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Ultrafast quasiparticle dynamics of $\text{La}_{2-x}\text{Sr}_x\text{CuO}_4$ probed by time-resolved THz spectroscopy ALEX FRENZEL, Massachusetts Institute of Technology / Harvard University, DANIEL PILON, Massachusetts Institute of Technology, ANTHONY BOLLINGER, IVAN BOZOVIC, Brookhaven National Laboratory, NUH GEDIK, Massachusetts Institute of Technology — We have studied picosecond quasiparticle recombination dynamics in the superconducting state of the cuprate superconductor $\text{La}_{2-x}\text{Sr}_x\text{CuO}_4$. After excitation by a 1.5 eV optical pulse, the optical conductivity in the range 0.5 - 2 THz is measured at varying time delays using coherent time-domain terahertz spectroscopy. We show that the conventional two-fluid model, which successfully describes the optical conductivity in YBCO, is unable to accurately reproduce our results. At optimal doping, we observe a weak dependence on excitation density in the recovery rate at low fluence. We comment on the recovery rate of the superconducting state in terms of the bimolecular recombination dynamics described by the phenomenological Rothwarf-Taylor model.

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