

High-resolution angle-resolved photoemission study of the electron-phonon and electron-electron interactions in simple metals

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Recently, high-resolution angle-resolved photoemission spectroscopy (ARPES) has been improved drastically in energy and angular resolutions, and one can extract detailed information on the quasi-particles near the Fermi level (E_F). Recently a "kink" structure, or a sudden change of the Fermi velocity near E_F , in the high- T_C cuprates has attracted much interest, and it is regarded as one of the important clues to clarify the mechanism of high- T_C superconductivity.[1] In order to interpret ARPES spectra in a quantitative way, it is important to investigate systematically how various manybody interactions in solids are reflected in these spectra. For this purpose, we selected simple metals such as Fe, Ni, Cu, and Pd single crystals and examined the electron-phonon and electron-electron interactions by means of high-resolution ARPES with synchrotron radiation. On the basis of detailed lineshape analyses, we have evaluated strengths of these interactions along high-symmetry line of the Brillouin zone.[2] We have evaluated effective masses and found their energy-band and spin dependence for Ni.[3] Our recent results will be presented.

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[1] A. Damascelli et al., *Rev. Mod. Phys.* **75** (2003) 473, and references therein.

[2] M. Higashiguchi, K. Shimada, K. Nishiura, X.Y. Cui, H. Namatame, M. Taniguchi, *J. Electron Spectrosc. Relat. Phenomen.* **144-147** (2005) 639.

[3] M. Higashiguchi, K. Shimada, K. Nishiura, X.Y. Cui, H. Namatame, M. Taniguchi, submitted to *Phys. Rev. B*.