

Industry Line Scan Confocal Microscope L Series



2024 V1

For customized projects please Contact us: info@simtrum.com



SIMIRUM

SIMSCOP was established in Singapore in 2019. We have an excellent R&D team. The core members have decades of optical technology and industry background, focusing on the innovation and application of microscope technology.

Our goal is to further promote the development of high-end microscopes and provide advanced microscope solutions for professional users in the fields of Life Sciences, Material, Bio-tech and Indsutry.



Microscope

Line Scan Confocal Microscope

Spinning Disk Confocal Microscope

SIMSCOP Series Products

Type of microscope	Spatial resolution nm	Vertical depth µm	Speed fps	Laser nm	Detector	Displacement Stage	Pixel	
Point scan confocal	~30	100	8fps 512 x 512pixel	405 488 561 640	SiPM	Manual\Electric XYZ	2048 x 2048	
Line scan confocal Industry	~230	100	50fps 1024 x 1024pixel	405	CCD	Manual\Electric XYZ	1024 x 1024	
Line scan confocal Research	150-200	600	50fps 1024 x 1024pixel	405 488 561 640	sCMOS	Electric XYZ	1024 × 1024	
Spinning Disk Confocal	~230	< 200	>100fps	405 488 561 640	sCMOS	Electric XYZ	2048 x 2048	
Raman/Fluorescen ce-PL confocal	> 200	< 100	10	532 785 1064	CMOS/Spectro meter	Electric XY	1340 x 1340	
Automated fluorescence	~230	50	>100fps	Three channel LED	sCMOS	Electric XYZ	2048*2048	
SIM structured light	~100	50	13	400 - 750	sCMOS	Electric XYZ	1024 x 1024	
Microscopy Solution	SIMSCOP provides various advanced microscopy solutions for industry and research, please refer to the relevant page.							

Remarks: Available wavelengths of lasers 375nm/445nm/473nm/515nm/525nm/532nm/633nm/660nm/685nm/785nm/808nm

The line scan confocal microscope (L series) is a powerful imaging tool that combines confocal microscopy principles with fast linear scanning capabilities. This innovative technology has revolutionized the testing of rapid events in materials science and microelectronics. Unlike traditional confocal microscopes, which capture images pixel by pixel, the line scan confocal microscope captures entire rows of information simultaneously, providing unmatched speed in detection, making it ideal for quick industrial inspections.

The core of the high-speed line scan confocal microscope lies in its ability to scan a laser or illumination along a line through the sample while simultaneously collecting emitted fluorescence or reflected light from that same line. This technology is unaffected by the intensity of reflected light, enabling high-precision detection of nearly any material. It effectively addresses challenges in industrial inspection, such as evaluating transparent objects, highly reflective surfaces, and strongly light-absorbing materials, opening new avenues for industrial testing.



High speed line scan confocal

Product Core Advantages

- High-speed acquisition 50fps@1024x1024 pixels.
- Single wavelength laser supports 11 kinds of wavelength customization from UV to NIR.
- Large FOV (60X: 0.36mm, 40X: 0.54mm.
- Software function Large image Mosaic, 3D imaging rendering.
- High-speed line scan 100mm/s (Linewidth 1mm.
- 3D depth of field fusion z-axis resolution 50nm.

L series Industry

High-speed acquisition (50fps@1024x1024 pixel)

Line-scan confocal microscopy is over 100 times faster than traditional methods. It reduces phototoxicity and photobleaching, making it great for observing time-based changes, like metal microstructures at high temperatures, and for quick industrial tests, such as detecting nanomaterials and welding defects.





Line-scan

Point-scan

Accurate surface analysis and non-

contact inspection

The line scan confocal microscope can accurately reconstruct the 3D images of material surfaces, making it suitable for measuring parameters such as surface roughness, microstructure, and coating thickness. It operates without contacting the sample, preventing physical damage, which is particularly advantageous for fragile, soft, or difficultto-reach samples, such as semiconductor wafers, microelectronic devices, and high-precision optical components.







Perfect industry high-speed and high-resolution solution



Detection speed reference

Camera	High-speed CCD			
Pixels per line	4096 x 2			
Pixels per line (Vertical)	8192			
Pixel width mm	0.0050			
Linear array camera scan rate (lines/second)	200000			
Magnification (dry objective)	10X	20X		
NA	0.50	0.50		
Imaging resolution nm: 0.61λ/NA	824	589		
Scan time s: Sample area / Scan area in 1s	397.3	397.3		
Single wafer detection time	2min	6min37s		

* The theoretical ideal parameters are only for reference, and the effects of motor and data transmission should be considered in practice The wafer defect detection system identifies physical and pattern defects on wafers, providing their location coordinates (X, Y). Line-scan confocal technology speeds up detection time by more than 10 times.

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- Line scanning speed: 100mm/s
- Line width: 1mm
- Defects can be detected on an 8-inch wafer in just 6 minutes



Parameter	L Series Industry					
	Standart wavelength: 405nm±5nm					
	Output way: Single-mode polarization-maintaining fiber coupling (TEM00)					
Laser unit	Single wavelength output power: > 20mW					
	Power stability: <1%					
	Spectrum Linewidth < 3nm					
	Line array scan camera; Resolution: 4096*2					
	Pixel size: 7µm * 7µm					
Detector	Maximum line speed: 200kHz					
	Pixel bit depth: 8/10/12bit					
	Dynamic range ≥ 66.2dB					
	Scan pixel: 100 x 100 ~ 2048 x 2048					
Scan module	Frame rate: 50fps(1024x1024pixels)					
	500fps(1024x100pixels) Speed scan mode					
XY Resolution	< 500nm@20x Objective					
Imaging depth	Standart scan module < 100um					
Field of view	5x: 1mmx1mm 10x: 0.51mmx0.51mm 20x: 0.26mmx0.26mm					
	40x: 0.13mmx0.13mm 60x: 85umx85um 100x: 51umx51um					
Objective switch	Five-hole internal positioning converter, ball bearing internal positioning					
	Available with wafer vacuum fixture					
	Table size: 270mm×170mm					
	Electric XY repeated positioning accuracy: ±0.5um;					
Sample stage	Maximum speed: ≥100mm/s					
	Table size ≥270x170mm					
	Effective travel: > 250mm					
	Maximum load capacity: > 1KG (horizontal)					
7 avic travel	Focusing resolution/minimum step size 0.5µm, repeated positioning accuracy +/-0.2µm,					
∠-axis travel	maximum stroke > 100um					
Confocal structure	Coarse trimmer coaxial, equipped with limit device and locking device, low hand position					
	coaxial focusing handwheel, trimmer handwheel grid value 1µm					
	Warm LED, continuously adjustable brightness					
Transmitting	LED knob brightness regulator					
illumination system	Condenser: ultra-long working distance 72mm, numerical aperture NA=0.30, with three-					
	hole phase lining ring plate					
	Z-stack data processing, large image Mosaic, image analysis, imaging data management,					
Software function	3D topography rendering					

Note: Available wavelength 375nm/445nm/473nm/515nm/525nm/532nm/ 633nm/660nm/685nm/785nm/808nm

SIMSCOP L Series Confocal Microscope Software main Function



GUI Function Panel





Scan Mode	÷		Coordinate(µm)				
			1,298 🔅	1,094		765	
	512X512		х	Y		Z	
	Resolution		1,097				

PMT-B Gain-B FITC-488nm 76% - 100% PMT-C Gain-C 91% TRITC-561nm PMT-D Gain-D 100% 23% Pinhole Size(µm) CY5-640nm 0 84%

Display Settings such as lasers/detectors are easy to identify

X步长	0		开始扫描
Y起始位置	0	Y终止位置	0
Y步长	0		开始扫描
Z起始位置	0	Z终止位置	0
Z步长	0		开始扫描

XYZ motor table scanning parameter setting





Microscope image acquisition parameter setting



Camera parameter setting

Laser control panel

Line scan confocal scanning effect display (without algorithm process



Micro-LED Slice surface morphology scanning



Micro-LED 3D Morphology detection





Micro LED Bonding gold wire depth chart

40D

Micro LED Bonding gold wire 3D reconstruction



mirco-LED-line scan result of gold line (raw picture)

Line-scan confocal microscopy provides high-resolution images of micro-LEDs, accurately revealing their light emission characteristics and surface structures. It also highlights defects in gold wires and fine details of the LEDs by scanning line-by-

line. This technique is essential for improving manufacturing processes, enhancing display performance, and solving optical issues in micro-LED technology.



High-speed line scan 8-inch wafer surface detection



High-speed detection of wafer surface defects



Finish high-resolution and high-contarst imgaing detection in 50s (without post imaging processing)

High-speed line scan 6-inch wafer surface detection



Wafer surface detection, 20X Objective diameter of microcrater 5.5 µm, diameter of defect 1.5 µm, 0.7 µm, 0.65 µm



Wafer surface detection , 20X Objective diameter of defects 1.1 μm , 0.9 μm , 0.9 μm , 0.45 μm



Metal step



Sample depth map of metal step



3D morphology of metal samples



3D morphology analysis of metal samples

Metal surface detection



The profiles of metal surface are clear under objectives with different magnification, capable of detecting metal surface defects.

High-speed line scan photovoltaic grid line surface morphology measurement







- **High resolution**: Measure depth and width accurately, analyzing micro details.
- **Fast scan**: One scan covers a large area, suitable for rapid detection of mass production.
- **Non-contact:** Not damage sample to ensure the reliability of the measurement.
- 3D morphology reconstruction: Generate 3D structure of notching line for detection.
- Automatic data process: Analize and generate report quickly, suitable for real-time quality control.
- Complex surface adaptation: Good adaptability to different materials and complex surfaces.

Line-scan confocal microscopy enables high-resolution imaging of the surface morphology of photovoltaic grid lines, accurately detecting micro-defects, surface roughness, and shape irregularities. This detailed measurement helps optimize the manufacturing process of photovoltaic modules, improving efficiency, long-term stability, and ensuring high performance and reliability in real-world applications.

Applicable to various industrial fields, including semiconductors, materials science, and nanotechnology.

Multiple customizable industrial vision inspection solutions

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