Joint CQSE and CASTS Seminar

Weekly Seminar
Dec. 27, 2013 (Friday)

TIME Dec. 27, 14:30 ~ 15:30
TITLE Study of Electronic Structure Evolution in FeTe Through its Magnetic Transition via Angle-Resolved Photoelectron Spectroscopy
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Abstract

FeTe qualifies as a ”bad metal” at its paramagnetic state. The resistivity increases with decreasing temperature down to the magneto-structural transition at T_{ms}=72 K. With a small amount of Se doping, superconductivity emerges. The electronic structure near the E_F of different iron-based systems is mainly derived from the Fe *3d* orbital, whereas the hole-like in the center of the Brillouin zone and electron-like state in the corners. Moreover, FeTe holds the simplest structure among all the iron-based superconductors, which contains only the Fe plane with chalcogen atoms placing below and above the plane alternatively. Despite these similarities, the actual magnetic structures are different for iron-chalcogenide and iron-pnictide systems at their magnetic state. In FeTe, the magnetic ordering exhibits a double stripe magnetic order with the associating wave vector, $Q_{AFM}=(\pi, 0)$, rotated by 45° with respect to the one of iron-pnictide. Consequently, electronic structure of FeTe is expected to be different from that observed in Fe pnictides, as nesting is absent.

We investigate the evolutions of the Fermi surface and the main bands from the paramagnetic state to the antiferromagnetic state via angle-resolved photoelectron spectroscopy (ARPES). Our observations correlate well with the changes observed in transport measurements occurring below 72 K in FeTe, which may help understanding the role of magnetic fluctuations in the bad metallic behavior; and further, relates correlation and magnetism to one parent compound of Fe-based superconductors.