

Ultrahigh-resolution photoemission study of superconductors using quasi-CW VUV  
Laser

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Abstract

We developed the ultrahigh-resolution photoemission system using quasi-CW VUV laser. VUV laser was newly developed for high resolution photoemission. Its photon energy is about 7 eV with 0.26 meV line width and repetition rate is around 80 MHz. The photon energy of 7eV is the highest photon energy as a quasi CW laser. The intensity is quite high with  $10^{15}$  photons/s. The resolution of the photoelectron spectrometer is about 0.25 meV with a wide collecting angle of about 38 degree. The total resolution of the Laser-PES system is estimated to be about 0.36 meV by using the gold Fermi edge at 3 K. This is the highest resolution of the world.

We will present the photoemission results on superconducting materials, such as CeRu<sub>2</sub>, Nb, LaRuP<sub>12</sub>, MgB<sub>2</sub>, doped diamond and organic superconductors, as well as several exotic superconductors. We found that these superconductors have anisotropic and/or multiple superconducting gaps as well as phonon structures. Furthermore, we will discuss on the bulk sensitivity of the laser photoemission spectroscopy.