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SQCRAMscope imaging of transport in an iron-pnictide superconductor FAN YANG, ALICIA KOLLAR, STEPHEN TAYLOR, JOHANNA PALMSTROM, Stanford University, JIUN-HAW CHU, Stanford University and University of Washington, IAN FISHER, BENJAMIN LEV, Stanford University — Microscopic imaging of local magnetic fields provides a window into the organizing principles of complex and technologically relevant condensed matter materials. However, a wide variety of intriguing strongly correlated and topologically nontrivial materials exhibit poorly understood phenomena outside the detection capability of state-of-the-art high-sensitivity, high-resolution scanning probe magnetometers. We have recently introduced a quantum-noise-limited scanning probe magnetometer that can operate from room-to-cryogenic temperatures with unprecedented DC-field sensitivity and micron-scale resolution. The Scanning Quantum Cryogenic Atom Microscope (SQCRAMscope) employs a magnetically levitated atomic Bose-Einstein condensate (BEC), thereby providing immunity to conductive and blackbody radiative heating. We will report on the first use of the SQCRAMscope for imaging a strongly correlated material. Specifically, we will present measurements of electron transport in iron-pnictide superconductors across the electron nematic phase transition at T = 135 K.

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