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BCS d-wave behavior in the THz electrodynamic response of electron-doped cuprate superconductors[1] ZHENISBEK TAGAY, Johns Hopkins University, FAHAD MAHMOOD, University of Illinois Urbana Champaign, ANAELLE LEGROS, Johns Hopkins University, TARAPADA SARKAR, RICHARD L. GREENE, University of Maryland College Park, N. PETER ARMITAGE, Johns Hopkins University — Although cuprate superconductors have been intensively studied for the past decades, there is no consensus regarding the microscopic origin of their superconductivity. In this work, we measure the low-energy electrodynamic response of slightly underdoped and overdoped $La_{2-x}Ce_xCuO_4$ thin films using time-domain terahertz (THz) spectroscopy to determine the temperature and field dependence of the superfluid spectral weight. We show that the temperature dependence obeys the relation n_s ~1-$(T/T_c)^2$, typical for dirty limit BCS-like d-wave superconductors. Furthermore, the magnetic field dependence was found to follow a sublinear $B^{1/2}$ form, which supports predictions based on a d-wave symmetry for the superconducting gap. These observations imply that the superconducting order in these electron-doped cuprates can be well described in terms of a disordered BCS d-wave formalism.

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