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Ultrafast dynamics in the presence of antiferromagnetic correlations in electron-doped cuprate $La_{2-x}Ce_xCuO_{4\pm\delta}$ INNA VISHIK, Univ of California - Davis, FAHAD MAHMOOD , Johns Hopkins University, ZHANYBEK ALPICHSHEV, Massachusetts Institute of Technology, J. S. HIGGINS, R. L. GREENE, University of Maryland, College Park, NUH GEDIK, Massachusetts Institute of Technology — We used femtosecond optical pump-probe spectroscopy to study the photoinduced change in reflectivity of thin films of the electron-doped cuprate $La_{2-x}Ce_xCuO_4$ (LCCO) with dopings of x=0.08 (underdoped) and x=0.11 (optimally doped). Above T_c, we observe fluence-dependent relaxation rates which onset at a similar temperature that transport measurements first see signatures of antiferromagnetic correlations. Upon suppressing superconductivity with a magnetic field, it is found that the fluence and temperature dependence of relaxation rates is consistent with bimolecular recombination of electrons and holes across a gap ($2\Delta_{AF}$) originating from antiferromagnetic correlations which comprise the pseudogap in electron-doped cuprates. This can be used to learn about coupling between electrons and high-energy ($\omega > 2\Delta_{AF}$) excitations in these compounds and set limits on the timescales on which antiferromagnetic correlations are static.

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