

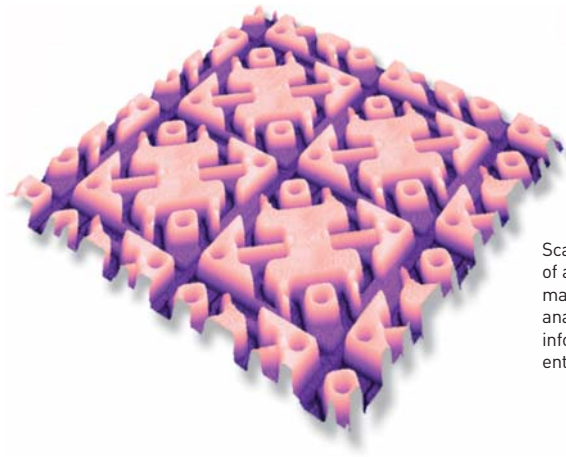
diDimension 3100

Scanning Probe Microscope (SPM) System

- Versatile Selection of Scanners and Controllers
- Advanced SPM Imaging Modes
- Sample Size Convenience and Flexibility



Solutions for a nanoscale world.™



Scalable AFM image contains 3D measures of an object. The image is viewable from many angles, and can be processed and analyzed to extract a wealth of dimensional information about individual features, the entire image, or a sub-section of the image.

diDimension 3100 SPM

Superior Research Versatility



The diDimension™ 3100 performs all the major scanning probe microscopy techniques and a wide range of standard and advanced characterization applications, making it one of the world's most multi-functional SPMs. The system offers unmatched flexibility through field-upgradable scanner, controller, and image mode options. Precise laser tracking and the ability to change scanning techniques easily guarantees ease of use and high sample throughput. A host of other innovative features and a proven record of reliability have helped the Dimension 3100 to become one of the most sought-after SPM systems in research and industry.

90µm Scanner

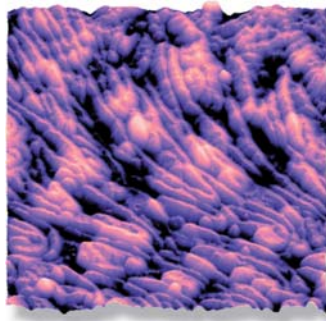
- Low noise performance
- Characterizes and controls tip movement

Multifunctional Platform

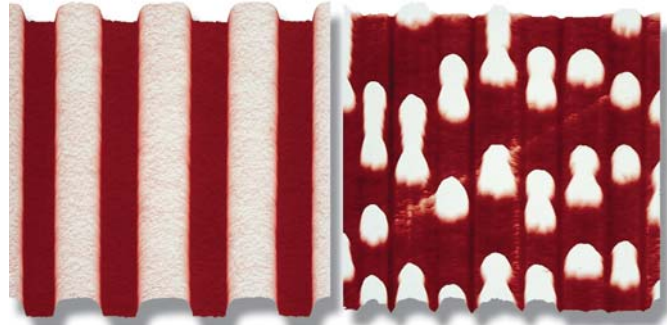
- Permits wide range of SPM techniques
- Proven measurement and analysis reliability

Large Sample Stage

- Guarantees application flexibility and sample-handling convenience
- Images small and large specimens in liquid or air



Teflon film coating near razor's edge. Scan size 3.5 μ m.



Topography (left) and Surface Potential images (right) of a CD-RW. The Surface Potential image locates the position of the bits. Scan size 5 μ m.

MAXIMUM SCANNING POWER

The Dimension 3100 system is offered with the Dimension DAFMLN low noise head. The scanner is constructed of rigid, low-vibration materials that guarantee low-noise specifications while providing superior reliability.

The Dimension DAFMLN head scans up to 90 μ m in X-Y and up to 6 μ m in Z. This head includes a piezoelectric tube scanner, a laser, and a quadrature optical detector. It uses advanced laser tracking to ensure that the laser beam reflects off the same spot on the cantilever throughout raster scans, maintaining a constant, low tip-sample force over the entire scan area. This head also maintains the low noise levels necessary for resolving single atomic steps on epitaxial thin films, and measuring sub-Angstrom surface roughness on ultrasmooth surfaces.

WORLD'S MOST PROVEN CONTROLLER TECHNOLOGY

For proven reliability and flexibility, the Dimension 3100 uses the NanoScope[®] 3D Controller that combines advanced analog and digital circuit designs with premium software and hardware to precisely control the SPM. It can scan from the maximum scan size to a few nanometers with full, 16-bit resolution on all scans and on each axis.

In addition to the standard contact and TappingMode, the optional Quadrex[™] technology with lock-in detection and advanced signal routing enables the patented PhaseImaging[™] technique, which goes beyond topographical data to detect variations in composition, adhesion, viscoelasticity, and other properties by mapping the phase of the cantilever oscillation during a scan. The superior performance and utility of the NanoScope 3D Controller has led to more publications than any other SPM controller.

LARGE SAMPLE STAGE PROVIDES FULL RANGE OF SPM TECHNIQUES

The Dimension 3100 provides researchers the ultimate, expandable platform for both standard and advanced SPM scanning modes:

- Lateral Force Microscopy (LFM)
- Magnetic Force Microscopy (MFM)
- Force Modulation
- Electric Force Microscopy (EFM)
- Scanning Capacitance Microscopy (SCM)
- Scanning Spreading Resistance Microscopy (SSRM)
- Tunneling Atomic Force Microscopy (TUNA)
- Conductive Atomic Force Microscopy (CAFM)
- Scanning Tunneling Microscopy (STM)
- Torsonial Resonance Mode (TRmode)
- And more

In addition to offering superior scanning, electronics, and performance, the Dimension 3100 utilizes many innovative, multifunctional design features. A large sample stage permits scanning specimens up to 8 inches in diameter and optionally 4 inches thick. It has the ability to scan in air or liquid and offers a host of add-on image modes. The Dimension 3100 has proven measurement and analysis reliability for a vast range of applications in physical sciences, and materials research, life sciences, as well as in industrial product development, off-line process monitoring, and quality control such as:

- Electronic materials
- Thin films
- MEMS/NEMS
- Advanced materials
- Tribology
- Biotechnology
- And more

Veeco Probes offers the world's largest selection of AFM probes and accessories. Below is a partial list available for the Dimension 3100. For a full list of probes and accessories, please visit www.veecoprobes.com or call 1-800-715-8440.

Application or Mode	Probe	Specifications
Tapping	RTESP	42N/m, 320kHz, 4 Sided Tip, No Coatings
Electrical	SCM-PIC	0.2N/m 13kHz, 4 Sided Tip, Pt/Ir Coating
Magnetic	MESP	2.8N/m, 75kHz, ~400 Oe, ~1e-13 EMU
Conductive	DDESP-FM	2.8N/m, 75kHz, 4 Sided Tip, Doped Diamond Coating
MEMS	TESP-HAR	42N/m, 320kHz, High Aspect Ratio Tip (5:1), No Coatings
Thin Film	Multi 75	3N/m, 75kHz, Symmetric Tip, No Coatings
TUNA	SCM-PIT	2.8N/m 75kHz, 4 Sided Tip, Pt/Ir Coating
SSRM	DDESP	42N/m, 320kHz, 4 Sided Tip, Doped Diamond Coating

DIMENSION 3100 SPECIFICATIONS WITH DIMENSION DAFMLN HEAD

• X-Y Scan Range	~90 μ m square; Lateral accuracy typically within 1%, max. 2%; provides full 16-bit resolution on all axes for all scan sizes and offsets
• Z Range	$\geq 6 \mu$ m
Sample Size	≤ 150 mm diameter (≤ 200 mm with optional chuck); ≤ 12 mm thick (adapters available for thicker samples)
Sample Holders	150 mm vacuum chuck for hard disks, semiconductor wafers, and other samples; interchangeable adapters for centering hard disks; removable wafer-locating pins; magnetic holder for smaller samples up to 6 mm thick; 200 mm vacuum chuck for 150 mm and 200 mm wafers (optional)
Stage	Precise motorized positioning; 125 mm x 100 mm inspectable area; Resolution: 2 μ m; Repeatability – unidirectional: 3 μ m in X, 4 μ m in Y; Repeatability – bidirectional: 8 μ m in X, 10 μ m in Y
Tip/Cantilever Holders	Tapping/contact modes; force modulation/STM holders (optional); fluid cell and tip holder for working with liquid
Microscope Optics	150 μ m to 675 μ m viewing area; motorized zoom and focus; ~1.5 μ m resolution; computer-controlled illumination; video image capture
Tip Viewing	On-axis, real-time via microscope optics
Vibration Isolation	Silicone vibration pad; vibration isolation table (optional)

Note: Performance specifications are typical and subject to change without notice.

Cover image: Dimension 3100 SPM topography image of highly ordered thin film of organic semiconductor para-sexiphenyl grown by Hot Wall Epitaxy on crystalline KCl substrate. Imaged in TappingMode. Scan size 5 μ m. Courtesy of A. Andreev, Linz Institute for Organic Solar Cells (LIOS), University of Linz, Austria.

Cover image, middle and lower right: PhaseImaging in water provides material property contrast on hydrogel contact lenses. The contrast in the phase image (bottom) depicts a subtle difference in visco/elastic properties that escaped detection by ESCA and FTIR. Scan size 50 μ m.



For more information visit www.veeco.com
or call 800-873-9750

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Worldwide Customer Support from the Industry Leader

Veeco Instruments Inc. provides solutions for nanoscale applications in the worldwide semiconductor, data storage, HB-LED/wireless and scientific research markets. Our Metrology products are used to measure at the nanoscale and our Process Equipment tools help create nanoscale devices. Veeco's manufacturing and engineering facilities are located in New York, New Jersey, California, Colorado, Arizona and Minnesota. Global sales and service offices are located throughout the United States, Europe, Japan and Asia Pacific.