Laser ARPES on High-Temperature Cuprate Superconductors

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After more than two decades, the superconductivity mechanism of high temperature copper-oxide (cuprate) superconductors remains an outstanding issue in condensed matter physics. Angle-resolved photoemission spectroscopy (ARPES) is a powerful tool to directly probe the electronic structure and superconductivity mechanism in cuprate superconductors. The utilization of the Vacuum Ultraviolet (VUV) laser as a new light source has elevated the ARPES technique to a new level by possessing unique advantages such as super-high energy resolution (better than 1 meV), high momentum resolution, super-high photon flux and enhanced bulk sensitivity [1]. The high-precision laser ARPES measurements have provided new insights on the Fermi surface topology and energy gap in cuprate superconductors [2,3]. Particularly, it has become a powerful tool to investigate many-body effects in cuprates[4,5,6,7]. In this talk, we will highlight some recent results obtained from the VUV laser-based ARPES on high temperature cuprate superconductors. Future developments will also be discussed.

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