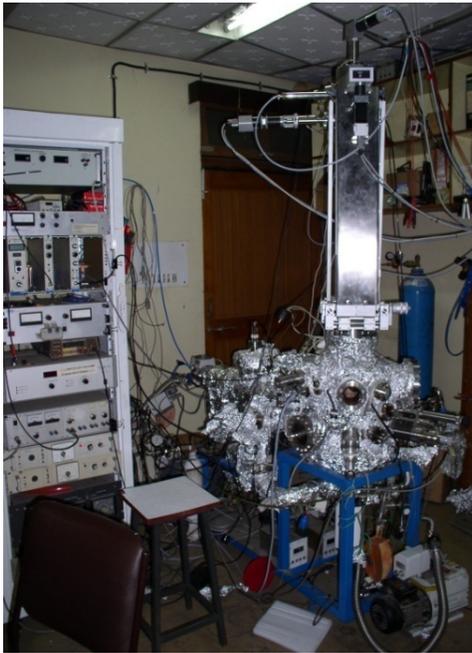


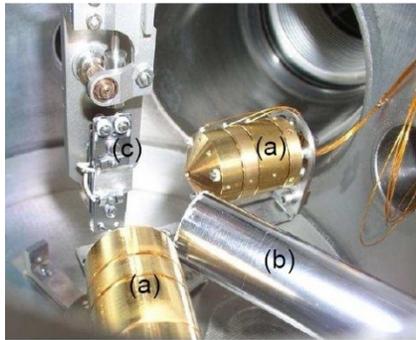
Inverse Photoemission Spectroscopy



- Base pressure: 5×10^{-11} mbar
- Mu metal chamber
- Manipulator with heating and cooling facility (LN_2)
- Provision for sample transfer

Inverse photoemission spectroscopy (IPES) is performed in isochromat mode using acetone/ CaF_2 band-pass Geiger-counter and Stoffel-Johnson type electron gun. Band-pass of the Geiger counter is determined by the transmission cut-off of CaF_2 (10.2 eV) entrance window and photoionization threshold of the acetone filling gas (9.7 eV). Thus, only 9.9 ± 0.2 eV photons can enter the detector to photoionize the acetone molecules that results in a charge pulse.

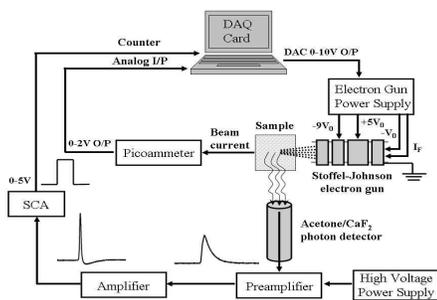
[Rev. Sci. Instrum., 76, 066102, 2005; Curr. Sci. 90, 490, 2006, Rev. Sci. Instrum, 83, 046107, 2012].



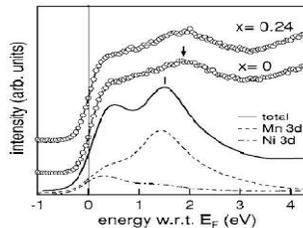
Inside the inverse photoemission spectroscopy (IPES) chamber (a) rotatable and fixed type Stoffel- Johnson type electron sources (b) Photon detector (c) Sample holder with polycrystalline Ag mounted on it.

Detector: Works in proportional region, negligible dead time, operates at 730 V, 4 mbar acetone pressure.

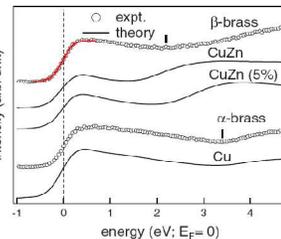
Electron gun: Focus at 25mm & spot size: 1.4 mm diameter, energy range: 5 to 40 eV.



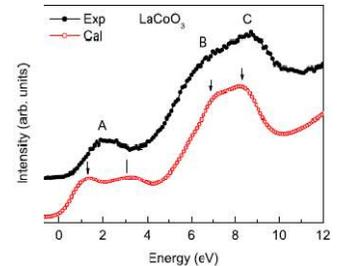
Block diagram of IPES.



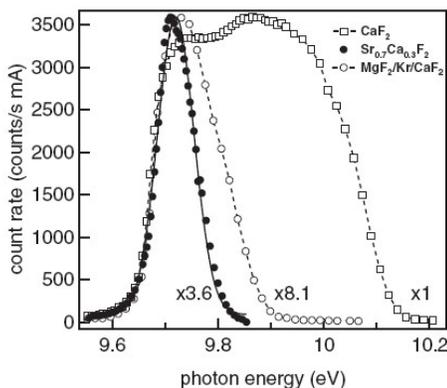
IPE spectrum of near stoichiometric $\text{Ni}_{2+x}\text{Mn}_{1-x}\text{Ga}$ ($x=0$) at RT in the ferromagnetic and cubic phase, compared with the calculated conduction band structure based on total, Mn, and Ni 3d PDOS. The IPES of $x=0.24$ is also shown. [Phys. Rev. B 74, 085110 (2006)]



Experimental inverse photo-emission spectra of α - and β -brass compared with calculated spectra of Cu, CuZn and Cu Zn with 5% lattice contraction. [Phys. Rev. B 78, 073107 (2008)]



Experimental and calculated inverse photoemission spectra of LaCoO_3 . [Phys. Rev. B 77, 113104 (2008).]



Photon detector for IPES with energy resolution of 82 ± 2 meV, best in literature until date. The detector consists of $\text{Sr}_{0.7}\text{Ca}_{0.3}\text{F}_2$ entrance window with energy transmission cutoff of 9.85 eV and acetone as detection gas with 9.7 eV photoionization threshold. The response function of the detector has a nearly Gaussian shape. [Rev. Sci. Instrum., 82, 093901, 2011].

Figure on left compares the response functions of CaF_2 , $\text{MgF}_2/\text{Kr}/\text{CaF}_2$ and $\text{Sr}_{0.7}\text{Ca}_{0.3}\text{F}_2$ /acetone detectors.