

NANOSPECTROSCOPY WITH THE SPELEEM AT ELETTRA

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High lateral resolution direct imaging of surfaces with chemical sensitivity is of increasing importance for basic and applied research in the fields of surface and materials science. With the construction of the Nanospectroscopy beamline, Elettra provides the user with a novel, effective, and versatile instrument, to be employed for lateral characterisation of surfaces in the nanoscopic range. The beamline, currently in the final phase of its commissioning, serves one end-station equipped with a SPELEEM (Spectroscopic Photo-Emission and Low Energy Electron Microscope). This microscope, which combines the ability to perform XPEEM (X-Ray Photo-Emission Electron Microscopy) and LEEM (Low Energy Electron Microscopy), achieves a lateral resolution of few tens of nm in XPEEM mode and 10 nm in LEEM mode, with atomic depth resolution [1]. A second branch of the beamline, currently under construction, will be dedicated to magnetic imaging.

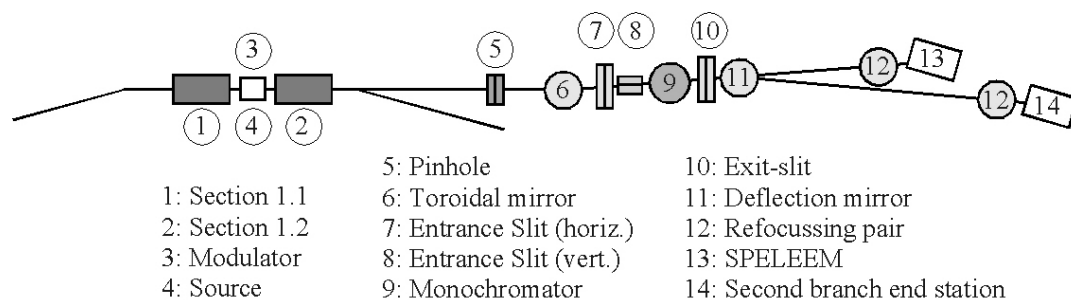


Figure1: Layout of the Nanospectroscopy beamline at Elettra

The beamline photon source, a Sasaki Apple II helical undulator with 10 cm period, can provide light with linear, elliptical, and circular polarization. Together with the beamline it provides a high photon flux over a wide energy range (from 20 to 1000 eV). This entire energy range is covered by two Variable Line Spacing (VLS) gratings. The photon beam is focused into a micro spot (2 to 10 μm in the vertical and 25 μm in the horizontal direction) on the sample by means of two bendable plane elliptical mirrors mounted in the Kirkpatrick-Baez configuration [2].

References

- [1] Th. Schmidt, S. Heun, J. Slezak, J. Diaz, K. C. Prince, G. Lilienkamp, and E. Bauer: Surf. Rev. Lett. **5** (1998) 1287.
- [2] D. Cocco, M. Marsi, M. Kiskinova, K. C. Prince, Th. Schmidt, S. Heun, and E. Bauer: Proc. SPIE **3767** (1999) 271.