

PROBING NANOSCALE ELECTRONIC PHASES IN QUANTUM MATERIALS

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4:00 P.M. NSH 118

The local electronic properties of quantum materials are of fundamental importance in nanoscale science and technology. Combining micro-fabrication process, microwave engineering, and scanning probe platforms, we have developed an impedance microscope to resolve the local dielectric constant and conductivity at 1GHz down to the sub-100nm length scale. We have observed, in a strained manganite thin film, a mesoscopic metallic percolating network, indicating that the substrate-induced strain plays the dominant role in the phase separation [1]. The microscope can also map out the alternating metallic and insulating edge strips of a two-dimensional electron gas in the quantum Hall regime [2]. Continuous research effort is expected to impact many areas of condensed matter physics, including multiferroics, topological insulators, and metamaterials.

[1] K. Lai et al., *Science* 329, 190 (2010).

[2] K. Lai et al., *Phys. Rev. Lett.* 107, 176809 (2011).

Condensed
Matter
Seminar

All interested
persons are
cordially
invited to
attend.