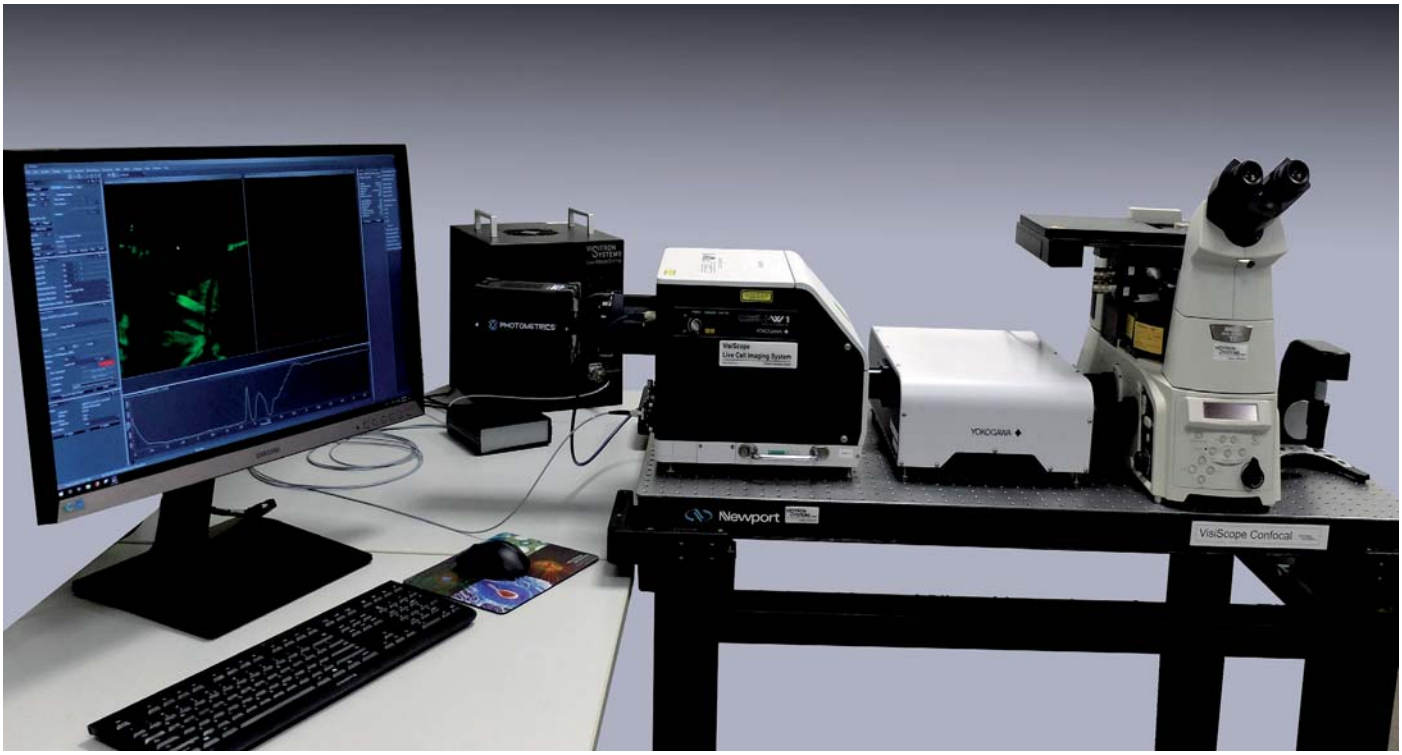
Real-Time Confocal with CSU-W1 SoRa Optics

Super Resolution via Optical Re-Assignment

The VisiScope-CSU-W1 SoRa system is the ideal tool for super-resolution for live cell imaging. Superresolution images are acquired at the unprecedented speed of 200 fps - a frame rate which equals that of a standard CSU-W1.

Moreover, for the first time a super-resolution technique becomes applicable to deeper tissue imaging and due to its low phototoxicity also to live cell imaging.

VisiScope-Confocal CSU-W1-SoRa SuperRes



VisiScope Confocal-CSU-W1-SoRa with Zeiss Axio-Observer, and VS-Homogenizer

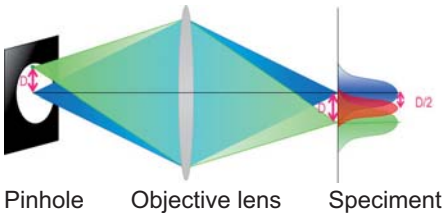
SUPER - RESOLUTION - FEATURES

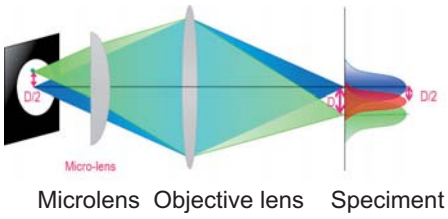
- Maximum resolution up to 120nm
- Realtime 2D VisiBoost Deconvolution
- Super Resolution for living samples
- Real-Time Super Resolution
- Extremly High Light throughput
- Easy to use
- Two-Color Simultaneous Imaging with DualCam
- Hardware Autofocus keeps your samples in focus
- Reduced phototoxicity
- One system, three imaging modes
- Managing of complex experiments

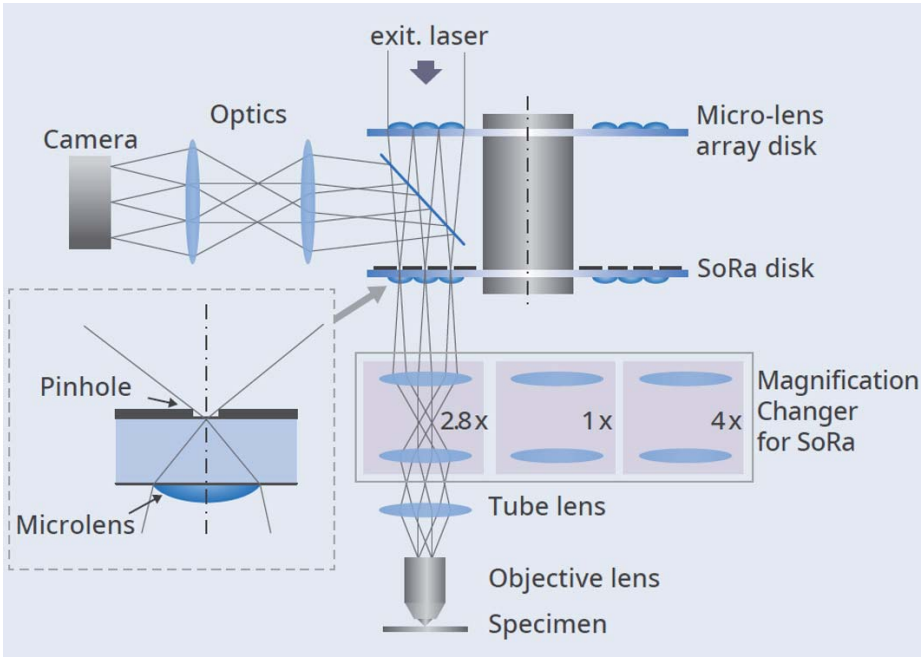
VisiScope-Confocal CSU-W1-SoRa SuperRes

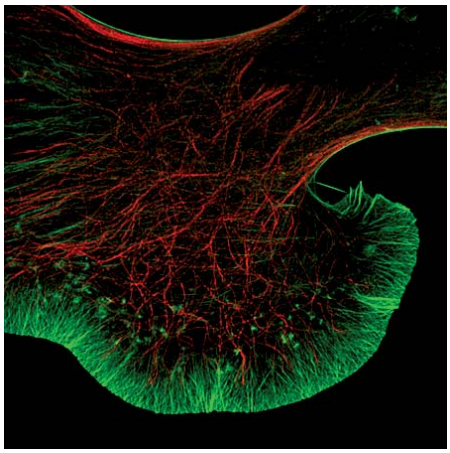
Principle of optical Re-Assignment

The image formation in microscopy is a product of illumination and detection point spread functions. For optimal resolution the confocal pinhole is infinitely small, which is impractical due to lack of light. If we consider the PSFs of an off-axis position in the large (50µm) pinhole of a Spinning Disk then the detection PSF differs largely from the illumination PSF (see figure). The discrepancy between original D/2 and detection position D causes a degradation in resolution. In the SoRa any photon is reassigned by the introduction of a lens in front of the pinhole to compensate this error. The result is an resolution improvement by the factor of √2 without sacrificing brigthness!









Product specification (only items which differ from the CSU-W1 are shown)			
	1 camera model (T1)	2 camera model (T2)	Split view model (T3)
Loadable model	A SoRa disk can be loaded as disk 2, and disk 1 can be selected (50µm or 25µm)		
Excitation wavelength	405nm - 640nm		
Observation wavelength	420nm - 680nm		
Effective field of view	Depends on the magnification changer for SoRa (see below)		
External light / NIR port	external light port cannot be equipped at the same time as the intermediate magnification switcher The NIR port cannot be used together with a SoRa disk		

Magnification changer for SoRa specification	
Lens-switched light path	3 light paths switched electronically 1x, 2.8x, 4.0x magnification
External dimensions	425(W)×301.1(L)×122.5(H) mm (excl. protrusions and supporting column)
Weight	13kg
Microscope connection	Manufacturer-specific adapter

Field of view when using magnification changer for SoRa		
Magnification Changer for SoRa	2.8 x	4.0 x
Recommended objective lens	100 x	60 x
Effective field of view	61x57µm	71x67µm

Resolution: PSF FWHM *1	
XY/Z resolution (optical super-resolution)	150nm / 320nm
XY/Z resolution (after deconvolution)	120nm / 300nm

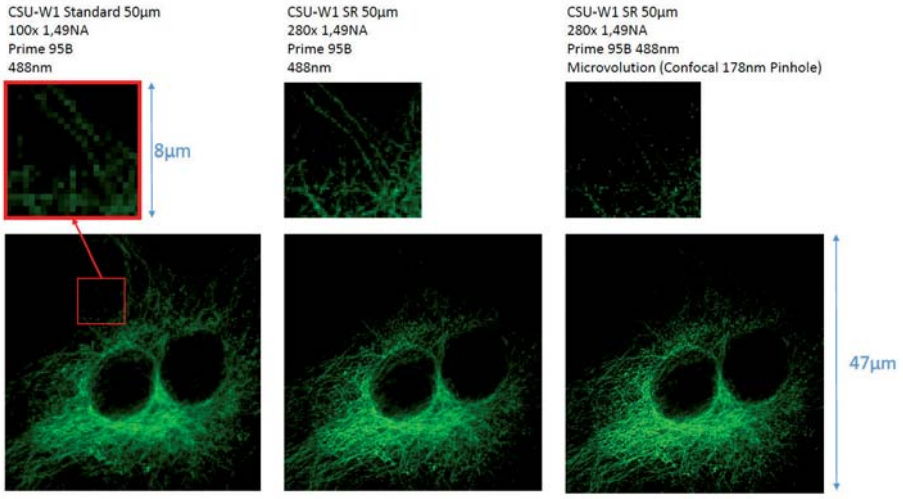
*1 Resolution value is for reference only

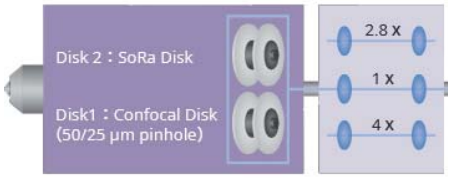
Easy to use and easy to upgrade !

The CSU-W1 SoRa is an easy-to-use super-resolution microscopy solution using the well know Yokogawa dual disk technology with microlenses on both the illuminating and pinhole disks. The resulting raw images show a 1.4x resolution improvement and with deconvolution one can achieve twice the resolution of raw spinning disk data. The high-speed advantage of a spinning disk confocal are well known, with a maximum speed of 200fps. The SoRa disk is available for new systems as well as an upgrade for existing CSU-W1 systems.

VisiScope-Confocal CSU-W1-SoRa SuperRes

CSU-W1 vs. CSU-W1-SoRa SuperResolution





CSU-W1 dualdisk

Magnification Changer SoRa

Comparison of resolution W1 with SoRa