Abstract Submitted
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How does the gap change at T_c in underdoped cuprates?[1] COLIN PARKER, AAKASH PUSHP, ABHAY PASUPATHY, Princeton University, KENJIRO GOMES, SHIMPEI ONO, CRIEPI, Japan, YOICHI ANDO, ISIR, Osaka University, JINSHENG WEN, ZHIJUN XU, GENDA GU, Brookhaven National Laboratory, ALI YAZDANI, Princeton University — Many measurements on underdoped cuprates have shown a gap that persists up to room temperature. This raises an important question: what happens at T_c in order to cause the loss of perfect conductivity? In ARPES, the nature of the gap changes from d-wave below T_c to Fermi arcs above T_c. However, ARPES necessarily averages over significant nanoscale disorder. We will present detailed STM spectroscopy on underdoped $Bi_2Sr_2CaCu_2O_{8+x}$ from both single points and areal averages. By using a local probe we avoid averaging over the disorder. We have performed lattice tracking spectroscopy on identical atomic sites [1] and indentical grids of points [2] for a range of temperatures both below and above T_c. Unlike overdoped samples, the STM spectrum in underdoped cuprates shows two energy scales [1]. We will compare our data to models based on ARPES, with emphasis on the difference between the superconducting and pseudogap phases. [1] Gomes *et al., Nature* **447**, 569 (2007) [2] Pasupathy *et al., Science* **320**, 196 (2008)

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