

Abstract Submitted
for the MAR08 Meeting of
The American Physical Society

Local tunneling spectroscopy and infrared spectroscopy of the electron-doped cuprate $\text{Sm}_{2-x}\text{Ce}_x\text{CuO}_4$ ¹ A. ZIMMERS, [1,2,3], Y. NOAT, T. CREN, W. SACKS, D. RODITCHEV, [1] INSP, Paris, France, B. LIANG, R. L. GREENE, [2] CNAM, Univ of Maryland, USA, R. P. S. M. LOBO, N. BONTEMPS, [1] LPEM, ESPCI, Paris, France — We present infrared and local tunneling spectroscopy of the electron-doped cuprate $\text{Sm}_{2-x}\text{Ce}_x\text{CuO}_4$. In STM, at optimal doping $x=0.15$, a clear signature of the superconducting gap is observed with an amplitude ranging from place to place and from sample to sample ($\Delta \sim 3.5\text{-}6\text{meV}$). Another spectroscopic feature is simultaneously observed at high energy above $\pm 50\text{meV}$. Its energy scale and temperature evolution is found to be compatible with previous photoemission and optical experiments. If interpreted as the signature of antiferromagnetic order in the samples, these results could suggest the coexistence on the local scale of antiferromagnetism and superconductivity on the electron-doped side of cuprate superconductors. Using optical spectroscopy, we analyzed the effects of the normal state gap opening (the higher energy gap seen in STM) and phonon structure as a function of temperature and doping from the underdoped to the metallic composition.

¹This work was supported by NSF Grants Nos. DMR-0352735 and DMR-0303112 at the University of Maryland. A. Z. acknowledges support from I2CAM, NSF Grant No. DMR-0645461.

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Date submitted: 03 Jan 2008

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