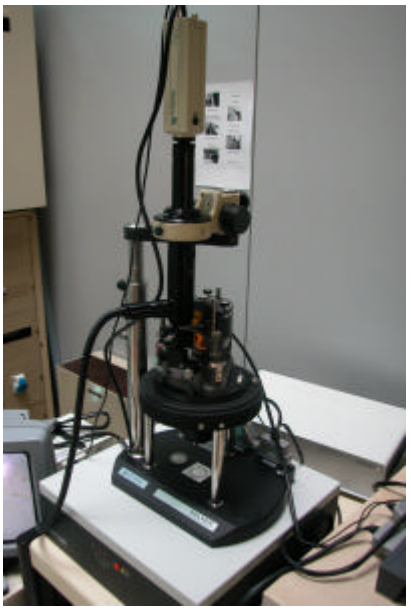
AFM

Atomic Force Microscope

Technique



Since its invention in 1986 the Atomic Force Microscope (AFM) has been established as a standard tool for the imaging of sample surfaces down to the atomic scale. Last AFM generation includes particular probes in order to measure property of the material like the magnetic force, the electrostatic force and the thermal conductivity.

The AFM principle is based on a tip (some nanometer apex size) that slide on the surface of the champion. The interaction forces between the tip and atoms of the sample surface (approximately nanonewton) cause a deflection of the lever on which the tip is mounted. Following a change of topography, a change in the deflection of the lever happened. A laser that affects the back side of the cantilever, comes reflected towards a couple of photodiodes that adjust a ceramic piezoelectric returning the probe in the initial position. The recorded data is the voltage demanded to return the tip in the initial position. Scanning the sample surface, a three-dimensional image can be obtained.

Most important features

Great **advantage** of AFM technique is that analyses are performed in air and, unlike STM, AFM technique allow microscopy on insulators materials. Besides it's a not destructive analysis and it does not demand particular preparations of the samples.

Applications

It's paticularly indicated for analysis of wafers, magnetic supports and compact discs, but you can perform satisfactory nanometer resolution images also on biological materials.

Instruments	**Solver P47H** and **Solver Pro SPM**
Measuring modes	*In air:* contact AFM/ LFM/ ResonantMode (semicontact + noncontact AFM)/ Phase Imaging/ Force Modulation (viscoelastisity)/ MFM/ EFM/ Adhesion Force Imaging/AFM Lithography-Force
	In liquid: contact AFM/LFM/Adhesion Force Imaging/Force Modulation (viscoelastisity) /ResonantMode(semicontact AFM)/Phase Imaging/AFM lithography (Force) –petri dish usable-
Scanning heads (dimensionX dimensionY dimensionZ)	*high resolution*: 10x10x2μm (vertical resolution <0.5Å)
	electrical measurements: 90x90x5μm (vertical resolution <0.5Å)
	liquid measurements: 90x90x5μm (+ double z range)
	scanner for heating stage: 50x50x2.5μm (until 300°C)
Max.sample diameter	15mm or infinitive as stand alone
equipped with heating stage and controlled gas environment	