

Abstract Submitted  
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**Near-field techniques for probing collective modes of anisotropic superconducting thin films** H.T. STINSON, J.S. WU, B.Y. JIANG, Z. FEI, Department of Physics, University of California, San Diego, A.S. RODIN, Department of Physics, Boston University, B. CHAPLER, A.S. MCLEOD, Department of Physics, University of California, San Diego, A. CASTRO-NETO, Graphene Research Centre, National University of Singapore, Y.S. LEE, Department of Physics, Soongsil University, M.M. FOGLER, D.N. BASOV, Department of Physics, University of California, San Diego — We propose the use of scattering-type scanning near-field optical microscopy (s-SNOM) to characterize the collective mode spectrum of anisotropic superconductors. To probe the dispersion of collective modes with large in-plane momenta, specifically surface plasmons and guided wave modes, we model the real-space interference patterns of modes launched by the sharp s-SNOM tip and their reflections off physical and electronic boundaries. In addition, we show that s-SNOM spectroscopy allows for a direct probe of the  $c$ -axis superfluid density in underdoped anisotropic superconductors with nanoscale spatial resolution.

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