L-20 **Wed. 18. 06., 17^{30}-18^{10}**

Nanospectroscopy by XPEEM and LEEM: state of the art and perspectives

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During the last 20 years, synchrotron-based X-ray photoemission electron microscopy (XPEEM) has emerged as one of the most powerful methods for nanoscale characterization, with frequent use in material science, surface chemistry and nanosciences [1]. In its simplest variant, XPEEM employs secondary emission to map local differences in the oxidation state, valence, and bond orientation around the emitter. The combination with x-ray circular and linear dichroism techniques has been the most successful application of PEEM at synchrotrons, permitting to image ferromagnetic and antiferromagnetic domains. Variants of XPEEM Instruments equipped with energy filter also exist, which can implement laterally resolved versions of x-ray photoelectron spectroscopy (XPS) and angle-resolved photoelectron spectroscopy, giving access to the local chemical state and electronic structure. XPEEM instruments often combine low energy electron microscopy (LEEM), which adds structure sensitivity and capability to image dynamic processes such as growth and self-organization. Such instruments provide a unique array of advanced surface characterization tools within a single instrument, microprobe angle-resolved photoelectron spectroscopy (μ-ARPES) and low energy electron diffraction (μ-LEED) being the most frequently demanded. In my talk, I will illustrate the current state of XPEEM and report recent results from the Trieste group in fields spanning from surface science to nanomagnetism. The study of graphene on various transition metals and, in particular, on a support with non-threefold symmetry, Ir(100), will serve to demonstrate the usefulness and power of the LEEM-XPEEM multi-technique approach [2,3].

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[2] A. Locatelli, C. Wang, C. Africh, N. Stojic, T.O. Menteş, G. Comelli, N. Binggeli, *ACS Nano* **7** (2013) 6955–6963.
[3] A. Locatelli, G. Zamborlini and T.O. Menteş, *Carbon* **74**, (2014) 237–248.

L-21 **Wed. 18. 06., 18^{10}-18^{50}**

The electronic structure of spintronic materials as seen by spin- and angle-resolved photoemission

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Keywords: photoemission, electronic structure, spin-orbit coupling

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I will introduce the basics of spin- and angle-polarized photoemission and its application to several physical systems including ferromagnetic thin films and topological insulators. Furthermore, I will review several types of modern photoemission spectrometers capable of spin analysis, discuss the key experimental challenges, and provide the outlook of the future instrumental developments.

The key quantity in spintronic devices is the spin polarization of the current flowing through the various device components, which in turn is closely determined by the components' electronic structure. Modern spin- and angle-resolved photoemission spectroscopy (spin-ARPES) can map the details of the spin-polarized electronic structure in many novel material systems – both magnetic and nonmagnetic. However, the interpretation of the experimental might be challenging in particular when the spin-orbit interaction comes into play. Furthermore, in order to separate close-lying electronic states an improvement in energy and angular resolution as well as information depth is still mandatory.

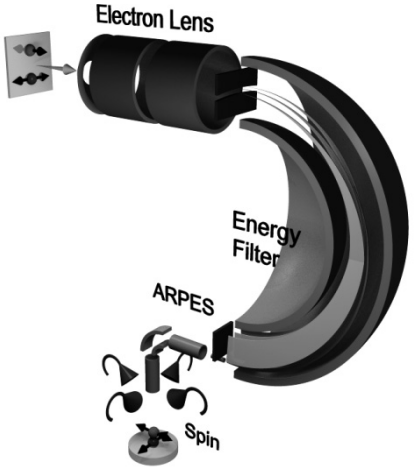

Figure 1. Schematic drawing of the state-of-the-art spin-ARPES spectrometer

[1] L. Plucinski and C. M. Schneider, *J. Electron. Spectrosc. Relat. Phenom.* **189** (2013) 137.