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**Atom chip microscopy: A novel probe for strongly correlated materials** BRIAN KASCH, MATTHEW NAIDES, RICHARD TURNER, USHNISH RAY, BENJAMIN LEV, University of Illinois at Urbana-Champaign — Atom chip technology—substrates supporting micron-sized current-carrying wires that create magnetic microtraps near surfaces for thermal or degenerate gases of neutral atoms—will enable single-shot, large area detection of magnetic flux below the $10^{-7}$ flux quantum level. By harnessing the extreme sensitivity of Bose-Einstein condensates (BECs) to external perturbations, cryogenic atom chips could provide a magnetic flux detection capability that surpasses all other techniques by a factor of $10^2$–$10^3$. We describe the merits of atom chip microscopy, our Rb BEC and atom chip apparatus, and prospects for imaging strongly correlated condensed matter materials.

Benjamin Lev
University of Illinois at Urbana-Champaign

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