A.P.E. Research
NANOTECHNOLOGY

pA-STM Scanning Tunnelling Microscope

Tools for Microscopy and Nanotechnologies

pA STM
Scanning Tunnelling Microscope

Scanning tunneling microscopy (STM) has proved to be an invaluable tool for probing different surfaces and providing both topographic and spectroscopic information with atomic-scale spatial resolution.

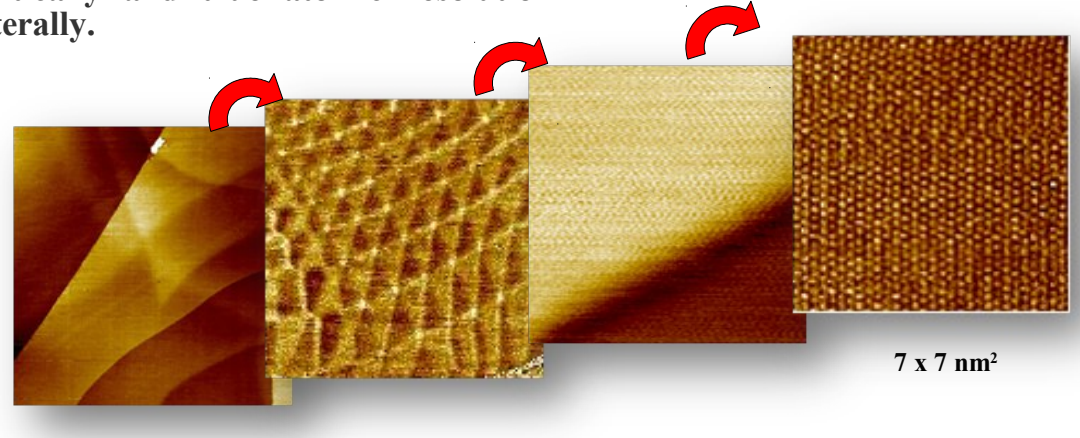
This technique has been successfully applied to various samples and has widened his fields of application from standard metal and semiconductor characterization to the direct visualization of organic molecules deposited on conductive substrates.

A.P.E. Research has developed a compact STM able to image the sample surface with sub - angstroms precision vertically and true atomic resolution laterally.

Scanning with the pA STM allows easy and fast operations in air for a wide range of materials. Furthermore with pA STM set-up is possible to operate the pA STM in a controlled environment or perform "in liquid drop" imaging.

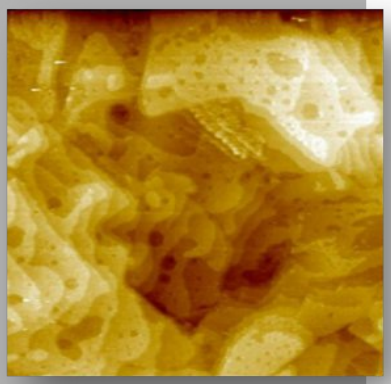
STM Head design minimizes the noise and provides open and easy front access to the tip – sample junction area.

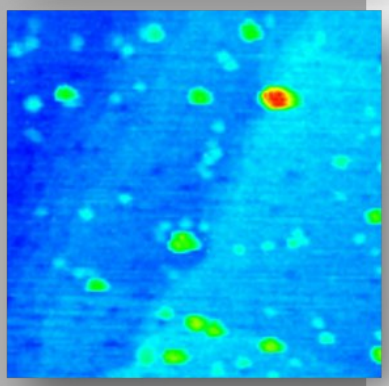
Lower tunnelling currents down to 500fA allow imaging of samples like self assembled monolayer (SAM) with large resistances and minimize the complicating effects of the voltage at the surface.

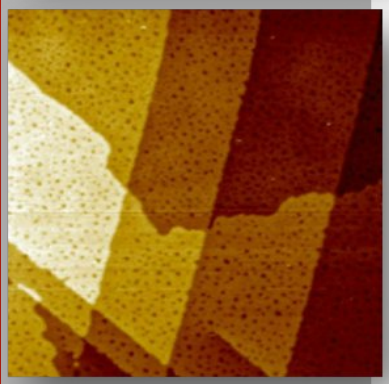


2.5 x 2.5 µm²

7 x 7 nm²







Key features:

- **Atomic resolution**
- **Low tunnelling currents (up to 500fA)**
- **Working modes: Imaging at Constant Tunnel Current Imaging at Constant Height, I–V Spectroscopy, etc.**

pA-STM Scanning Stage

Scanning stage with Piezoceramic Tube.

Standard scanner technical data:

X-Y piezo tube:

high voltage mode scan size: 10 x 10 µm;
low voltage mode scan size: 650 x 650 nm
high voltage mode resolution: 1.5 Å
low voltage mode resolution: 0.1 Å

Z piezo tube:

high voltage mode scan size: 1.2 µm
high voltage mode resolution: 0.2 Å

*Based on specific demands other scanning ranges can be set by the user in different configurations.**

Translator stage data:

X-Y range: 5 x 5 mm
Z range: 13 mm (4 mm servo assisted)

STM Head

STM Head with tip holder.

The Head houses low current preaplifier with $1 \cdot 10^9$ V/A gain that make possible to get images from 2pA to 2nA. Other preamplifiers with different gain are optional on request.
Sample bias: -10 to +10 V with step size < 1 mV

SPMCU-T

SPM Control Unit

SPM Control Unit and PC (equipped with a multi input-output board) drives the scanner, data acquisition and sample motion.
Tip to sample distance is controlled by ultra-low noise analogue feedback, digitally driven by PC.
High speed and temporal precision are provided by hardware timing.

HVA3-T Unit

HVA is an high voltage amplifier module projected to drive A-100 Heads.

Acquisition software

Software runs under Windows and is composed of a multi-window applications for instrument control and data acquisition. The software comes equipped with simple filters for immediate analysis of acquired images. The software controls all the parameters of the instrument.

Accessories:

pA STM can be equipped with additional tools to enhance the instrument capabilities.

*** Please contact your local distributor for specific configuration.**

Characteristics and technical specifications are subject to change without notice

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