

Abstract Submitted  
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**Low-temperature scattering-Scanning Near-field Optical Microscopy of Strongly Correlated Materials** MOLLY MAY, JOANNA ATKIN, MARKUS RASCHKE, University of Colorado at Boulder — Strongly correlated electron materials display diverse complex phenomena such as metal-insulator transitions and ferroelectric and ferromagnetic ordering, with characteristic lengths on the nanometer scale. In order to directly access and study the associated nanophase behavior and domains for a wide range of materials, we have developed a low temperature tip-enhanced scattering-type scanning near-field optical microscope (s-SNOM). A microscopy flow cryostat reservoir is coupled to a shear-force atomic force microscope, with illumination of electrochemically etched Au tips provided by an on-axis high numerical aperture parabolic mirror. We will discuss the use of this system for the study and imaging of ferroic ordering in multiferroic and ferroelectric materials through the symmetry selectivity provided by tip-enhanced second harmonic generation (SHG) and nano-Raman crystallography via the tensor based selection rules.

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