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Disparities in the vortex state electrodynamics of high Tc cuprates ANDREW LAFORGE, ZHIQIANG LI, University of California, San Diego, WILLIE PADILLA, KENNETH BURCH, Los Alamos National Laboratory, SASA DORDEVIC, University of Akron, KOUJI SEGAWA, YOICHI ANDO, Central Research Institute of Electric Power Industry, Japan, DIMITRI BASOV, University of California, San Diego — We report new far infrared measurements of underdoped YBCO in magnetic field and situate these new data within earlier work on related compounds. We show that the cuprate superconductors, including $YBa_2Cu_3O_y$ (YBCO), $La_{2-x}Sr_xCuO_4$ (LSCO), and $Bi_2Sr_2CaCu_2O_{8+\delta}$ (BSCCO), have revealed strikingly different vortex state electrodynamic responses between the various families. For example, in the Josephson vortex regime a strongly field dependent transverse resonance is observed in the interplane conductivity of YBCO, whereas no such feature is found in LSCO. Microwave magnetoabsorption spectra of BSCCO exhibit two resonances which are separated by a temperature gap, again at variance with the other systems. We compare and contrast these findings with several models of the electrodynamics in the vortex state and offer possible explanations for the observed discrepancies.

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