

## Nanospectroscopy with the SPELEEM at Elettra

S. Heun

*TASC-INFM Laboratory, Area di Ricerca, Basovizza, 34012 Trieste (TS), Italy*

In my talk I will illustrate the potential of the spectroscopic photoemission and low energy electron microscope (SPELEEM) operating at the Nanospectroscopy Beamline at Elettra. The SPELEEM is a commercial LEEM system (Elmitec company) equipped with an imaging energy filter. The incorporation of a band pass energy filter has dual role. It allows us to select a narrow energy window for imaging, which reduces the chromatic aberrations and results in a gain of lateral resolution, and allows to perform x-ray photoelectron spectroscopy (XPS). The SPELEEM instrument can be operated in different imaging modes, XPEEM (x-ray photoemission electron microscopy), PED (photoelectron diffraction), and small spot micro-XPS. An important advantage of the SPELEEM is the incorporated electron gun, which adds LEEM and micro-LEED techniques for obtaining structural information from the same sample area where XPEEM is performed. That makes the experimental station a real multi-technique spectromicroscopic probe.

The Nanospectroscopy Beamline at Elettra was designed to provide the highest possible photon flux density to the SPELEEM instrument. Two APPLE II type undulators and monochromator provide high flux-density photon beam with variable polarization within a wide energy range (10-1000 eV). The maximum photon flux of  $2 \times 10^{13}$  ph/s is reached at about 145 eV. The beam is focused onto the sample by two bendable plane elliptical mirrors mounted in a Kirkpatrick-Baez configuration. A spot size of  $25 \mu\text{m} \times 2 \mu\text{m}$  (hor x vert) has been measured on the sample. Due to the grazing incidence ( $16^\circ$ ) of the photon beam onto the sample, the spot size in the plane normal to the beam is  $7 \mu\text{m} \times 2 \mu\text{m}$ .

Selected results from various fields of nanotechnology and materials science research will highlight the performance and the potential of this energy-filtered x-ray photoemission electron microscope.