

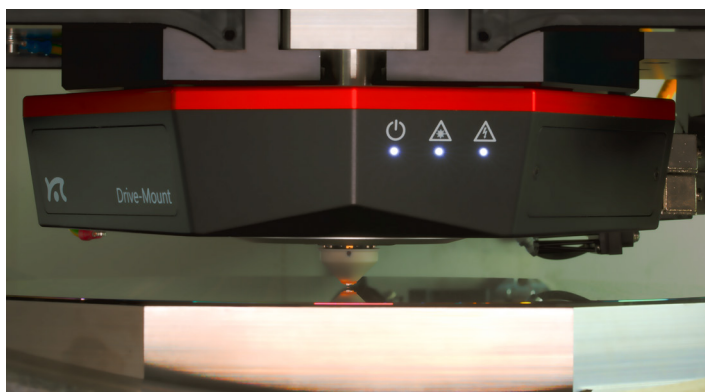
Alphacen 300 Drive

Your Wafers Analyzed



High Throughput
High Reproducibility
Low Cost of Ownership

Bringing DriveAFM Technology to 300mm Wafers



DriveAFM scan head in Alphacen 300 Drive system.

WaveMode – Maximum Imaging Stability and Speed

Fastest Off-Resonance Imaging

Enabled by photothermal cantilever excitation.

Prolonged Tip Lifetime

Quantitative, low tip-sample interaction force.

Reliable High-Resolution Data

Stable operation provides robust results.

Ultra-Low-Noise Design

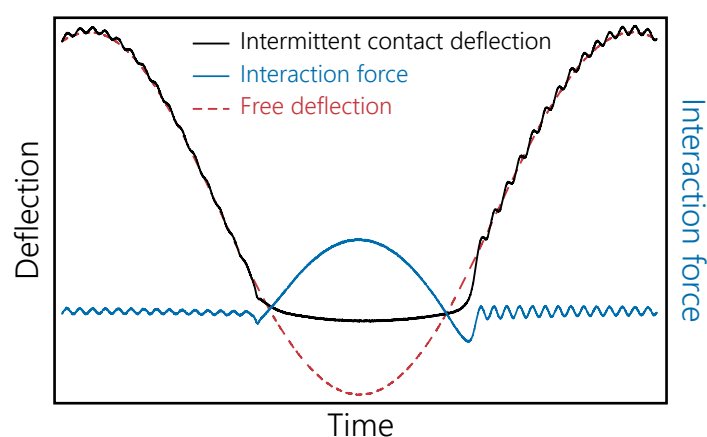
Maximum stability for the most demanding measurements.

Photothermal Excitation

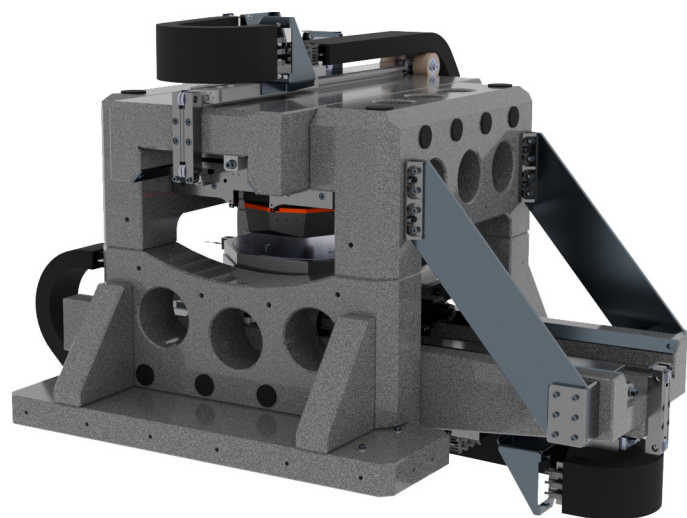
Ultimate cantilever excitation stability enabling WaveMode.

Tip-Scanning Architecture

Fast, reliable imaging without compromise.



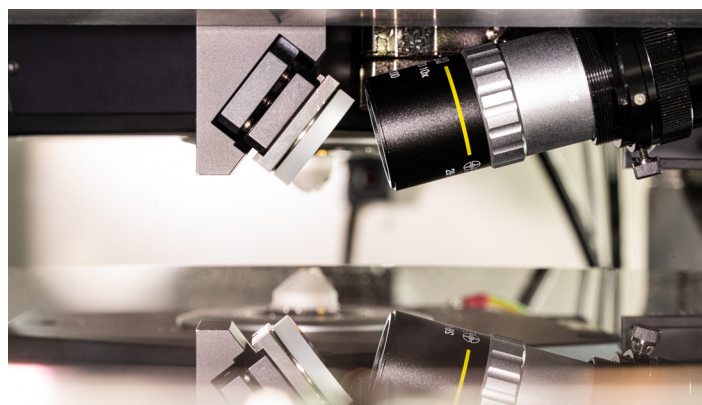
WaveMode schematic.



Alphacen 300 Drive stage. Patent pending (EP24204078).

Workflow Automation

The Alphacen 300 Drive is designed for fully automated operation. From precise wafer alignment and automated laser positioning to cantilever alignment, gain determination, and measurement execution, every step is optimized for hands-free performance. This level of automation ensures consistent results, minimizes operator intervention, and maximizes throughput for demanding metrology workflows.



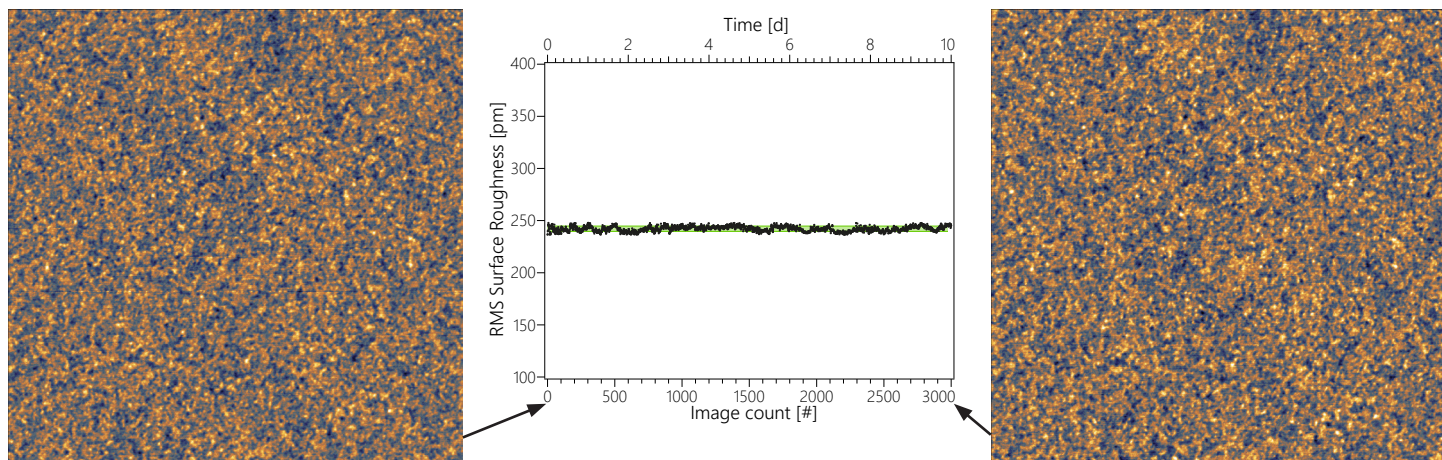
Off-axis camera for wafer alignment or high-resolution optical inspection.

Ultra-Stable Stage Design

The construction of the Alphacen 300 Drive was tailored to the needs of investigating intricate samples: lowest noise, highest stability, and sub-micron positioning - delivering uncompromising performance, even on ultra-smooth surfaces, so you can trust every detail.

Robust Surface Roughness Measurements

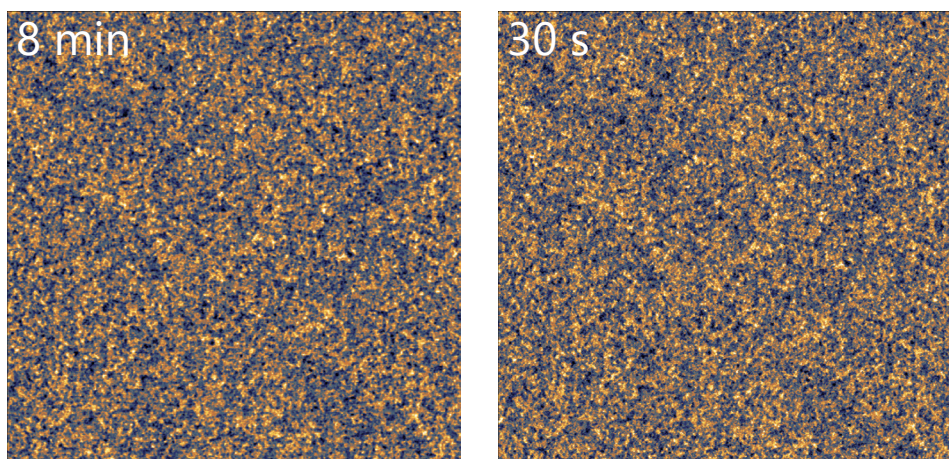
WaveMode, Nanosurf's advanced photothermal off-resonance mode, delivers outstanding noise performance, ensuring highly accurate surface roughness measurements while maintaining imaging stability and superior quality. Its capability of precisely controlling interaction forces below 1 nN preserves tip sharpness over long periods of time – greatly reducing cost of ownership.



First and last topography image of an imaging series extending over ten days. Images were acquired on a bare silicon wafer using WaveMode and dedicated WaveMode cantilevers. Image size $1\text{ }\mu\text{m} \times 1\text{ }\mu\text{m}$, color range 2 nm, 512 px x 512 px. Average RMS surface roughness $242.1\text{ pm} \pm 2.43\text{ pm}$ (Avg $\pm$ SD).

Fastest Sub-nm Surface Metrology

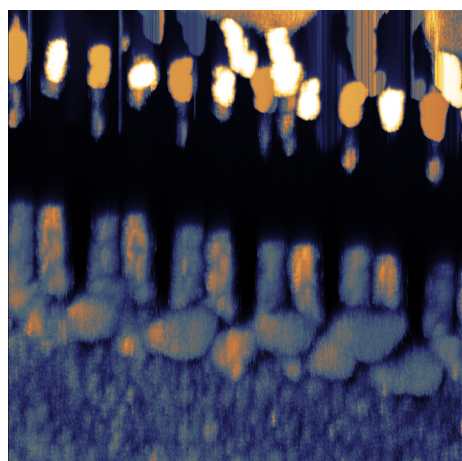
Nanosurf's FastScanning option with WaveMode technology enables capturing high-resolution data at unprecedented speeds without sacrificing accuracy. Fast scanning accelerates your throughput, while WaveMode ensures stable, precise measurements even on challenging surfaces.



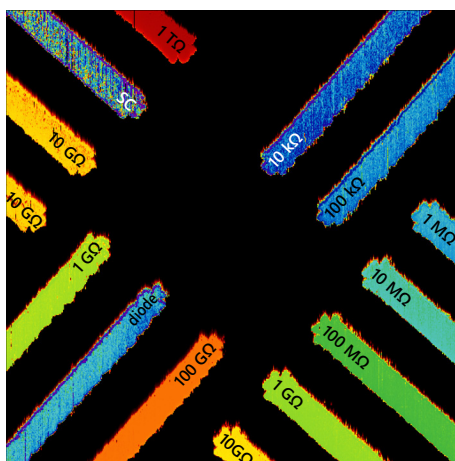
Surface topography images of a bare silicon wafer recorded in WaveMode using the FastScanning option. Acquisition times: 8 min (1Hz line rate, left) and 30 s (15 Hz line rate, right). Image size $1\text{ }\mu\text{m}$, color range 2 nm.

Nanoelectrical Characterization

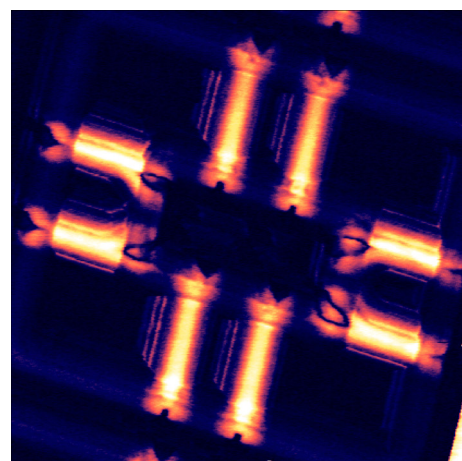
Scanning Spreading Resistance Microscopy (SSRM) and Scanning Microwave Microscopy (SMM) provide detailed low-noise, high-resolution maps of important properties such as local conductivity or type and density of dopants.



Local conductivity map of finFET structures. Image size 600 nm; current range 1 pA to 500 nA.



Conductivity map of a multi-resistance (10 kΩ to 1 TΩ) calibration sample. Image size 60 μm . Sample courtesy: Laboratoire national de métrologie et d'essais (LNE)

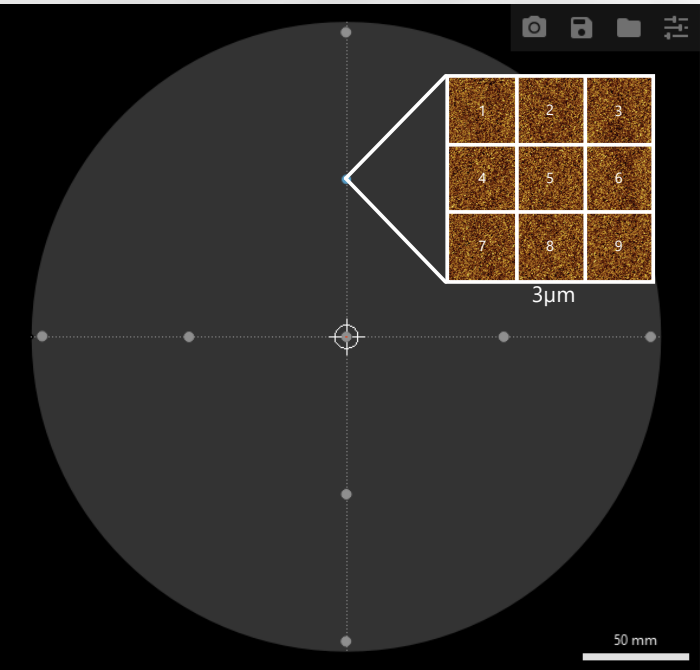


SRAM imaged in dS/dV Scanning Microwave Microscopy (SMM) visualizing differences in dopant concentration. Image size 11.5 μm .

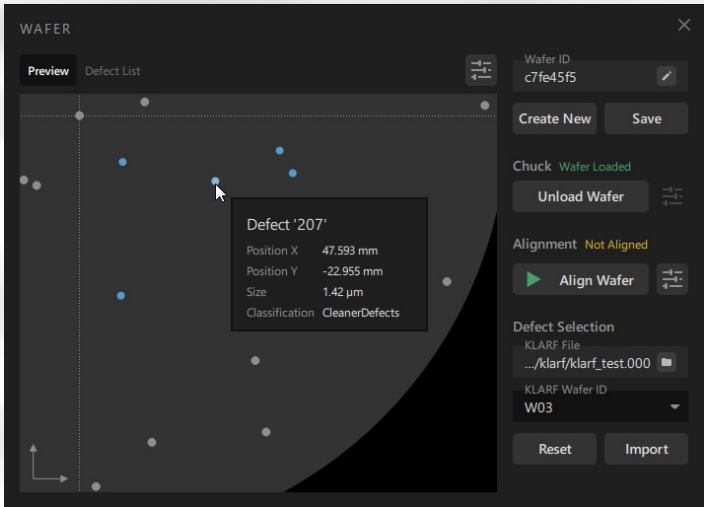
Smarter AFM Workflows with Nanosurf Studio

Nanosurf Studio is the next-generation control and analysis software that brings precision, flexibility, and ease of use to your AFM workflows that transform AFM measurements into a seamless, intuitive process.

From the very first step, Nanosurf Studio ensures safe and accurate wafer loading with guided procedures that protect your system and guarantee correct placement. Built-in alignment tools deliver accurate positioning, laying the foundation for consistent, high-quality measurements. For routine tasks, automation



ViewPort representation of 300 mm wafer with multiple measurement locations. Each location consists of 9 individual 1 μm x 1 μm measurement areas



The Wafer Widget in Nanosurf Studio provides wafer loading and unloading, wafer alignment, and KLARF import.

features let you set up and complete metrology tasks with just a few clicks, while full manual control remains at your fingertips for developing and refining new applications. KLARF file support allows you to import defect maps and jump directly to the locations that matter most. ViewPort provides a clear, interactive wafer overview, navigation becomes fast, precise, and remarkably user-friendly

Specifications

Scan head	DriveAFM: High-resonance frequency flexure-guided scanner with direct drive actuation 100 μm x 100 μm x 20 μm range (XYZ)
Operating modes	WaveMode, WaveMode-NMA, CleanDrive-based Dynamic and Phase imaging, Static Mode, Lateral Force Mode, Scanning Spreading Resistance Microscopy, Conductive AFM, Scanning Microwave Microscopy, Force Spectroscopy, I-V Spectroscopy, FastScanning Option, and many more
Stage	XYZ range: 640 mm x 300 mm x 16 mm Movement velocity: 100 mm/s Encoder resolution: 10 nm Repositioning accuracy (bidirectional): <500 nm
Sample Mount	300 mm wafer chuck with integrated lift pins; compatible with 200 mm wafers
On-axis optics	Top view camera for simultaneous cantilever and sample observation Field of view: 1100 μm x 850 μm Camera resolution 2592 px x 1944 px, 15 fps @ full resolution
Off-axis optics	Camera for wafer alignment 10x objective Field of view: 900 μm x 700 μm
Acoustic isolation	STC 34+
Cleanroom rating	ISO 5