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Nature of the quasiparticle remnant in $La_{2-x}Sr_xCuO_4$ (LSCO) A. BANSIL, S. SAHRAKORPI, R.S. MARKIEWICZ, Northeastern U., M. LINDROOS, V. ARPIAINEN, Tampere UT, Finland, X.J. ZHOU, Stanford U., T. YOSHIDA, U. of Tokyo, Kashiwa, W.L. YANG, Stanford U., T. KAKESHITA, Superconductivity Research Laboratory, ISTEC, Tokyo, H. EISAKI, National Institute of Advanced Industrial Science and Technology, Tsukuba, S. UCHIDA, U. of Tokyo, Bunkyo-ku, A. FUJIMORI, U. of Tokyo, Kashiwa, Z. HUSSAIN, Advanced Light Source, Berkeley, Z.-X. SHEN, Stanford U. — Angle resolved photoemission (ARPES) studies in LSCO have revealed a remarkable state of affairs in that the observed Fermi surface maps are in excellent accord with the LDA calculations even in the highly underdoped regime. Here we demonstrate that the agreement with gross band dispersion persists to quite high energy scales of several hundred meV's. For example, even in the 3%-doped sample, the position and shape of the van Hove singularity is found to be in accord with LDA predictions. Signatures of strong correlation physics are manifest however through the suppression of spectral weight near the Fermi energy particularly in the underdoped system. In this way, even though the gross dispersion is virtually unrenormalized, there is a strong renormalization of the spectral weight. Work supported in part by the USDOE.

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