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Anisotropic transport and metamagnetism in microstructured $CeRhIn_5$ KENT R. SHIRER, KIMBERLY A. MODIC, Max Planck Institute for Chemical Physics of Solids, Dresden, Germany, FEDOR F. BALAKIREV, ROSS D. MCDONALD, BRAD J. RAMSHAW, National High Magnetic Field Laboratory, LANL, Los Alamos, New Mexico, USA, ERIC D. BAUER, FILIP RONNING, Los Alamos National Laboratory, Los Alamos, New Mexico, USA, PHILIP J.W. MOLL, Max Planck Institute for Chemical Physics of Solids, Dresden, Germany — We present magnetoresistance data on high quality, focused ion beam (FIB)-fabricated microstructures of $CeRhIn_5$, a strongly correlated metal which is antiferromagnetic (AFM) below $T_N \sim 3.8$K due to the local 4f-moments of the cerium. Under applied pressure, the AFM gives way to an unconventional superconducting state in zero magnetic field. Additionally, the AFM, which exhibits a transverse spiral structure, undergoes a metamagnetic transition at $H_c \sim 2$T for magnetic fields applied perpendicular to the c-axis of the crystal. To effectively probe anisotropic properties of the electronic structure, we microstructure samples with extremely well-defined geometries. Microstructures of $CeRhIn_5$ prepared using FIB-techniques demonstrate quantum oscillations, large residual resistivity ratios, and good quantitative agreement with bulk data. We discuss how the AFM transition removes spin scattering anisotropically, and we show a- and c-direction resistivity measurements near the metamagnetic transition as well as its angular dependence.

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