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Spatially Inhomogeneous Collapse of Superconducting Gaps on the Nanoscale: Connection to Macroscopic Measurements on $Bi_2Sr_2CaCu_2O_{8+x}$[1] ALI YAZDANI, ABHAY PASUPATHY, KENJIRO GOMES, AAKASH PUSHP, Princeton University, SHIMPEI ONO, YOICHI ANDO, CRIEPI, Japan — Using spatially resolved STM spectroscopy, we have mapped the superconducting correlations in $Bi_2Sr_2CaCu_2O_{8+x}$ to show that these correlations collapse in a spatially inhomogeneous manner with increasing temperature. These experiments provide valuable insight for understanding the results of spatially averaged measurements such as angle-resolved photoemission, vortex Nernst and field-induced diamagnetism on the same material system. The connection between nanoscale measurements and bulk parameters such as T_c and T* is clarified. Finally, high-resolution STM measurements provide a method to characterize the processes by which superconductivity is destroyed with increasing temperature in samples with various hole doping levels.

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