

Abstract Submitted
for the MAR10 Meeting of
The American Physical Society

Superconducting fluctuation of $\text{La}_{2-x}\text{Sr}_x\text{CuO}_4$ thin films probed by THz conductivity measurement DAISUKE NAKAMURA, YUKI SHIBUYA, YOSHINORI IMAI, ATSUTAKA MAEDA, the University of Tokyo, ICHIRO TSUKADA, Central Research Institute of Electric Power Industry — In high- T_c cuprate superconductor, Nernst signal appears far above T_c in the underdoped region, which was suggested as the manifestation of vortex-like precursor of the superconducting transition.¹ On the other hand, we previously investigated the superconducting fluctuation by measuring the microwave complex conductivity of $\text{La}_{2-x}\text{Sr}_x\text{CuO}_4$ (LSCO) thin films, and found a different analytical result that the superconducting fluctuation exists up to $T \sim 2T_c$ at most, even at the infinite frequency.² To resolve this discrepancy, we directly measured the THz conductivity on LSCO thin films with various doping level ($x = 0.07, 0.12, 0.15, 0.225$). We found that the imaginary part of the complex conductivity increases rapidly from the temperature about $T \sim 2T_c$ at most, which is consistent with the result of our microwave measurement. This result suggests that the appearance of large Nernst signal in high- T_c superconductor is not caused by superconducting fluctuation.

¹Z. A. Xu *et al.*, Nature **406**, 486 (2000).

²H. Kitano *et al.*, Phys. Rev. **B73**, 092504 (2006); T. Ohashi *et al.*, Phys. Rev. **B79**, 184507 (2009).

Daisuke Nakamura
the University of Tokyo

Date submitted: 19 Nov 2009

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