLEY, Department of Physics, University of California, Davis — In this study changes in the electronic structure accompanying a temperature-induced metamagnetic transition from anti-ferromagnetic to ferromagnetic order are investigated in strained epitaxial FeRh thin films via valence-band and core-level hard x-ray photoelectron spectroscopy with a photon energy of 6 keV. At such high photon energy, the resulting inelastic mean-free paths of the photoemitted electrons and therefore the average probing depths are on the order of 60 Å, corresponding to about 20 unit cells and ensuring truly bulk-sensitive measurement. Clear differences between the AFM and FM states are observed across the entire valence-band spectrum and these are well reproduced using density functional theory. Changes in the Fe 2p core-levels of Fe are also observed and interpreted using Anderson impurity model calculations. These results suggest that significant electronic structure changes are involved in this AFM-FM transition.

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