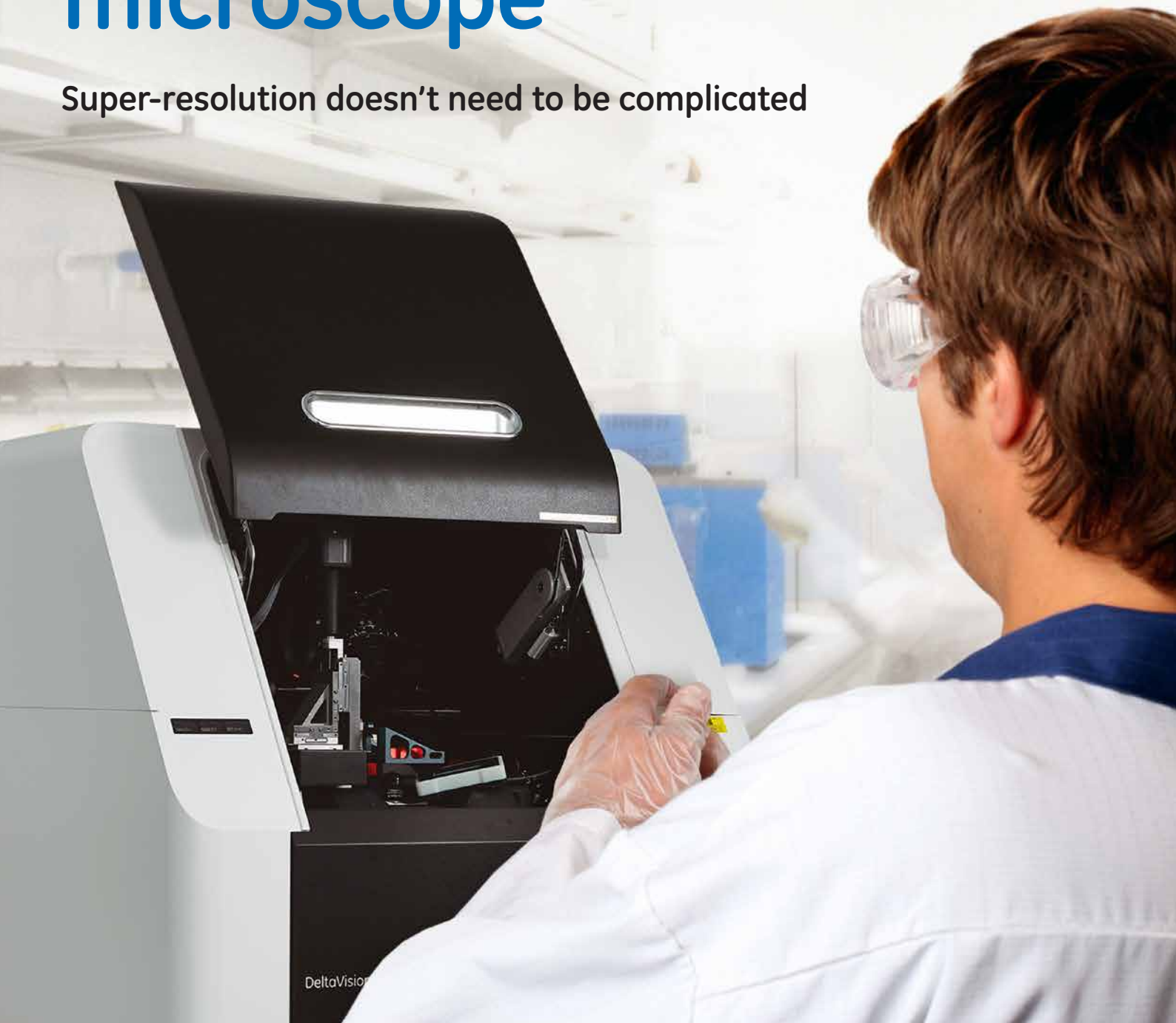




DeltaVision™ OMX SR super-resolution microscope

Super-resolution doesn't need to be complicated



DeltaVision

Live-cell super-resolution microscopy

DeltaVision OMX SR is a compact super-resolution microscope system optimized to incorporate the power of structured illumination microscopy (SIM) into a stable live-cell imaging platform.



DeltaVision OMX SR is fully enclosed, does not require a darkroom, and can be installed ready-to-run in a standard lab within days.

Technology overview

Structured illumination microscopy (SIM)

Structured illumination is an imaging technique that generates super-resolved images through the interaction of structured light patterns with sample. Computer algorithms process the collected raw data set and generate the final super-resolution image.

- 3D-SIM yields twice the resolution of conventional imaging techniques in X, Y (2D/3D), and Z (3D)
- 3D-SIM provides an overall eight-fold improvement in volume resolution (X, Y, and Z)
- 2D-SIM and SIM-TIRF improve X and Y resolution only but offer higher acquisition rates that may be more suitable for fast moving dynamic events
- DeltaVision OMX SR uses our exclusive Blaze SIM module which is fast enough to enable super-resolution imaging in live cells

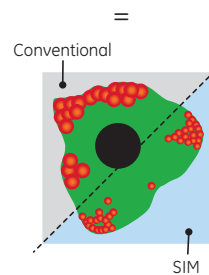
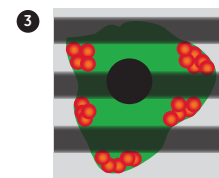
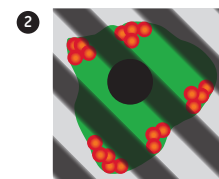
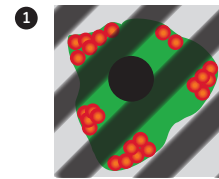
Localization microscopy

The Localization Microscopy System is an advanced imaging option that employs laser activation to control the on/off state of the fluorophores within the sample.

By spreading the signals over time it is possible to acquire stacks comprising images of sparsely distributed individual fluorophores. These images are analyzed with a fitting algorithm to find the locations of fluorophores within a sample and this output is used to reconstruct a super-resolved image.

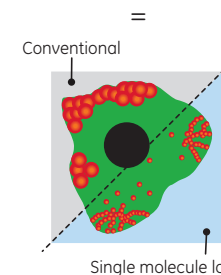
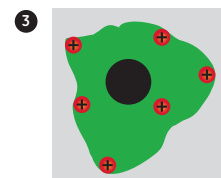
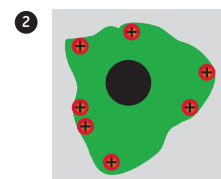
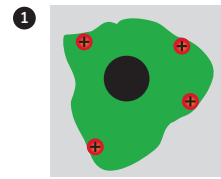
- Provides 2D resolution down to 20 nm (requires appropriate sample preparation, labeling density, and localization precision)
- Is compatible with photoactivation, photoconversion, and photoswitching fluorophore systems
- Deltavision OMX SR uses our exclusive Dense Stochastic Sampling Imaging (DSSI) algorithm which can resolve overlapping signals from fluorophores spaced closer than the diffraction limit in dense fields

Three-dimensional structured illumination microscopy (3D-SIM)



Reconstructed image after seconds to minutes

Localization microscopy



Summed image after 1 000 frames

Physiologically relevant, technically sound

Designed for biologists wishing to advance their research beyond what is possible with confocal microscopes, DeltaVision OMX SR improves spatial resolution by a factor of 2 in x, y, and z directions, enabling previously unseen detail to be obtained from highly resolved images of small, dim, and live samples.

Unlike many super-resolution technologies, SIM requires minimal change to your sample preparation or preferred buffers and fluorophores, meaning you can be confident that your results are physiologically relevant from day one.



SIM technology delivers outstanding images for better data analysis.

Same sample preparation, super-resolution results

The DeltaVision OMX SR is the latest addition to our high-performing DeltaVision range and builds on the reputation of the DeltaVision Elite and DeltaVision OMX for delivering outstanding images particularly for small, dim, and live samples.

In addition to 2D and 3D SIM super-resolution imaging, the DeltaVision OMX SR is also capable of widefield, timelapse imaging, deconvolution, and TIRF illumination using the same techniques and fluorophores utilized on confocal microscopes. For added flexibility, a ring TIRF option provides even illumination and artifact-free TIRF imaging enabling the system to be used for localization microscopy and photokinetic applications.

General capabilities

- **Standard fluorophore excitation:** Multiple lasers support a wide range of generally used fluorescent dyes and proteins
- **Speed AND sensitivity:** Up to four sCMOS cameras offer high-sensitivity and incredible speed up to 400 fps in widefield mode
- **Convenience:** Enclosure eliminates the need for a dedicated darkroom

Practical super-resolution imaging

- **See beyond the norm:** 3D SIM enables resolution improvements in X, Y, and Z directions
- **Super-resolve live cells:** 2D SIM and 2D SIM-TIRF imaging modes for dynamic super-resolution imaging
- **Molecular imaging:** Localization microscopy option utilizes exclusive 2D multi-emitter fitting algorithms

Live-cell and widefield imaging

- **More data from your sample:** Multiplex data acquisition with simultaneous multi-camera imaging
- **Preserve cell viability:** Ultra-low light imaging combined with advanced deconvolution algorithm
- **Capture dynamic processes:** Rapid image acquisition and stage automation



SIM technology delivers outstanding images for better data analysis.

A system you can trust

The DeltaVision OMX SR can be installed, set up, and validated within days while full training and post installation support are provided giving you the time to focus on your research and contribute to the insight SIM technology has brought to our understanding of cellular processes and structures.

Why not check out some of the hundreds of articles published by biologists already using SIM based super-resolution microscopes for their research?



The DeltaVision OMX SR optical block provides the stability required for super-resolution imaging.

DeltaVision OMX SR system details

Standard camera/filter setup	One sCMOS camera and eight-position filter wheel
Additional cameras	Four maximum. Additional cameras also require new filters and optical components which are included in the camera package
Standard lasers	405, 488, 568, and 640 nm (100 mW)
Conventional illumination	Laser illumination through Blaze SIM module or Ring-TIRF module operating in widefield mode using any laser available on system
SIM illumination option	3D SIM, 2D SIM, 2D SIM-TIRF
Ring-TIRF illumination option	Adjustable angle TIRF and photokinetic illumination
Optional accessories	DIC option, live-cell environmental control kit

Resolution capabilities of different imaging modes

	Widefield microscopy	Widefield deconvolution	2D SIM	3D SIM	2D localization
Lateral X, Y*	320 nm	250 nm	120 nm	120 nm	> 20 nm [†]
Axial Z*	600 nm	500 nm	600 nm	340 nm	~100 nm (TIRF)
Imaging speed[‡]	~ 400 fps	~ 400 fps raw acquisition Does not include after acquisition reconstruction time	15 reconstructed fps	0.8 s/1 μ m stack of 120 images	Dependent on number of frames desired
Applications	Live imaging Fast live imaging Fixed tissue imaging	Live imaging Fast live imaging Fixed tissue imaging	Live-cell super-resolution imaging Fixed tissue imaging	Live-cell super-resolution imaging Fixed tissue imaging	Molecular imaging or biomolecular organization

* Actual resolution is dependent on wavelength and optical configuration. Values quoted for 488 nm excitation.

[†] Field of view 512 x 512, 1 ms exposure time, no Z stepping, zero time delay, standard camera operation mode.

[‡] Resolution using DLM is highly dependent on sample type and optimization of imaging conditions.



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