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Analysis of the renormalization of the quasiparticle dispersion in high-T_c superconductors JIAN-XIN LI[1,3], TAO ZHOU[1], Nanjing University, China, Z.D. WANG[2], The University of Hong Kong — Based on the slave-boson approach to the bilayer $t - t' - J$ model, the renormalization of the quasiparticle dispersion in high-T_c cuprates is investigated by examining both interactions of fermions with spin fluctuations and phonons. It is shown that both interactions can give rise to a kink in the dispersion around the antinodes of the d-wave gap (near $(\pi, 0)$ and $(0, \pi)$). However, three remarkable differences caused by these interactions are found, namely the peak/dip/hump structure in the quasiparticle lineshape, the doping dependence of the quasiparticle weight, and the role played by the interlayer coupling on the formation of the antinodal kink. These differences are suggested to serve as a discriminance to single out the main residual interaction in the superconducting state. A comparison to the recent angle-resolved photoemission (ARPES) experiments shows that the coupling to the spin resonance dominates for quasiparticles around the antinodes.

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