

Inhomogeneous d-wave Superconducting State of The Doped Cuprate Superconductors(LT26)

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We study the local density of states (LDOS) in the doped cuprate superconductors within the two-dimensional $t - J - U$ model, where the doping is accompanied by ionic Coulomb potentials centered in the plane located a distance d_s away from the copper-oxide plane. The order parameters are determined in a self-consistent way with the Gutzwiller projected mean-field approximation and the Bogoliubov-de Gennes theory¹. We obtained the distributions of the electron concentration, the valence bond, and the pairing order parameters for different doping concentrations. We also calculate the LDOS spectrum and the local superconducting gap. We make comparisons to the related experiments, and find that our results are qualitatively consistent with the experimental data.²

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²A. Yazdani et al., Phys. Rev. Lett. **83**, 176(1999); S. H. Pan et al., Nature (London) **403**, 746 (2000).