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Scanning SQUID microscopy: A powerful tool for probing magnetism and superconductivity in complex oxides

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Magnetic measurements are useful in investigating novel materials because they probe the behavior of electrons and their interactions. Superconducting Quantum Interference Devices (SQUIDs) are ultra-sensitive flux magnetometers and, when used in imaging mode, they become a powerful tool for mapping magnetic fields above a sample. This talk will outline the basics of scanning SQUID microscopy and highlight our recent measurements on a new material system: complex oxide interfaces. Our scanning SQUID technique uncovered the coexistence of superconductivity and magnetism in the LAO/STO oxide system. These measurements highlight many key benefits of the scanning SQUID technique including a 3 micron imaging kernel, excellent flux sensitivity, and an on-chip field coil to simultaneously measure both the intrinsic magnetism and the sample's response to an applied magnetic field.