Séminaire SOLEIL

"Many-body interactions in metal surfaces investigated with Angle Resolved Photoemission Spectroscopy"

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Invitée par Amina TALEB

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Séminaires

The life time of excited electrons and holes have a pronounced effect on a wide range of phenomena such as chemical reactivity and electrical conductivity. High resolution Angle Resolved Photoemission Spectroscopy is a powerful tool for investigating the many body effects leading to finite life times of two-dimential states. From the measured spectral line shape and dispersion detailed information can be extracted and directly related to the self-energy of the quasi particles. The real part of the self energy is renormalising the dispersion (shifting the dispersion energy dependently) and the imaginary part is proportional to the inverse life time and is equal to the HWHM of an energy distribution curve. In many systems the dominating many body effects are electron-phonon, electron-electron and electron-defect interactions. Each interaction contributes to the self-energy in a unique way, allowing us to separate them to some degree.

In this talk I will present, after some of the basic theory of how to measure and extract many-body effects, three different cases, where we have studied the many body effects in metals experimentally and theoretically in collaboration with E.V. Chulkov and co-workers; The electron-phonon coupling on Al(001), the anisotropic electron-phonon coupling on Be(0001), and a study of how the life time of the spin- orbit split surface state of Au(111) depends on spin direction. All the measurements are performed at the SGM3 beamline of the synchrotron source ASTRID in Aarhus, Denmark.