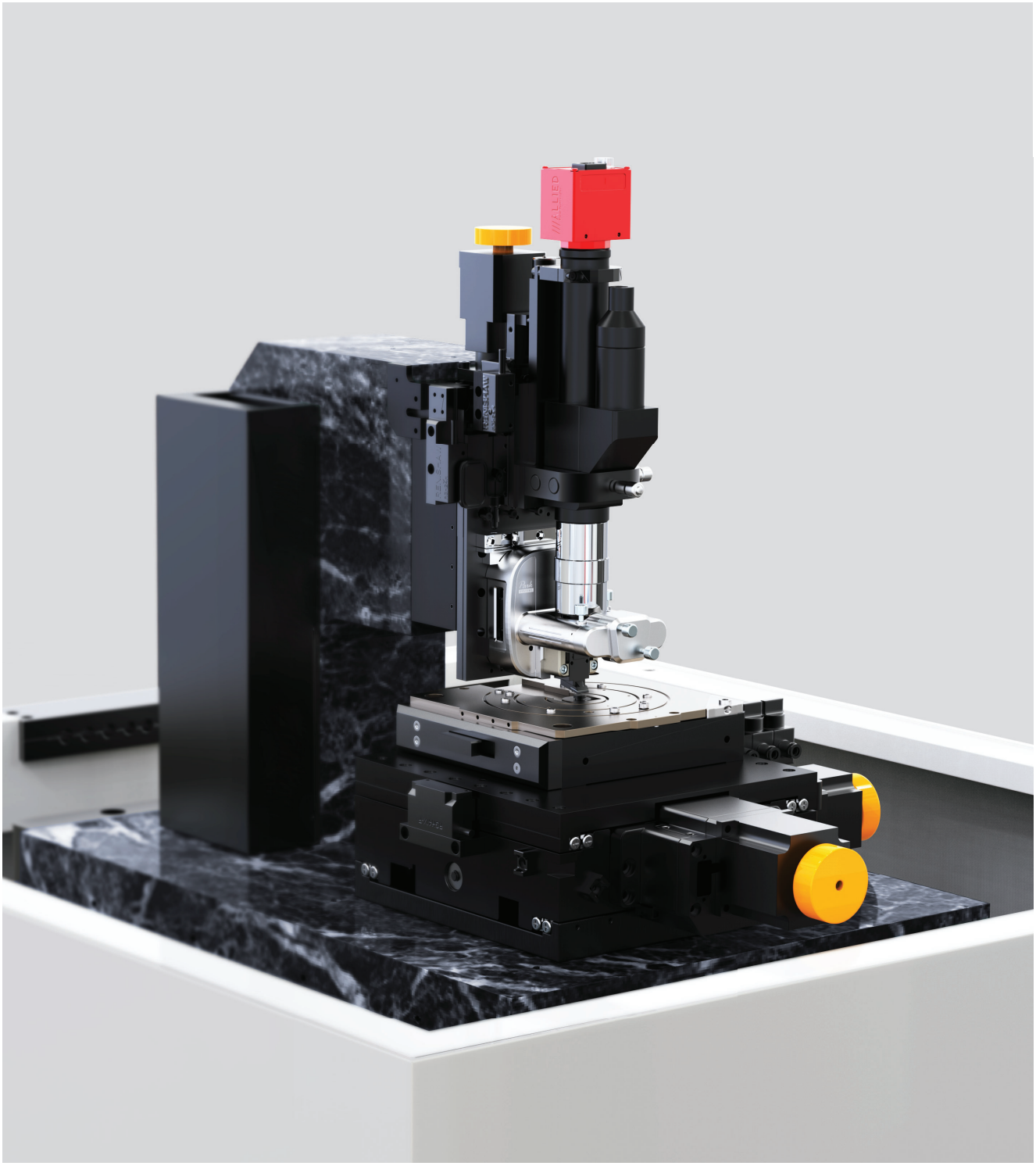
Enabling Nanoscale Advances

Park SYSTEMS

Park NX20 Lite

The most affordable AFM system for wafer measurement and analysis with the latest NX performance



Park NX20 Lite

Increase your productivity with our powerfully versatile AFM

The Most Convenient Sample Measurements with MultiSample Scan

- Automated imaging of multiple samples in one pass
- Specially designed multi-sample chuck for the loading of up to 16 individual samples (optionally available)
- Fully motorized XY sample stage travels up to 150 mm x 150 mm

Accurate XY Scan by Crosstalk Elimination

- Two independent, closed-loop XY and Z flexure scanners
- Flat and orthogonal XY scan with low residual bow
- More accurate height measurements enabled by NX electronic controller without any need for software processing

Best Tip Life, Resolution and Sample Preservation by True Non-Contact™ Mode

- Fast Z-servo speed enabling True Non-Contact™ Mode
- Minimum tip wear for prolonged high-quality and high-resolution imaging

Versatile Range of Modes and Options

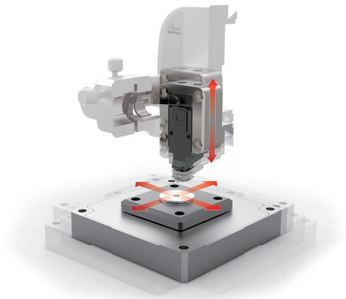
- Comprehensive set of measurement modes and characterizations
- Expanded capabilities with optional accessories and upgrades
- Advanced electrical measurements for failure analysis (FA)

Park NX20 Lite

AFM Technology

Flat Orthogonal XY Scanning without Scanner Bow

Park's Crosstalk Elimination scanner structure removes scanner bow, allowing flat orthogonal XY scanning regardless of scan location, scan rate, and scan size. It shows no background curvature even on flattest samples, such as an optical flat, and with various scan offsets. This provides you with a very accurate height measurement and precision nanometrology for the most challenging problems in research and engineering.



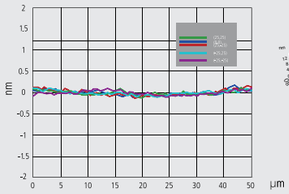
Decoupled XY and Z Scanners

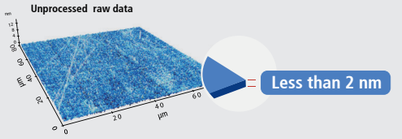
The fundamental difference between Park and its closest competitor is in the scanner architecture. Park's unique flexure based independent XY scanner and Z scanner design allows unmatched data accuracy in nano resolution further improved with NX AFM Head (Z scanner) powered by NX AFM electronic controller.

Accurate Surface Measurement

"Flat" sample surface as it is!

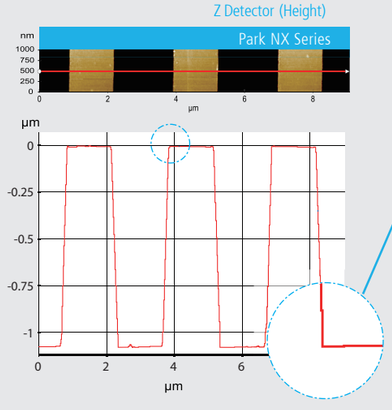
- Low residual bow
- No need for software processing
- Accurate results independent of scan location
- Less than 2 nm of out-of-plane motion with the NX electronic controller





Industry Leading Low Noise Z Detector

Park AFMs are equipped with the most effective low noise Z detectors in the field, with a noise of 0.02 nm over large bandwidth. This produces highly accurate sample topography and no edge overshoot. Just one of the many ways Park NX series saves you time and gives you better data.



No creep effect

Accurate Sample Topography Measured by Low Noise Z Detector

- Uses low noise Z detector signal for topography
- NX electronic controller provides low Z detector noise of 0.02 nm over large bandwidth
- Has no edge overshoot at the leading and trailing edges
- Needs calibration done only once at the factory

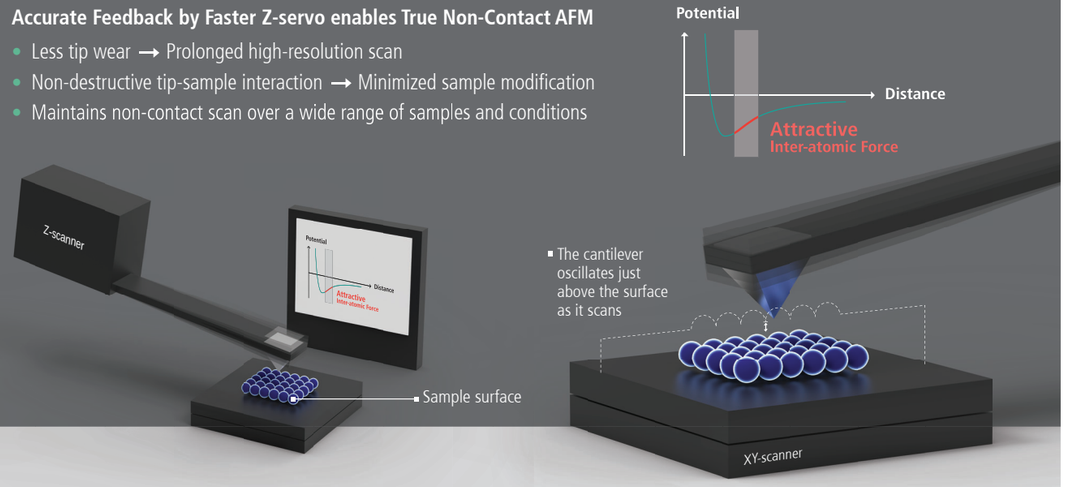
Sample: 1.2 μm Nominal Step Height
(9 μm x 1 μm, 2048 pixels x 128 lines)

True Non-Contact™ Mode

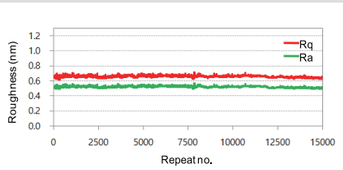
True Non-Contact™ Mode is a scan mode unique to Park AFM systems that produces high resolution and accurate data by preventing destructive tip-sample interaction during a scan.

Accurate Feedback by Faster Z-servo enables True Non-Contact AFM

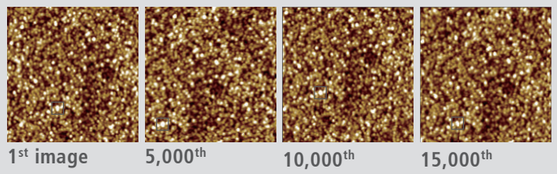
- Less tip wear → Prolonged high-resolution scan
- Non-destructive tip-sample interaction → Minimized sample modification
- Maintains non-contact scan over a wide range of samples and conditions



Unlike in contact mode, where the tip contacts the sample continuously during a scan, or in tapping mode, where the tip touches the sample periodically, a tip used in non-contact mode does not touch the sample. Because of this, use of non-contact mode has several key advantages. Scanning at the highest resolution throughout imaging is now possible as the tip's sharpness is maintained. Non-contact mode avoids damaging soft samples as the tip and sample surface avoid direct contact.

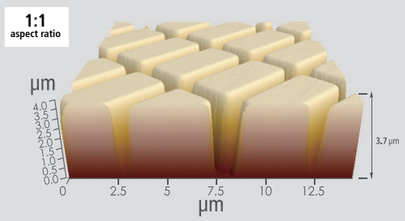


Repeat	1st	...	5000th	...	10000th	...	15000th	Total Avg.	1σ (%)
Rq(nm)	0.669		0.674		0.665		0.642	0.662	0.011 (1.720%)
Ra(nm)	0.527		0.535		0.525		0.508	0.524	0.010 (1.835%)

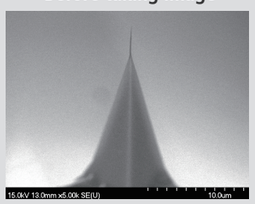


Furthermore, non-contact mode senses tip-sample interactions occurring all around the tip. Forces occurring laterally to tip approach to the sample are detected. Therefore, tips used in non-contact mode can avoid crashing into tall structures that may suddenly appear on a sample surface. Contact and tapping modes only detect the force coming from below the tip and are vulnerable to such crashes.

Deep trench image

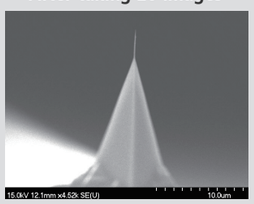


Before taking image



SEM (5.00 k)

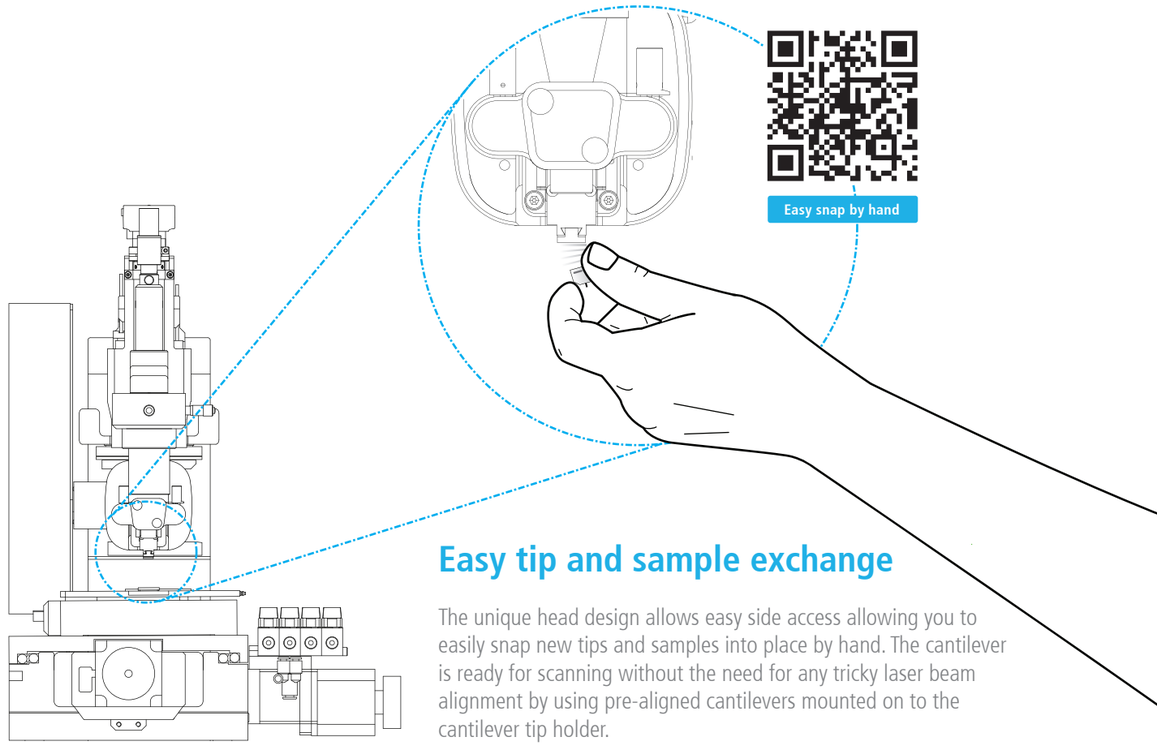
After taking 20 images



SEM (4.52 k)

Park NX20 Lite

Why the world's most accurate AFM is also the easiest to use

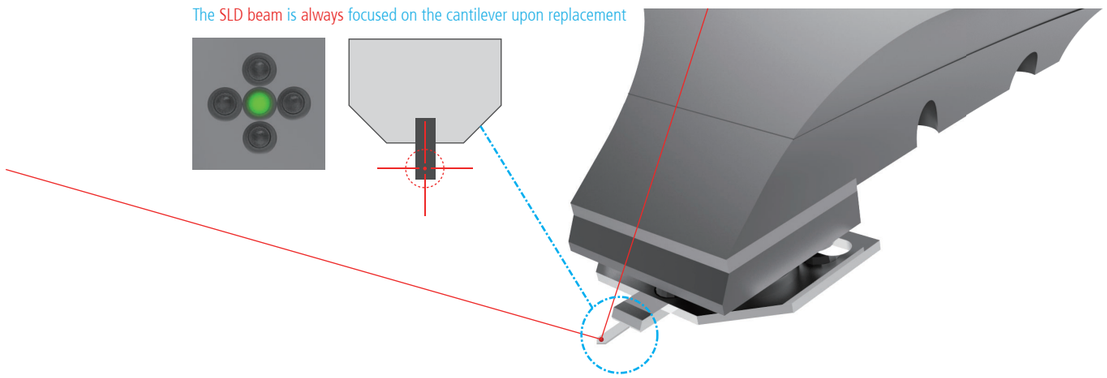


Easy tip and sample exchange

The unique head design allows easy side access allowing you to easily snap new tips and samples into place by hand. The cantilever is ready for scanning without the need for any tricky laser beam alignment by using pre-aligned cantilevers mounted on to the cantilever tip holder.

Easy, intuitive SLD beam alignment

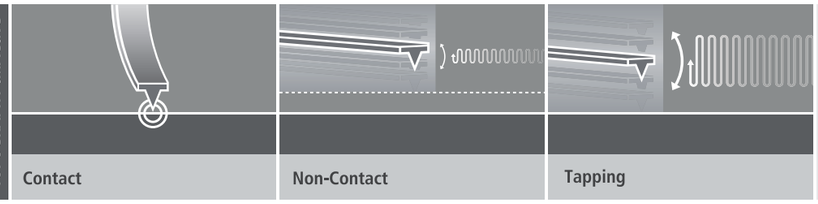
With our advanced pre-aligned cantilever holder, the SLD beam is focused on the cantilever upon placement. Furthermore, the natural on-axis, top-down view allows you to easily find the SLD spot. Since the SLD beam falls vertically onto the cantilever, you can intuitively move the SLD spot along the X- and Y -axis by rotating two positioning knobs. As a result, you can easily find the SLD and position it onto the position-sensitive photodiode using our operation software's beam alignment user interface. From there, all you will need is a minor adjustment to maximize the signal prior to starting data acquisition.



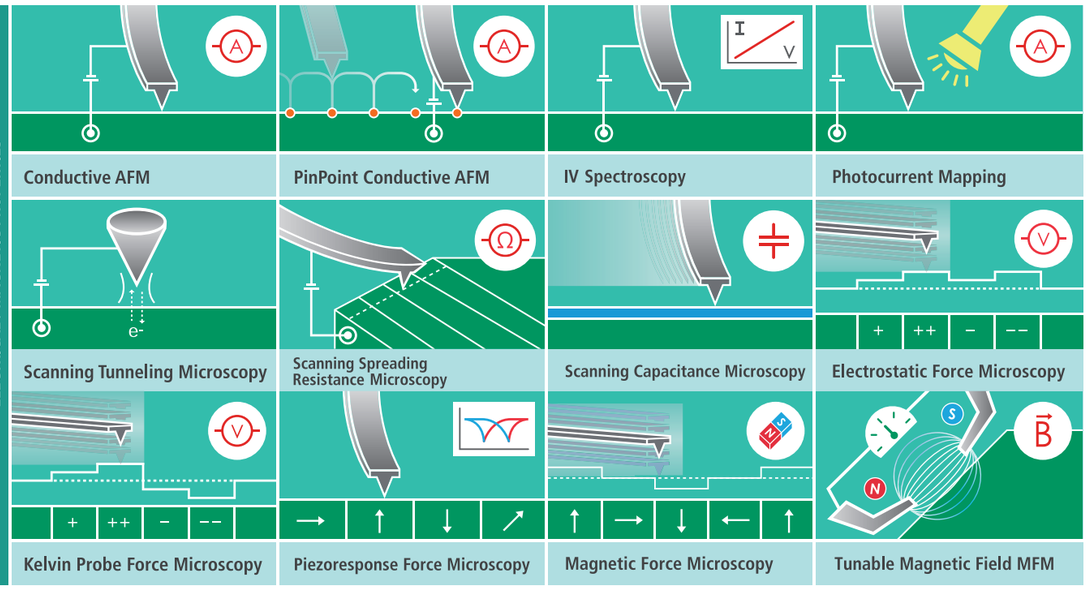
Park Atomic Force Microscopy Modes

Get the data you need with Park's selection of scanning modes

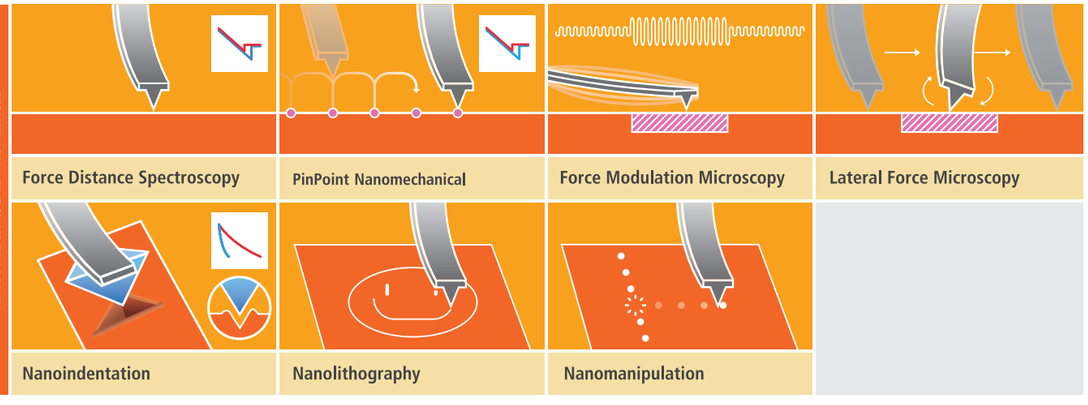
TOPOGRAPHY IMAGING



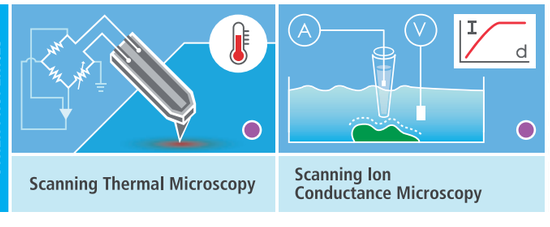
ELECTRICAL / MAGNETIC PROPERTIES



NANOMECHNICAL PROPERTIES

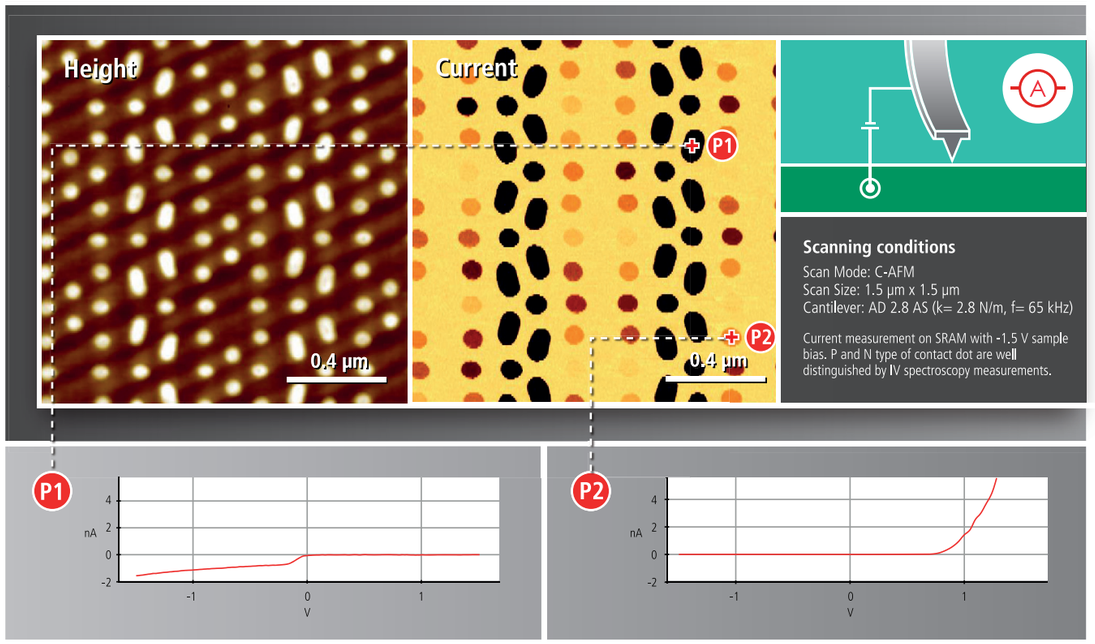


OTHER PROPERTIES

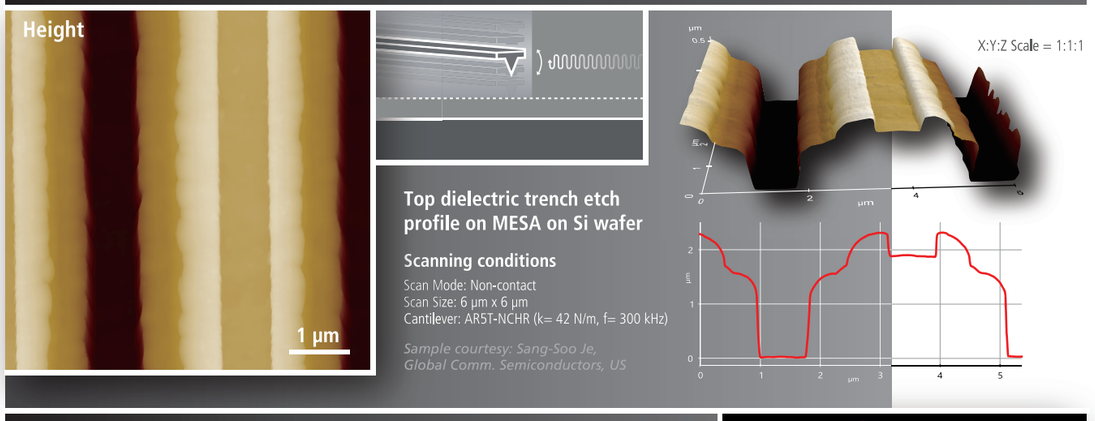


● NOT AVAILABLE FOR THIS PRODUCT

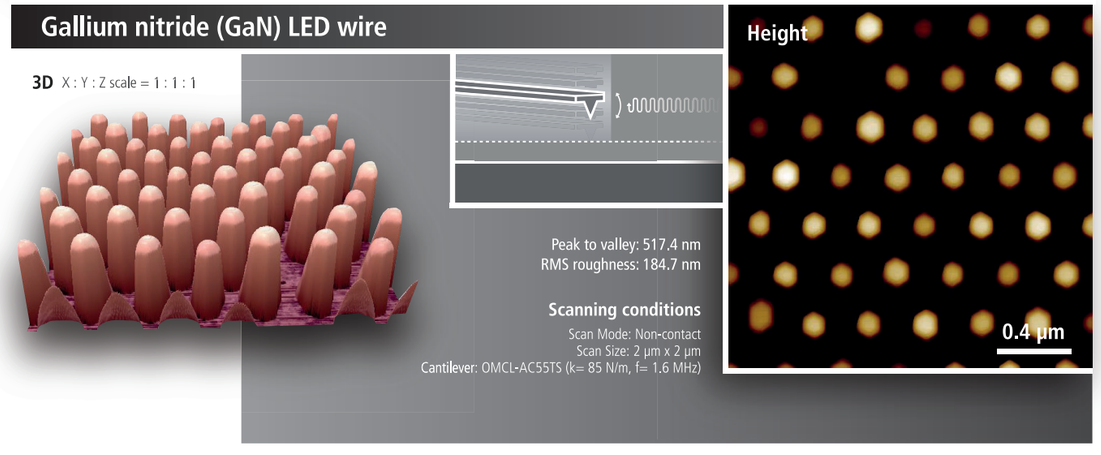
SRAM



Trench Etch Profile on MESA



Gallium nitride (GaN) LED wire

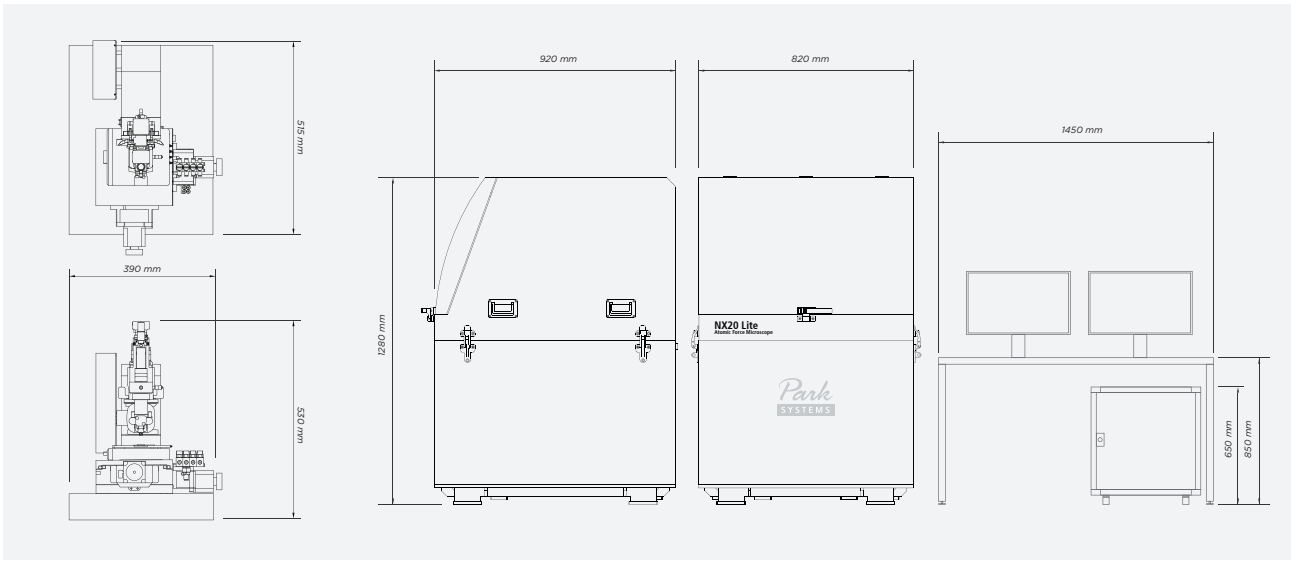


Scanner	Z Scanner	XY Scanner	**Stage**	Z Stage	XY Stage
	Flexure guided high-force scanner Scan range: 15 µm (optional 30 µm)	Single module flexure XY-scanner with closed-loop control Scan range: 100 µm × 100 µm		Motorized Z stage travel range: 25.5 mm, optional precision encoder for better stage repeatability	Motorized XY stage travel range: 150 mm (200 mm optional), optional precision encoders for better XY stage repeatability

Vision	On-axis Optic with Vision	**Sample Mount**	Sample Dimension	**Electronics**	Signal Processing	Integrated Functions
	Objective lens: 10x magnification Field-of-view: 480 um x 360 um (with default 1.2 M pixel vision camera) 840 um x 630 um (with optional 5 M pixel vision camera)		Sample size: Up to 150 mm wafer sample Up to 200 mm wafer sample (Optional 200 mm Vacuum Sample Chuck)		ADC: 24-bit ADCs for X, Y, and Z scanner position sensor DAC: 20-bit DACs for X, Y, and Z scanner positioning	4 channels of flexible digital lock-in amplifier Spring constant calibration (Thermal method) Digital Q control

Options/Modes	Topography Imaging	Magnetic Properties	Electrical Properties	Mechanical Properties
	• Non-Contact • Contact • Tapping	• Magnetic Force Microscopy (MFM)	• Conductive AFM (C-AFM) • I/V Spectroscopy • Kelvin Probe Force Microscopy (KPFM) • KPFM with High Voltage • Scanning Capacitance Microscopy (SCM) • Scanning Spreading-Resistance Microscopy (SSRM) • Scanning Tunneling Microscopy (STM) • Photo Current Mapping (PCM) • Electrostatic Force Microscopy (EFM)	• Force Modulation Microscopy (FMM) • Nanoindentation • Nanolithography • Nanolithography with High Voltage • Nanomanipulation • Lateral Force Microscopy (LFM) • Force Distance (F/d) Spectroscopy • Force Volume Imaging
	Dielectric/Piezoelectric Properties	Chemical Properties		
	• Piezoresponse Force Microscopy (PFM) • PFM with High Voltage • Piezoresponse Spectroscopy	• Chemical Force Microscopy with Functionalized Tip • Electrochemical Microscopy (EC-AFM)		

Software	**Park SmartScan™**	**Park SmartAnalysis™**	**Accessories**
	• AFM system control and data acquisition software • Auto mode for quick setup and easy imaging • Manual mode for advanced use and finer scan control	• AFM data analysis software • Stand-alone design—can install and analyze data away from AFM • Capable of producing 3D renders of acquired data	• Electrochemistry Cell • Universal Liquid Cell with Temperature Control • Temperature Controlled Stages • Magnetic Field Generator



ⓘ **Note: All specifications are subject to change without notice. Please visit our website for the most up-to-date specifications.**

Committed to Contribute to Impactful Science and Technological Development

More than 25 years ago, the foundations of Park Systems were laid at Stanford University, where Park Systems' founder, Dr. Sang-il Park, worked in Prof. Calvin Quate's group; the group that invented the world's first AFM. After years of development, Dr. Park introduced the first commercial AFM to the world, thus starting the successful path of Park Systems. With good foresight, a superior product and keen business acumen, Park has positioned themselves as the dominant industry leader in AFM Nanoscale Metrology and in 2020, Park Systems will roll out their most exciting line of AFM products in their history.

Park Systems continuously strives to live up to the innovative spirit of its origin. Throughout its long journey, the company has been committed to provide advanced, accurate, and reliable AFM instrumentation, with revolutionary features such as True Non-Contact™ mode and PinPoint™ Nanomechanical AFM. Cutting-edge AFM automation features, like SmartScan™, make Park Systems AFMs not only extremely easy to use, but they also enable users to obtain outstanding results faster, more efficiently and more accurately.

Park Systems

Enabling Nanoscale Advances

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