

Abstract Submitted
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Evolution of Mid-gap States and Residual 3-Dimensionality in Cuprates¹ S. SAHRAKORPI, Northeastern University, M. LINDROOS, Tampere University of Technology, R. MARKIEWICZ, Northeastern University, A. BANSIL, Northeastern University — We have carried out extensive first principles doping-dependent computations of angle-resolved photoemission (ARPES) intensities in $\text{Bi}_2\text{Sr}_2\text{CaCu}_2\text{O}_8$ (Bi2212) and $\text{La}_{2-x}\text{Sr}_x\text{CuO}_4$ (LSCO) over a wide range of binding energies.^{1,2,3} Intercell hopping and the associated 3-dimensionality, which is usually neglected in discussing cuprate physics, is shown to play a key role in shaping the ARPES spectra. Despite the obvious importance of strong coupling effects (e.g. the presence of a lower Hubbard band coexisting with mid-gap states in the doped insulator), a number of salient features of the experimental ARPES spectra of LSCO are captured to a surprising extent when k_z -dispersion is properly included in the analysis.

1. S. Sahrakorpi, et al., Phys. Rev. Lett. 95, 157601 (2005).
2. A. Bansil, et al., Phys. Rev. B 71, 012503 (2005).
3. A. Bansil, et al., New Journal of Physics 7, 140 (2005); <http://www.iop.org/EJ/abstract/1367-2630/7/1/140>.

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