ON THE MECHANISM OF THE FORMATION OF SUPERCONDUCTING AND PSEUDOGAP STATES IN HIGH-TEMPERATURE SUPERCONDUCTORS

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It is shown that the key role in the mechanism of high-T_c superconductivity in layered cuprate metal-oxides with the anisotropic quasi-two-dimensional electronic spectrum and the d-wave symmetry of the superconducting order parameter is played by the retarded screened Coulomb interaction and many-body correlations. The possibility of the coexistence of superconducting and dielectric gaps on the flat portions of the Fermi surface in the vicinity of the extended saddle points with the quasi-one-dimensional spectrum is considered for cuprate high-T_c superconductors. It is assumed that the pseudogap is actually an anisotropic dielectric gap that appears due to the electron-hole (excitonic) pairing and is partially suppressed by the elastic scattering of charge carriers on charged point defects. Such a pseudogap state is analogous to the "gapless" superconductivity in superconductors with magnetic impurities. The complete suppression of the pseudogap by charged impurities is supposed to increase T_c significantly.