Single particle spectral weight and ARPES spectra from cuprates in the bond-ordered, bond-centered stripe phase

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9.7 cm

Motivated by recent inelastic neutron scattering experiments on cuprates, we discuss the formation of bond order in the stripe phase. We suggest that spin-Peierls order appears in hole-rich domain walls (DWs) formed between hole-poor regions in which long-range antiferromagnetic (AF) correlations exist. On the example of a single stripe we analyze the stability of such structures. The motion of a hole inside the DW which takes the form of a bond ordered ladder is in principle unrestricted. The hopping of a hole in domains is to some extent obscured by the fact that a moving hole spoils AF correlations. By analyzing the energy dispersion of a quasiparticle propagating along the bond-centered, bond-ordered stripe and of a quasiparticle propagating along the site-centered stripe we deduce that bond ordered stripes are stable at and above the total doping level 1/8 and the linear stripe-filling level 1/2. Later we compute the electronic structure and the single-particle spectral density of a stripe array formed by ladder-like DWs and by AF domains of width 2 lattice spacings and compare them with ARPES spectra from some doped cuprates belonging to the 214 family of compounds. The intensity map plotted in the coordination frame momentum-energy reproduces quite well the ARPES spectra of Nd doped LSCO systems obtained at the doping level of 15%.

13.4 cm

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