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STM investigation of incipient order in $Bi_2Sr_2CaCu_2O_{8+x}$ PEGOR AYNAJIAN, EDUARDO H. DA SILVA NETO, Princeton University, SHIMPEI ONO, Komae, Tokyo, JINSHENG WEN, ZHIJUN XU, GENDA GU, Brookhaven National Laboratory, ALI YAZDANI, Princeton University — We investigate the spatial and momentum structure of electronic excitations in underdoped samples of the high-temperature superconductor $Bi_2Sr_2CaCu_2O_{8+x}$ using spectroscopic mapping with the scanning tunneling microscope. A defining feature of the electronic states in these samples is a strong Cu-O bond oriented modulation of the local density of states (Q*). Characterizing Q* as a function of temperature and doping we have established that it appears at the onset of the pseudogap phase at T*, above the regime attributed to fluctuating superconductivity [1]. Model calculations that include both the effects of impurity-induced quasiparticle scattering and incipient order reproduce the energy-dispersion of the measured Q* below and above Tc near optimal doping — where incipient order effects are weak [2]. To extend our understanding to the underdoped samples, we have carried out new high-resolution spectroscopic mapping measurements as a function of doping which more clearly identify the low-energy signatures of the incipient order.

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