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Fermi Surface evolution as a function of temperature in heavy fermion Ce_2RhIn_8 probed by ARPES FANNY RODOLAKIS, Argonne National Laboratory, CRIS ADRIANO, FRANCISCO RESTREPO, DIMITAR TENEV, University of Illinois at Chicago, PASCOAL PAGLIUSO, University of Campinas, JUAN CARLOS CAMPUZANO, University of Illinois at Chicago —
The crossover of $4f$ localized magnetic moments at high temperatures into itinerant states of heavy mass at low temperatures in Cerium-based heavy fermion materials is a fundamental problem in condensed matter physics, involving a temperature-dependent hybridization between the f levels immersed in a sea of conduction electrons (ce). Due to the Luttinger theorem, this hybridization leads to a Fermi surface (FS) enlargement at low temperature: as the f electrons become itinerant, their contribution to E_F increases. We have studied the evolution of the heavy fermion FS in Ce2RhIn8 as a function of temperature using angle resolved photoemission. We observed topological changes that emerge at a temperature scale much higher than the onset of the coherence character of the f electrons. This behavior can be related to the evolution of the electrical resistivity as a function of temperature: as typically found for Kondo lattice materials, it first decreases when temperature is lowered, but increases below $\sim$ 150K as the magnetic scattering of the ce by the localized f electrons becomes larger than the phonon scattering. It reaches a maximum and then drops when the magnetic scattering becomes coherent for $T^* \sim 5$K. This multiple scale behavior of the f electrons is in good agreement with a recent theoretical study performed in the parent compound $CeRhIn_5$ [1].

[1] Choi et al, Phys. Rev. Lett. **108**, 016402.

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