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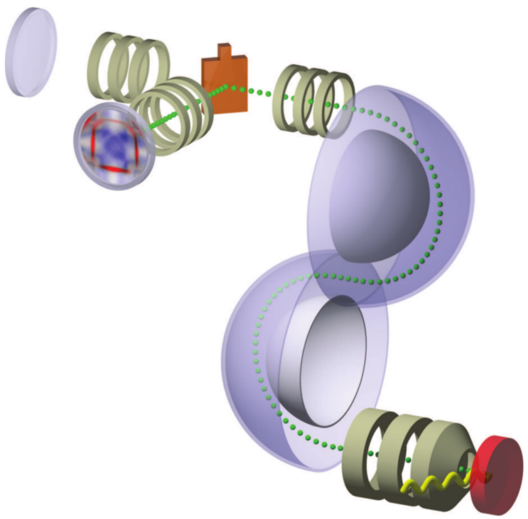
A spin- and momentum-resolved photoemission study of strong electron correlation in Co/Cu(001)



λογος

Electron correlation is an important phenomenon of solid-state physics, which is actively studied both by experimentalists for the rich material properties which result from it and by theoreticians who face a lot of open questions on the way to a succesful many-body description of electron systems where the Coulomb interaction plays an important role.

Ferromagnetic cobalt is an interesting candidate for the study of electron correlation, since the exchange interaction splits the band structure into majority-spin and minority-spin bands, which differ considerably in the strength of the electron-electron interaction. Using a revolutionary, parallelized approach to spin-resolved photoemission with an efficiency 3 to 4 orders of magnitude higher than previously possible, the spin-dependent manifestations of the electron correlation are revealed in unprecedented detail, allowing for a characterization of the self energy. As an additional phenomenon of the electron correlation, unusual *waterfall* features, previously only observed in superconductors, occur in the photoemission spectra of cobalt. Further subjects include a comprehensive mapping of the fcc cobalt Fermi surface and an investigation of unoccupied quantum well states in ultrathin cobalt films on copper accessed by spin-resolved, non-linear photoemission. The principle of the imaging spin filter and the data analysis routine are discussed in-depth in a dedicated chapter.

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