

Spectroscopic Photoemission and Low Energy Electron Microscope (SPELEEM) at MAX-lab

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A SPELEEM microscope (Elmitec, GmbH) has been installed as a second experimental station at a high resolution, undulator based soft X-ray beamline (BLI311) working in the photon energy range of 30–1500eV at the MAX II synchrotron radiation source (E=1.5GeV). The microscope is installed after the existing experimental chamber and the photon beam is refocused with two (vertical and horizontal) refocusing mirrors. The output flux from the monochromator is 10^{11} - 10^{13} ph/sec depending on the photon energy and beamline settings. The flux is delivered to the $150 \times 150 \mu\text{m}^2$ spot size on the sample through the beam separator and the objective lens of the microscope at *normal* incidence. This powerful and versatile instrument will be used for studying the structural, electronic, chemical, and magnetic properties of surfaces and interfaces on the nanometre scale, finding application in diverse fields such as catalysis and magnetism, thin-film growth and many domains of material science and nanotechnology. In Low Energy Electron Microscopy (LEEM) mode 10nm spatial resolution is possible to achieve. The microscope can also perform energy-filtered XPEEM (X-ray photo-emission electron microscopy), with a band width of ~ 300 meV in imaging mode, achieving lateral resolution of ~ 30 -50nm depending on the flux. Some of the application examples and novel experiments will be presented.