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Scanning tunneling spectroscopy studies of $\text{Bi}_2\text{Sr}_2\text{CaCu}_2\text{O}_{8+x}$ from the strongly underdoped to strongly overdoped regime

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Using atomically resolved scanning tunneling microscopy (STS), we investigate the electronic structure $\text{Bi}_2\text{Sr}_2\text{CaCu}_2\text{O}_{8+x}$ across a range of doping levels from $x \sim 0.1$ up to as high as ~ 0.23 , with significant changes in electronic structure observed above $p \sim 0.21$. New sample preparation processes [1] were used to produce heavily overdoped crystals suitable for the imaging of various forms of electronic heterogeneity. The evolution of the gap map $\Delta(\mathbf{r})$, coherence peak height map $A(\mathbf{r})$, the inelastic tunneling signatures $\omega(\mathbf{r})$, and the quasiparticle interference LDOS modulations, as well as their interrelations across this range of doping levels, will be presented.

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[1] J. Slezak, K. Fujita, J. C. Davis, in preparation (2005)