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Scanning Cryogenic Magnetometry with a Bose-Einstein Condensate BENJAMIN LEV, Departments of Physics and Applied Physics, Stanford University, JOSHUA STRAQUADINE, FAN YANG, Department of Applied Physics, Stanford University — Microscopy techniques co-opted from nonlinear optics and high energy physics have complemented solid-state probes in elucidating exotic order manifest in condensed matter systems. We present a novel scanning magnetometer which adds the techniques of ultracold atomic physics to the condensed matter toolbox. Our device, the Scanning Quantum CRyogenic Atom Microscope (SQCRAMscope) uses a one-dimensional Bose-Einstein condensate of ^{87}Rb to image magnetic and electric fields near surfaces between room and cryogenic temperatures, and allows for rapid sample changes while retaining UHV compatibility for atomic experiments. We present our characterization of the spatial resolution and magnetic field sensitivity of the device, and discuss the advantages and applications of this magnetometry technique. In particular, we will discuss our plans for performing local transport measurements in technologically relevant materials such as Fe-based superconductors and topological insulators.

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