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Dynamics of quasiparticles and antiferromagnetic correlations in electron-doped cuprate $La_{2-x}Ce_xCuO_{4\pm\delta}$ (LCCO) I. M. VISHIK, F. MAHMOOD , Z. ALPICHSHEV, Massachusetts Institute of Technology, J. S. HIGGINS, R. L. GREENE, University of Maryland, N. GEDIK, Massachusetts Institute of Technology — We studied quasiparticle dynamics in thin films of the electron-doped cuprate $La_{2-x}Ce_xCuO_4$ (LCCO) via optical pump-probe spectroscopy. In underdoped LCCO, the quasiparticle recombination dynamics imply a nodeless superconducting gap, which can be realized with $d_{x^2-y^2}$ symmetry if a nodal hole-pocket is absent. Meanwhile, optimally doped LCCO shows recombination dynamics consistent with line nodes. Above T_c, fluence-dependent dynamics indicate a fully-formed gap in the density of states, which is associated with antiferromagnetic correlations, and limits can be placed on the correlation length and time.

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