Nell’ambito del Corso di Dottorato in Materials for Health, Environment and Energy, il Professor Rachel Desfeux University of Artois, Lens Cedex– France terrà due seminari sulla tematica:

Scanning Probe Microscopy: Scanning Tunneling Microscopy, Atomic Force Microscopy and Derived Modes

Aula seminari del Dipartimento di Scienze e Tecnologie Chimiche

Martedì 7 Giugno 2011 ore 14:30 – 15:15   15:30-16:15

Mercoledì 8 Giugno 2011 14:30 – 15:15   15:30-16:15

Scanning Probe Microscopy: Scanning Tunneling Microscopy, Atomic Force Microscopy and Derived Modes

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Scanning Probe Microscopy(SPM) is known to be particularly attractive and powerfulfor investigation ofstructural and physical properties up to the atomic scale inmaterials. By placing a probe in the immediate vicinity of sample, SPM allows to overcome the propagation regime that limits resolutionfor optical and electronic microscopies. They are the physicists Gerd Binnig (German) and Heinrich Rohrer (Swiss) who invented and developed in 1982 the first scanning probe microscope in the laboratories of IBM research: the Scanning Tunneling Microscope. For this discovery, they received the Nobel Prize in 1986. Emergence of a new local probe microscopeappeared three years later (1985): the Atomic Force Microscope. During the following years, different modes of Atomic Force Microscopy (AFM) were developed: we can citethe Piezoelectric Force Microscopy (PFM), the Magnetic Force Microscopy (MFM), the Electrochemical Strain Microscopy (ESM)…In fact, via a specific tip-surface interaction, each SPM technique/mode could probe a remarkable propertywithin a material. In multiferroic oxides for example, PFM could measure piezo/ferroelectricity while MFM could probe ferromagnetism.

In the frame of seminars, the STM, the AFM and derived modessuch as PFM and MFMwill be presented. The principles of STM and AFM will be described. Technical aspects and forces existing between a tip (probe) and sample will be shown.About AFM derived modes, a particular attention will be paid oni) PFM (imaging) ii) the spectroscopic tool of PFM which permits to record local hysteresis loops iii) MFM. Nanoscale investigations performed on ferroelectric/relaxor (PZT and PMN-PT), ferromagnetic (LSMO) and multiferroic(BFO) thin films will be addressed.Structure/properties relationships will be highlighted.