Contribution ID: **71** Type: **Poster**

Dispersive Kondo resonance and hybridized bands in Yb-based compounds

Monday, 23 July 2012 20:00 (2 hours)

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Heavy-fermion or valence-fluctuation phenomena in strongly-correlated f-electron systems can be derived from the hybridization between conduction band and 4f states (c-f hybridization). Therefore, to directly probe the c-f hybridized electronic structures in the momentum space is important for understanding the heavy-fermion physics. Angle-resolved photoemission spectroscopy (ARPES) is a powerful tool for this purpose.
In this work, we have performed ARPES for Yb-based compounds such as YbAl2, a prototypical valence fluctuation system, to observe the energy-momentum dispersion curves in the three-dimensional momentum space using a synchrotron radiation.
For YbAl2, the c-f hybridized bands and the dispersive Kondo resonance peak have been clearly observed in the APRES spectra. The results are closely associated with the extremely high Kondo temperature (>2000 K). On the basis of these findings, the c-f hybridized electronic structures in Yb compounds will be discussed in comparison with theoretical models such as LDA band calculations and periodic Anderson model.

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Session Classification: Poster Session 1

Track Classification: Spin Phenomena