

Visualizing electrons living in momentum space

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Angle resolved photoemission spectroscopy (ARPES) is the powerful probe that allows us to visualize the electronic structure of solid, how electrons are living in the momentum space, with the simple working principle of photoelectric effect. It is a spectroscopy but thus can be regarded as a momentum space microscope. Not only just visualizing the electronic structure, ARPES can provide deeper information on how electron lives, such as i) with what other elements electrons are interacting, ii) what is the symmetry and phase of the electron's wave function. In this talk, I will introduce the power of this momentum space microscope. Starting from how it works theoretically and practically, I will provide two examples of i) an evidence of interaction between electron and charge density wave excitation mode and ii) visualizing Berry curvature distribution in the momentum space of inversion symmetry broken system and try to demonstrate what can we get from ARPES, together with recent technical expansion of ARPES.