

Nanospectroscopy of low-dimensional systems

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The SPELEEM (Spectroscopic Photo Emission and Low Energy Electron Microscope) of the Technical University of Clausthal, Germany, is connected to beamline 6.2LL at the ELETTRA storage ring in Trieste, Italy. It is a multimethod electron microscope which combines Low Energy Electron Microscopy (LEEM) with photoemission microscopy using synchrotron and UV light (PEEM). The microscope is equipped with an imaging electron energy analyser. The spatial resolution in photoemission mode is currently better than 25 nm, which is the highest so far reported for an instrument of this kind, while the energy resolution is better than 0.5 eV. The current photon energy range is 45 to 160 eV using light illuminating a 30 micron spot on the sample, which is incident at a grazing angle of 15 degrees. Since the microscope is a direct imaging rather than a scanning instrument, this is an acceptable area of illumination.

The present status of the SPELEEM spectromicroscopy project at ELETTRA will be described. Recent applications of this method to current problems of semiconductor research (InAs nanocrystals [1], Schottky barrier inhomogeneities [2], and nanolithography) will illustrate its potential.

- [1] Y. Watanabe, S. Heun, Th. Schmidt, and K. C. Prince, *Jpn. J. Appl. Phys.*, in press.
- [2] S. Heun, Th. Schmidt, J. Slezak, J. Díaz, K. C. Prince, B. H. Müller, and A. Franciosi, *J. Crystal Growth* 201/202 (1999) 795.