

Abstract Submitted  
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**Ultrafast transient grating and pump probe measurements in optimally doped  $\text{La}_{2-x}\text{Sr}_x\text{CuO}_4$  thin films** DARIUS TORCHINSKY, FAHAD MAHMOOD, DAVID HSIEH, JAMES MCIVER, MIT, A. BOLLINGER, I. BOZOVIC, Brookhaven National Laboratory, NUH GEDIK, MIT — We have performed pump probe and transient grating measurements on high- $T_c$  thin films of optimally doped  $\text{La}_{2-x}\text{Sr}_x\text{CuO}_4$ . In these experiments, a pair of femtosecond pulses are interfered on the sample generating a sinusoidal intensity modulation that in turn induces a density grating of photoexcitations. The resulting change in reflectivity allows time-resolved optical measurement of the separate effects of recombination and diffusion. We describe the temperature and excitation density dependence of these measurements and discuss their implications on the nature of superconductivity in the cuprates.

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