

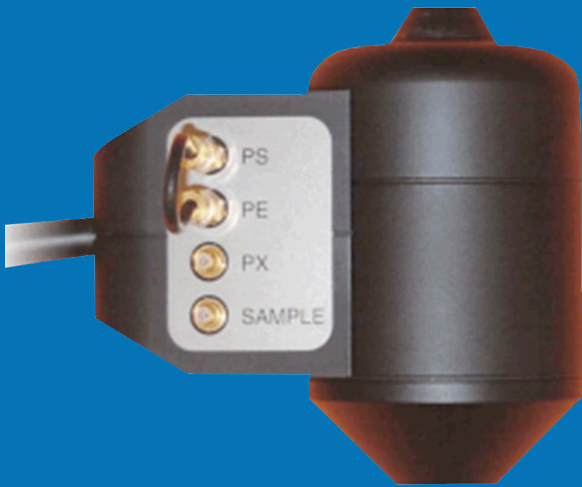
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DME DS-95 Atomic Force Microscopes



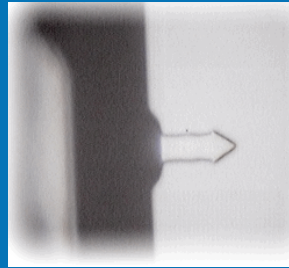
DME DS-95 SPM Scanner

The Tool for Fast and Reliable SPM Results



Main Features

- DS-95 SPM Tip Scanner
- Modularity
- Play and Plug cantilever Exchange
- Compact design



With the DS-95 SPM scanner series we provide the ultimate unification of ease of use and performance! Decade lasting experience in the field of SPM application and manufacturing are united in the DS-95 SPM scanners to help the user achieve the best and most reliable results in the shortest possible period of time.

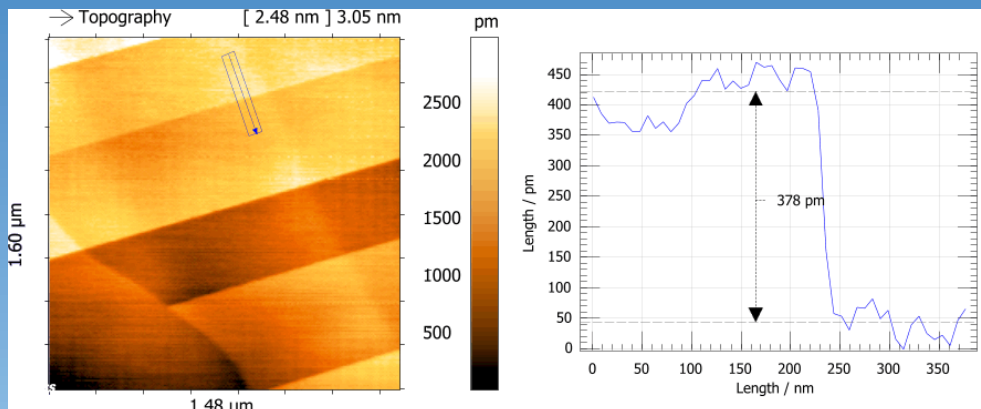
The compact design of the DS-95 SPM scanner guarantees outstanding stability and scan rates. The unique plug and play cantilever exchange secures fast and safe operation of the instrument.

An integrated optical axis in the SPM scanner provides total visual control during approach and positioning.

The DS-95 SPM scanner provides the facilities for all common and advanced SPM modes.

Integrated electronics in the scan head guarantees lowest noise values in electrical SPM modes.

DS allows installation of the DS-95 SPM scanner into the stages and other facilities like nanoindenters, optical microscopes, etc.



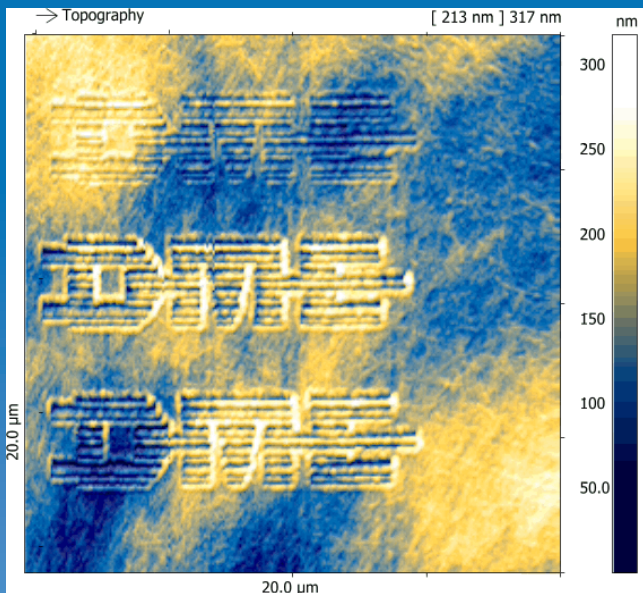
Superior stability and ease of use: Atomic layers on HOPG in less than 1 minute from switching on the system.

DME DS-95 Igloo Stage

Your first, but not last step to nanoscience

Main Features

- DS-95 SPM Tip Scanner
- Stability and Anti Drift Optimized Scanner Mount
- High Resolution Digital CCD Camera for Visual Control
- Stage Base with Sample Table and Transmission Light Source
- High Precision Manual XY and Z Sample Positioning



The DME Logo imprinted in a polymer thin film by using the lithography function in the ScanTool software



A handling and performance optimized design makes it the optimal system for everyday measurement routines on small samples.

The total visual control via the CCD allows exact sample positioning.

The short mechanical loop, paired with the circular design of base and scanner mount guarantee highest stability and lowest drift values.

Its modular design provides full upgrade possibilities to motorized or large sample stages.

As a "pure SPM" alternative for optical microscope or OEM integrated DS-95 systems in nano indenters etc., the DS-95 igloo stage is a valuable choice.

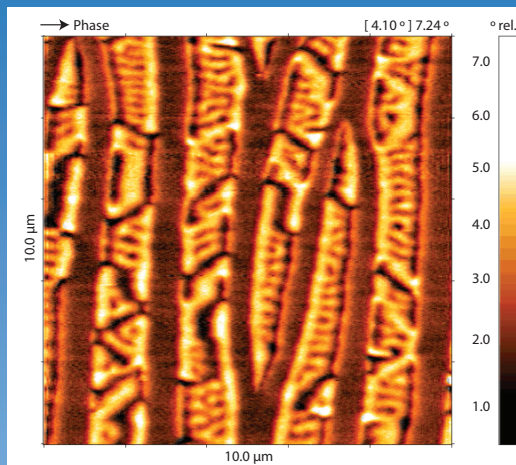
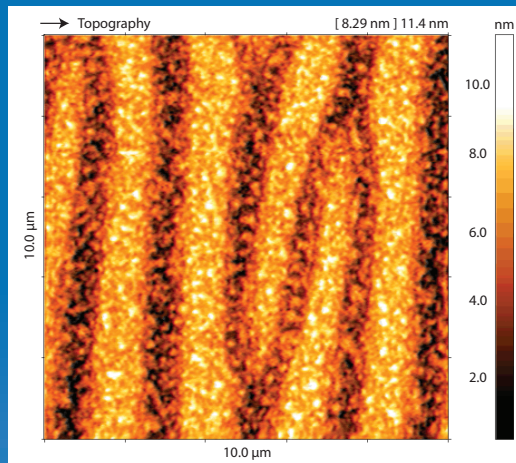
Igloo Stage has an outstanding stability and it can be handled at an affordable price level.

DME DS-95 Compact Granite Stage

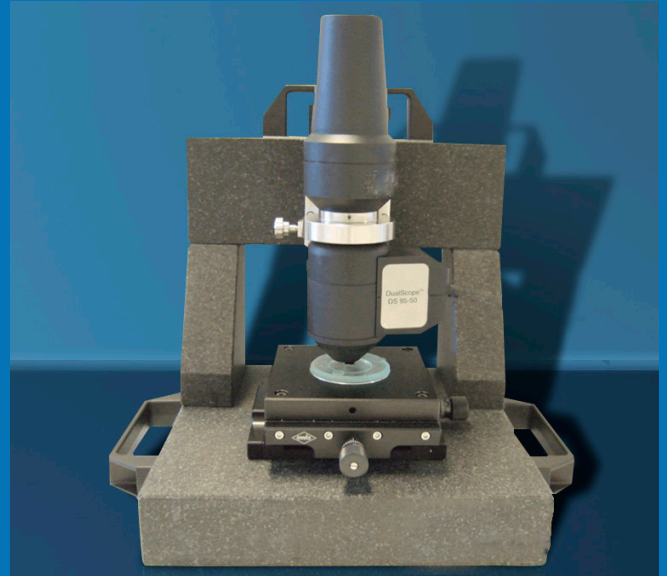
**Flexibility and stability:
Semilab Small Granite Stage Unites Extremes**

Main Features

- DS-95 SPM Tip Scanner
- Super Rigid Railmount with Manual Z Sample Height Adjustment
- Wide variety of Manual and Motorized XY Translators and Sample Holders
- Free Sidewise Access to Sample
- High Resolution Digital CCD Camera For Visual Control



Application example: Topography and magnetic information of a inplane magneized Pt/Co multilayer. Imaged with the Small Granite DS-95 50 system. (Sample generously provided by TU Berlin, AG Eisebitt)



The DS-95 Compact Granite Stage provides the possibility of investigating nearly all samples by SPM.

From a splitter of a coated wafer to a whole nano-coated surgical implant, the compact granite stage will surprise you with its flexibility.

Thereby, the design makes no compromises concerning stability. Scanning atomic layers on a standard writing desk is possible.

The open tip scanner design gives room for free sample access and a variety of selectable XY translators and special measurement stages as a temperature control stage or liquid cell.

For exotically shaped sample we can provide customised illumination, sample stages and sample holder for request.

DME DS-95 ProberStation 150

Efficiency and Reproducibility in All Measurements On All Samples

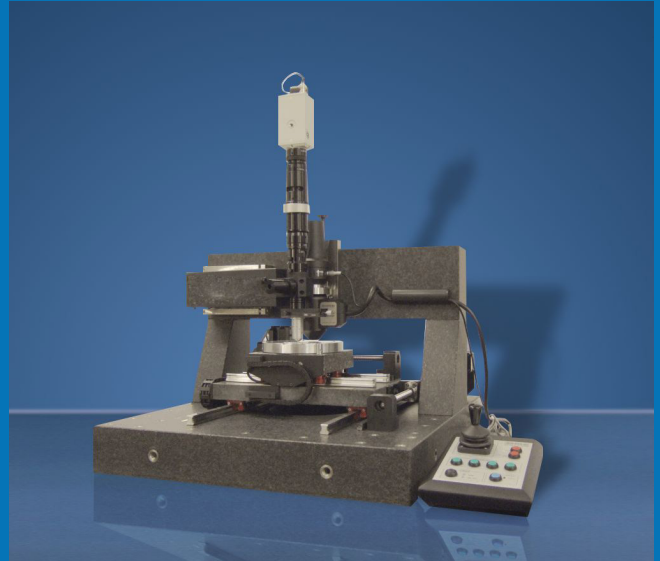
Main Features

- DS-95 SPM Tip Scanner
- High Precision Sample Positioning
- Full Automation Capability
- Optional Additional Optical Axis

The DS-95 ProberStation 150 is the ultimate stage for SPM on large samples. Its long range XY translators allow the investigation of 150 mm samples at all positions and up to 300 mm on specific sample areas.

The fully programmable sample positioning enables autonomous SPM measurements on multiple sample positions with automatic image analysis and automatic report generation.

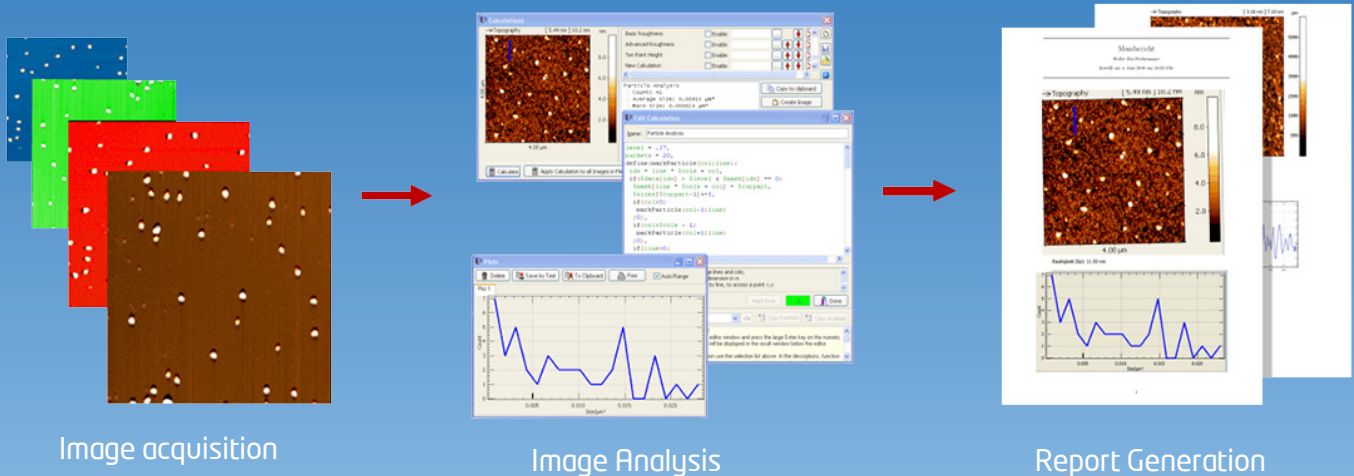
The combination with high end optics enable an automated preselection of sample sites for SPM investigation.



Thereby the ProberStation 150 setup is the optimal solution for industry quality maintenance application and R&D environments.

The unlimited space for custom or OEM integration of additional analytic equipment opens up new horizons for research applications.

Completely Automated Measurement

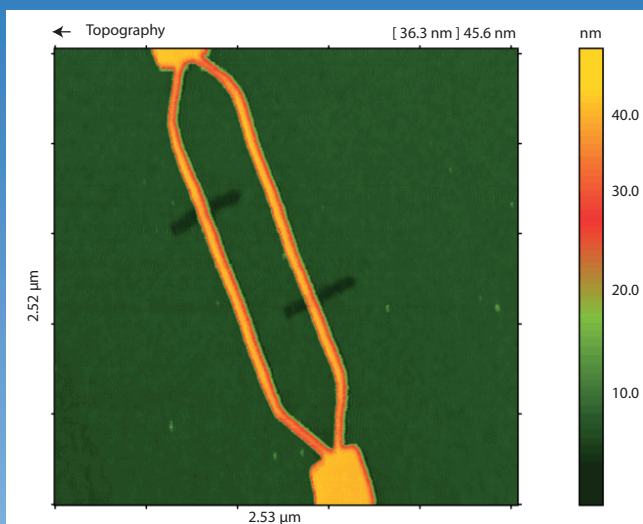
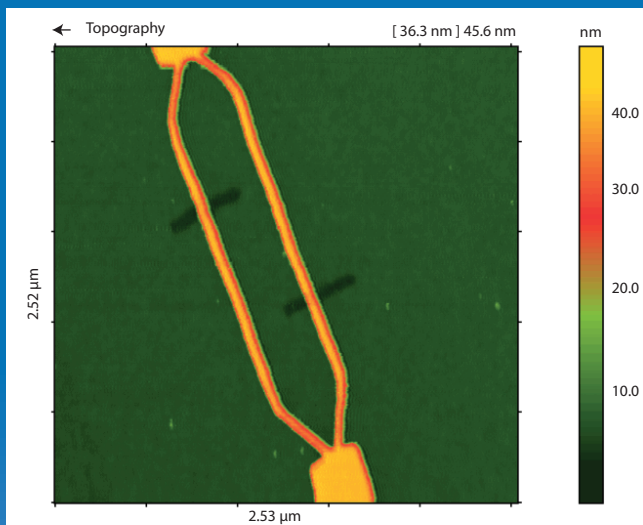
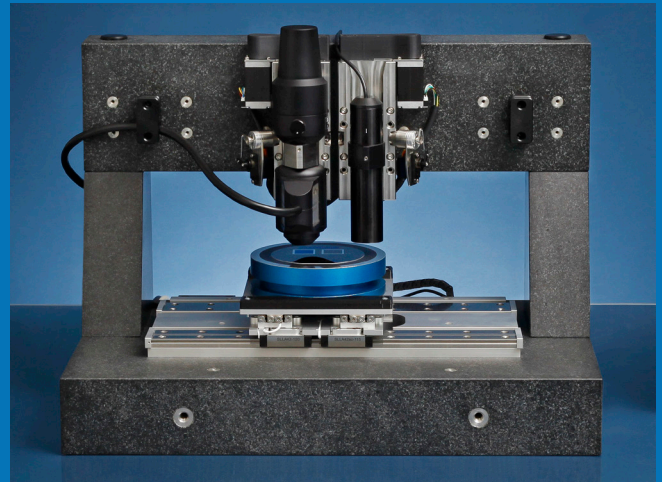


DME DS-95 Navigator 220

Efficiency and Reproducibility
in All Measurements On All Samples

Main Features

- DS-95 SPM Tip Scanner
- High Precision Piezo Sample Table
- Full Automation Capability
- Optional Additional Optical Axis
- Coordinate System Based Sample Positioning



One and the same nanowire structure generated by e beam lithography: a) quality control by AFM after the lithography process. b) after FIB processing to tune the resistance of the nanowire.

Since the DS-95 Navigator 220™ is released the statement "You will never again find this spot with your AFM" is no longer true. The DS-95 Navigator 220™ enables to investigate one and the same area again even after removing the sample from the AFM. Based on reference structures the system finds the area of interest with a precision better than 250nm.

The whole positioning progress is full automatic and highly stable and thereby perfect to analyze multiple structural features on a single sample in long term and overnight measurement runs.

Compared to interferometer based positioning systems the investment effort is dramatically reduced by providing a comparable performance.

The main application areas are quality control of e-beam lithography, lithography masks, nanoimprints and analysis of multistep processes like functionalisation of surfaces, CNTs, nano particles, growth of quantum dots and thin layers/films etc.

System Specifications

	Igloo	Compact Granite	Probestation 150	Navigator 220
Sample Size	50 mm	70 mm	150 mm	150 mm
Sample thickness	5 mm	60 mm	60 mm	60 mm
XY movement of sample	16 x 16 mm	16 x 16 mm	200 x 150 mm	200 x 150 mm
XY movment	manual	manual or motorized xy sample table, joystick and automated xy table control	motorized with or without reference coordinate system, joystick and automated xy table control	motorized by piezo table with reference coordinate system joystick and automated xy table control
Completely automated measurement	no	no	yes	yes
Automated find and re-find routine	no	no	no	yes
High resolution CCD camera	yes	yes	with bright and dark field or DIC imaging	with bright and dark field or DIC imaging
LED transmission and reflecting illumination	yes	yes	yes	yes
Scanner	DS 95 - 50 or DS 95 - 200 see below	DS 95 - 50 or DS 95 - 200 see below	DS 95 - 50 or DS 95 - 200 see below	DS 95 - 50 or DS 95 - 200 see below
SPM modes	All modes, see below	All modes, see below	All modes, see below	All modes, see below
PC with Windows	optional	optional	optional	optional
Controller	C26	C26	C26	C26
Software	ScanTool, see below	ScanTool, see below	ScanTool, see below	ScanTool, see below
DiProWa (digital programmable waveform analyzer)	optional	optional	optional	optional
Liquid cell: measurements in fluids are possible	optional	optional	optional	optional
Magnetic stage: ability to apply magnetic field to sample	optional	optional	optional	optional
Thermal stage: enables heating of samples up to 250 C	optional	optional	optional	optional
Probe assembly tool kit	optional	optional	optional	optional

System specification

Scanner DS-95

- Scan volume: 50 x 50 x 5 mm (DS 95-50) or 200 x 200 x 15 mm (DS 95-200)
- Tip scanner xyz: independent on sample size (important criteria for a general purpose AFM)
- Highest mechanical stability (atomic step resolution in z direction 0.06 nm RMS on HOPG!)
- Fast scan rates up to 30Hz line rate
- Hardware linearized scan motion in z direction
- Noise Level < 0.05 nm rms in z direction
- Self adjusting laser/cantilever deflection system
- Min. amplitude setting in AC mode < 1 nm
- Integrated optical axis on cantilever
- Plug and play cantilever insertion, fastest and safest cantilever exchange on the market! (unique feature)
- Highly sensitive approach procedure by piezo motors (unique feature)
- Environmental working conditions:
Temperature range 15-28°C
Humidity range 10-65%

Electronics

- Triple CPU Design, 1x32 MHz, 1x16 MHz, 1 FPGA 80 MHz, for autonomous scan operation and realtime processing
- Feedback: 32 bit internal resolution
- Full digital (PID filtered) or digital/analog (P filtered) operation, active Q-control
- Digital lock-in based AC detection, fully digital AC signal synthesizer (Q Booster) and demodulator
- Built in automatic self test
- Automatic z detector gain adjustment
- All signals accessible, 8 channels simultaneously available
- AC amplitude selectable over a large range (high sensitivity high reliability for automation, unique feature)

SPM measurements methods

- AC (tapping mode) including amplitude imaging and phase imaging
- DC (contact mode) including LFM (lateral force measurement)
- MFM (magnetic force spectroscopy)
- KPFM (Kelvin Probe Microscopy), EFM (Electric Force Microscopy), SCM (Scanning Capacitance Microscopy)
- STM (Scanning Tunneling Microscopy)

Software ScanTool

- **Common properties:**
 - No licence limitations, installation on multiple PC System possible (unique feature)
 - Free software updates (unique feature) and long live and value conservation (unique feature)
- **Operation functions:**
 - Intelligent approach: safe approach procedure especially developed for soft samples (unique feature)
 - Tip guard: safety function for sample and SPM tip, useful on inhomogeneous samples (unique feature)
 - Phase align: for highest sensibility in phase imaging to detect material differences (unique feature)
 - Show area: tip surrounds the to be scanned area, useful for identifying optical visible objects
 - Amplitude control: maintains optimal oscillation properties in dynamic modes
 - Amplitude watch: tells if the right AC oscillation amplitude is selected (unique feature)
 - Interactive amplitude: enables the user to select the oscillation amplitudes from large (100nm) to small (sub nm) for either reliable automated measurements or ultra high resolution imaging (unique feature)
- **Setup:**
 - Access to all relevant operation parameters
 - Integration of optical image of the area of interest and cantilever in software interface
 - Optical image can be calibrated (unique feature)
 - Online 3D display and image analysis possible, line trace graph permanently visible
- **Data Analysis:**
 - All common analysis procedures are supported
 - Volume measurements for indentations and protrusions in surfaces (unique feature)
 - Length measurements of nonlinear features like polymer chains, fibers and DNA (unique feature), angle measurement
 - Automatic counting and size determination of particles and holes
 - Overlay of topographical and other channels possible like topography + MFM, topography + EFM, etc.
 - User specified analysis procedures can be implemented by the Image calculator (unique feature)
 - Automatic analysis of single images and batch processing possible
 - Ability to implement user-defined analysis procedures, for example: roughness, electrical surface properties, etc.
- **Automation**
 - Access and free combination abilities to all operating and analysis procedures for automation (unique feature)
 - Organization of automation functions in a automation database, easy to use (unique feature)