OLYMPUS®

Your Vision, Our Future

Nano Search Microscope

OLS4500

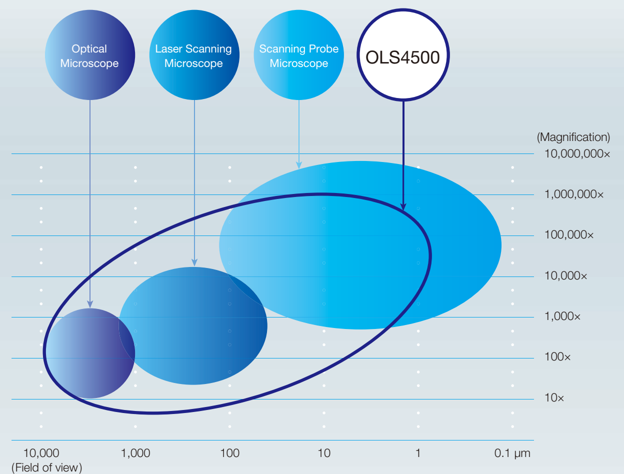
LEXT

From Millimeters to Nanometers

Seamless, Accurate Measurement Across the Scale

Integrated Laser/Probe Microscope

NEW

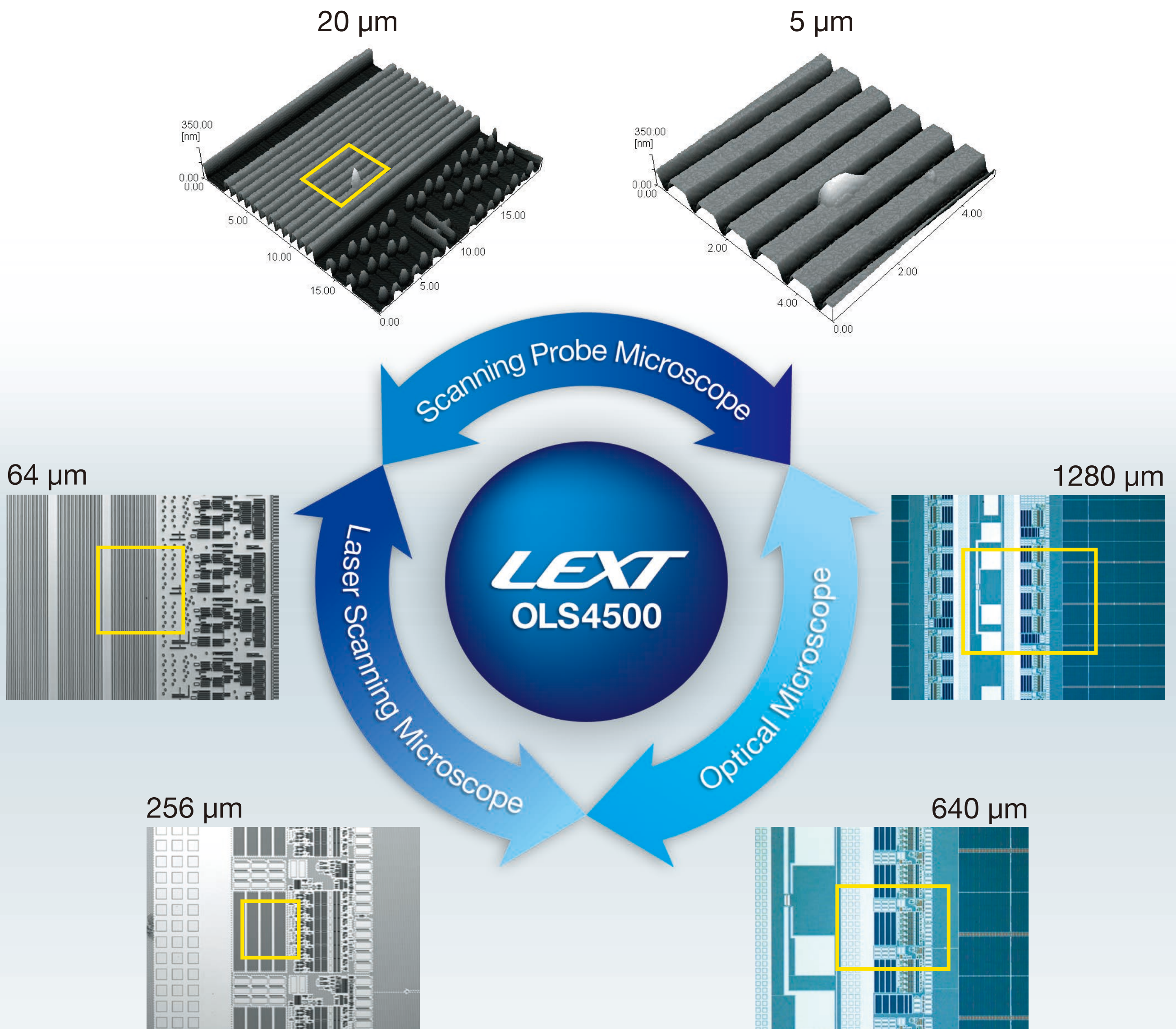


Flexible Observation/Measurement Capability
From the Millimetric Scale All the Way Down to the Nanometric Scale.

LEXT OLS4500

Integrating a traditional optical microscope with an excellent laser scanning microscope (LSM) and a nanometric-scale scanning probe microscope (SPM), the OLYMPUS LEXT OLS4500 is compatible with a wide range of samples, providing a total observation/measurement solution for a new era.
With quick, easy switching between optical, laser and probe microscopy, this composite microscope enables observation and measurement from the millimetric scale to the nanometric scale. Fast access to scanning probe microscopic observation without losing the target from the view results in a dramatic reduction of work time to acquire the required image.
This makes ultrawide-range observation and measurements easier and smoother than ever.

The new OLYMPUS LEXT OLS4500. Pursuing further seamless operation.



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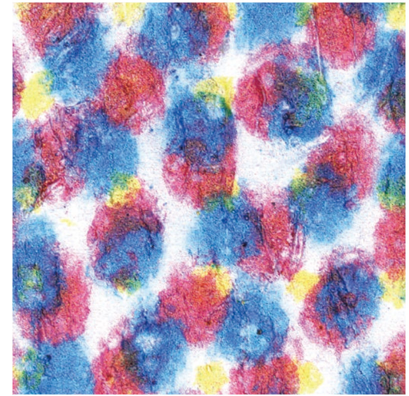
Microscope Technologies of the OLS4500

Principles and Features of Optical Microscope

The optical microscopic image using visible light range (400 to 800 nm wavelength) enables observation at magnifications ranging as high as approx. 1000x. The optical microscope makes it possible to observe a sample in color, to enhance surface texture by switching the observation method, and to observe substances by taking advantage of their properties (polarization property). The OLS4500 can apply the following observation methods.

• **Brightfield observation**	Most popular observation method. Forms an image from the light reflected from the sample surface.
• **Differential Interference Contrast (DIC) observation**	3D visualization of fine surface irregularities on the sample by enhancing the contrast.
• **Simplified polarized light observation**	Visualizes the polarization property of the sample using incident polarized light (light with a specific vibration direction)

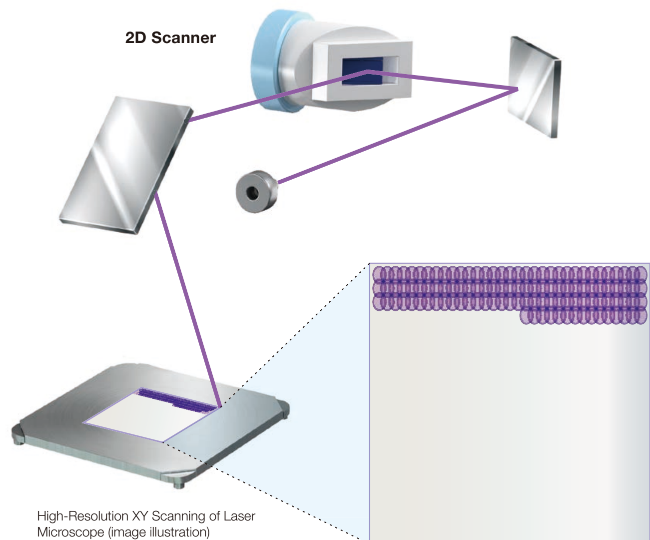


Brightfield observation can provide color information. Ink-jet dots.

Principles and Features of Laser Scanning Microscope

LSM (Laser Scanning Microscope) Facilitates Submicron Observation and Measurement

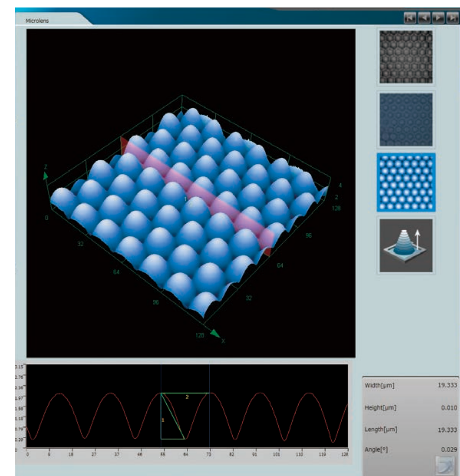
The X-Y plane resolution of an optical microscope depends greatly on the wavelength of the light used. The LSM employs short-wavelength light so its X-Y plane resolution is superior to that of a traditional microscope which uses visible light.
The OLS4500 incorporates a laser light with a short wavelength of 405 nm and combines a dedicated high-aperture (high-N.A.) objective and confocal optics to achieve X-Y plane resolution of 0.12 µm. Its XY scanning function – which uses an Olympus-original 2D scanner – makes possible high-resolution scanning of 4096 x 4096 pixels (max.).



High-Resolution XY Scanning of Laser Microscope (image illustration)

Superior Height Measuring Capability

The LSM employs a short-wavelength semiconductor laser light and confocal optical system to detect in-focus images, while eliminating out-of-focus images. Combined with a high-precision liner scale, this allows high-definition imaging, enabling accurate 3D measurement.

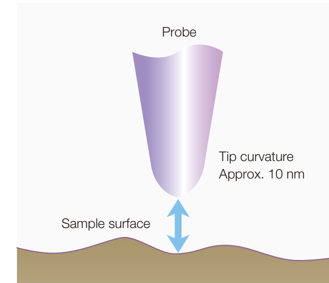


Step Difference Measurement

Principles and Features of Scanning Probe Microscope

SPM (Scanning Probe Microscope) Visualizes the Nanometric-Order World

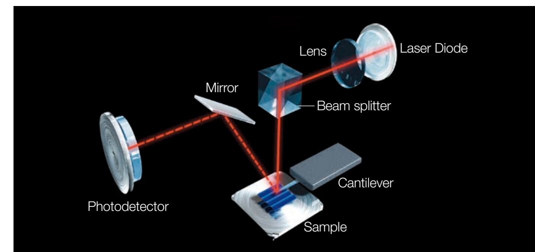
SPM is the generic name of microscopes which perform 3D type observation of samples by approaching a small probe with a tip curvature of about 10 nm to the sample surface and scanning the sample, while detecting the dynamic and electrical interactions between the probe and sample. One of the typical SPMs is the AFM (Atomic Force Microscope), which images minute surface texture of the sample by detecting the attractive and repulsive forces between the probe and sample surface. Observation at the nanometric level makes it possible to capture the texture of the sample finely.



Principles of Probe Microscope

Nanometric Observation by Cantilever Scanning

The OLS4500 employs an optical lever system that can detect the micro-deflection (displacement) of the cantilever carrying the probe on the tip with high sensitivity. By reflecting the laser beam on the back of the cantilever and applying Z-axis drive using a piezo device, the beam hits the specified point on the photodetector so that the system can read a minute Z-direction displacement.



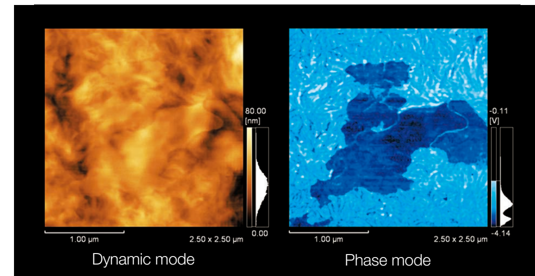
Optical Path of SPM Sensor

Various Modes for Imaging Surface Texture Figure and Physical Properties

The scanning probe mode incorporates various modes for use in texture observation and measurements of the sample surface, as well as for analysis of the physical properties. The modes available with the OLS4500 are as follows.

Mode	Description
• **Contact mode**	Surface texture visualization (hard surface)
• **Dynamic mode**	Surface texture visualization (soft surface, viscous surface)
• **Phase mode**	Visualization of physical differences on the sample surface.
• **Current mode***	Detection and visualization of current flowing between the probe and sample.
• **Surface potential mode (KFM)***	Visualization of electric potential on the sample surface.
• **Magnetic force mode (MFM)***	Visualization of magnetic information on the sample surface.

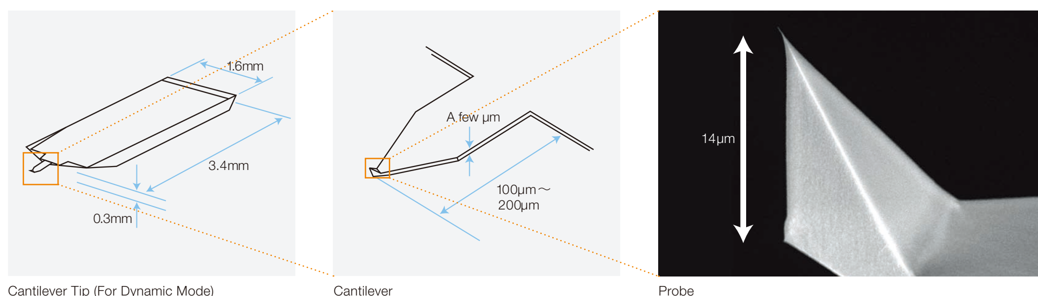
* Optional.



Polymer Film

Cantilever: Key to the High Definition and Quality of an Image

The probe is placed on the tip of a sheet-type cantilever with a length of approximately 100 to 200 µm. The spring constant and resonance frequency of the cantilever are selected according to the sample feature. As the probe wears after repeated scanning, the cantilever tip should be replaced either periodically or as required.



Cantilever Tip (For Dynamic Mode) Cantilever Probe

New Solutions Made Possible by the OLS4500

Have you experienced the following problems when using an SPM?

1

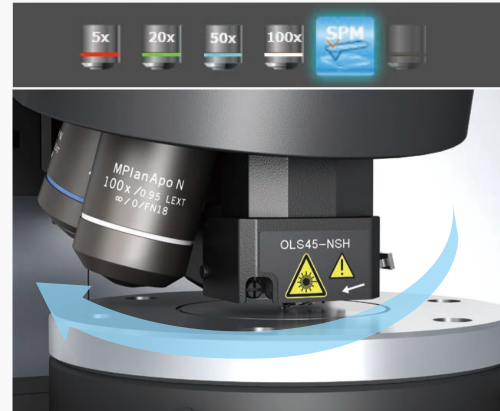
The area of interest disappears from view.

Even after a point of interest has been imaged with an accompanying optics device, the point often disappears in the field of view when the observation mode is switched to an SPM.

OLS4500

Never loses the target once it has been captured.
A new microscope with nano-surface texture measuring capability.

Four objectives ranging from low to high magnifications are installed on the motorized revolving nosepiece together with an SPM unit. The magnification and observation method can be switched seamlessly so that the observation target will remain captured within a field of view. The OLS4500 performs fast search in nano-surface texture.



Magnification/Observation Method Switching with Revolving Nosepiece

2

The area of interest cannot be found.

The optical microscope used with a common SPM has only low magnification so they were often either unable to find micro-defects present on a wafer or crystal surface.

OLS4500

A wide range of magnifications and various observation methods enable to detect observation target easily.

With a wide range of magnifications and various observation methods, backed by advanced optical technology, the optical microscope makes it easy to locate the observation target. In addition, laser DIC (Differential Interference Contrast) observation enables to visualize nanometric order irregularity in live image.

Brightfield Observation (IC Pattern)

DIC Observation

Laser DIC Observation

3

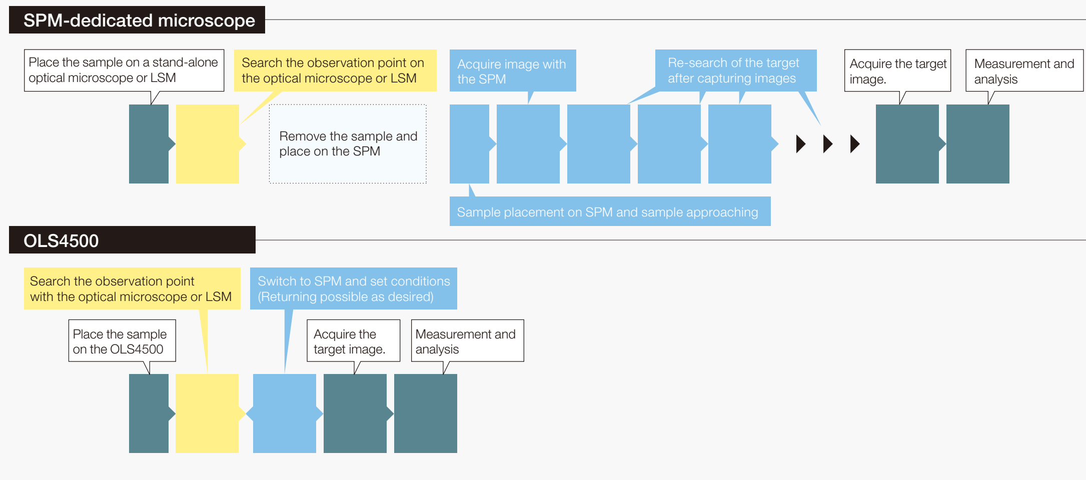
The time needed to acquire an SPM image is too long.

Even after the observation target has been located with a non-SPM microscope, it needs several pre-scans to acquire a target SPM image after the sample has been re-placed on a conventional SPM. As a result, it takes much longer to obtain the image.

OLS4500

Reduces the work time from sample placement to image acquisition.

Once the sample has been placed on the OLS4500 microscope, all subsequent operations can be performed on the same microscope. The ability to locate the observation target quickly and accurately with SPM allows target image acquisition in one scanning area.



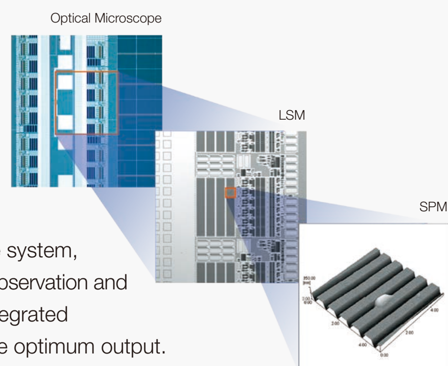
4

Different types of microscopes must be used to evaluate a sample.

To evaluate an unfamiliar sample, the operator must try different types of microscopes separately.

OLS4500

Integrated design makes it possible to use a single microscope simply by switching the magnification and observation method, without having to remove and replace the sample on another microscope.



As the OLS4500 is an integrated optical, laser and probe microscope system, you can switch between the three microscopic modes as required for observation and evaluation, without having to replace the sample itself. Each of the integrated microscopes is equipped with an array of powerful functions to assure optimum output.

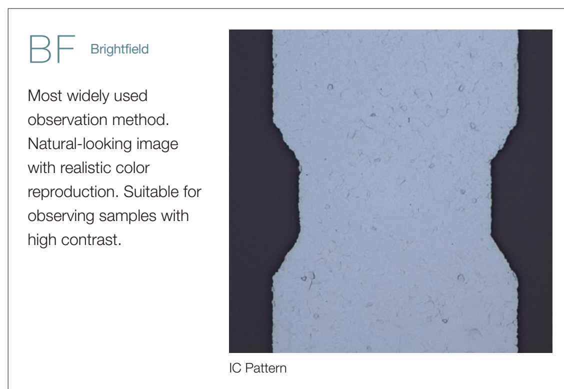
Find | Find the Area of Interest Immediately

The OLS4500 Can Quickly Locate the Area of Interest Using a Wide Variety of Observation Methods.

A white LED is used as the light source to ensure clear color images with excellent color reproduction. The four objectives enable observation at various magnifications, ranging from low to high. Making full use of the features of optical microscope, the OLS4500 is capable of BF (Brightfield) observation – the most commonly used, DIC (Differential Interference Contrast) observation for stereoscopic visualization of fine surface texture by enhancing contrast, and simplified polarized light observation that represents the polarization characteristics of the sample with different colors. Other functions include HDR (High Dynamic Range), which synthesizes several images captured by varying the exposure time to obtain an image with well-balanced brightness and enhanced texture. The OLS4500 can quickly find the area of interest using various observation methods.

BF Brightfield

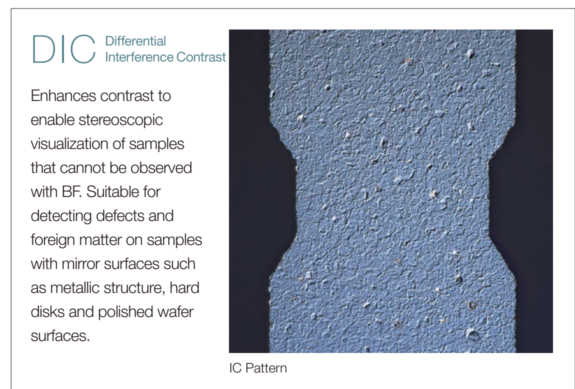
Most widely used observation method. Natural-looking image with realistic color reproduction. Suitable for observing samples with high contrast.



IC Pattern

DIC Differential Interference Contrast

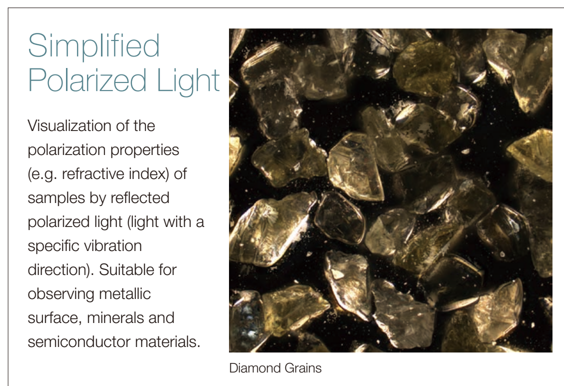
Enhances contrast to enable stereoscopic visualization of samples that cannot be observed with BF. Suitable for detecting defects and foreign matter on samples with mirror surfaces such as metallic structure, hard disks and polished wafer surfaces.



IC Pattern

Simplified Polarized Light

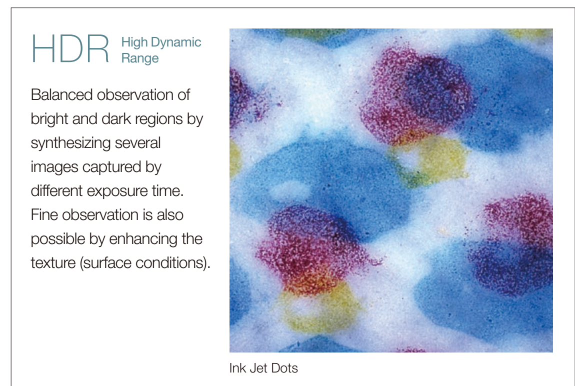
Visualization of the polarization properties (e.g. refractive index) of samples by reflected polarized light (light with a specific vibration direction). Suitable for observing metallic surface, minerals and semiconductor materials.



Diamond Grains

HDR High Dynamic Range

Balanced observation of bright and dark regions by synthesizing several images captured by different exposure time. Fine observation is also possible by enhancing the texture (surface conditions).



Ink Jet Dots

LSM Can Visualize What Cannot Be Observed with an Optical Microscope.

Thanks to a short-wavelength 405nm laser light, a higher-aperture (high-N.A.) objective lenses and confocal optics, high X-Y resolution is available so that objects not visible with the optical microscope can be observed in clear images. Laser DIC observation makes possible live observation of nanometer micro surface.

Brightfield Observation
(Foreign Materials on Glass Plate)

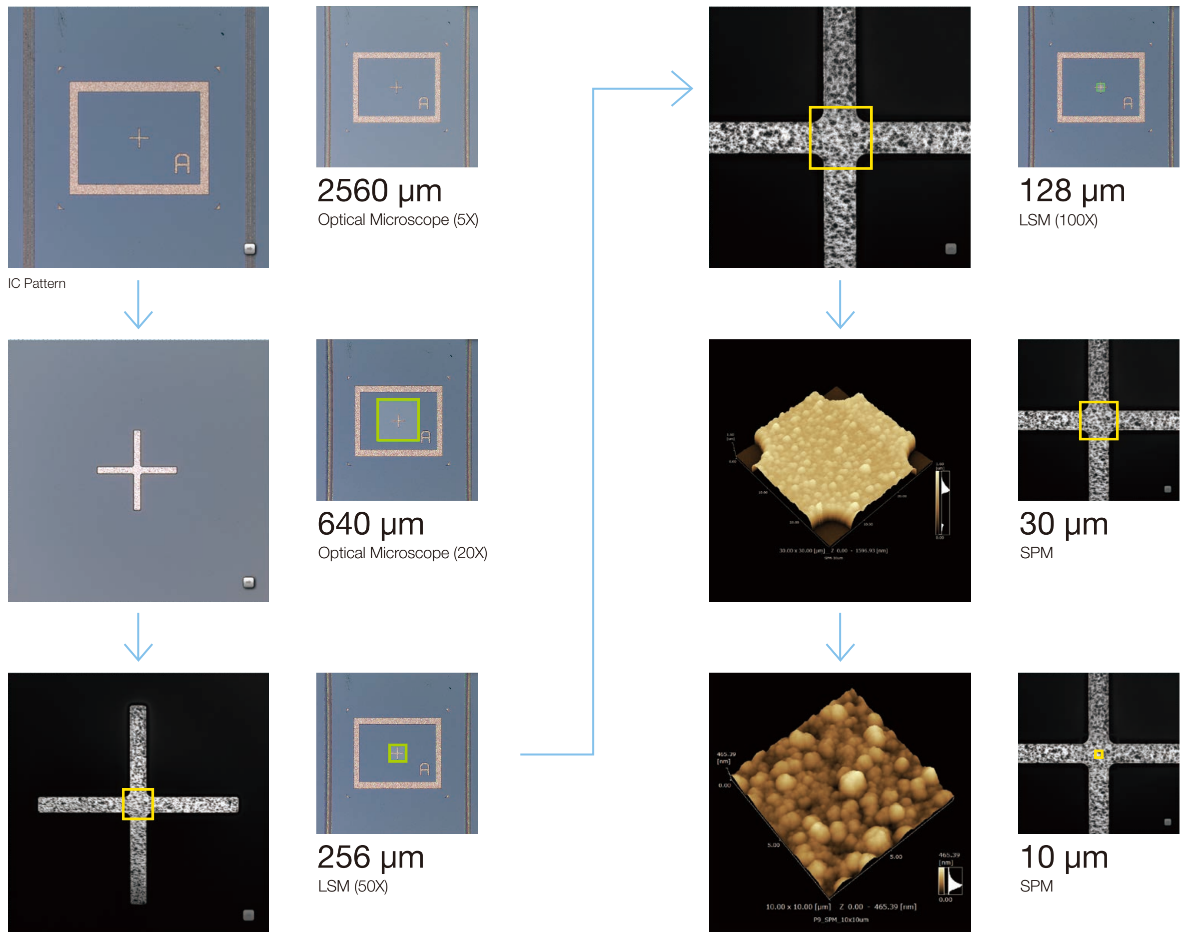
Laser DIC Observation

Approach

Approach the Area of Interest Quickly and Accurately with SPM

Seamless-Magnification Observation Keeping the Object within a Field of View

Four objectives ranging from low to high magnifications are installed on the motorized revolving nosepiece together with the SPM unit. 50X and 100X live observation mode using the optical microscope or LSM places the SPM scanning area in the center of the field. The area of interest can be approached accurately by setting a target mark over the area and switching to the probe scan mode. This means that the target image can be obtained with a single SPM scan, improving work efficiency and reducing wear of the cantilever.



Guidance for Easy Switching to SPM Observation

Preparations for SPM observation, such as cantilever installation and scanning area setting, can be performed by following the guidance display, which means that even operators with little experience can safely perform preliminary work.

Workflow of SPM Observation

The SPM observation is performed according to procedures described below. This Guidance explains the preparation procedures required for SPM observation, such as attaching a cantilever, etc.

Attaching the Cantilever to the Cantilever Holder

↓

Checking Cable Connection

↓

Starting the System

↓

Placing the Test Sample

↓

Attaching/Replacing the Cantilever

Nanometric Measurement

Quick Measurement with Simple Operations

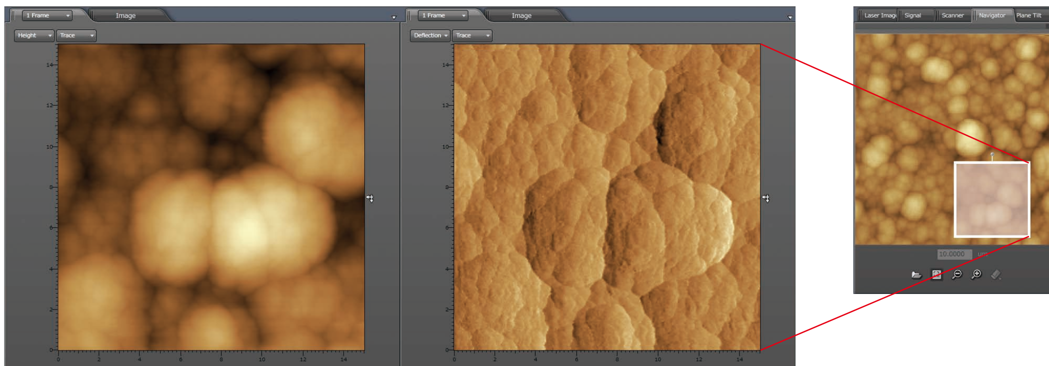
Newly Developed SPM Head with Reduced Noise

The OLS4500 employs a nosepiece-mounting-type SPM scanner head. Because the objective and the cantilever tip are in the coaxial, parfocal positioning, the observation point will not be lost from the field of view even after switching to SPM mode. The newly developed compact SPM head is improved rigidity, so it features reducing image noise and improving responsiveness.

Newly Developed Compact SPM Scanner Head

Navigator to Magnify the Region as Requested

The navigator function allows closer viewing of the required region in an image acquired with the probe scan mode by further increasing the magnification. The target image can be obtained by simply setting the magnifying region using the cursor and starting probe scan. The scanning area can be set freely, allowing observation and measurement to be performed more quickly and efficiently.

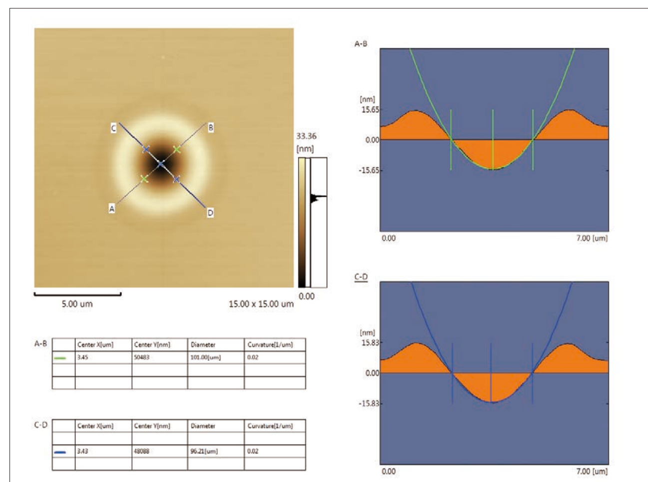


Navigator magnifies a 3.5 µm x 3.5 µm area on a 10 µm x 10 µm image

Analyses to Meet Different Requirements

Images acquired in SPM measurement mode can be analyzed to suit the requirements of different applications, and the results can be exported as the CSV format. The OLS4500 provides the following analysis functions.

- **Profile** (curvature factor measurement, contained angle measurement)
- **Roughness**
- **Topography** (area, surface , volume, height, histogram, bearing ratio)
- **Step** (line, area)
- **Particle analysis** (optional)



Curvature Measurement (Hard Disk Pits)

Advantages of Composite Microscope

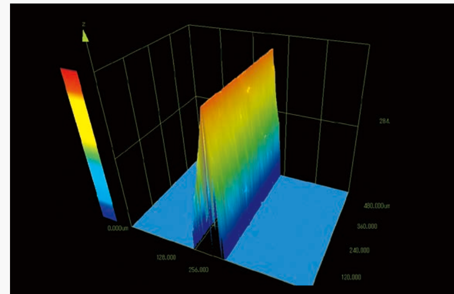
LSM allows flexible handling of various samples

The OLS4500 also functions as a powerful composite microscope that integrates optical, LSM and SPM supported by an array of advanced functions. In particular, the LSM is ideal for micro surface texture measurements of very small regions from micron to submicron-order, and is capable of seamless-magnification measurement in combination of the SPM. As a result, the OLS4500 can flexibly adapt to handle various samples, providing optimum output even from a sample that the operator has not handled before.

Imaging Slopes up to 85°

Thanks to dedicated objective lenses with high numerical apertures and a dedicated optical system that obtains superior performance from a 405 nm laser, the OLS4500 can reliably measure acute-angled samples that were previously impossible to measure.

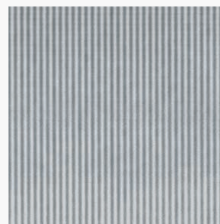
LEXT-Dedicated Objective Lenses



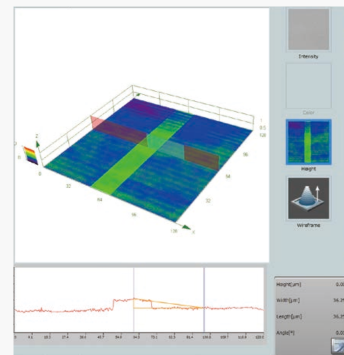
Razor with an Acute Angle

Micro-Profile Measurements with High Resolution

Thanks to a short-wave length 405 nm laser light and a higher-aperture objective lens, 0.12 µm X-Y resolution is available. As a result, the OLS4500 can perform submicron measurements of sample's surface. Combined with a high-precision linear scale and Olympus original intensity detection technology, this allows high-definition imaging, enabling accurate height measurement from the submicron to the hundreds of microns range. In addition, the OLS4500 is able to assure both "accuracy", which indicates how close a measurement value is to its true value and "repeatability", which indicates the degree of variations among repeated measurement values, both show the performance of measuring tool.



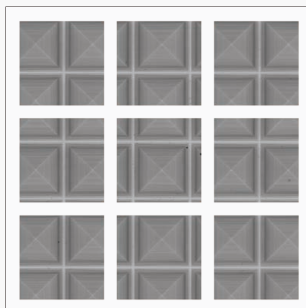
0.12 µm Line and Space Pattern



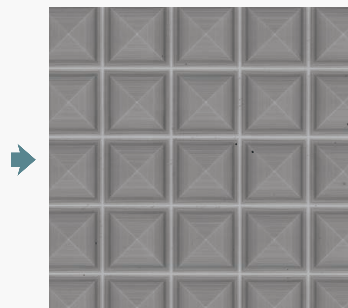
(MPLAPON50XLEXT)
STEP Height standard Type B, PTB-5, Institut für Mikroelektronik, Germany,
6 nm Detection in Height Measurement

Designation of Any Image Capturing Area from a Wide Area

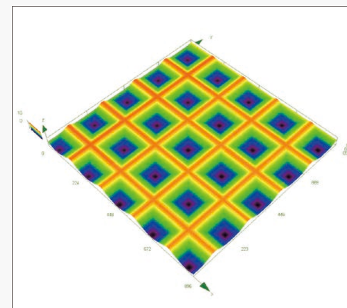
Though the field of view at high-magnification image is narrow in general, the stitching function of the OLS4500 can provide image data with high resolution and a wide field area by stitching together up to 625 images. The obtained wide-field image can be subjected to 3D display and 3D measurement.



Individual 2D Images Before Stitching (Simulated)



2D Image After Stitching



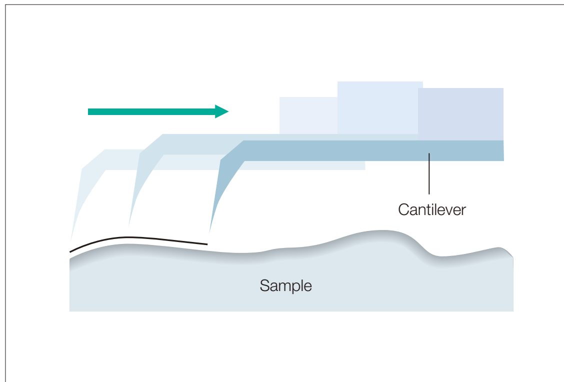
3D Image After Stitching

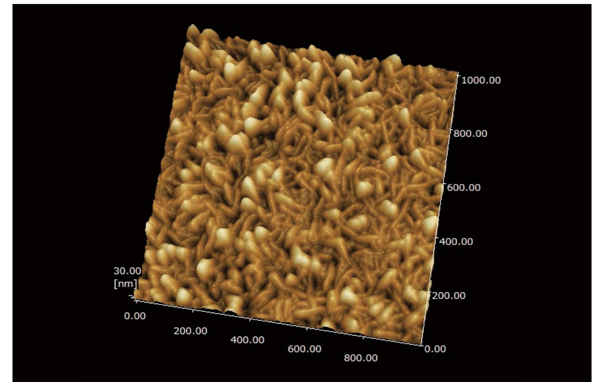
Six SPM Measurement Modes with Easy-to-Follow Guidance Display

Three Standard Modes for Dealing with a Wide Range of Samples

Contact mode

This mode scans the setting area by the cantilever statically while keeping the repulsive force constantly between the cantilever and sample in order to visualize the height information of the sample. It can also be used for the force curve measurement.

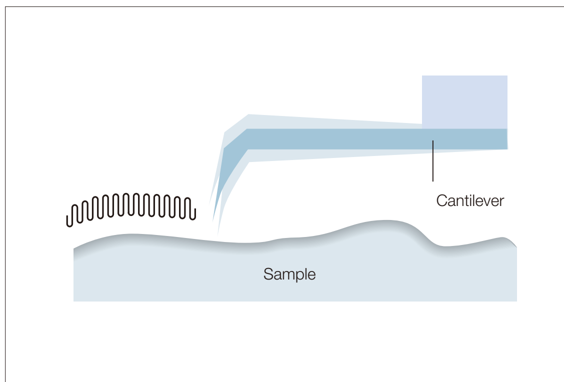


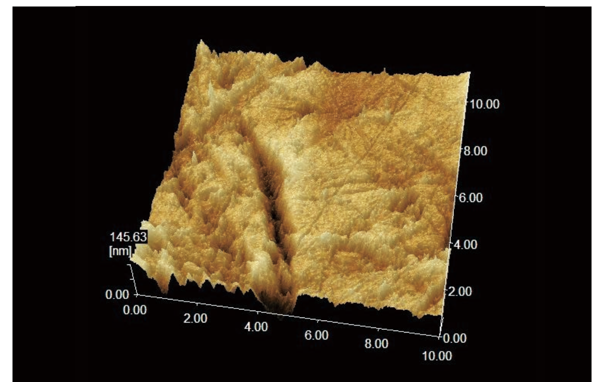


Metallic Thin Film

Dynamic mode

This mode vibrates the cantilever at near the resonance frequency and controls the Z-direction distance to make the vibration amplitude constant in order to visualize the height information of the sample. It is suitable for samples with soft surfaces such as polymers or viscous materials.

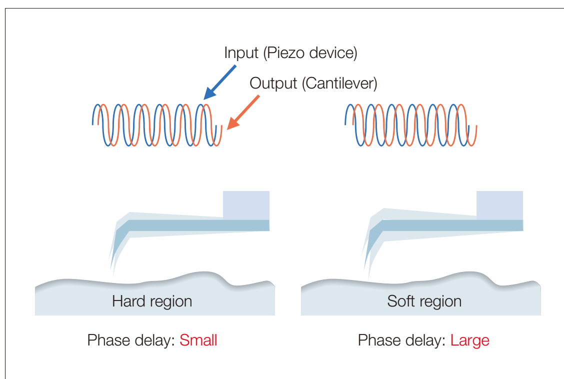


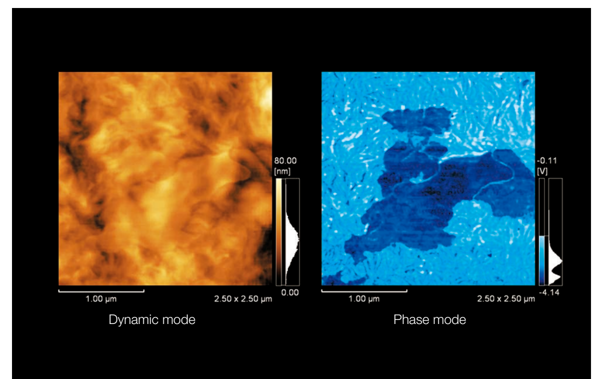


Aluminium Surface

Phase mode

This mode detects phase delays in the cantilever vibration during scanning in the dynamic mode. It can visualize the difference in physical properties on the sample surface.



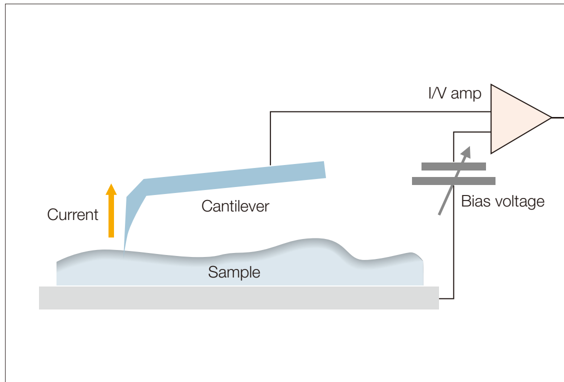


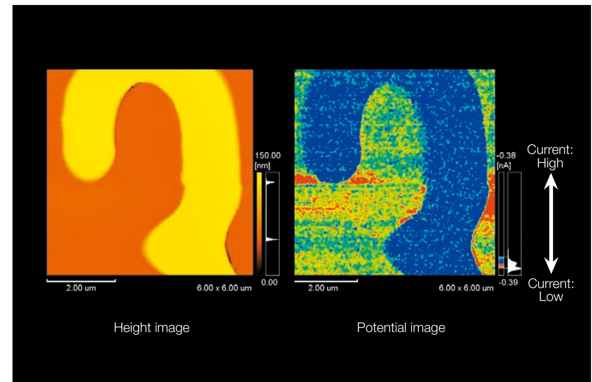
Polymer Film

Three Optional Modes Added for Supporting Various Analyses

Current mode

This mode applies a bias voltage to the sample to detect and visualize the current flowing between the cantilever and sample. It can also be used for I/V measurements.

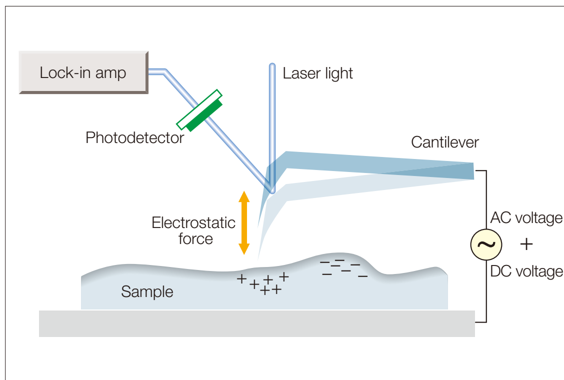


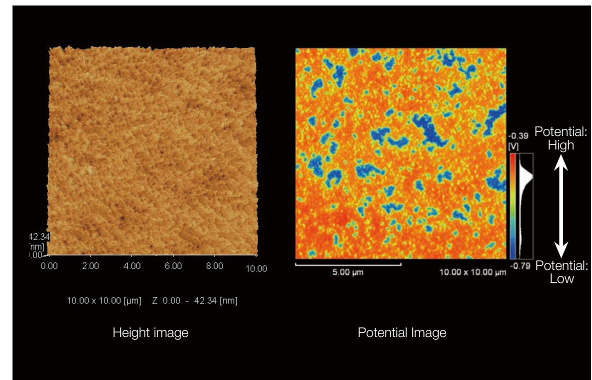


Sample of SiO_2 pattern on a Si substrate. The yellow region in the height image (left) is SiO_2, which is displayed blue (region without current flow) in the current image (right). These images show that a substrate has regions without current flow.

Surface Potential mode (KFM)

This mode applies an AC voltage through the conductive cantilever, detects the electrostatic force working between the cantilever and sample, and visualizes the electric potential on the sample surface. It is also called the Kelvin Force Microscope (KFM) mode.

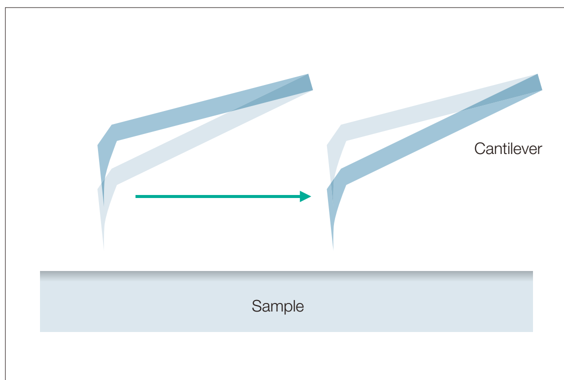


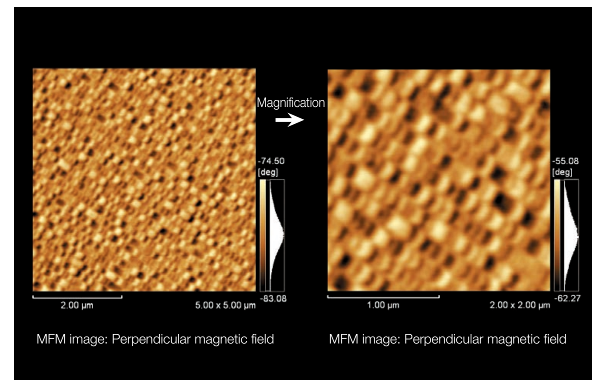


Sample of magnetic tape. The surface potential image shows that potential difference of a few hundreds of mV is distributed on the sample surface. This distribution is regarded to reflect the presence of irregularities in the lubrication layer on the tape surface.

Magnetic Force mode (MFM)

This mode scans the setting area with magnetized cantilever in phase mode and detects the phase delays in the cantilever vibration then visualizes the magnetic information on the sample surface. It is also called the Magnetic Force Microscope (MFM) mode.





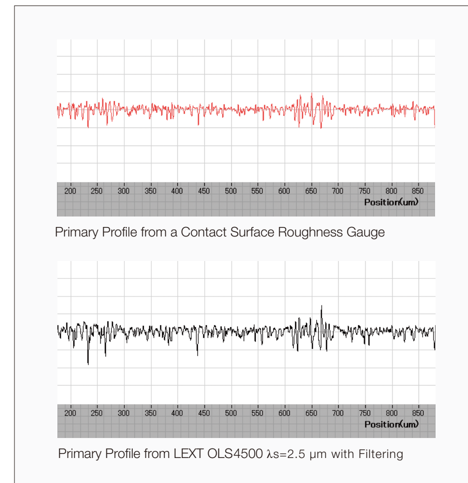
Sample of hard disk. The image shows the distribution of magnetic property.

Non-Contact Measurement of Surface Roughness of Micro Area

Enables Plane Roughness Measurement in Addition to Line Roughness

Increasing Importance of Surface Roughness Measurement

With continuous reductions in the size and weight of recent industrial products, the parts composing them are also subject to miniaturization. This trend toward micro-miniaturization of component parts is increasing the importance of surface roughness measurement, as well as geometry measurement. Reflecting these market needs, the ISO added the LSM and AFM to the list of 3D surface texture measuring instruments (ISO 25178-6). This means that non-contact surface roughness measurement is recognized as an official evaluation standard just like the traditional contact surface roughness gauge . The OLS4500 comes with roughness parameters conforming to the ISO.

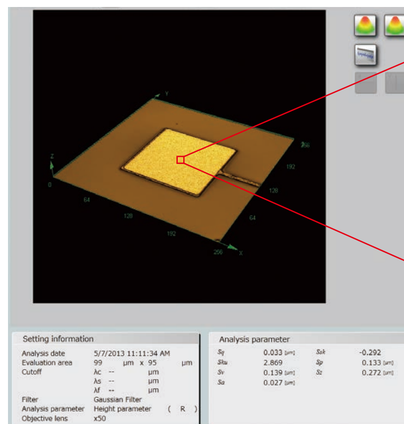


Primary Profile from a Contact Surface Roughness Gauge

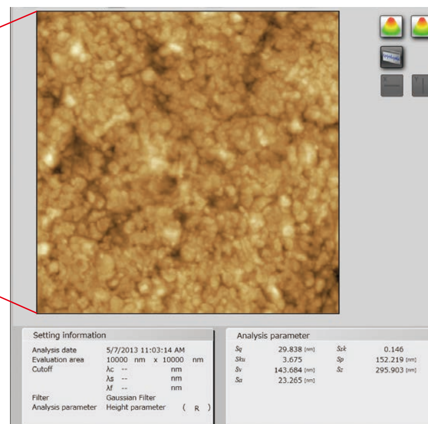
Primary Profile from LEXT OLS4500 λs=2.5 μm with Filtering

Plane Roughness Measurement for Capturing Detailed Information

Non-contact surface roughness measurement can obtain the plane roughness as well as the line roughness. The plane roughness measurement can also identify roughness distribution and properties in a region designated on the sample surface so that they can be collated with the 3D image for evaluation. The OLS4500 can measure the surface roughness using either the LSM or SPM function. These two functions can be selected according to the sample properties or observation purpose.



Plane Roughness Measurement with LSM (105 μm x 105 μm)
Bonding Pad



Plane Roughness Measurement with SPM (10 μm x 10 μm)

LEXT OLS4500 Parameters

Parameter Compatibility	The OLS4500 comes with the same Surface Profile Parameters as contact-type surface roughness gauges, offering compatible operability and measurement results.		
		Primary Profile	: *Pp, Pv, Pz, Pc, Pt, Pa, Pq, Psk, Pku, Psm, PΔq, Pmr(c), Pδc, Pmr*
		Roughness Profile	: *Rp, Rv, Rz, Rc, Rt, Ra, Rq, Rsk, Rku, Rsm, RΔq, Rmr(c),Rδc, Rmr, RZJIS, Ra75*
		Waviness Profile	: *Wp, Wv, Wz, Wc, Wt, Wa, Wq, Wsk, Wku, Wsm, WΔq, Wmr(c), Wδc, Wmr*
		Bearing Area Curve	: *Rk, Rpk, Rvk, Mr1, Mr2*
		Motif	: *R, Rx, AR, W, Wx, AW, Wte*
		Roughness Profile (JIS 1994)	: *Ra(JIS1994), Ry, Rz(JIS1994), Sm, S, tp*
		Others	: *R3z, P3z, PeakCount*

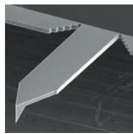
Accommodating Next-Generation Parameters	The OLS4500 comes with roughness (3D) parameters conforming to ISO 25178. By evaluating the planer area, high-reliability analysis is made possible.		
		Amplitude Parameters	: *Sq, Ssk, Sku, Sp, Sv, Sz, Sa*
		Functional Parameters	: *Smr(c), Sdc(mr), Sk, Spk, Svk, SMr1, SMr2, Sxp*
		Volumetric Parameters	: *Vv(p), Vvv, Vvc, Vm(p), Vmp, Vmc*
		Lateral Parameters	: *Sal, Str*

High-Quality Cantilevers for High Reliability

Wide Line of Olympus-Developed Cantilevers

The X-Y plane resolution of the SPM is determined by the probe tip diameter. The cantilevers developed and fabricated by Olympus assure stable probe tip quality to lead to high reliability. Unique designs such as “TipView” structure facilitates exact probe positioning, while the “New Concept Chip” improves usability as well as accuracy.

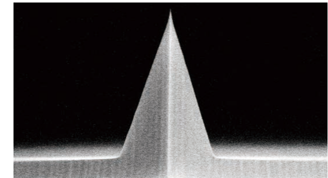
• A cantilever product catalog is separately available.



OMCL-AC160TS-C3 Standard Silicon Cantilever

High Q factor for high-resolution measurement

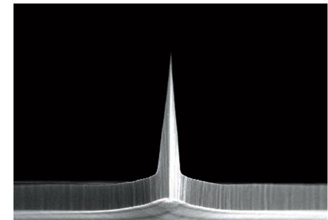
Widely used in dynamic mode measurements. It is suitable for surface roughness measurement.

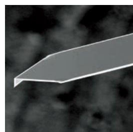


OMCL-AC160BN-A2 Blade Tetrahedral Probe Silicon Cantilever

High aspect ratio suitable for groove measurement

Used in dynamic mode, features a sharper, blade-like tip with a 7:1 aspect ratio views along the cantilever axis. Common applications include measuring the electrode patterns of ICs and moth-eye structures for anti-reflective coating for LED.

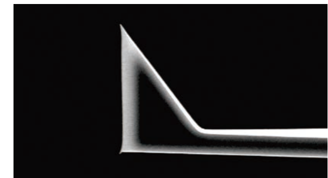




OMCL-AC240TS-C3 Medium-soft Silicon Cantilever

Viscoelasticity measurement with high reproducibility

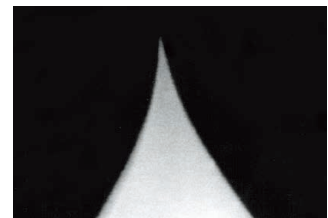
Spring constant of 2 N/m (Nom.) is smallest of silicon cantilevers for AC series. It is therefore suitable for measurements of viscoelasticity of soft samples.



OMCL-TR800PSA-1 Standard Silicon Nitride Cantilever

Low wear, excellent durability

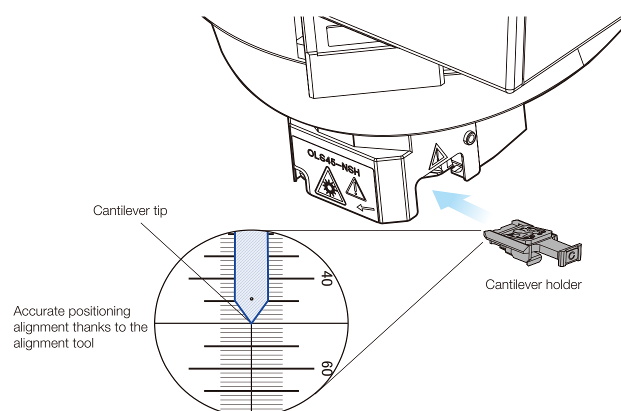
Widely used in contact mode measurement, due to the cantilever softness and probe wear resistance. Each chip has two cantilevers of differing lengths of 100 µm and 200 µm.



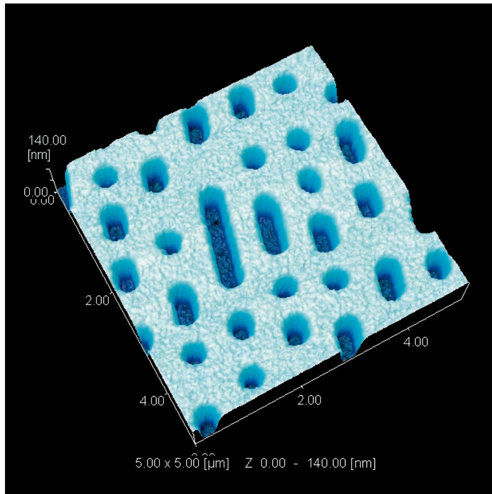
Compatible with a Wide Range of Cantilevers, Easy and Accurate Cantilever Replacement

The cantilever needs to be replaced, depending on the frequency of use. As the motorized revolving nosepiece, SPM scanner head and cantilever are precisely aligned, you can complete replacement of the cantilever just by inserting the position-aligned cantilever holder into the SPM scanner head. A special alignment tool is provided for use in the positioning of the cantilever and holder so that accurate adjustment is easy for anyone. Other types of cantilevers can also be replaced using the same procedure, thereby improving the efficiency of observation and measurement.

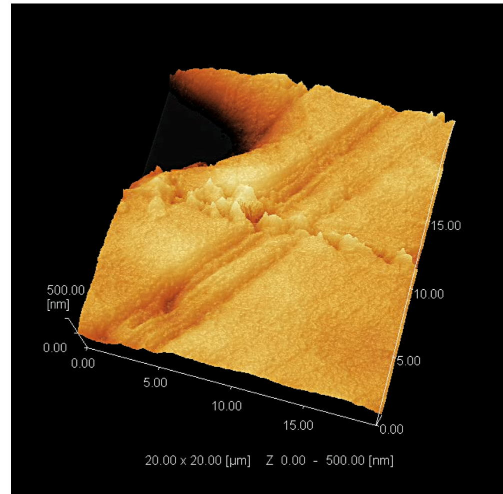
Cantilever positioning alignment tool



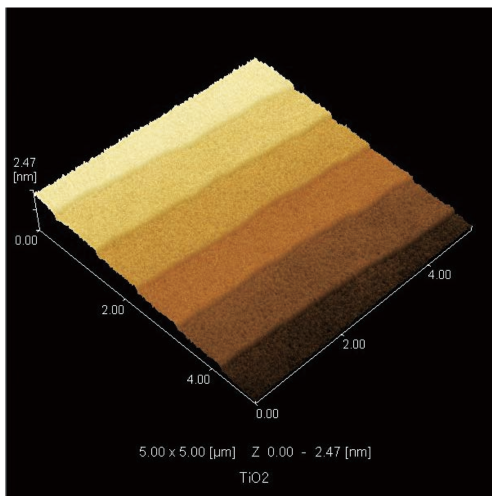
Sample Applications



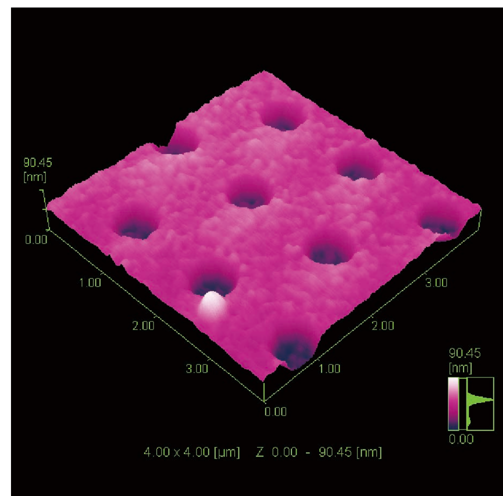
DVD Disc Surface
(Scanning area: 5 µm x 5 µm, 3D image)
Pits on the recording surface and surface conditions can be observed in detail.



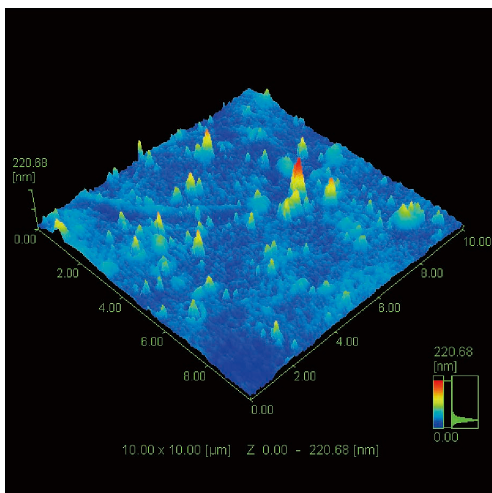
Vickers Indentation
(Scanning area: 20 µm x 20 µm, 3D image)
Cracks propagated from the apex angle of indentation are clearly visible.



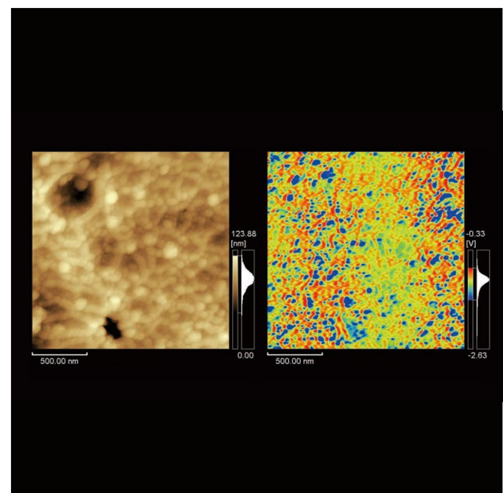
TiO2 Monocrystal Substrate
(Scanning area: 5 µm x 5 µm, 3D image)
Atomic steps of approx. 0.3 nm TiO_2 (oxidized titanium) can be seen.



IC Pattern Hole
(Scanning area: 4 µm x 4 µm, 3D image)
Minute foreign particle (white area) attached to the pattern surface can be seen.

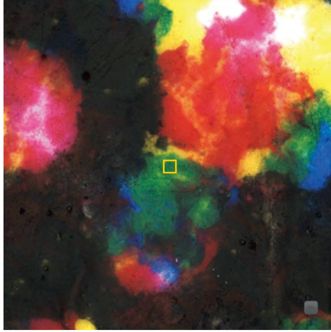


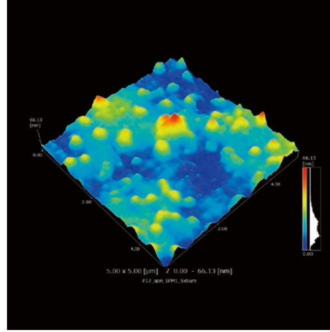
Polymer Film
(Scanning area: 10 µm x 10 µm, 3D image)
A flaw on the film surface (center left) can be seen.

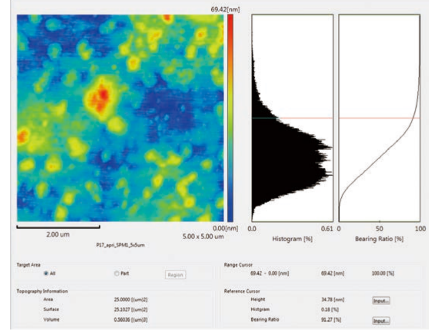


Aluminium Anode Oxide Layer
(Scanning area: 1.8 µm x 1.8 µm, surface potential mode (KFM); Left: height image, Right: potential image) Surface shape (left) and surface potential (right) on the aluminium anode oxide layer are visible. A mesh structure that is not apparent in the height image is detected.

Color Printing

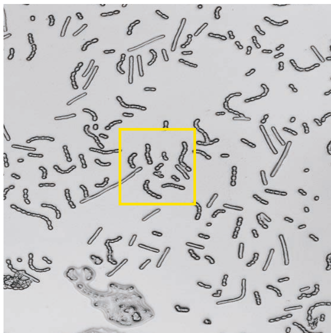

Optical Microscope (50x)

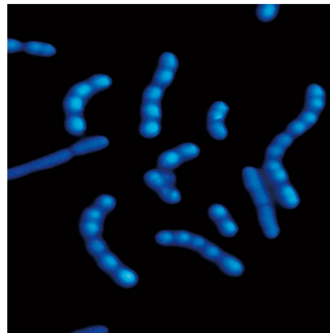

SPM (Scanning area: 5 μm x 5 μm, 3D image)

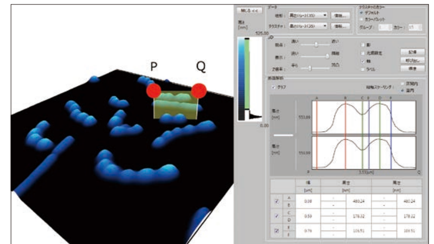


SPM Topography Analysis

Lactic Acid Bacteria

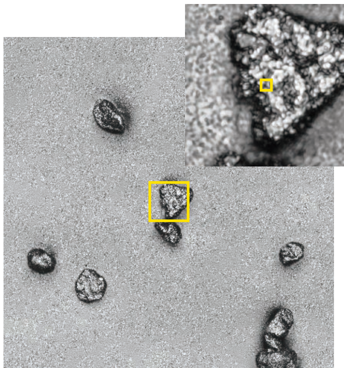

LSM (Scanning area: 100 μm x 100 μm)

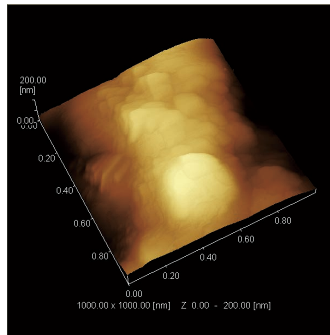

SPM (Scanning area: 20 μm x 20 μm, height image)



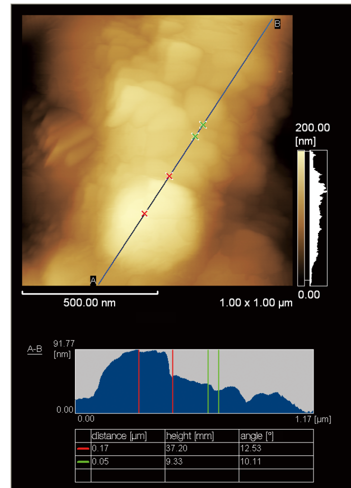
SPM Profile Analysis

Toner Particle


LSM (Scanning area: 80 μm x 80 μm, Right above: 10 μm x 10 μm)



SPM (Scanning area: 1 μm x 1 μm, 3D image)



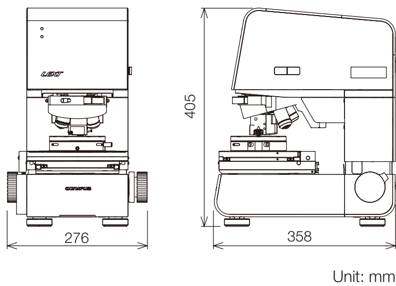
SPM Profile Analysis

Dimensions / Specifications

SYSTEM APPEARANCE

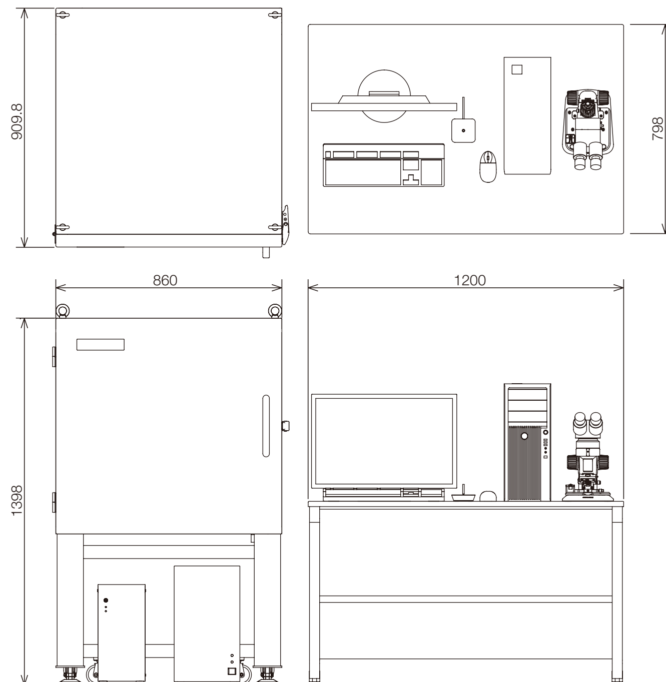
* The table shown above is available as an option.

MAIN UNIT DIMENSIONS



Unit: mm

COMBINATION SYSTEM DIMENSIONS



Upgrade Service to the OLS4500 Nano Search Microscope

You can upgrade your OLS4000/OLS4100 Laser Scanning Microscope to the OLS4500 Nano Search Microscope. The upgrade can be done right at your facility, so there is no need to return the microscope system.

For more details, please contact your Olympus dealer.

MAIN UNIT

LSM Section				
LSM Section			Light Source/Detector	Light Source: 405 nm Semiconductor Laser, Detector: Photomultiplier
			Total Magnification	108x – 17,280x
			Zoom	Optical Zoom: 1x – 8x
	Measurement	Planar Measurement	Repeatability	100x: $3\sigma_{n-1}$=0.02 µm, 50x: $3\sigma_{n-1}$=0.04 µm, 20x: $3\sigma_{n-1}$=0.1 µm
			Accuracy	Measurement Value ±2%
		Height Measurement	System	Revolving Nosepiece Vertical-Drive System
			Stroke	10 mm
			Scale Resolution	0.8 nm
			Movement Resolution	10 nm
			Display Resolution	1 nm
			Repeatability	100x: σ_{n-1}=0.012 µm, 50x: σ_{n-1}=0.012 µm, 20x: σ_{n-1}=0.04 µm
			Accuracy	0.2+L/100 µm or Less (L=Measuring Length)
	Color Observation Section		Light Source/Detector	Light Source: White LED, Detector: 1/1.8-Inch 2-Megapixel Single-Panel CCD
			Zoom	Digital Zoom: 1x – 8x
	Revolving Nosepiece			Motorized BF Sextuple Revolving Nosepiece
	Differential Interference Contrast Unit			Differential Interference Contrast Slider: U-DICR, Polarizing Plate Unit Built-In
	Objective Lens			BF Plan Semi-apochromat 5x, LEXT-Dedicated Plan Apochromat 20x, 50x, 100x
	Z Focusing Unit Stroke			76 mm
	XY Stage			100 x 100 mm (Motorized Stage)

SPM Section		
SPM Section	Measurement mode	Contact mode, Dynamic mode, Phase mode, Current mode*, Surface Potential (KFM) mode*, Magnetic Force (MFM) mode*
	Displacement detection	Optical lever system
	Light source	659 nm Semiconductor Laser
	Detector	Photodetector
	Max. scanning range	X-Y: Max. 30 µm x 30 µm, Z: Max. 4.6 µm
	Cantilever mount	One-touch mount using cassette-type cantilever holder. With the pre-alignment using the dedicated special tool for cantilever mounting, optical alignment is not required when replacing the cantilever

* Optional

System		
System	Total weight	Approx. 440 kg (excluding table)
	Input rating	100 - 120 V/220 - 240V, 600VA, 50/60 Hz

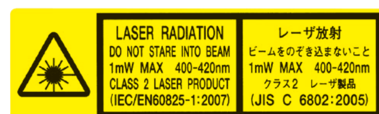
OBJECTIVE LENS

Model	Magnification	Field of View	Working Distance (WD)	Numerical Aperture (NA)
MPLFLN5X	108x-864x	2,560-320 µm	20.0 mm	0.15
MPLAPON20XLEXT	432x-3,456x	640-80 µm	1.0 mm	0.60
MPLAPON50XLEXT	1,080x-8,640x	256-32 µm	0.35 mm	0.95
MPLAPON100XLEXT	2,160x-17,280x	128-16 µm	0.35 mm	0.95

CANTILEVER

Application (Usage)	Product Name	Type	Chip Number	Cantilever		Probe		Material	Coating Metal
				Resonance Frequency (kHz)	Spring Constant (N/m)	Height (µm)	Radius (nm)	Probe / Lever	Probe side / Reflex side
Dynamic mode / Phase mode	OMCL-AC160TS-C3	Standard silicon	24	300	26	14	7	Si / Si	Non / Al
	OMCL-AC160BN-A2	High aspect ratio silicon	12	300	42	9	8	Si / Si	Non / Non
	OMCL-AC240TS-C3	Medium-soft silicon	24	70	2	14	7	Si / Si	Non / Al
Contact mode	OMCL-TR800PSA-1	Standard silicon nitride	34	73 / 24	0.57 / 0.15	2.9	15	SiN / SiN	Non / Au
Surface potential mode	OMCL-AC240TM-B3	Silicon for electrical measurement	18	70	2	14	15	Si / Si	Pt / Al

- The dimensions and mechanical properties shown above are typical values.
- Pay special attention as cantilevers are very small and subject to danger of getting could get into your eyes or be accidentally ingested.
- For information on using cantilevers for Current mode and Magnetic Force mode, please contact your Olympus dealer.
- In addition to the cantilevers shown here, a wide variety of cantilevers are available from Olympus. Please contact your Olympus dealer for details.



LEXT

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• Specifications and appearances are subject to change without any notice or obligation on the part of the manufacturer.
• The device is designed for use in industrial environments for the EMC performance (Class A device).
Using it in a residential environment may affect other equipment in the environment.

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