

CAN XPEEM MEET THE CHALLENGES OF FAST AND NANO?

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Driven by the strong interest in surface processes occurring at sub-micron length scales, x-ray photo-emission electron microscopy (XPEEM) has become widespread at 3rd generation synchrotron radiation facilities. The most advanced instruments are now equipped with energy filter and reach lateral resolution of less than few tens of nanometer. They enable us to characterize surfaces, interfaces and thin films with both elemental, magnetic and electronic-structure sensitivity. The combination of XPEEM with low-energy electron microscopy (LEEM) into a single instrument adds structure sensitivity to spectroscopy, enabling thus a unique multi-technique approach to the study of surfaces.

In my talk I will report recent experimental work that exploits the multi technique capabilities of the SPELEEM microscope at the Elettra Synchrotron Laboratory [1-4]. Selected application examples in surface and material sciences will be presented to illustrate the strengths and limitations of this instrument. Besides imaging at high lateral resolution, I will highlight the potential of microprobe-ARPES, an XPEEM operation mode that is still rarely employed, and that of microprobe-EELS. The future experimental developments, such as aberration correction and time resolved UV and X-PEEM with of ultra bright sources, will be critically discussed considering the implications of space charge effects [5,6].

References

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