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Appearance of Universal Metallic Dispersion in a Doped Mott Insulator HSIN LIN, S. SAHRAKORPI, R.S. MARKIEWICZ, Northeastern U., M. LINDROOS, Northeastern U. and TUT Finland, X.J. ZHOU, Stanford U. and LBNL, T. YOSHIDA, U. of Tokyo, W.L. YANG, Stanford U. and LBNL, T. KAKESHITA, U. of Tokyo, H. EISAKI, Stanford U. and U. of Tokyo, S. UCHIDA, U. of Tokyo, SEIKI KOMIYA, CRIEPI Japan, YOICHI ANDO, Osaka U., F. ZHOU, Z.X. ZHAO, Chinese Acad. of Sci., T. SASAGAWA, Stanford U. and TIT Japan, A. FUJIMORI, U. of Tokyo, Z. HUSSAIN, LBNL, Z.-X. SHEN, Stanford U. and LBNL, A. BANSIL, Northeastern U. — Under strong electronic correlations the parent compounds of all cuprate high-temperature superconductors assume the so-called Mott-Hubbard insulating state. By what routes these insulators accomplish the miraculous transformation into superconductors with the addition of electrons or holes is a question of intense current interest. In this study we consider the classic superconductor $La_{2-x}Sr_xCuO_4$ (LSCO) over the wide doping range of $x = 0.03 - 0.30$, delineating how the electronic spectrum evolves with doping for binding energies extending to several hundred meV's. Our analysis indicates that this Mott insulator contains 'nascent' or 'preformed' metallic states, which develop finite spectral weight with doping, but otherwise undergo relatively little change in dispersion over a wide doping range. Our findings challenge existing theoretical scenarios for cuprates. Work supported in part by the USDOE.

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