

Abstract Submitted
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Vortex-state electrodynamics in superconducting thin films studied by infrared spectroscopy¹ XIAOXIANG XI, D.B. TANNER, Department of Physics, University of Florida, G.L. CARR, Photon Sciences, Brookhaven National Laboratory, J.-H. PARK, D. GRAF, National High Magnetic Field Laboratory, Florida State University — In a type-II superconductor, a magnetic field above the lower critical field creates vortices and dramatically changes the superconductor's electrodynamic response. Such changes have been observed in thin film samples by our infrared magneto-spectroscopy experiments with field normal to the film surface. The complex optical conductivity was extracted, and was compared to existing models for the effective electrodynamic response of the vortex state. We found a good agreement between our optical data and a calculation using Maxwell Garnett theory, which treats the mixed state as having normal-metal disks (representing the vortex cores) surrounded by superconductor. Our data also show the effect of magnetic-field-induced pair breaking on the superconducting fraction outside of the vortices.

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