Enabling Nanoscale Advances

Park NX7

The affordable choice for the first step AFM research with the latest NX components

Park NX7

The most affordable research grade AFM with flexible sample handling

Park NX7 has all the state-of-the-art technology you have come to expect from Park Systems, at a price your lab can afford. Designed with the same attention to detail as our more advanced models, NX7 allows you to do your research on time and within budget.

Accurate XY Scan by Crosstalk Elimination

- Two independent, closed-loop XY and Z flexure scanners
- Flat and orthogonal XY scan with low residual bow
- Accurate height measurements without any need for software processing

The Most Extensible AFM Solution

- The most comprehensive range of SPM modes
- Advanced nanomechanical measurement modes are supported as default enabled by NX electronic controller
- The best option compatibility and upgradeability in the industry

User Experience-Driven Software and Hardware Features

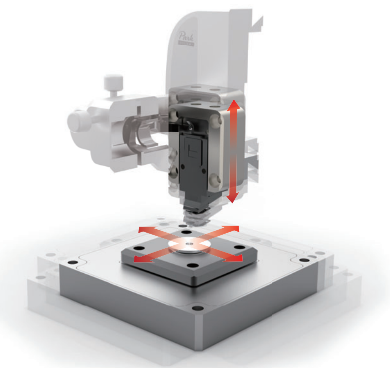
- Open side access for easy sample or tip exchange
- Easy, intuitive laser alignment with pre-aligned tip mount
- Park SmartScan™ - AFM operating software versatile enough to empower both novices and power users alike toward great nanoscale research

Park NX7

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.



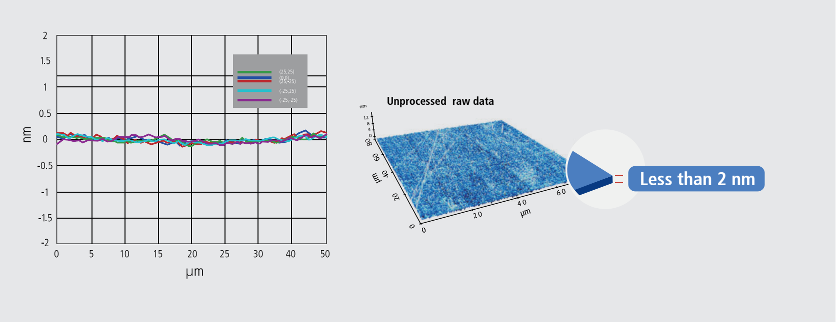
Decoupled XY and Z Scanners

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

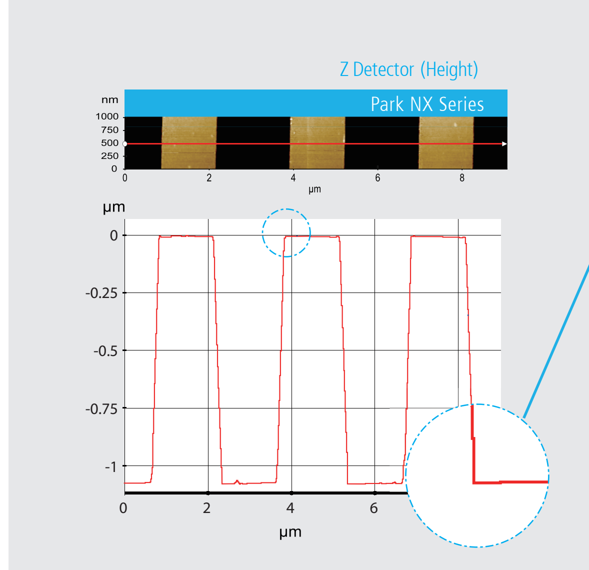
"Flat" sample surface as it is!

- 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

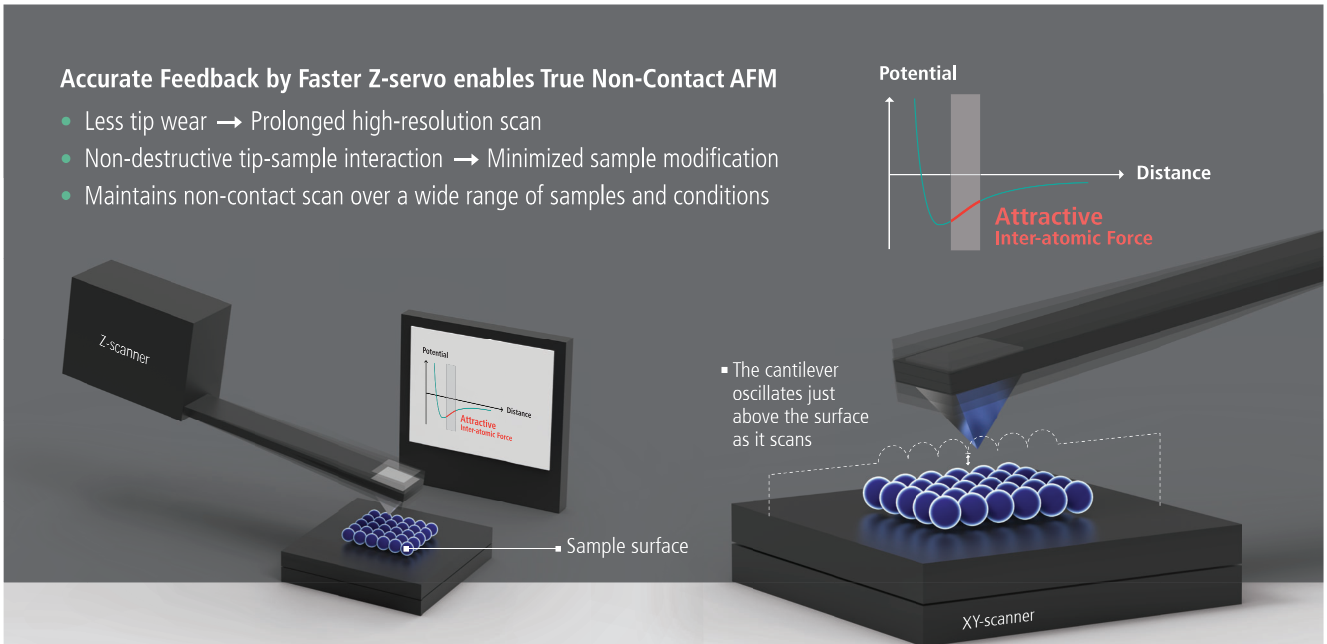
Accurate Sample Topography Measured by Low Noise Z Detector

- Uses low noise Z detector signal for topography
- Has 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

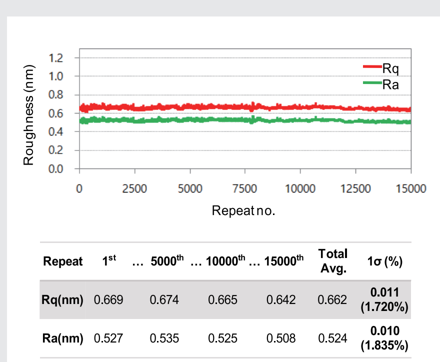
Sample: 1.2 µm Nominal Step Height
(9 µm x 1 µm, 2048 pixels x 128 lines)

True Non-Contact™ Mode

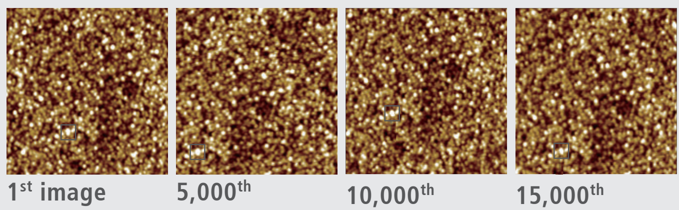
True Non-Contact™ Mode is a scan mode unique to Park AFM systems that produces high resolution and accurate data by preventing destructive tip-sample interaction during a scan.



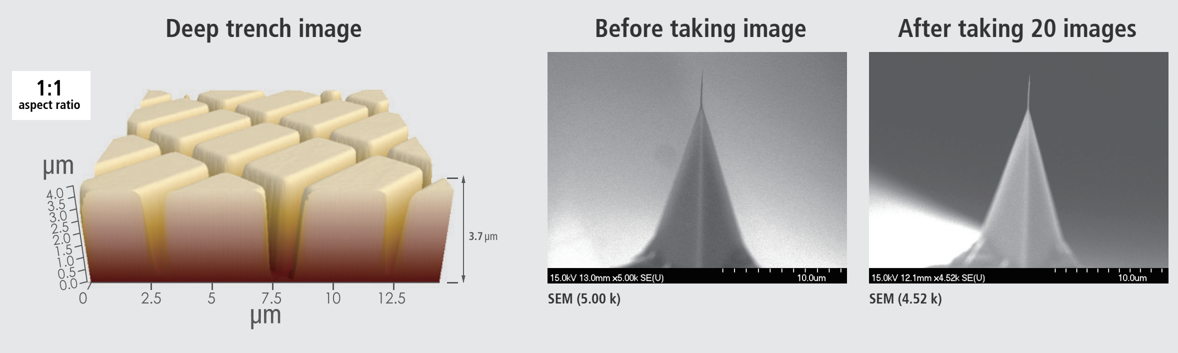
Unlike in contact mode, where the tip contacts the sample continuously during a scan, or in tapping mode, where the tip touches the sample periodically, a tip used in non-contact mode does not touch the sample. Because of this, use of non-contact mode has several key advantages. Scanning at the highest 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%)

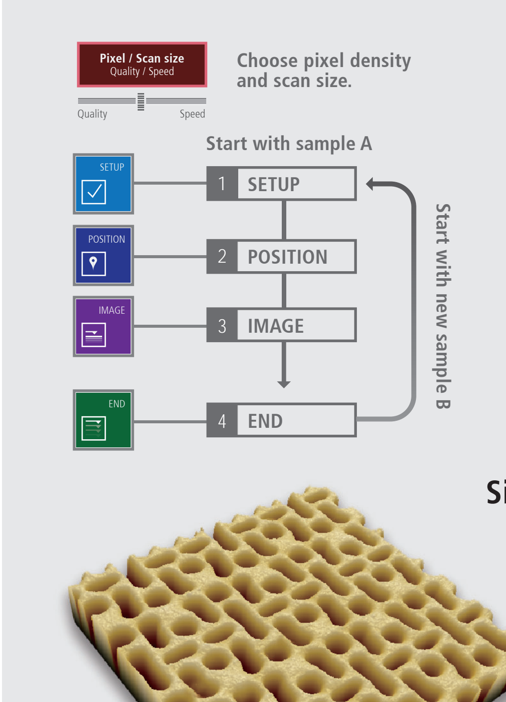


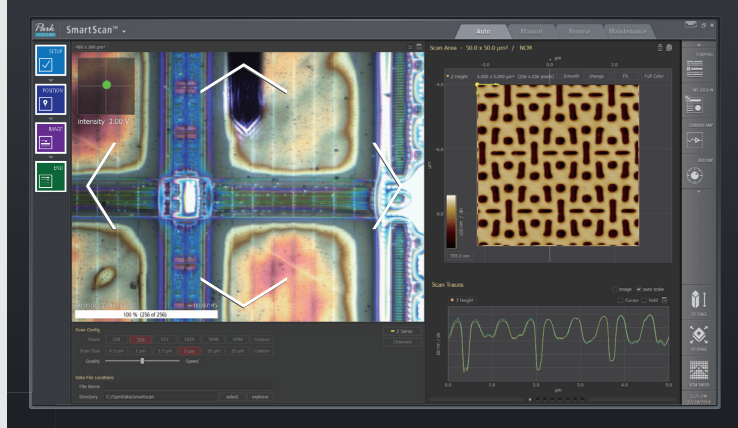
Furthermore, non-contact mode senses tip-sample interactions occurring all around the tip. Forces occurring laterally to tip approach to the sample are detected. Therefore, tips used in non-contact mode can avoid crashing into tall structures that may suddenly appear on a sample surface. Contact and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



Park SmartScan™

Park AFM Operating Software





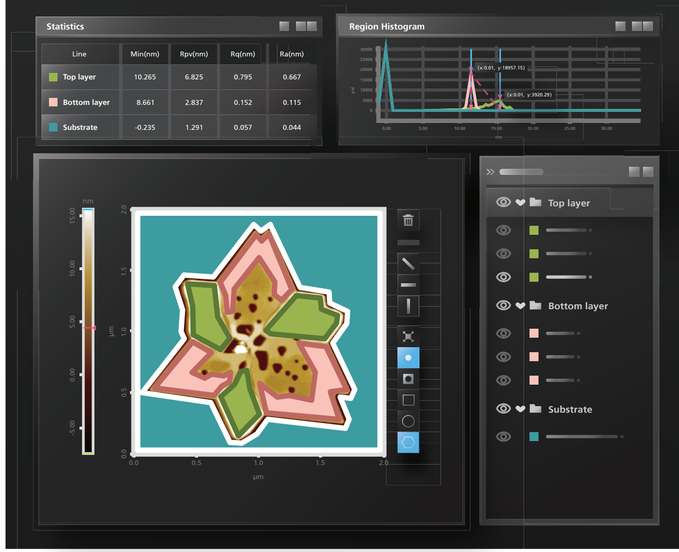
Single-click Imaging with SmartScan™ Auto Mode

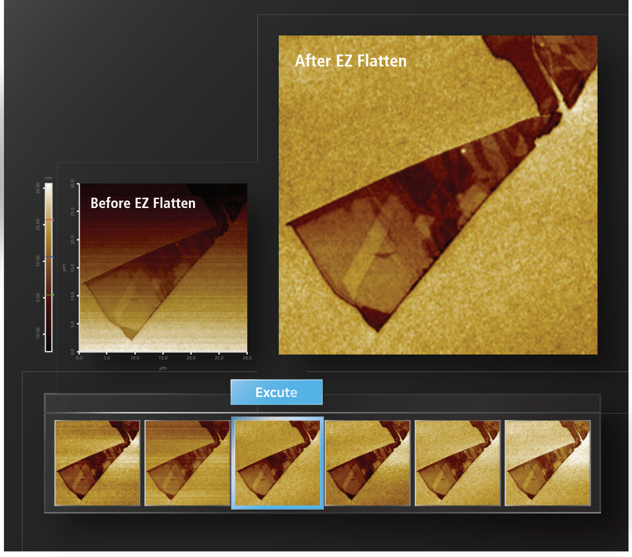
All you need to specify for AFM imaging are quality-speed preference, pixel density and scan size. Outside of those factors, you can leave all sophisticated AFM parameters up to the Auto mode of SmartScan™. The system will start a measurement with optimized conditions for imaging automatically at the click of a button.

Park SmartAnalysis™

The Park AFM Image Analytics Software

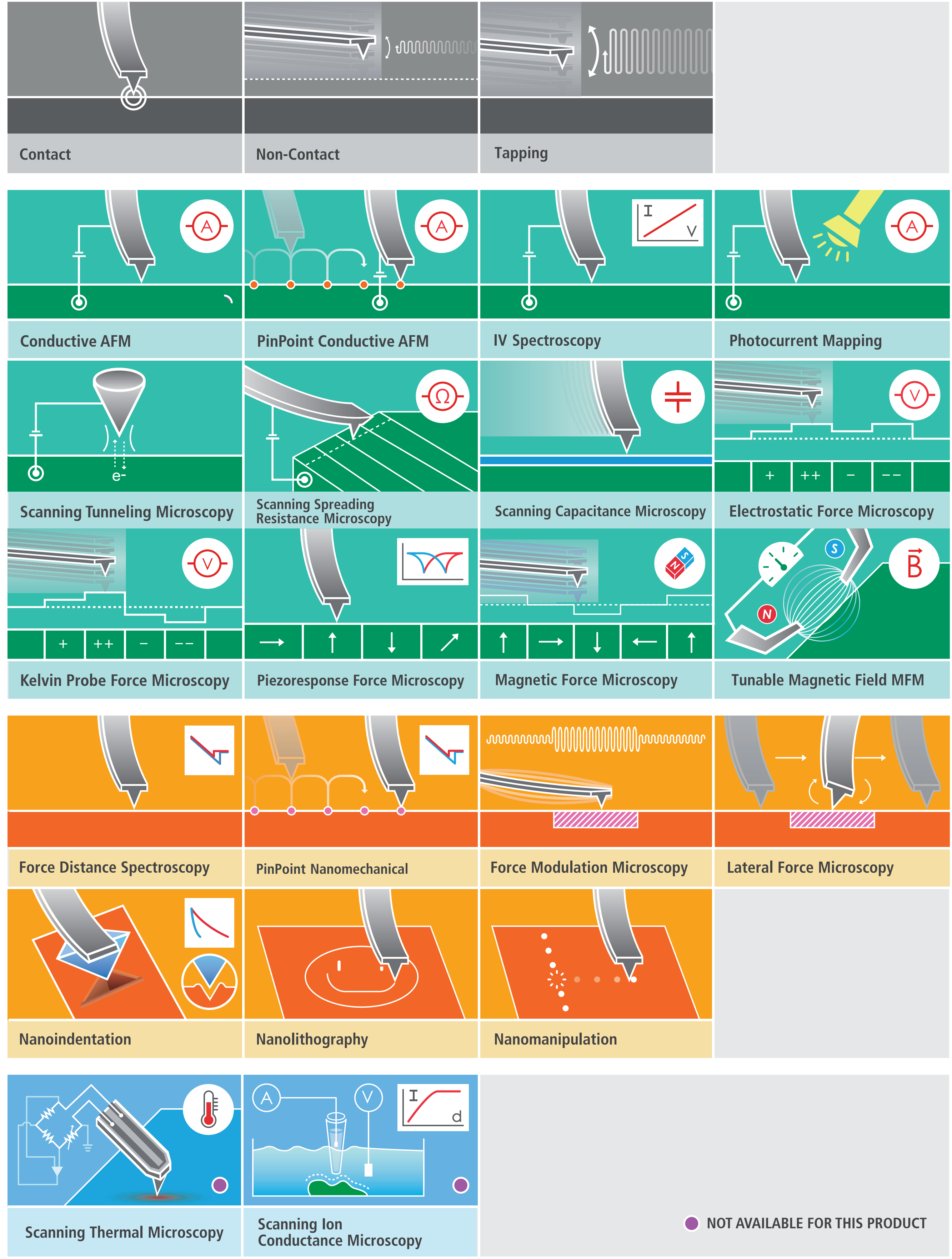
Park SmartAnalysis™ is an atomic force microscopy image processing and data analysis software for Park AFM.
It is the next generation image analytics software with powerful features and newly added automated functions.
Park SmartAnalysis enables users to swiftly prepare, analyze and publish their AFM acquired images and measurements.

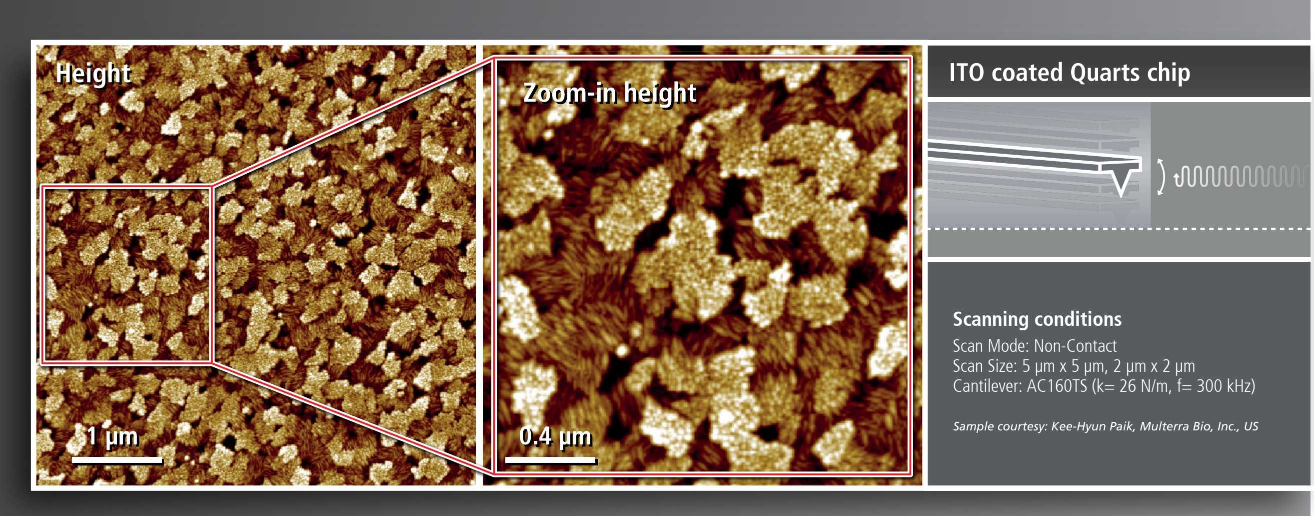


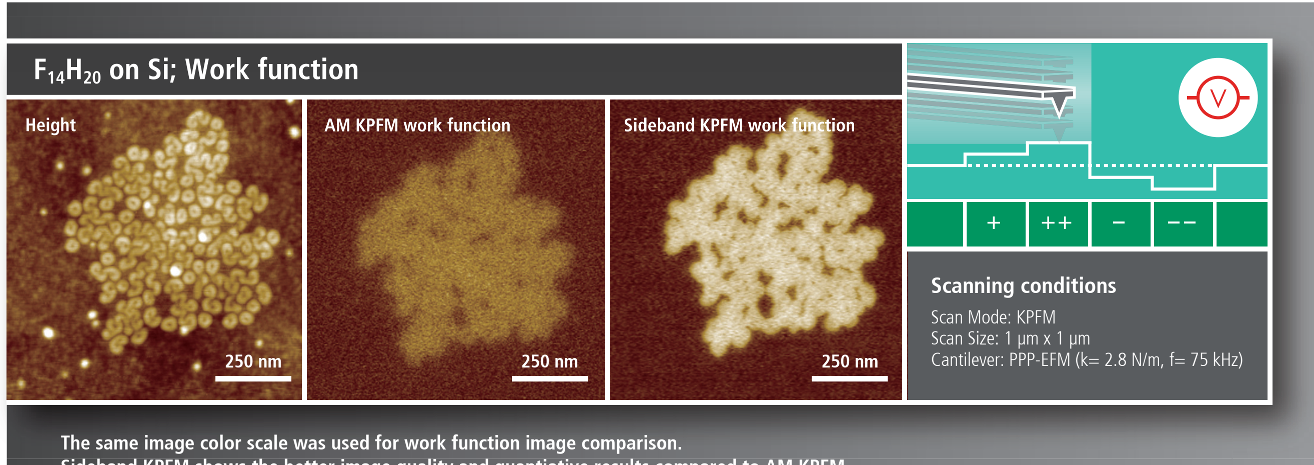


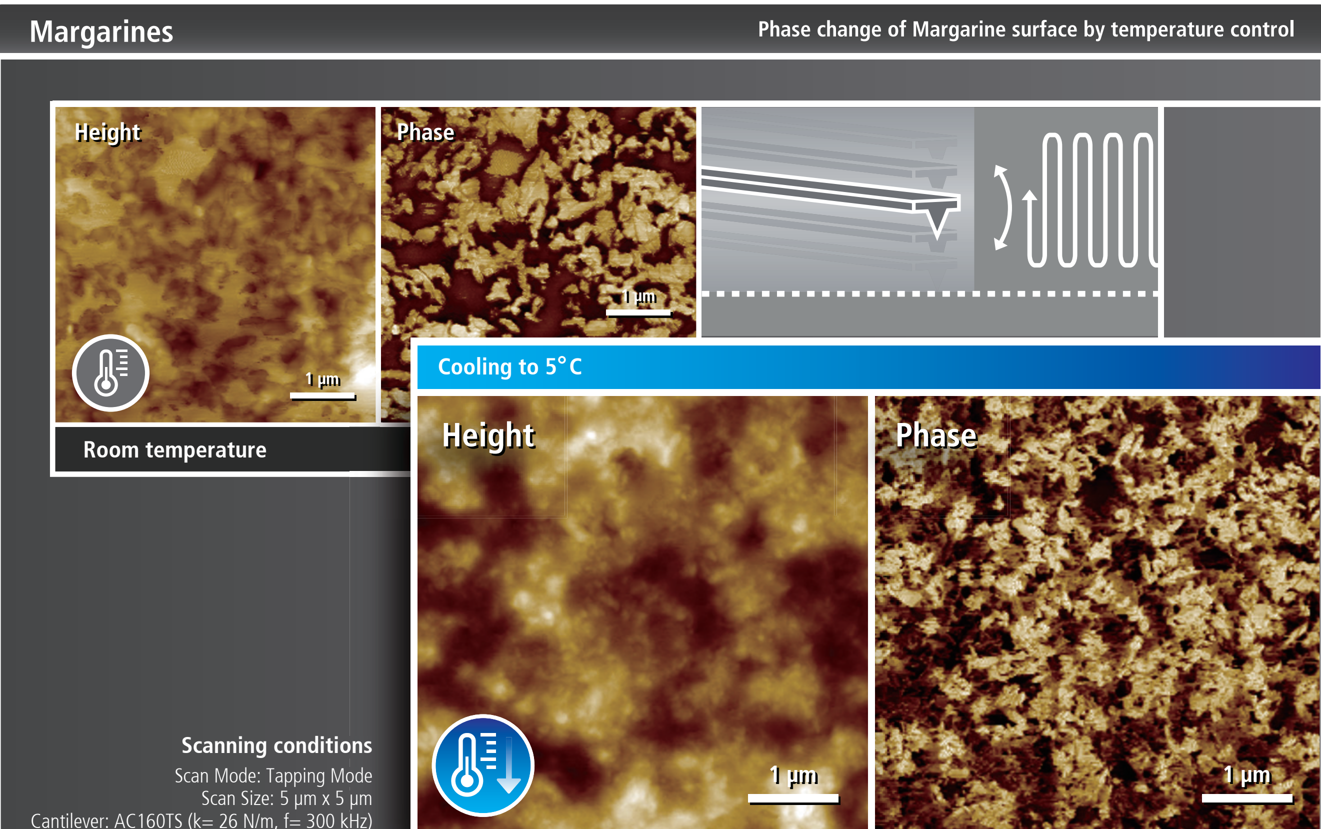
Park Atomic Force Microscopy Modes

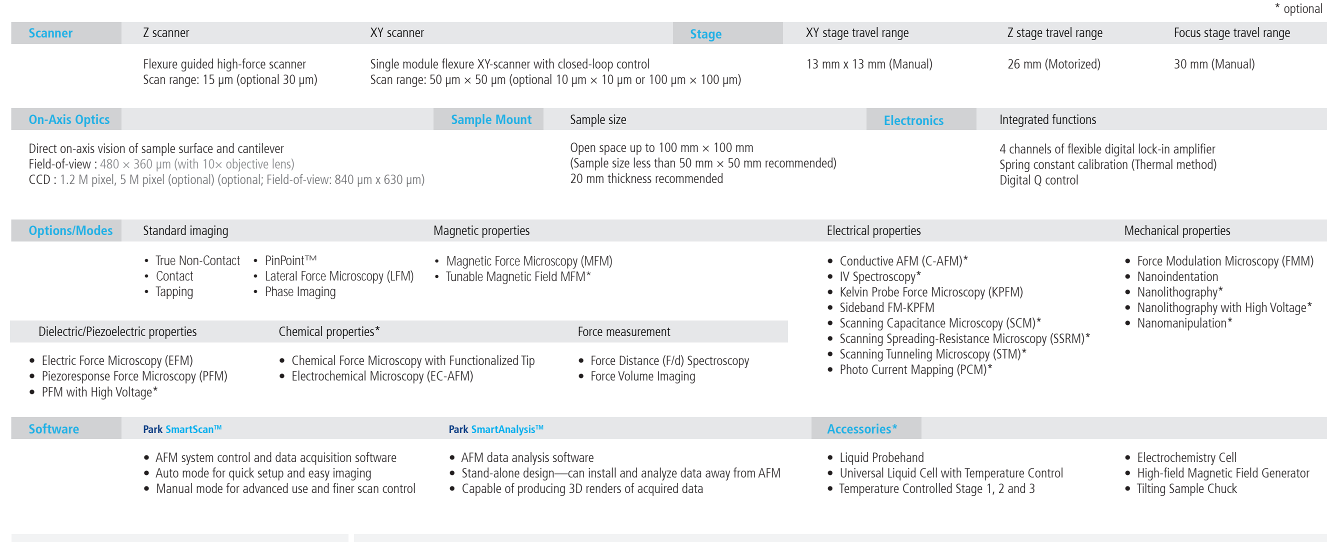
Get the data you need with Park's selection of scanning modes




Height
1 µm
Zoom-in height
0.4 µm
ITO coated Quarts chip
Scanning conditions
Scan Mode: Non-Contact
Scan Size: 5 µm x 5 µm, 2 µm x 2 µm
Cantilever: AC160TS (k= 26 N/m, f= 300 kHz)
Sample courtesy: Kee-Hyun Paik, Multerra Bio, Inc., US


$F_{14}H_{20}$ on Si; Work function
Height
250 nm
AM KPFM work function
250 nm
Sideband KPFM work function
250 nm
V
+
++
−
−−
Scanning conditions
Scan Mode: KPFM
Scan Size: 1 µm x 1 µm
Cantilever: PPP-EFM (k= 2.8 N/m, f= 75 kHz)
The same image color scale was used for work function image comparison.
Sideband KPFM shows the better image quality and quantiative results compared to AM KPFM


Margarines
Phase change of Margarine surface by temperature control
Height
1 µm
Phase
1 µm
Room temperature
Cooling to 5°C
Height
1 µm
Phase
1 µm
Scanning conditions
Scan Mode: Tapping Mode
Scan Size: 5 µm x 5 µm
Cantilever: AC160TS (k= 26 N/m, f= 300 kHz)



* optional

Scanner	Z scanner	XY scanner
	Flexure guided high-force scanner Scan range: 15 µm (optional 30 µm)	Single module flexure XY-scanner with closed-loop control Scan range: 50 µm × 50 µm (optional 10 µm × 10 µm or 100 µm × 100 µm)

Stage	XY stage travel range	Z stage travel range	Focus stage travel range
	13 mm x 13 mm (Manual)	26 mm (Motorized)	30 mm (Manual)

On-Axis Optics

Direct on-axis vision of sample surface and cantilever
Field-of-view : 480 × 360 µm (with 10× objective lens)
CCD : 1.2 M pixel, 5 M pixel (optional) (optional; Field-of-view: 840 µm x 630 µm)

Sample Mount — Sample size

Open space up to 100 mm × 100 mm
(Sample size less than 50 mm × 50 mm recommended)
20 mm thickness recommended

Electronics — Integrated functions

4 channels of flexible digital lock-in amplifier
Spring constant calibration (Thermal method)
Digital Q control

Options/Modes

Standard imaging
- True Non-Contact
- Contact
- Tapping
- PinPoint™
- Lateral Force Microscopy (LFM)
- Phase Imaging

Magnetic properties
- Magnetic Force Microscopy (MFM)
- Tunable Magnetic Field MFM*

Electrical properties
- Conductive AFM (C-AFM)*
- IV Spectroscopy*
- Kelvin Probe Force Microscopy (KPFM)
- Sideband FM-KPFM
- Scanning Capacitance Microscopy (SCM)*
- Scanning Spreading-Resistance Microscopy (SSRM)*
- Scanning Tunneling Microscopy (STM)*
- Photo Current Mapping (PCM)*

Mechanical properties
- Force Modulation Microscopy (FMM)
- Nanoindentation
- Nanolithography*
- Nanolithography with High Voltage*
- Nanomanipulation*

Dielectric/Piezoelectric properties
- Electric Force Microscopy (EFM)
- Piezoresponse Force Microscopy (PFM)
- PFM with High Voltage*

Chemical properties*
- Chemical Force Microscopy with Functionalized Tip
- Electrochemical Microscopy (EC-AFM)

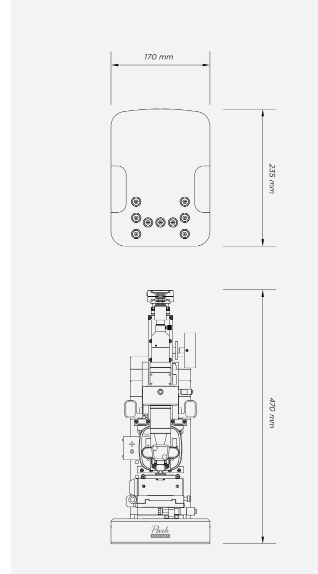
Force measurement
- Force Distance (F/d) Spectroscopy
- Force Volume Imaging

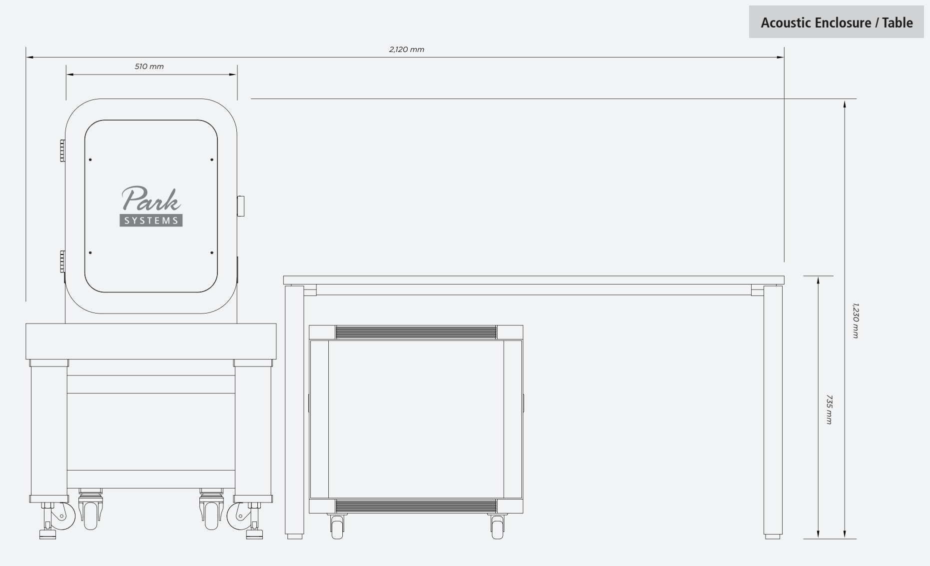
Software

Park SmartScan™
- AFM system control and data acquisition software
- Auto mode for quick setup and easy imaging
- Manual mode for advanced use and finer scan control

Park SmartAnalysis™
- AFM data analysis software
- Stand-alone design—can install and analyze data away from AFM
- Capable of producing 3D renders of acquired data

Accessories*
- Liquid Probehand
- Universal Liquid Cell with Temperature Control
- Temperature Controlled Stage 1, 2 and 3
- Electrochemistry Cell
- High-field Magnetic Field Generator
- Tilting Sample Chuck





Committed to contributing to impactful science and technology

Park Systems Corporation is a leading manufacturer of nanoscale microscopy and metrology solutions that encompasses the atomic force microscopy, white light interferometry, infrared spectroscopy and ellipsometry systems. Its products are widely used for scientific research, nanoscale engineering, and semiconductor fabrication and quality assurance. Park Systems provides a full range of AFM products from desktop to fully automated systems with integrated robotic arms. Furthermore, its product line includes WLI AFM, Photo-induced Force Microscopy spectroscopy and ellipsometry systems for those in the chemistry, materials, physics, life sciences, and semiconductor industries. In 2022, Park Systems acquired and merged Accurion GmbH, a leader in high-end ellipsometry and active vibration isolation, to form Park Systems GmbH, Accurion Division.

Park Systems is a publicly traded corporation on the Korea Stock Exchange (KOSDAQ) with corporate headquarters in Suwon, Korea, and regional headquarters in Santa Clara, California, Mannheim, Germany, Paris, France, Beijing, China, Tokyo, Japan, Singapore, India, and Mexico. To learn more, please visit www.parksystems.com.

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