

Abstract Submitted
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Frequency-dependent Thermal Response of the Charge System and Restricted Sum Rules in $\text{La}_{2-x}\text{Sr}_x\text{CuO}_4$ PAOLO CALVANI, I, MICHELE ORTOLANI, STEFANO LUPI, INFN-Coherentia and Dip. di Fisica, Universit La Sapienza, Roma — The infrared optical conductivity $\sigma_1^{ab}(\omega, T)$ of the *ab*-planes of $\text{La}_{2-x}\text{Sr}_x\text{CuO}_4$ (LSCO) has been measured for different temperatures and for $0.03 < x < 0.26$. The spectral weight of the carriers $W = \int_0^\Omega \sigma_1^{ab}(\omega, T) d\omega$ fulfills the same law $W = W_0 - B(\Omega)T^2$ as in a conventional metal like gold, for any Ω up to the plasma edge. However in LSCO the thermal response $B(\Omega)$ points toward correlation effects and, unlike in gold, is related to an energy scale $t_T \ll t_0 \sim W_0$. This experimental result is in agreement with Dynamical mean Field Theory calculations. The Ferrell-Glover-Tinkham sum rule is fulfilled in LSCO superconductors for $\Omega \gtrsim 2000 \text{ cm}^{-1}$, an energy much higher than predicted for conventional superconductors.

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