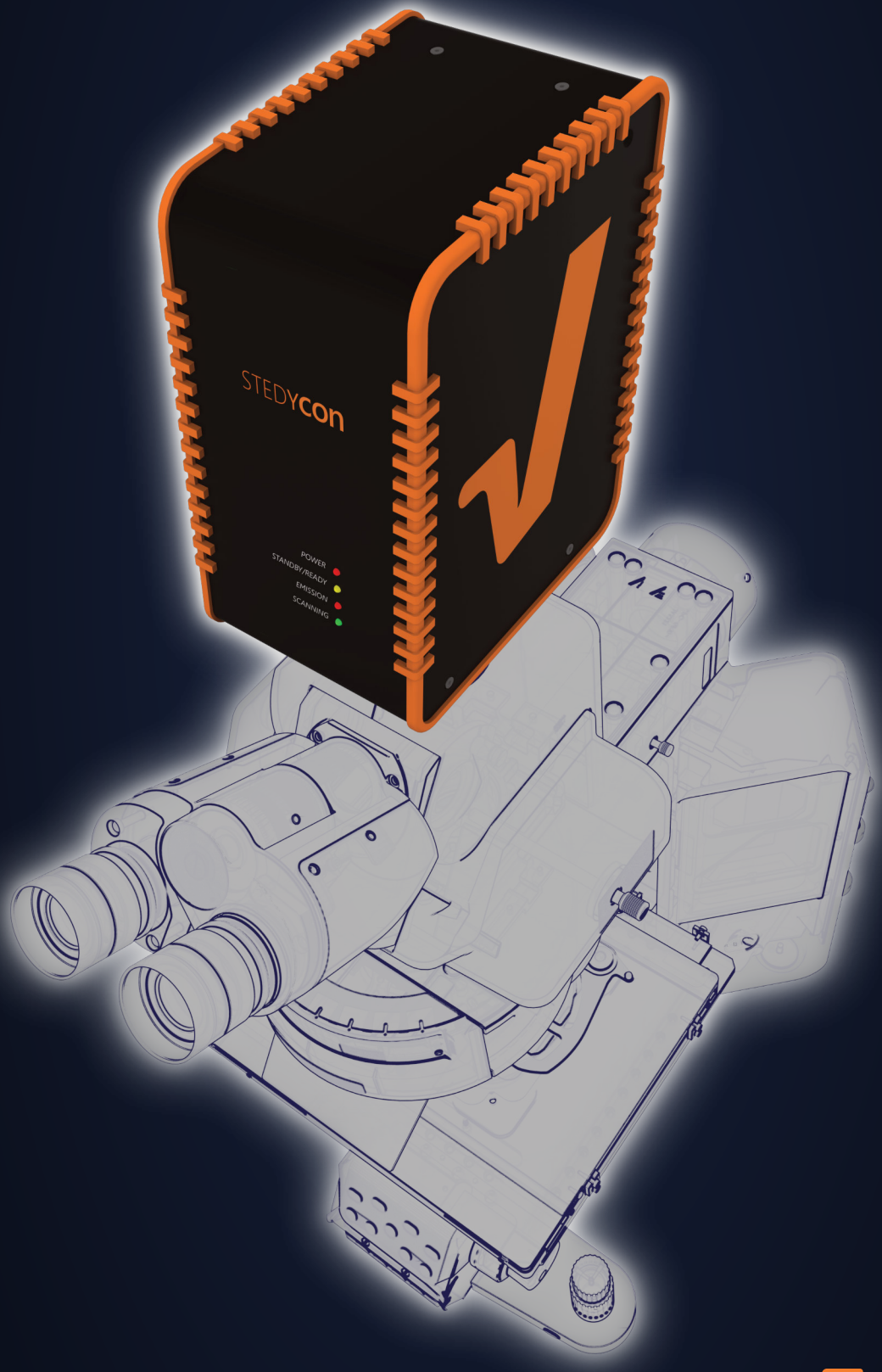
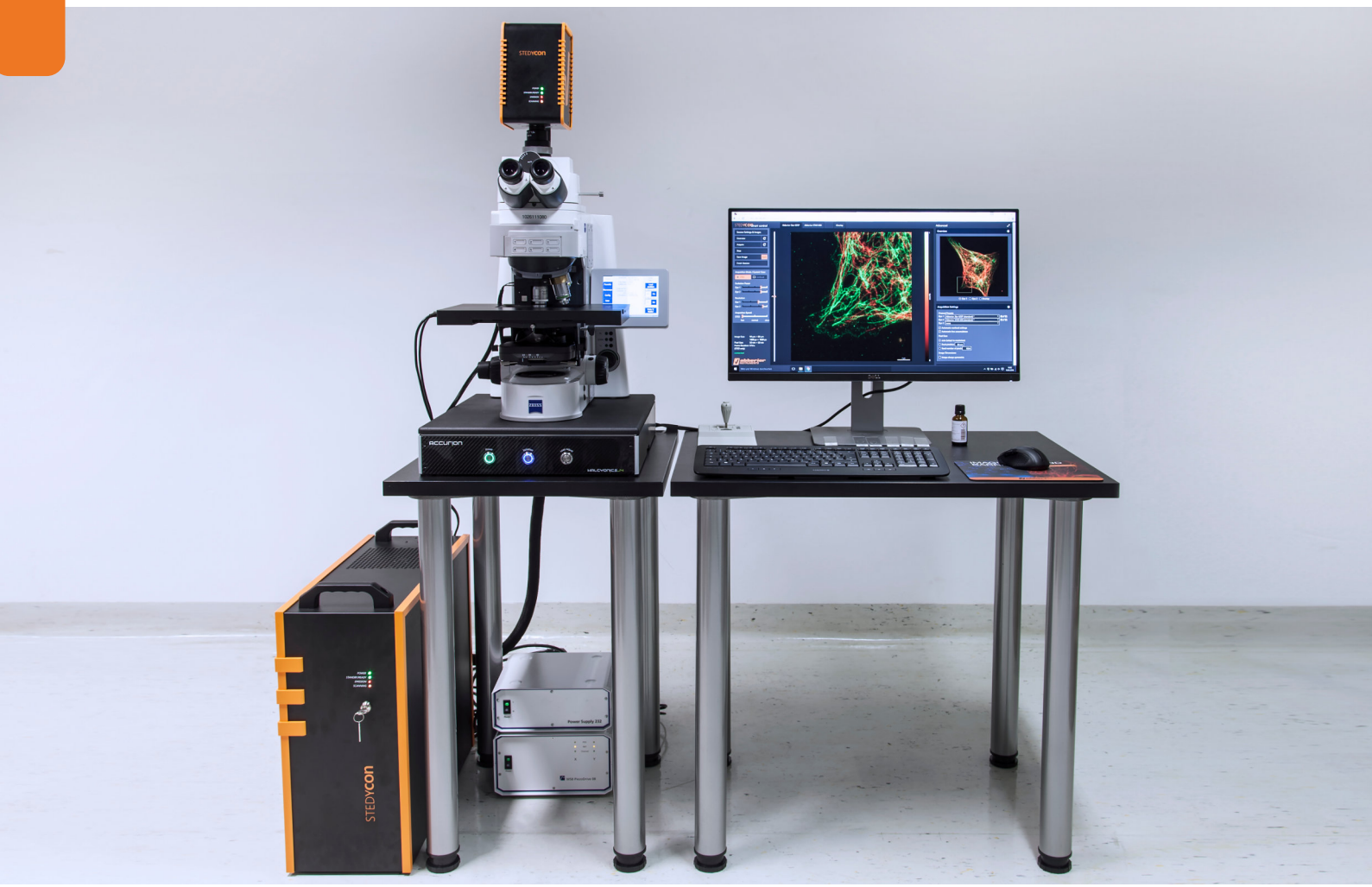
STEDYcon



abberior INSTRUMENTS



The STEDYCON is a completely new class of nanoscope. It converts your existing conventional epifluorescence microscope into a powerful multicolor confocal and STED system. At the same time, it is incredibly compact and can be used by anyone.

The STEDYCON provides top-notch 2D STED performance, with a resolution of about 30 nm. It is extremely compact, it comes at the size of a standard camera, and is installed within minutes.

The STEDYCON is alignment free! The laser beams of the STEDYCON are aligned by design through its patent-protected 'easySTED' optical arrangement. All laser beams travel through the same fiber and are not separated as in other STED microscopes, resulting in maximum stability.

What you see is what you get! Acquire your STED image at the push of a button, no post-processing required. The STEDYCON works on all microscope bodies, no need to invest in a full confocal system, just use your existing widefield microscope.

Feel free to contact us if you have questions on our products or would like to test the STEDYCON.

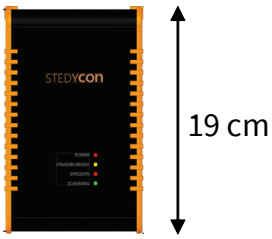
Yours sincerely,

Abberior Instruments GmbH

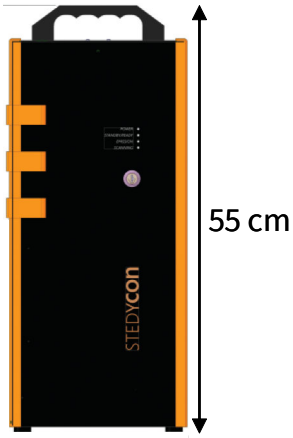
Specifications

- Lasers

405	488	561	640	775 (STED)
cw	pulsed			



- 2-color STED imaging / 4-color confocal imaging
- 2D STED resolution < 40 nm (typically ~30 nm)
- easySTED geometry all lasers are aligned by design



- Time-gated detection
- Detection 3 or 4 single-photon counting APDs
- DynamicPLUS Detection

- QUAD beam scanner 90 µm x 80 µm with 100x objective
- Pinhole motorized pinhole with 12 different positions
- 3D sectioning capability z-focusing piezo drive
- Upgrade with Fluorescence Lifetime Imaging (FLIM) unit

Software

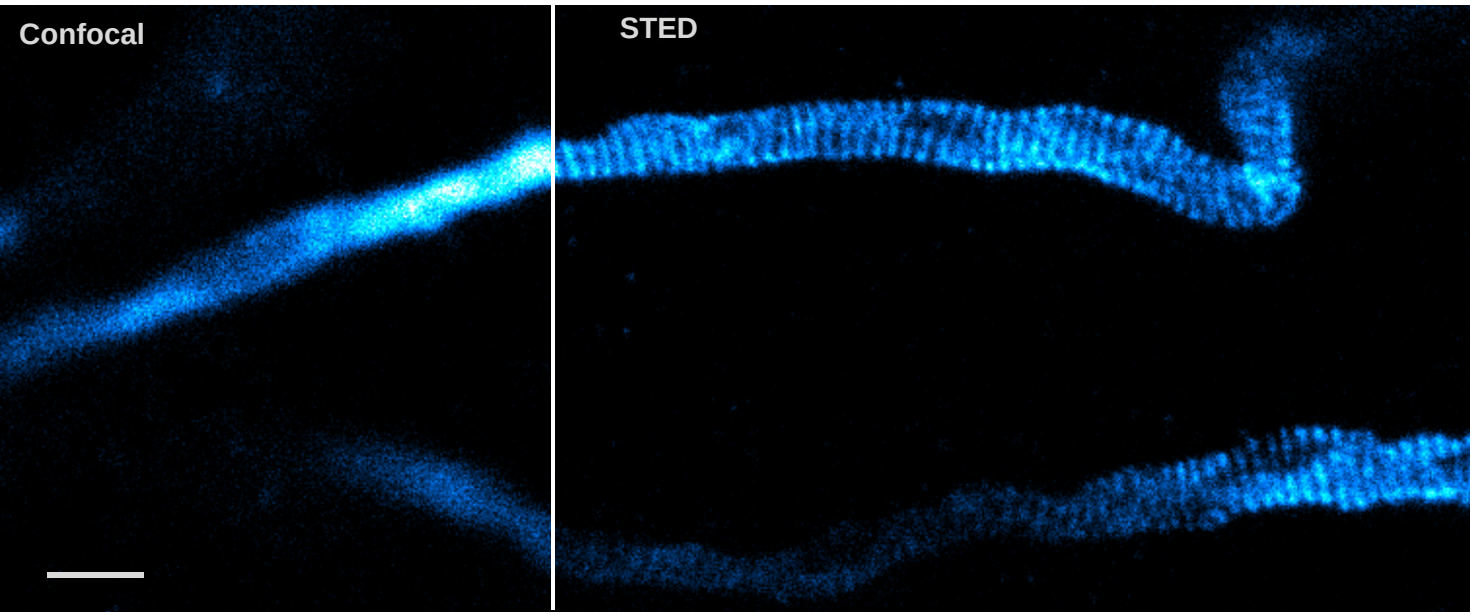
The STEDYCON can be controlled via Abberior Instruments' STEDYCON smart control, a web browser-based graphical user interface. Beginners can use the STEDYCON after a few minutes of training.

Smart control runs on every device with a modern web browser, like Windows-based PCs, Linux-based PCs, Apple PCs or even tablets.

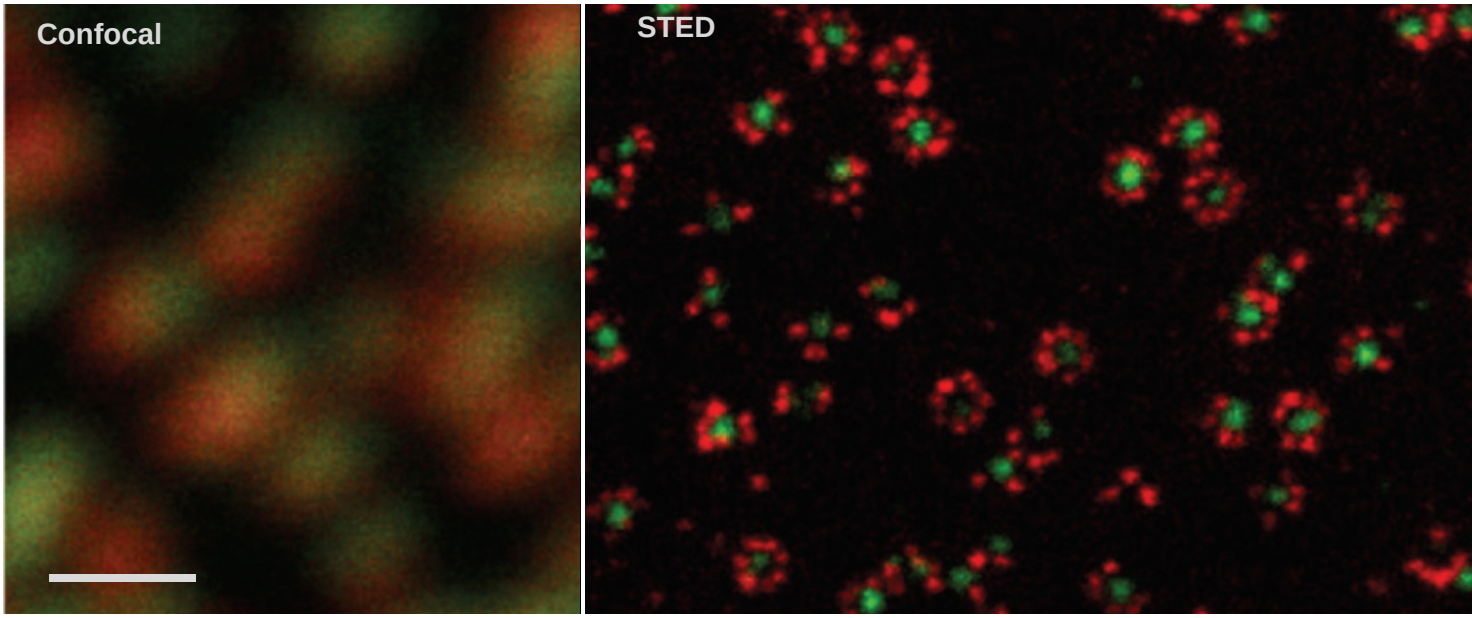
- Intuitive operation
- 3 clicks to STED
- Only minutes of training for confocal and STED imaging
- Browser-based software, platform independent
- Image acquisition in xy, xyz, xyzt, ROI queues, time series
- Analysis software package with line profiles, resolution fitting
- Imaging mode is line-interleaved for different channels


STEDYcon
POWER
STANDBY/READY
EMISSION
SCANNING
1,0x
1026111080
BUDGET FIT
FOR ANYONE
TOP IMAGES

Images



βIV-spectrin labelled with Alexa594. 20 µm cryo-section of mouse neocortex. Sample kindly provided by Dr. Maren Engelhardt, Institute of Neuroanatomy, Medical Faculty Mannheim, Heidelberg University. Shown are raw data. Images were acquired by a STEDYCON on a Zeiss Axioimager. Scale bar: 1 µm.

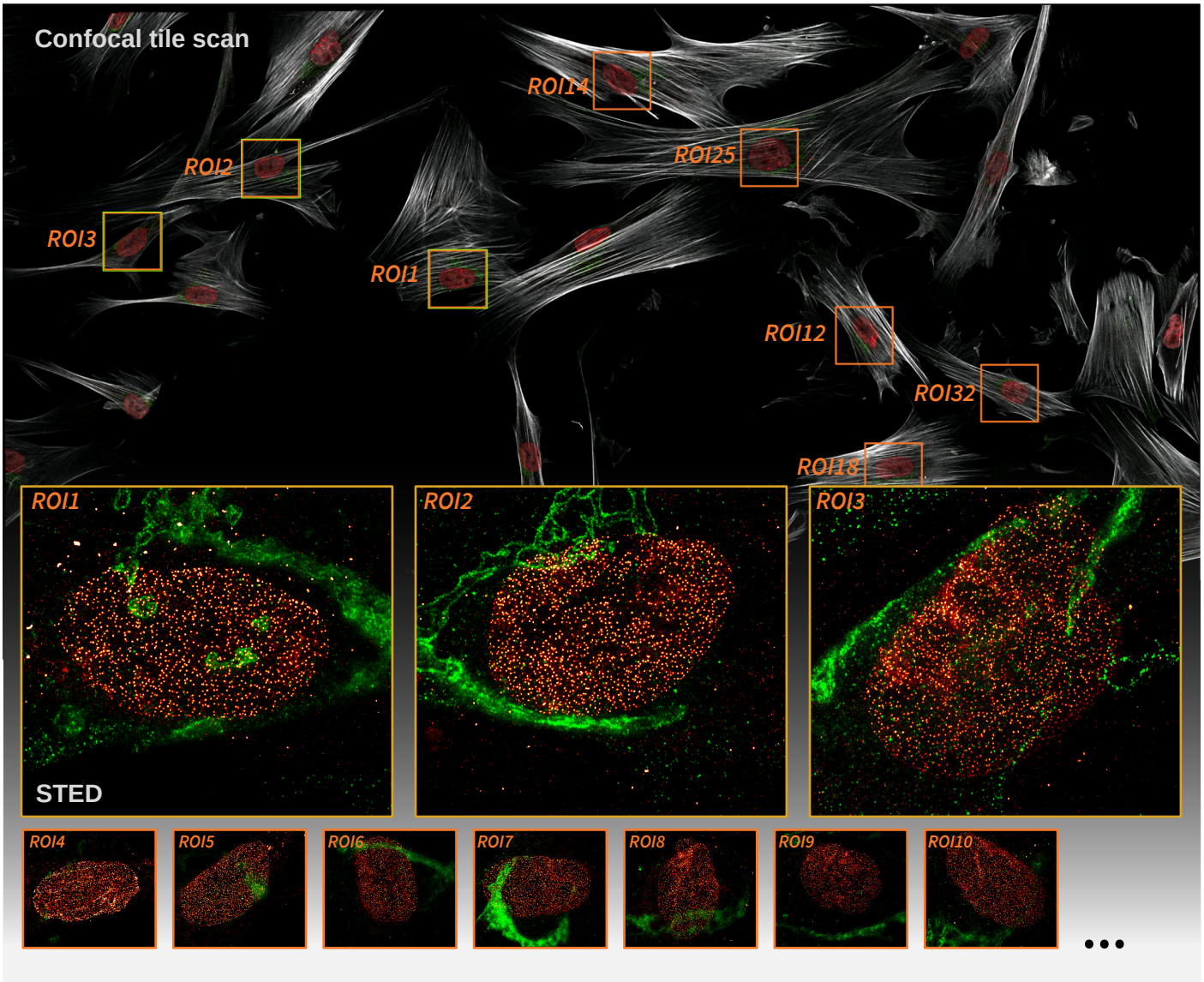


Two subunits of the nuclear pore complex were immunolabelled using antibodies against gp210 and antibodies with multiple specificities (PAN4/5) and secondary antibodies coupled to Abberior STAR580 and Abberior STAR635P. Shown are raw data. Images were acquired by a STEDYCON on a Nikon Eclipse NI. Scale bar: 500 nm.

Multiposition Imaging

NEW

The STEDYCON now controls motorized stages. Discover your sample over millimeters with a tiled spiral scan, which allows navigation and imaging within the whole context of your specimen. Image multiple regions of interest (ROI) queued in an automatic recording in confocal or STED mode, while you go on and use the imaging time to prepare the next sample. Or just let the microscope work for you over night. Scale up your experiments!

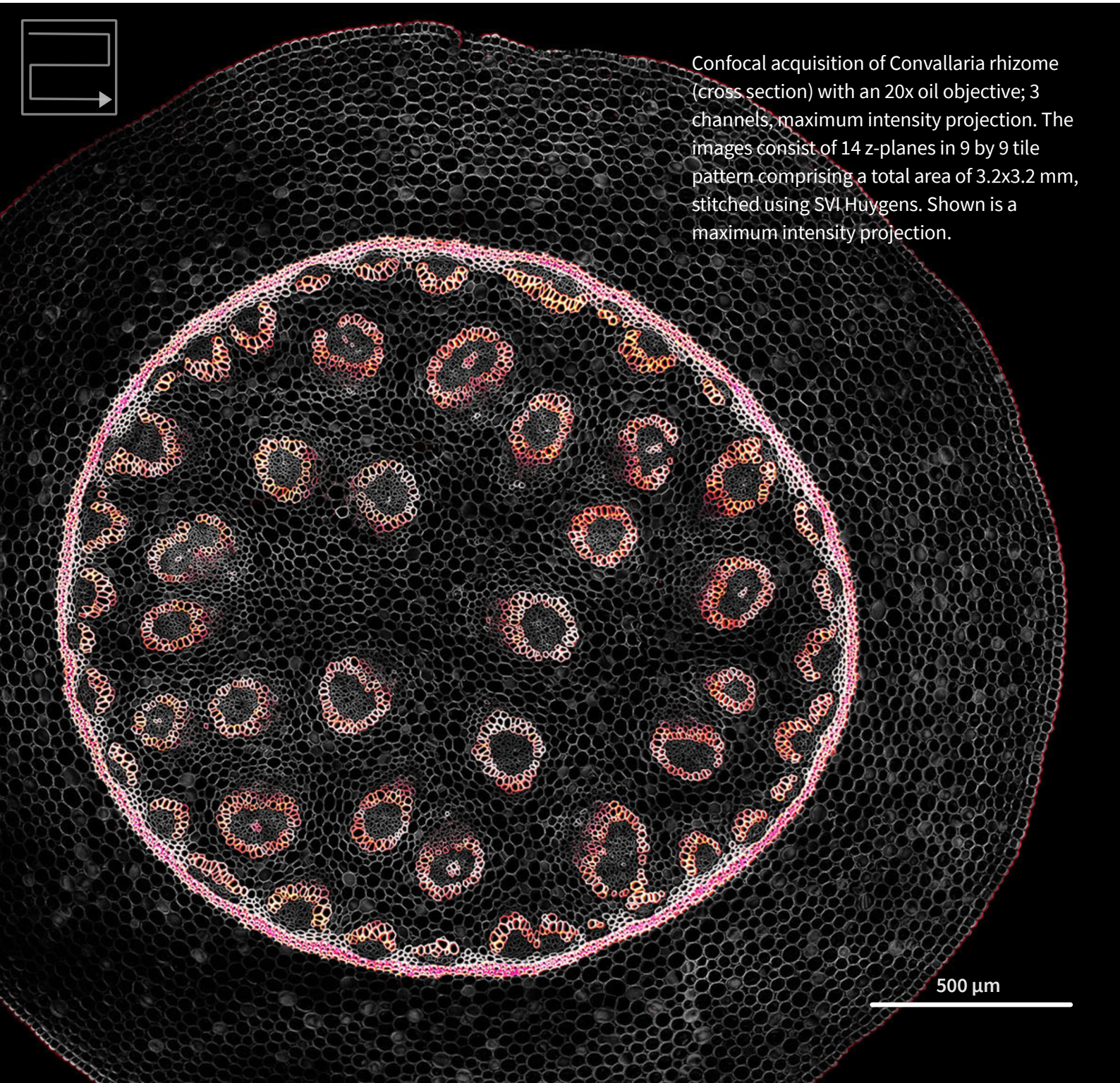


Tiling & Stitching

NEW

Discover your sample first, with a quick tiled overview scan, e.g., using a small magnification objective, and define your imaging from there. If needed, choose a different objective lenses for the final acquisition.

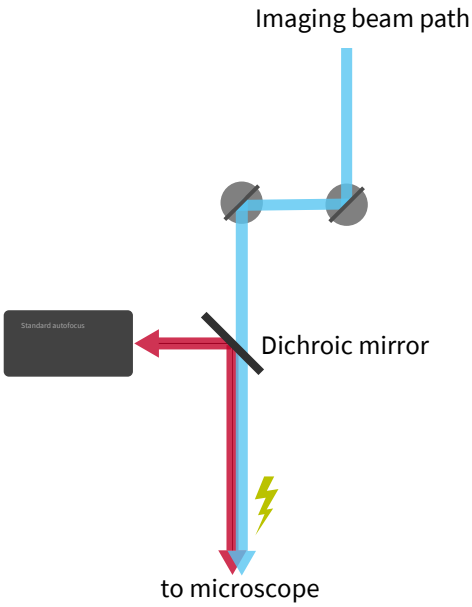
Acquire large regions of interest as tile scan in a grid, snake, or spiral pattern. Send the images over to SVI Huygens for easy stitching or deconvolution with one click.

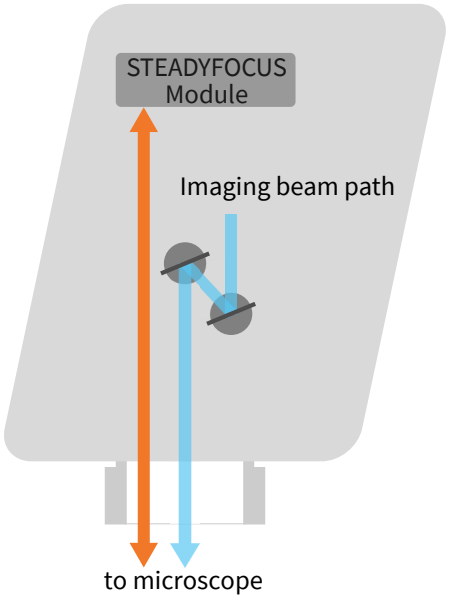


Confocal acquisition of Convallaria rhizome (cross section) with an 20x oil objective; 3 channels, maximum intensity projection. The images consist of 14 z-planes in 9 by 9 tile pattern comprising a total area of 3.2x3.2 mm, stitched using SVI Huygens. Shown is a maximum intensity projection.

STEADYFOCUS

Standard autofocus solution	abberior INSTRUMENTS STEADYFOCUS
The autofocus laser is coupled into the beam path using a dichroic mirror, which interferes with imaging.	The autofocus laser runs side-by-side with the imaging beam path. No dichroics are required and there is absolutely no interference with imaging.



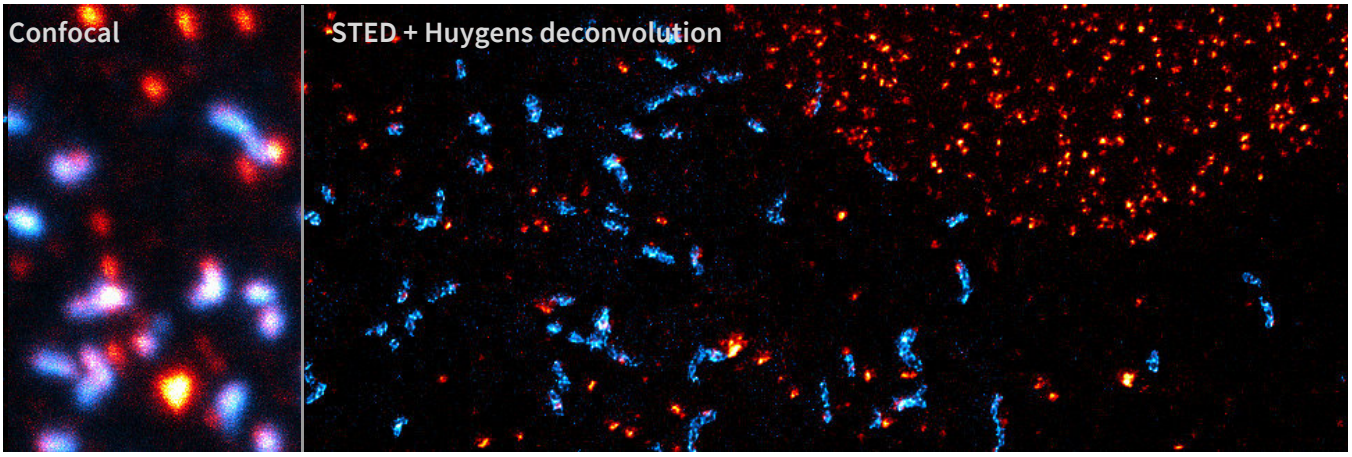


Our new push-button STEADYFOCUS module is a continuous laser-based hardware focus lock for the STEDYCON. It guarantees confocal and STED imaging over days without focus drift.

On top, thanks to its proprietary design, it uniquely requires no additional optics in the imaging beam path, and therefore is 100% free of fluorescence losses or imaging distortions.

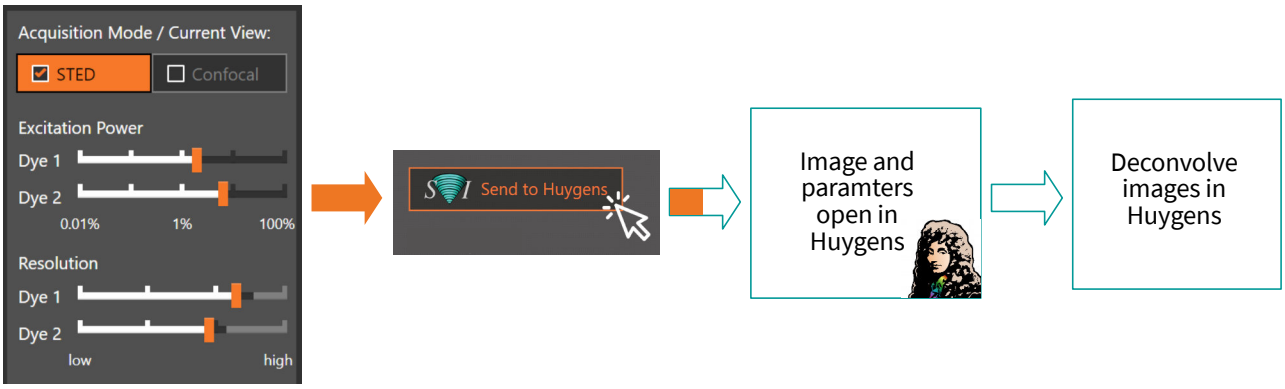
The STEADYFOCUS module is compatible with a multitude of immersion (water, water dipping, oil, silicone, glycerol...) and embedding media (water-based, Mowiol, ...) and with upright and inverted microscope bodies of all major brands.

Huygens Deconvolution

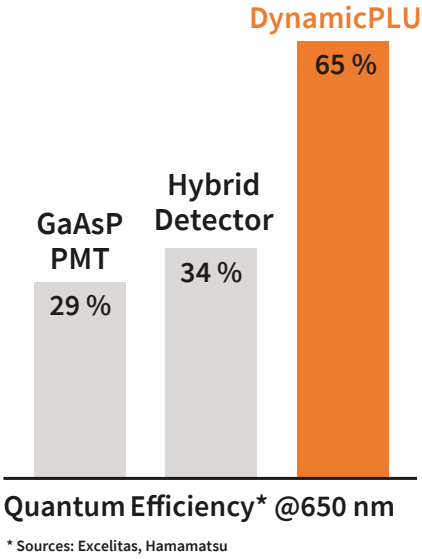


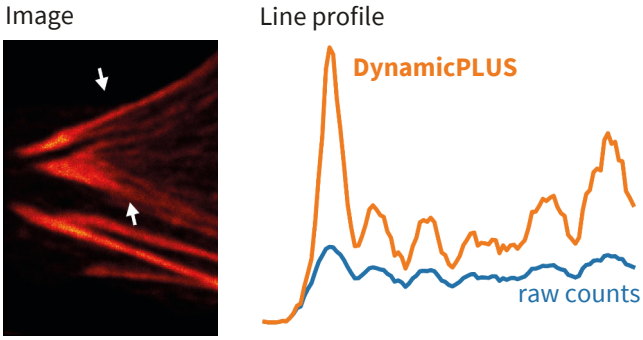
The combination of top-notch STED imaging with a sophisticated deconvolution method reveals the faintest details in the sample. Moreover, all this unfolds at the push of a button!

The deconvolution workflow with the STEDYCON and Huygens is easy and intuitive: From the STEDYCON software, send images directly to Huygens. Huygens opens the images automatically and imports all relevant meta-data for deconvolution. Deconvolve your in Huygens via the fully automated Deconvolution Express, or with the Deconvolution Wizard when full manual control is preferred. Of course, all available Huygens features can be used: Movie Maker, 3D Viewer, Object Analyzer, Colocalization Analyzer...



DynamicPLUS





Superior sensitivity and full dynamic range within the same image: Our new **DynamicPLUS** feature offers unrivaled performance with both STED and classical confocal applications. With **DynamicPLUS**, you can be sure to capture everything from the faintest details to the brightest spots.

The underlying avalanche photo detectors (APDs) have a superior quantum efficiency, up to a factor of two above hybrid detectors. This means that when signal-levels are low, our APDs still reliably collect the available photons to grant the most accurate representation of your sample in the captured image.

Typical applications are super-resolution STED imaging and experiments with low labeling densities designed to stay close to physiological conditions.

Now, with our newly developed dead-time compensation of **DynamicPLUS**, even high-signal samples are imaged crisply with a high dynamic range and excellent signal-to-noise ratio. Of course, raw data for quantitative analysis and deconvolution is always available.

Dyes & Mounting

Abberior Instruments and its sister company Abberior bundle their expertise to provide the best dyes for your confocal and STED experience. Abberior's STAR and LIVE dyes are extremely photostable, making them an excellent choice for confocal imaging, and for high quality STED imaging at highest resolutions.

Standard mounting media are suitable for STED imaging. *Abberior* mounts are optimized for best resolution and lowest bleaching. Two different mounting media are available from Abberior: *Abberior* mount solid is an aqueous mounting medium designed for confocal and super-resolution microscopy. *Abberior* mount liquid is designed for 3D confocal and super-resolution microscopy.

	confocal imaging		STED imaging	
exc. Laser	405	488	561	640
Dyes for fixed imaging	DAPI Hoechst Alexa 405	**STAR GREEN** Oregon Green Alexa 488 STAR 488 Atto 488 FITC	**STAR ORANGE** **Alexa 594** STAR 580 STAR 600 Atto 594 Atto 590	**STAR RED** STAR 635P STAR 635 Atto 647N Atto 633
Dyes for live imaging	CFP	GFP YFP	**Atto 590** LIVE580	**SiR** mNeptun2

- Best suited dyes are shown in **bold** -

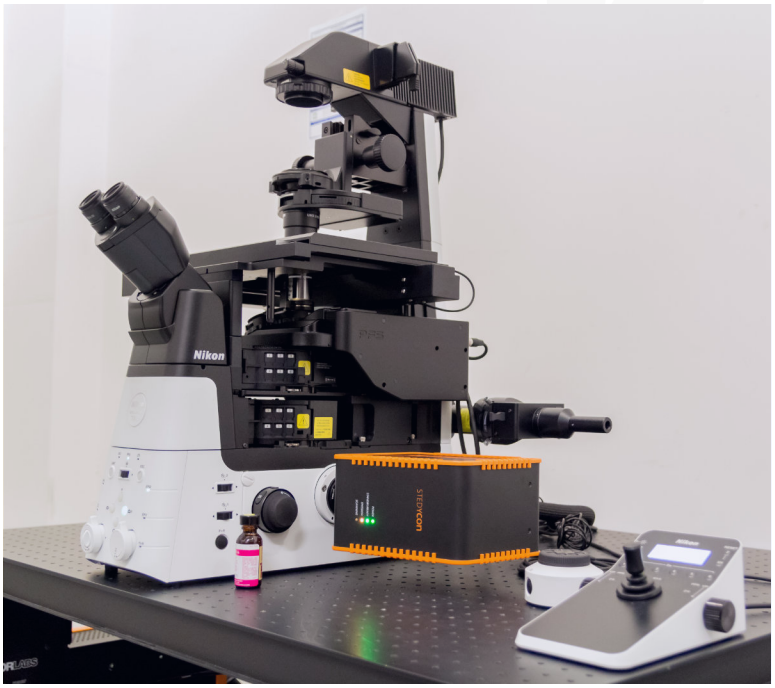
For confocal imaging, any dyes that fit the spectrum can be chosen for all excitation lasers. For STED imaging, please refrain from using blinking dyes such as Alexa647 or Cy5, as they start blinking under high laser powers.

For any questions regarding dyes or mounting, please contact Abberior:

abberior beyond barriers

info@abberior.com

Compatibility



The STEDYCON is compatible with all microscope stands that have a free 100% 1x camera port (C-mount). Inverted as well as upright microscope bodies can be upgraded with the STEDYCON. Laser safety will be provided by us specifically for your microscope body.

The STEDYCON has been successfully tested with many microscope bodies, among others in the following configurations

- **Upright microscope bodies:**
  Zeiss AxioImager Z2, Nikon NiE, Olympus BX53/63, Leica DM2500 ...
- **Inverted microscope bodies:**
  Zeiss AxioObserver, Nikon TiE/Ti2, Olympus IX83/73, Leica DMI6000 ...
- **Objectives:**
  Zeiss 100x/1.46, Zeiss dip-in 60x/1.0, Olympus 100x/1.4, Olympus 100x/1.45, Nikon 100x/1.45 lambda series, Leica 100x/1.4 ...

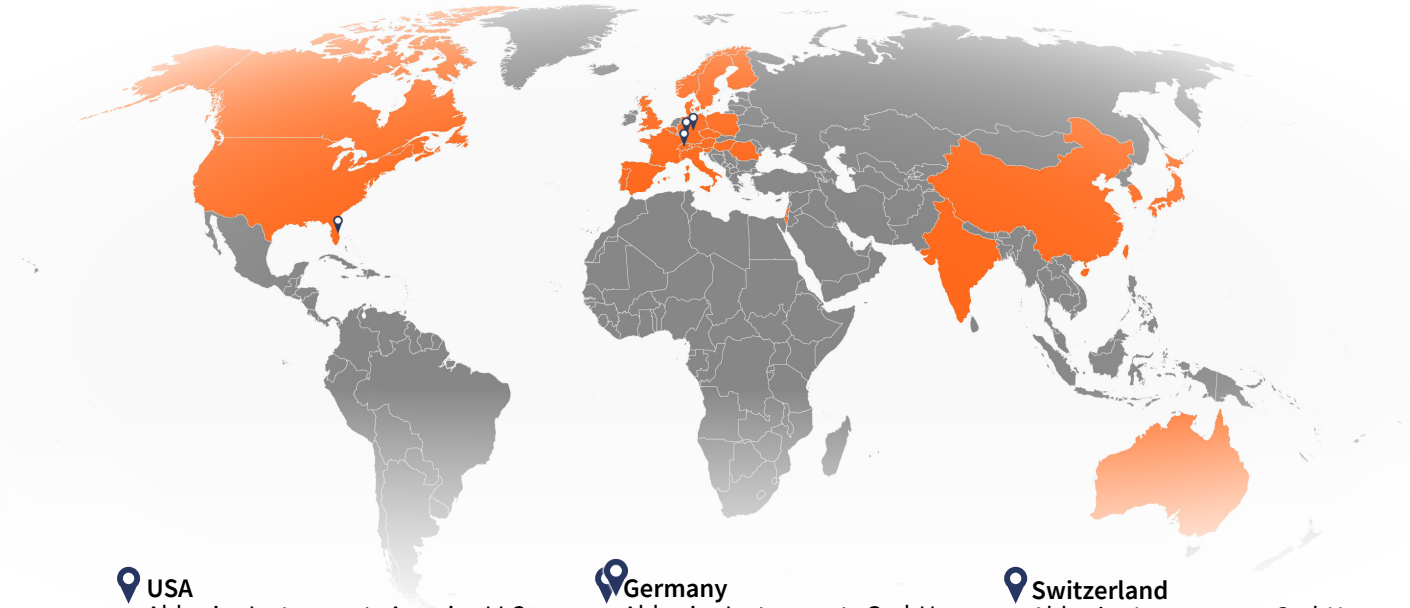
Check out our video:

Follow along with the incredibly quick installation of a STEDYCON super resolution microscope, uncut. We go from opening the box to the first super-resolution STED image in under three minutes.

Company

Abberior Instruments GmbH is a spin-off from Prof. Stefan W. Hell's group at the Max Planck Institute in Göttingen, Germany. Founded in 2012, Abberior Instruments GmbH is now a leading innovator, developer and manufacturer of cutting-edge super-resolution STED and RESOLFT microscopes, designed and built by the inventors of the methods.

Hundreds of satisfied users around the world...



USA
Abberior Instruments America LLC
Jupiter

Germany
Abberior Instruments GmbH
Göttingen (Headquarter)
Heidelberg

Switzerland
Abberior Instruments GmbH
Basel

Why work with us?

- Connect with the inventors of STED and RESOLFT
- Get the best resolution
- Want something special? We customize your system to your needs!
- Short development cycles: stay cutting-edge with us

INNOVATIONSPREIS DER DEUTSCHEN WIRTSCHAFT

Microscopy TODAY 2014 Innovation Award

STEP AWARD

2016 GOLD STEVIE WINNER GERMAN STEVIE AWARDS

WACHSTUMS-CHAMPION 2019

Literature

STED microscopy

Hell, S. W. (2007) "Far-Field Optical Nanoscopy" Science 316, 1153-1158

Dyba, M., S. Jakobs, S. W. Hell (2003) "Immunofluorescence stimulated emission depletion microscopy" Nature Biotechnol. 21, 1303-1304

Dual color STED microscopy

Göttfert, F., C. A. Wurm, V. Mueller, S. Berning, V. C. Cordes, A. Honigmann, S. W. Hell (2013) "Coaligned Dual-Channel STED Nanoscopy and Molecular Diffusion Analysis at 20 nm Resolution" Biophys. J. 105, L01-L03

Time-gating & STED microscopy

Vicidomini, G., G. Moneron, K. Y. Han, V. Westphal, H. Ta, M. Reuss, J. Engelhardt, C. Eggeling, S. W. Hell (2011) "Sharper low-power STED nanoscopy by time gating" Nature Meth. 8, 571-573

STED microscopy in neurobiology

D'Este, E., D. Kamin, C. Velte, F. Göttfert, M. Simons, S. W. Hell (2016) "Subcortical cytoskeleton periodicity throughout the nervous system" Scientific Reports 6, 22741, doi:10.1038/srep 22741

Berning, S., K. I. Willig, H. Steffens, P. Dibaj, S. W. Hell (2012) "Nanoscopy in a Living Mouse Brain" Science 335, 551

STED microscopy in cardiology

Kohl, T., V. Westphal, S. W. Hell, S. E. Lehnart (2013) "Super-resolution microscopy in heart - Cardiac nanoscopy" J. Mol. Cell. Cardiol. 58, 13-21

STED microscopy in mitochondrial biology

Jans, D. C., C. A. Wurm, D. Riedel, D. Wenzel, F. Stagge, M. Deckers, P. Rehling, S. Jakobs (2013) "STED super-resolution microscopy reveals an array of MINOS clusters along human mitochondria" PNAS 110, 8936-8941

Kukat, C., K. M. Davies, C. A. Wurm, H. Spahr, N. A. Nonekamp, I. Kühl, F. Joos, P. Loguerico Palosa, C. Bae Park, V. Posse, M. Falkenberg, S. Jakobs, W. Kühlbrandt, N.-G. Larsson (2015) "Cross-strand binding of TFAM to a single mtDNA molecule forms the mitochondrial nucleoid" PNAS 112, 11288-11293

STED microscopy in virology

Chojnacki, J., T. Staudt, B. Glass, P. Bingen, J. Engelhardt, M. Anders, J. Schneider, B. Müller, S. W. Hell, H.-G. Kräusslich (2012) "Maturation-Dependent HIV-1 Surface Protein Redistribution Revealed by Fluorescence Nanoscopy" Science 338, 524-528

Live cell STED microscopy

Bottanelli F., E. B. Kromann, E. S. Allgeyer, R. S. Erdmann, S. Wood Baguley, G. Sirinakis, A. Schepartz, D. Baddeley, D. K. Toomre, J. E. Rothman and J. Bewersdorf (2016) Two-colour live-cell nanoscale imaging of intracellular targets. Nat. Commun. 7:10778 doi: 10.1038/ncomms10778

Butkevich, A. N. , G. Y. Mitronova, S. C. Siedenstein, J. L. Klocke, D. Kamin, D. N. H. Meineke, E. D'Este, P.-T. Kraemer, J. G. Danzl, V. N. Belov, S. W. Hell (2016) "Fluorescent Rhodamines and Fluorogenic Carbopyronines for Super-Resolution STED Microscopy in Living Cells" Angew. Chem. Int. Ed. 55, 3290-3294

Details

STED Laser 775 nm

Wavelength	(775 ± 1.5) nm
Operating mode	pulsed
Repetition rate	40 MHz
Output power	1.25 W
Pulse duration	~1 ns

CW Diode Laser 405 nm (optional)

Wavelength	(405 ± 5) nm

Pulsed Diode Laser 488 nm

Wavelength	(485 ± 5) nm
Repetition rate	40 MHz
Pulse duration	< 150 ps (80 ps typ.)

Pulsed Diode Laser 561 nm

Wavelength	(561 ± 2) nm
Repetition rate:	40 MHz
Pulse duration:	< 150 ps (80 ps typ.)

Pulsed Diode Laser 640 nm

Wavelength	(638 ± 4) nm
Repetition rate	40 MHz
Pulse duration	<150 ps (110 ps typ.)

Resolution

Imaging resolution, STED <40 nm , typically 30 nm
Depending on objective lens and dyes used
Measured using 40 nm Crimson fluorescent beads

QUAD Scanner

Scanning field	approx. 90 µm x 80 µm for 100x/1.4 NA oil objective
Scanning frequency	up to 800 Hz
Frame rate	512 x 512 px >1.1 frames/s

Software

Browser-based, operational on PC, Mac or tablet
Imaging modes xy, xyz, xyt, xyzt, xyp, xyzp, xyztp
For up to 4 colors in line-interleaved scanning mode
Includes auto-save function

Detection Path

Detector 1	APD; 650 nm – 700 nm
Detector 2	APD; 578 nm – 627 nm
Detector 3	APD; 505 nm – 545 nm
Detector 4	APD; DAPI detection (optional)

Time-gating for confocal and STED

Motorized Pinhole

12 different pinholes sizes, between 10-200 µm
Effective pinhole sizes:
100x/1.4 objective: 0.2-3.2 AU
60x/1.4 objective: 0.4-5.4 AU
20x /0.5 objective: 0.5-5.9 AU

z-Piezo

Pifoc fast axial nanopositioner and scanner for microscope objectives included

Travel range	100 µm
Resolution	0.7 nm

Different z-piezo stages can be controlled by the STEDYCON - ask us!

Laser Safety

Provided by us depending on the microscope body, mandatory

Installation Requirements

Antivibration table	recommended
Computer	PC or Mac, 8 GB RAM
Temperature	(23 ± 2)°C
Voltage	100 - 240 VAC, 47 - 63 Hz
Current	≥ 10 A fuse

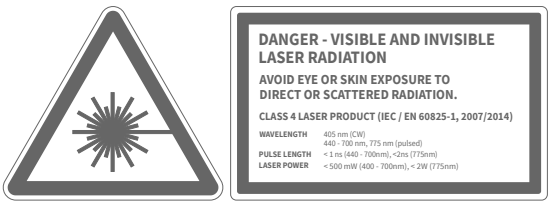
Dimensions

STEDYCON head	11 cm x 20 cm x 20 cm
STEDYCON supply unit	22 cm x 55 cm x 60 cm
Total weight	~ 40 kg

Upgrades

Fluorescence Lifetime Imaging Unit - ask us!

The STEDYCON is listed by CSA group as certified.



Contact us

info@abberior-instruments.com
sales@abberior-instruments.com
+49 551 30724 170

www.abberior-instruments.com

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