PROGRAMMA SHORT TERM MOBILITY – ANNO 2013

Proponente: Roberto Flammini
Fruitore: Roberto Flammini

Istituto di afferenza del Fruitore: ISTITUTO DI METODOLOGIE INORGANICHE E PLASMI (IMIP)
Istituzione ospitante: Fritz-Haber-Institut der Max Planck Gesellschaft, Berlin, Germany.

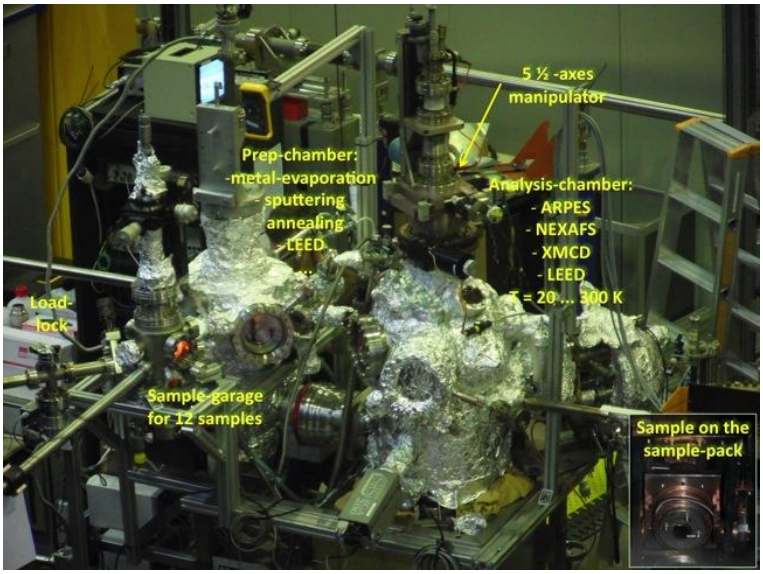
Titolo del programma: Study of the of the materials showing characteristics of low dimensionality by ARPES technique.

Final Report:

1) Brief description of the experimental set-up

BESSY II in Berlin-Adlershof is a brilliant source of synchrotron light. BESSY II offers synchrotron light pulses in the terahertz range to the visible spectrum all the way to hard X-rays, with an emphasis on the soft X-ray range. At each of the beamlines' experimental stations, it is possible to adjust wavelength, polarization, and photon energy so as to examine their samples at high spectral (and in microscopy applications also spatial) resolution. As of fall 2012, during operation, electron packets can be shot out every 30 to 60 seconds in the so-called top-up mode. A new LINAC type pre-accelerator was incorporated to this purpose. In addition, the electron orbit is adjusted 150 times per second using fast orbit feedback, ensuring a near constant light intensity.

The Beamline U56-2 PGM 1 provides photons within an energy range of 50 to 1300 eV, with horizontal, vertical or circular polarization. The end station consists of 2 chambers, a preparation chamber and an analysis chamber. The analysis chamber has been designed to host a SPECS hemispherical analyser with a 2D detector, allowing for the measurement of the electronic band structure via the angle resolved photoelectron spectroscopy (ARPES) technique. (see fig.)



2) brief description of the activity during the STM program:

Measurements have been carried out on two systems. First, the adsorption of NO_2 molecules on top of graphene grown on Ir(111) substrate has been studied. This system is of interest because of the possible developments in the field of the functionalization of the graphene where many applications are envisaged. The main motivation of this study is the modification of electronic properties by adsorbates, via an opening of the energy gap at the Dirac point in single and bilayer graphene. Secondly, the intercalation of Mn grown on the Gr/Ir(111) system has been studied as well. This interface is of particular interest because of the possible application in the field of spintronics, due to the peculiar superposition of the graphene bands with those of Mn.
These topics are still under investigation and further measurements are planned for next year.