

MAR07-2006-002833

Abstract for an Invited Paper
for the MAR07 Meeting of
the American Physical Society

Ultrahigh-resolution photoemission from superconductors and strongly-correlated materials

SHIK SHIN, University of Toyko

I would like to introduce the ultra-high resolution photoemission study of several superconductors and strongly correlated materials using UV-laser-photoemission [1]. The laser-PES system has the performance of about $360\text{-}\mu\text{eV}$ resolution at about 3 K at present. We will also introduce the newly developed laser-PES system that has the higher performance. Recently, it is found that the diamond becomes superconductor when the boron is doped heavily. We observed the superconducting gap and several phonon structures in the ultra-high resolution photoemission spectra of the doped diamond [2]. We would like to introduce several superconductors including organic materials. It is found, for the first time, as a transition metal compound that LiV_2O_4 is a heavy Fermion material. We have directly observed a sharp peak structure at 4 meV just above E_F in d -electron heavy Fermion LiV_2O_4 [3]. The spectral shape and the temperature dependence of the peak structure are very similar to those of the Kondo resonance in conventional f -electron heavy Fermion compounds. The present result can be well described within Kondo scenario. I also show several ARPES results on superconductors and strongly-correlated materials.

[1] T. Kiss, et al., Phys. Rev. Lett. **94**, 057001 (2005).

[2] Ishizaka et al., unpublished

[3] A. Shimoyamada, et al., H. Ueda, Y. Ueda, S. Shin, Phys. Rev. Lett. **96**, 026403 (2006).