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Large resistivity modulation in mixed-phase metallic systems YEONBAE LEE, University of California, Berkeley, ZHIQI LIU, Oak Ridge National Laboratory, Center for Nanophase Materials Sciences, JOHN HERON, Cornell University, JAMES CLARKSON, JEONGMIN HONG, CHANGHYUN KO, University of California, Berkeley, MICHAEL BIEGALSKI, Oak Ridge National Laboratory, Center for Nanophase Materials Sciences, ULRICH ASCHAUER, ETH Zurich, SHANG-LIN HSU, MARK NOWAKOWSKI, JUNQIAO WU, University of California, Berkeley, HANS CHRISTEN, Oak Ridge National Laboratory, Center for Nanophase Materials Sciences, SAYEEF SALAHUDDIN, JEFFREY BOKOR, University of California, Berkeley, NICOLA SPALDIN, ETH Zurich, DARRELL SCHLOM, Cornell University, RAMAMOORTHY RAMESH, University of California, Berkeley — We have investigated the effect of an electric field to FeRh/PMN-PT heterostructures and report 8% change in the electrical resistivity of FeRh films. Such a "giant" electroresistance (GER) response is striking in metallic systems, in which external electric fields are screened and thus only weakly influence the carrier concentrations and mobilities. We show that our FeRh films comprise coexisting ferromagnetic and antiferromagnetic phases with different resistivities, and the origin of the GER effect is the strain-mediated change in their relative proportions. The observed behavior is reminiscent of colossal magnetoresistance in perovskite manganites, and illustrates the role of mixed-phase coexistence in achieving large changes in physical properties with low-energy external perturbation.

Yeonbae Lee
University of California, Berkeley

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