Gap Distributions in Cuprate Superconductors

ASHOT ME-LIKYAN, University of Florida, BRIAN M. ANDERSEN, University of Florida, TAMARA S. NUNNER, Institute of Theoretical Physics, Berlin, P. J. HIRSCHFELD, University of Florida — Recent Scanning Tunneling Microscopy (STM) data on Bi$_2$Sr$_2$CaCu$_2$O$_{8+x}$ impose stringent restrictions on the spatial distribution of the superconducting order parameter and scalar potential due to impurities. In Ref. [1] it was shown that these distributions are inconsistent with a conventional mean-field approach where the inhomogeneities in the LDOS are driven by a scalar impurity potential. It was further demonstrated that the salient experimental features of the LDOS spatial modulations can be obtained if the pairing coefficient itself is assumed to be enhanced by the dopant atoms. Here, we report additional features of the LDOS that support the conclusions of Ref. [1]. [1] T. S. Nunner, B. M. Andersen, A. Melikyan, and P. J. Hirschfeld, Phys. Rev. Lett. 95, 177003 (2005)

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