

## Report on experiment MI667

### VOLPE Project: VOLume Sensitive PhotoEmission from solids with Synchrotron Radiation

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The aim of the VOLPE (VOLume PhotoEmission from solids) project is to measure the volume electronic properties of solids via the Photoemission (PE) technique with Synchrotron Radiation.

The VOLPE set-up was assembled at ESRF in January 2004 and installed in February 2004 on beamline ID16 for first experiments, MI667 (main proposer Dr. G. Paolicelli, INFM Univ. Rome III). The results are very promising, especially considering that the instrument is in its commissioning phase (see figures). In particular, we were able to demonstrate:

- bulk sensitivity at about 5 keV and 7 keV kinetic energy, measuring 2p core level emission from Co buried under a capping layer 120 Å thick.
- An overall energy resolution (photons+analyser) of about 110 meV, estimated, after subtraction of temperature contribution, from the measurement of the Fermi level of polycrystalline Ag.
- Negligible surface contribution, as revealed from the intensity measured on d and s band of Ag, without **any preparation** of the sample (neither scraping nor sputtering), in a 10<sup>-7</sup> mbar vacuum and as deduced from the spectra of 3d level. To our knowledge these spectra reveal the sharper linewidth ever measured on Ag 3d.

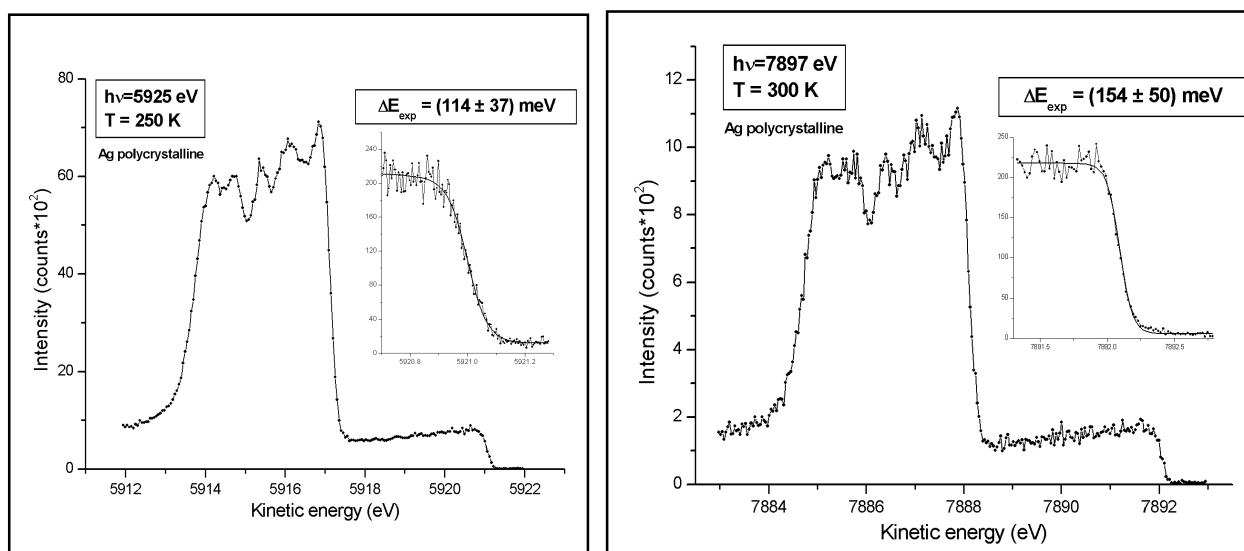


Fig. 1 Ag valence band and fermi level as measured at  $h\nu = 5925$  eV (left) and  $h\nu = 7897$  eV (right)

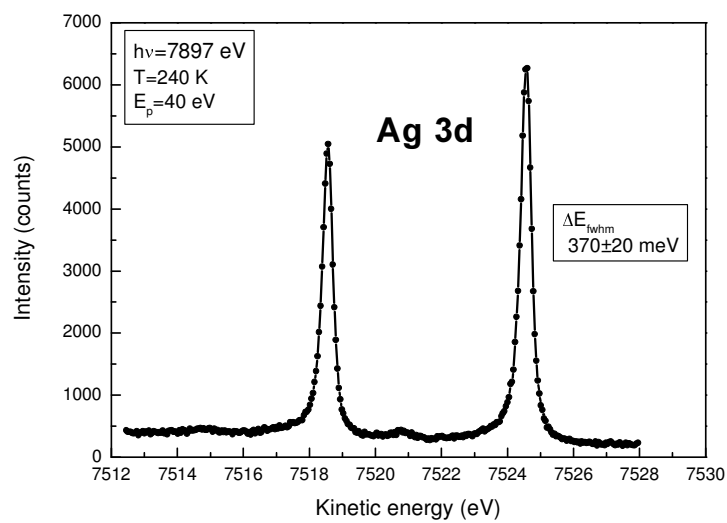


Fig. 2 Ag 3d core level as measured at  $h\nu = 7987$  eV.

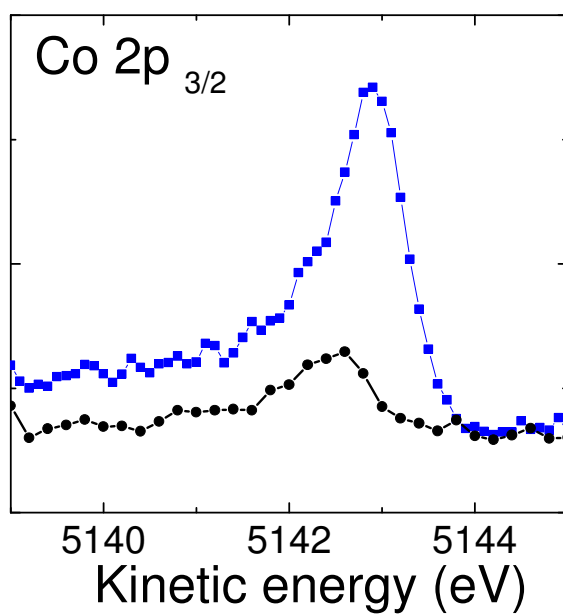


Fig. 3 Co 2p  $3/2$  core level measured at  $h\nu = 5929$  eV. Blue: Co signal under 7.5 nm of Ta/MnIr capping. Black: Co signal under 12.5 nm of Ta/MnIr capping.