Synchrotron radiation for the study of thin films and surfaces

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Amphithéâtre SOLEIL

HDR

In solids, the organization of the valence electrons, the band structure, determines all the physical properties such as conductivity, magnetism or optical behaviour. Beyond bulk materials, the improvements of vacuum techniques and the ability to prepare an atomicaly clean and well cristallized surface in ultra-high vacuum led to the development of surface science and material deposition methods, like Molecular Beam Epitaxy, allowed to control thin films deposition at the angström scale. This opened the way to explore new fascinating areas of research like the surface of materials, materials as thin films, heterostructures (a pilings of thin films of different materials) or nanostructures, thus creating an endless playground for scientists.

The solid-state physicist needs as many tools as possible to study the various structural and electronic properties of those systems. For more than 45 years, many synchrotron radiation-based experimental techniques like X-ray Absorption Spectroscopy or Photoelectron Spectroscopy provided us with priceless information on our favorite materials.

In this presentation, I will show how the crystallographic structure of magnetic thin films, including possible distortions due to epitaxy, can be investigated by Surface Extended X-ray Absorption Fine Structure. The X-ray absorption edge also contains a valuable information on the material electronic structure. We will see how resonant electronic spectroscopies can help in understanding their profile in rare earth compound or oxydes.

Finally, Angle Resolved PhotoElectron Spectroscopy is a unique technique to image the band structure. The CASSIOPEE beamline is dedicated to this technique and I will describe results obtained on metallic 2D-electron gas at the surface of insulating oxides.

Vous êtes cordialement invités au pot qui suivra

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 piece d'identité (à échanger à l'accueil contre un badge d'accès)

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