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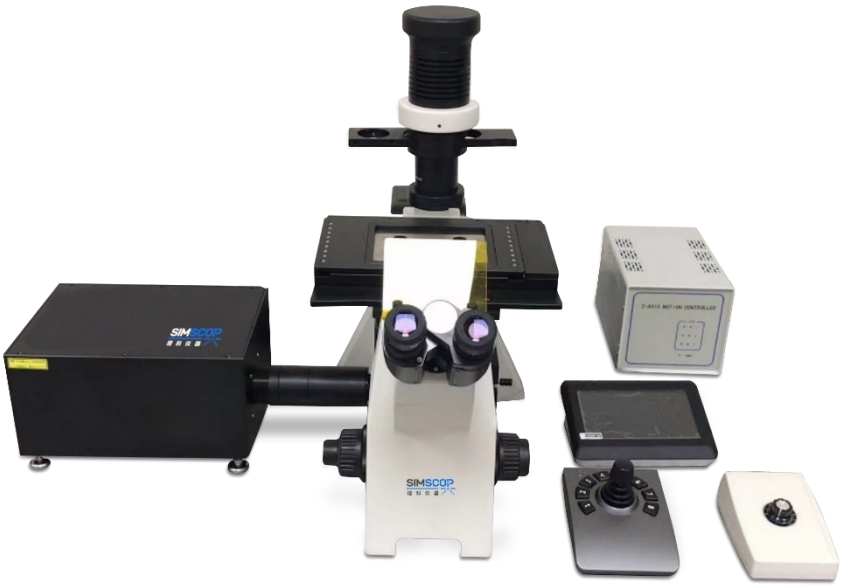
Laser Line Scan Confocal Microscope

Basic L Series

Advance L Series



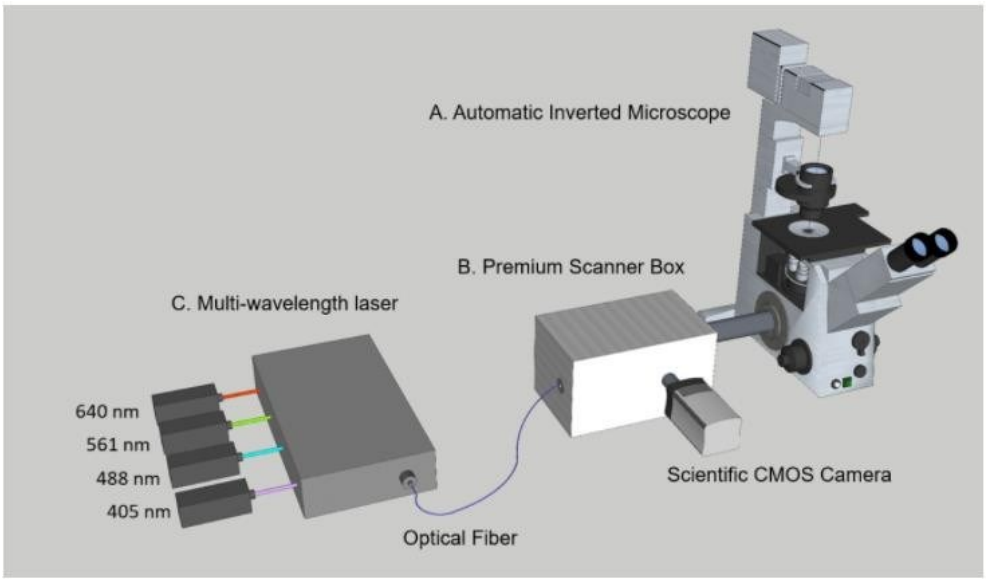
2022 V1

For customized projects please Contact us:

info@simtrum.com

SIMSCOP L Series LFMM (Line-scan Focal Modulation Microscopy)

LSFMM (Line-scan Focal Modulation Microscopy) is a high-speed, high-contrast multi-dimensional imaging platform capable of three key imaging advantages. At its core is a focal modulation module for high-contrast imaging. It significantly reduces the background signal caused by multiple scattering and effectively picks up the high-resolution signal related to the ballistic excitation light. Consequently, the signal to background ratio and the spatial resolution can be maintained to a deeper penetration depth, which is about two to four times deeper than conventional confocal microscopes. High acquisition speed is the second feature of LSFMM. Capturing at speeds at least 100x faster than conventional confocal technology, LSFMM is the optimal solution for live cell and tissue imaging, providing low phototoxicity and photobleaching, or perfect for fast volume acquisition of fixed samples and even small live animals.



The third characteristic is large field of view (FOV) available. Our scientific CMOS camera can offer up to 5.5 Megapixel sensor, yielding the largest available field of view with 60x objectives (0.36 mm) and 40x objectives (0.54 mm). Maximizing view in fluorescence microscopy is of increasing relevance across a wide range of applications, including high content screening of large fields of cells, imaging of the developing embryo, neuron mapping and tissue imaging.

Features & Benefits

- ✓ High-speed acquisition
- ✓ Strong optical sectioning
- ✓ Single molecule imaging
- ✓ Multi-color fluorescence
- ✓ High sensitivity
- ✓ Large field of view
- ✓ Low photobleaching and phototoxicity
- ✓ Super-resolution
- ✓ Intuitive software

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The Product Configurations Comparison

Hardware Feature	Hardware Feature	Basic L Series	Advance L Series
High-speed line- scan laser confocal imaging	Up to 140 fps for fast cell dynamics (small ROI).At least 100 x faster than conventional confocal	✓	✓
FMM image contrast enhancement	Imaging deeper in cells and tissue At least 2-4 times deeper than conventional confocal 20-40 dB enhancement in image signal-to-background ratio	-	✓
Large field of view	Capture more in a single image. Matches large sCMOS sensors	-	✓
Low noise level	Acquire noise-free images with weak fluorescence	-	✓
16-bit dynamic range	Capture both weak and bright signals without saturation	✓	✓
Multi-color fluorescence imaging	Choice of 4 wavelengths up to 640 nm Any two colours simultaneously - match penetration depth of two labelled targets instantly	Opt. to choose laser	✓
Super-resolution	Acquire higher resolution images than the diffraction limit by algorithm	-	✓
XY-motorized stage	Acquire stitching images automatically	-	✓
Z-motorized stage	Acquire volumetric images automatically	✓	✓

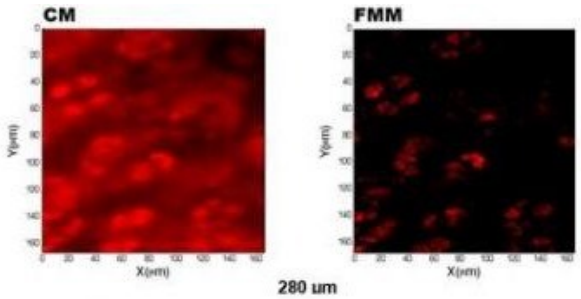
Software Feature	Benefits
Automatical image acquisition GUI software	· Microscope configuration, image acquisition, 3D images visualization and rendering. · Immediate visual feedback on experimental progress to evaluate data and make appropriate decisions in real-time
Imaris file format	· Easy transfer of data to Imaris for comprehensive downstream multi- dimensional analysis

Technical Data

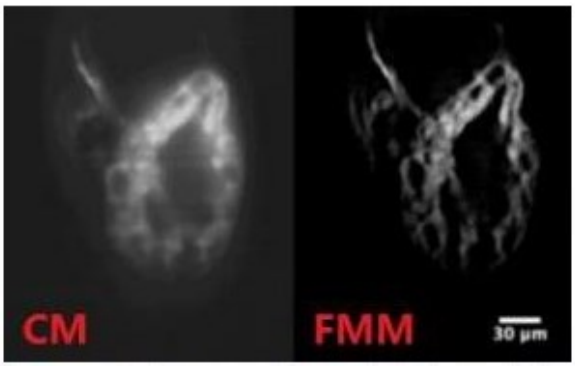
Parameters	Basic L Series	Advance L Series
Laser combiner	488nm (original configuration); Laser wavelengths are optional according to user requirement.	405nm, 488nm, 561nm, 640nm (original configuration); Laser wavelengths are optional according to user requirement.
Laser power	Maximum 20mW fiber input	
Frame rate	10 fps (1024 x 1024 pixels) 100 fps (1024 x 100 pixels) Fast scan mode	14 fps (1024 x 1024 pixels) 140 fps (1024 x 100 pixels) Fast scan mode
Image resolution	100 x 100 pixels to 1920 x 1920 pixels	100 x 100 pixels to 2048 x 2048 pixels
Image format	8/16 bit	8/16 bit
Noise level	6.2e-	0.9e-
Noise level (count in photons)	8.8 photons	1.5 photons
Lateral resolution	optical diffration limit	1.2-1.4 fold over optical diffration limit
Number of laser channel	4	1
Microscope stage	Semi-motorized stage with piezo z scanner	Fully-motorized and automated stage with piezo XYZ scanner

Technical Features Explained

LSFMM (Line-scan Focal Modulation Microscopy) is a novel microscopy method that has been developed to achieve a deeper penetration depth on the basis of confocal microscopy. Equivalently selective excitation is achieved by modulating the light intensity at the focal point only. Fluorescence emission or backscattered light are collected and demodulated. As a result, only focal signals are decoded and thus significantly reducing the background signals. Specially, we add a cylindrical lens to generate a line-focus at the sample and achieve line-scan imaging. Therefore, the imaging acquisition speed is improved significantly compared with conventional point-scan confocal microscopes.



Chicken chondrocytes labelled with a lipid tracer



3-day post-fertilized zebrafish heart labelled by EGFP

Comparison with other conventional confocal microscope models					
Parameters	**Advance L Series**	**Olympus FV3000**	**Nikon C2+**	**ZEISS LSM 980**	**LEICA TCS SP8**
Typical frame rate	Up to 140 fps	1.8 fps	2 fps	13 fps	7 fps
Imaging depth	Up to 600 μm	typically 50-200 μm			
FMM contrast enhancement	20-30 dB	No			
Noise level	1.5 photons	17 photons at 10 μs pixel time; 7.6 photons at 2 μs pixel time			

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Creating the Optimum Products for You

Step 1 Select the Scan Box You Require

- **Basic L Series**
- **Advance L Series**

Step 2 Choose Laser Combination for Your Selected Model

Many combinations of the following laser lines can be supported. For specific laser wavelength configurations please **Click Here** to speak to our Sales engineer.

Available Wavelengths (nm)	Power (mW)
405	>20
445	>20
488	>20
514	>20

Available Wavelengths (nm)	Power (mW)
532	>20
561	>20
640	>20
785	>20

Step 3 Select the Inverted Microscope Model

Recommended Microscope Models

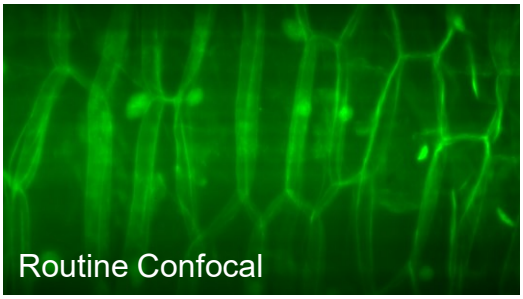
Olympus	Nikon	Zeiss& Leica	Mshot
Olympus IX73	Nikon Ti-E	Zeiss AxioObserver	MF53N
Olympus IX83	Nikon Ti-U	Leica DMi6000	
	Nikon Ti2-E	Leica DMi8	
	Nikon Ti2-A		
	Nikon Ti2-U		

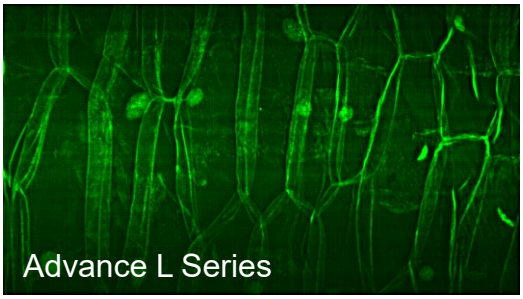
Step 4 Select the Required Accessories

Please discuss any additional requirements, such as motorized XY and Z stage control, incubation and accessories for your specific application needs with our Sales Engineer.

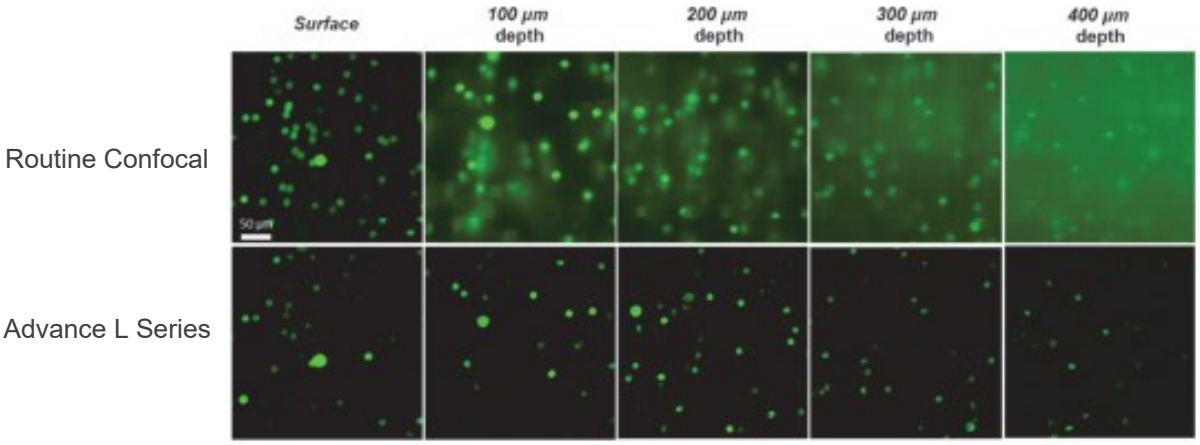
Applications

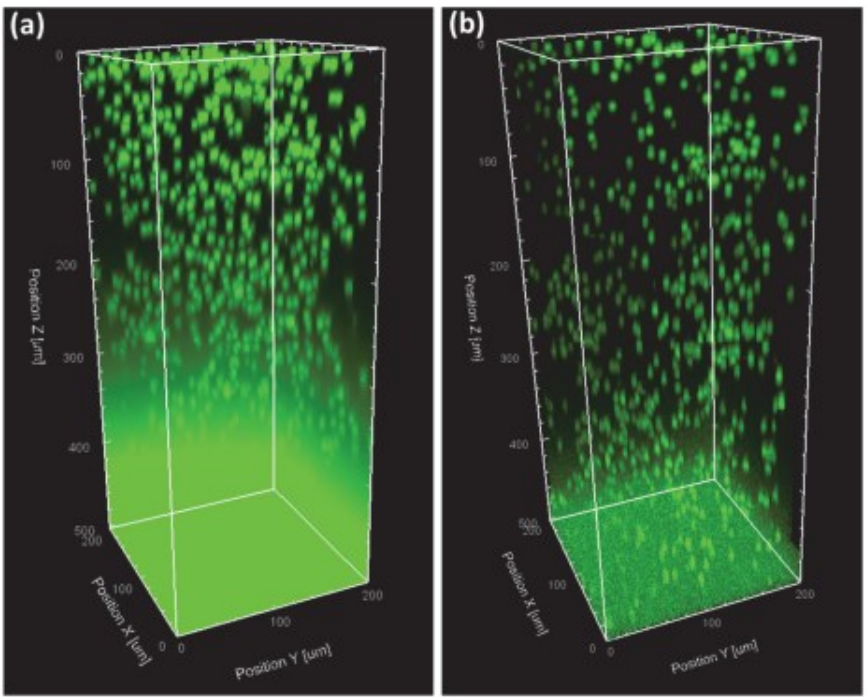
Onion Cell Imaging (20x/0.45)





Thick Beads Phantom Imaging (20x/0.45)

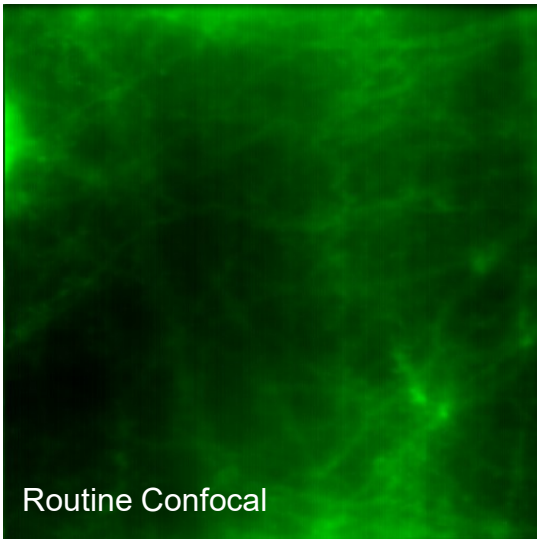


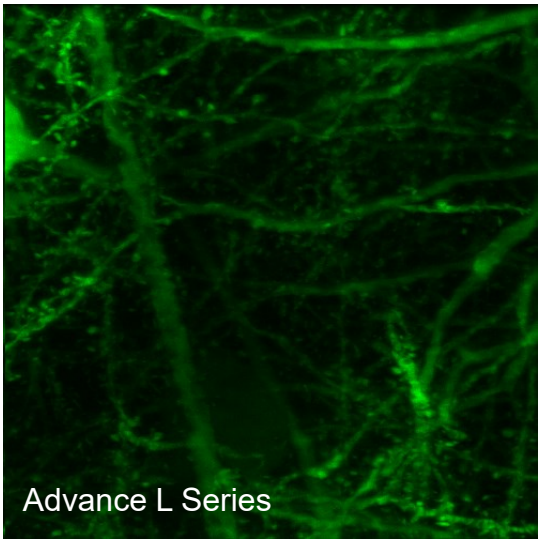


Routine Confocal Advance L Series

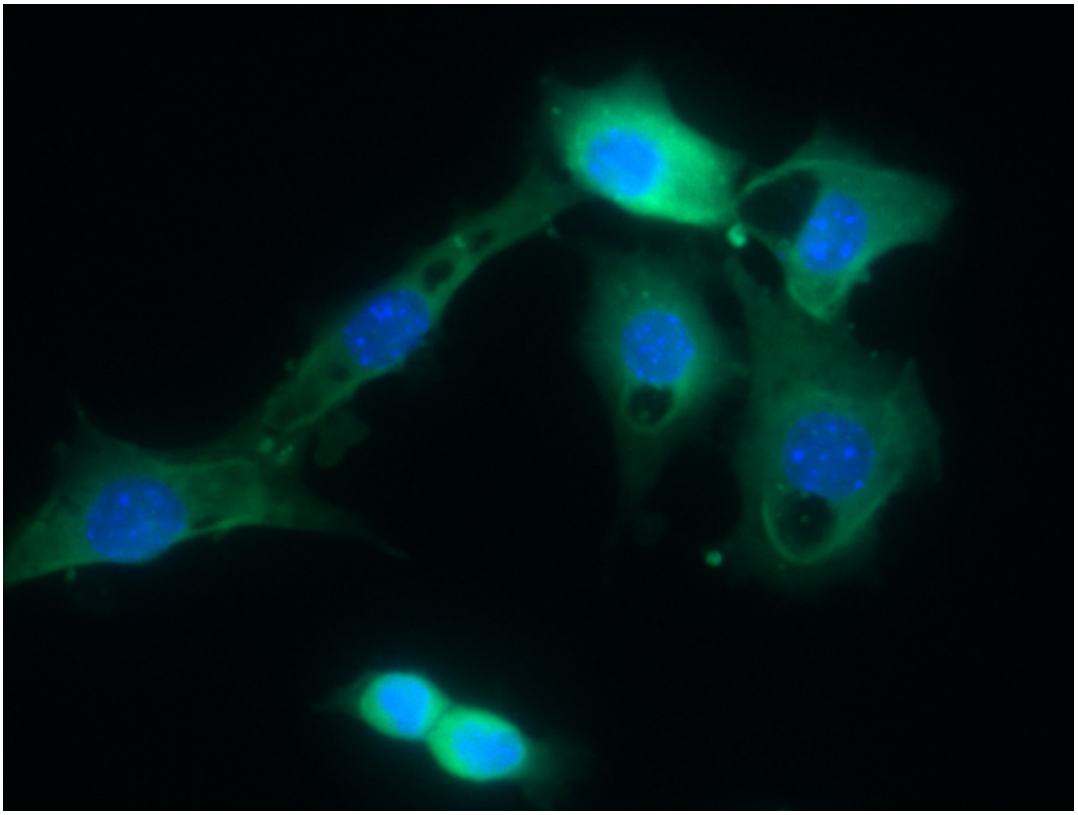
Applications

Mouse Brain GFP Neurons (20x/0.95, 3D projection)





Mouse Epithelial Cells (40x/0.75, DAPI/FITC)



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