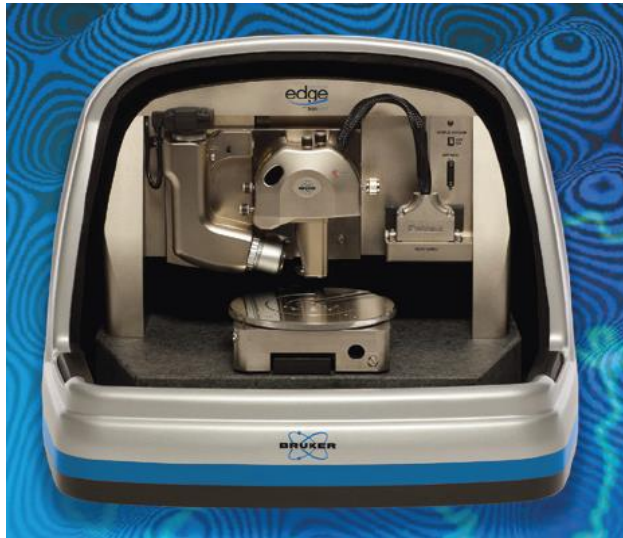


## SPM (Scanning Probe Microscope)



**SPM** contains Scanning Tunneling Microscope (STM) and Atomic Force Microscope (AFM). In liquid and air environments, it provides three-dimensional image of surface in high resolution and atomic dimension by means of a sharpened needle tip in conductor, semi-conductor, insulator specimens. Imaging is performed as a result of examining the interaction of the needle tip with the surface.

The surface structures, molecular sizes, location and stand-alone images of the atoms in the three-dimensional system of the conductive samples are obtained with **STM**. **AFM** is a technique that can measure the surface topography from the angstrom level to a few hundred microns. By scanning the surface of a very sensitive needle, interatomic forces can be measured with nN or pN sensitivity. Atomic force microscope can be used with three different techniques. These are contact method applied by contacting the needle with the surface (**CONTACT MODE**), non-contact method where the needle does not touch the surface (**NON-CONTACT**) and tapping method applied by tapping the needle on the surface (**TAPPING MODE**). As well as imaging the surfaces of sample, phase, electrical conductivity and magnetic field differences can be detected by SPM.

### SPM Applications:

#### Materials Science Applications

- Polymers
- Semiconductors
- Metals and Alloys
- Ceramic and Glass Materials, Minerals
- Colloids, Nanoparticles, Nanowires
- Thin films and Coatings
- Photovoltaic Materials
- LED

#### Life Science Applications

- Biomolecules
- Viruses
- Bacteria and Cells
- Tissue
- Biopolymers
- Biopolymers

**Device Name :** BRUKER Dimension Edge with ScanAsyst

**Device Hardware and Features:**

X-Y Scan Range	: 90 $\mu\text{m}$ $\times$ 90 $\mu\text{m}$ typical, 85 $\mu\text{m}$ minimum
Z Range	: 10 $\mu\text{m}$ typical in imaging and force ramp modes, 9.5 $\mu\text{m}$ minimum
Vertical Noise Floor	: <50 pm RMS in appropriate environment, typical imaging bandwidth (up to 625Hz)
XY Position Sensor Noise Level (Closed Loop)	: <0.5 nm RMS typical imaging bandwidth (up to 625Hz)
Z Position Sensor Noise Level (Closed Loop)	: <0.2 nm RMS typical imaging bandwidth (up to 625Hz)
Sample/Size/Holder	: 150 mm vacuum chuck, 15 mm thick; up to 40 mm thick with optional frame spacer
Motorized Positioning Stage (X-Y axis)	: 150 mm x 150 mm inspectable area; programmable for multi-site measurements
Microscope Optics	: 5-megapixel digital camera; 180 $\mu\text{m}$ to 1465 $\mu\text{m}$ viewing area; digital zoom and motorized focus
Signal Access	: Configurable I/O signal access built into the controller; includes customizable signal routing, digital feedback, and dual digital lock-in
Single Point Spectroscopy	: Three-axis closed loop control for point-and-shoot positioning and ramping; spring constant calibration with built-in thermal tune
Temperature Control	: -35 to + 250 $^{\circ}\text{C}$ with optional heater/cooler accessory; includes gas purging capability