High resolution ARPES on low-dimensional structures

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Abstract:
Angle resolved photoelectron spectroscopy (ARPES) is a powerful technique to explore electronic properties of various kinds of materials. We are using this technique to investigate the modification of the well-known Shockley type surface state in adsorbate/metal systems in order to learn about the interaction at the interface. Indeed, the Shockley states can be used as a probe to estimate the strength of the bonding between the adsorbate and the substrate. For example, in the case of organic/metal systems, the change in the valence band is very consistent with the modification in the Shockley states band. On the other hand, ARPES is among the best techniques to study strongly correlated systems, in particular high-Tc superconductors (cuprates). In this context, the Bi-based components, particularly the Bi2223, i.e., $Bi_2Sr_2Ca_3Cu_3O_{10+\delta}$ characterized by three CuO_2 layers represents the model system, which is, in our opinion, much less investigated due to his complex crystallographic structure and also the lack of high quality samples. Here, we present high resolution ARPES measurements on optimally-doped Bi2223 single crystal and discuss behaviors like the “kink” in the quasiparticle dispersion, the gap evolution over the Fermi surface and the band splitting induced by CuO_2 multilayer.