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Evolution of Mid-gap States and Residual 3-Dimensionality in $\mathbf{La_{2-x}Sr_xCuO_4}$ ARUN BANSIL, SEPPO SAHRAKORPI, Northeastern University, MATTI LINDROOS, Tampere University of Technology, ROBERT MARKIEWICZ, Northeastern University — We have carried out extensive first principles doping-dependent computations of angle-resolved photoemission (ARPES) intensities in $La_{2-x}Sr_xCuO_4$ (LSCO) over a wide range of binding energies. 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), we show that a number of salient features of the experimental ARPES spectra are captured to a surprisingly large extent when effects of k_z-dispersion are properly included in the analysis. Work supported in part by the U.S.D.O.E.

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