Réunions scientifiques

Séminaires

Séminaire SOLEIL

Energy-filtered x-ray photoelectron emission microscopy : principles and recent progress

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Grand Amphi SOLEIL

X-ray photoelectron emission microscopy (XPEEM) is one of the most promising full-field imaging methods to have emerged recently with now mature instruments providing non-destructive spectromicroscopic analysis of surfaces [1]. The contrast mechanisms offered by this imaging technique are very rich and range from elemental composition, chemical states and work function [2], to contrast modes related to local electronic, magnetic and plasmonic properties. To date XPEEM has been mostly implemented at synchrotron sources in the absorption mode, using secondary electrons at the photoemission threshold either for magnetic or chemical imaging. One of its major challenges now is the use of effective energy filtering to make XPEEM a true spectromicroscopic tool at high lateral- (<100 nm), high energy- (<100 meV) and high-temporal (<10 ps) resolutions, for core-level and valence band imaging in direct and reciprocal space. A new XPEEM instrument fitted with an aberration-corrected, double hemispherical analyzer as a high-transmission imaging spectrometer (*NanoESCA*) now allows to fully achieve these objectives [3].

In this talk, we will first set briefly the principles of XPEEM before addressing the issue of energy-filtering in some examples from different research groups active in the field. Selected case studies using the *NanoESCA* spectromicroscope and soft x-ray excitation will be presented (single nanowires [4], single polycrystalline oxide grains [5]). Finally some interesting perspectives (*k*-space imaging, temporal resolution) will be addressed.

[1] Locatelli *et al*., 2003 *J. De Phys*. IV **104** 99 ; Schmidt et al. 2002 *Surf. Rev. Lett*. **9** 223 ; Mori *et al*., 2006 *Nucl. Instr. Methods* B **246** 39.
[2] Locatelli, Bauer, 2008 *J. Phys. : Condens. Matter* **20** 093002
[3] Escher *et al*., 2005 *J. Phys. : Condens. Matter* **14** S1329 ; Renault, Barrett *et al*., 2007 *Surf. Sci.* **601** 4727
[4] Zagonel, Barrett *et al*., 2008 *Surf. Interface Anal*. **40**, 1709
[5] Bailly, Renault, Barrett *et al*., 2008 *Nano. Lett.* **8** 3709

Formalités d'entrée *: accès libre dans l'amphi du Pavillon d'Accueil. Si la manifestation a lieu dans le Grand Amphi Soleil du Bâtiment Central, merci de vous munir d'une pièce d'identité (à échanger à l'accueil contre un badge d'accès).*

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