Domain-dependent surface states with peculiar spin texture in $IrTe_2$

Takashi Mizokawa[1]

[1] *Department of Applied Physics, Waseda University, Okubo 3-4-1, Shinjuku, Tokyo 169-8555, Japan*

Angle-resolved photoemission spectromicroscopy with submicron resolution (nano-ARPES) is a powerful technique to study electronic structure of microcrystals and microdomains. $IrTe_2$ is a unique layered transition-metal dichalcogenide which exhibits a first order phase transition with stripe-type charge-orbital order at about 280 K [1,2] associated with the orbitally induced Peierls mechanism [3]. In a recent nano-ARPES study on $IrTe_2$ surface, we observed two types of domains with striped texture at 250 K and three types of domains with trijunction texture at 47 K [4]. The evolution of domain texture at the surface is related to the periodicity change of the charge-orbital order in the bulk. Each domain harbors quasi one-dimensional surface bands forming fragmented Fermi surfaces (Fermi arcs). The direction of the Fermi arcs is perpendicular to that of the stripe-type charge-orbital order. The Fermi arcs exhibit peculiar spin polarization which can be probed by spin-resolved ARPES. The spin texture of the domain-dependent surface states indicates that the Ir 5d and Te 5p spin-orbit interaction plays an important role in the charge-orbital order of $IrTe_2$.

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