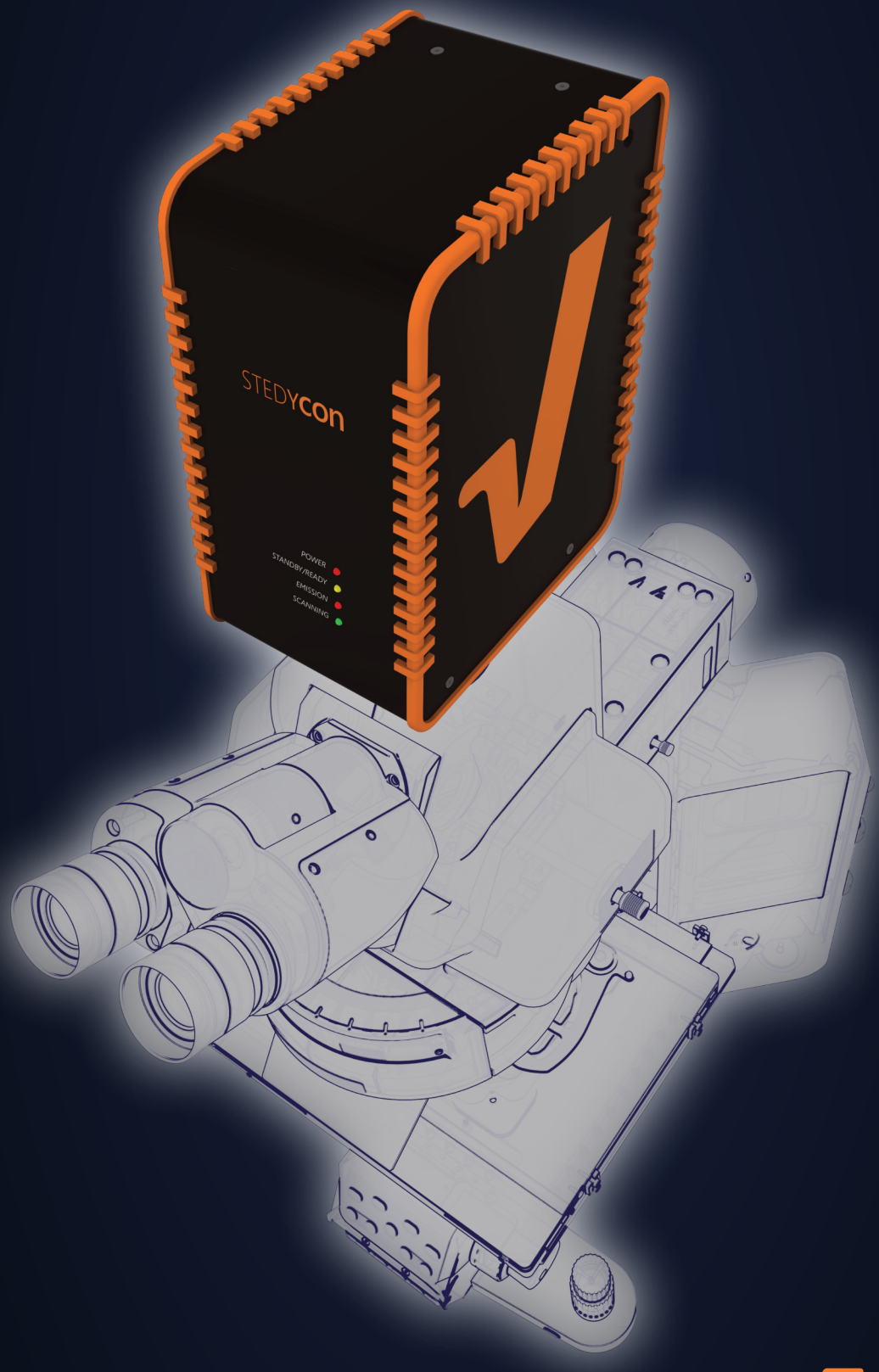
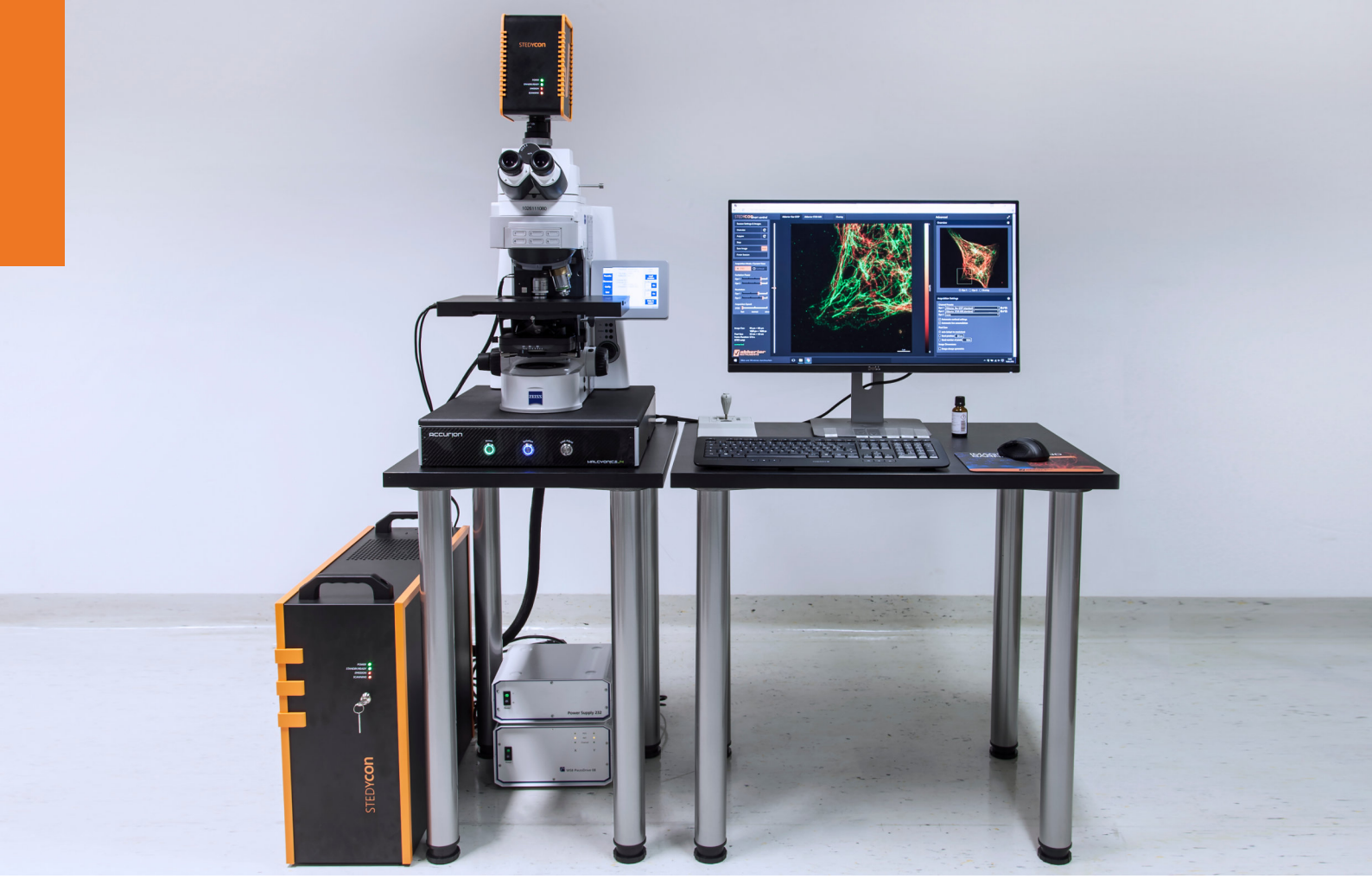
STEDYcon



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.

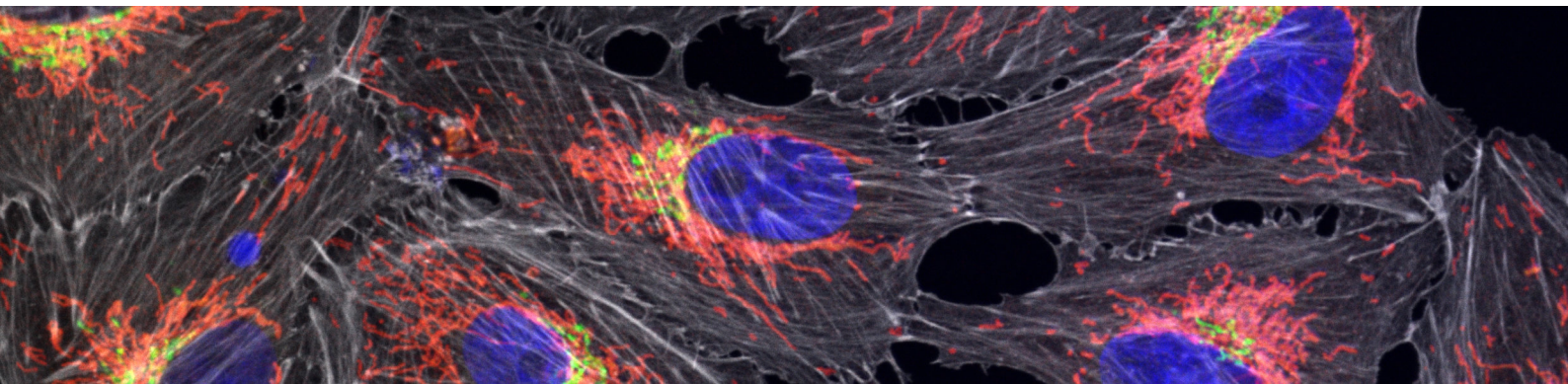
The STEDYCON has a top-notch 2DSTED performance, with a resolution of about 30 nm. It is extremely compact, it comes at the size of a standard camera, and is installed within minutes.

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

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

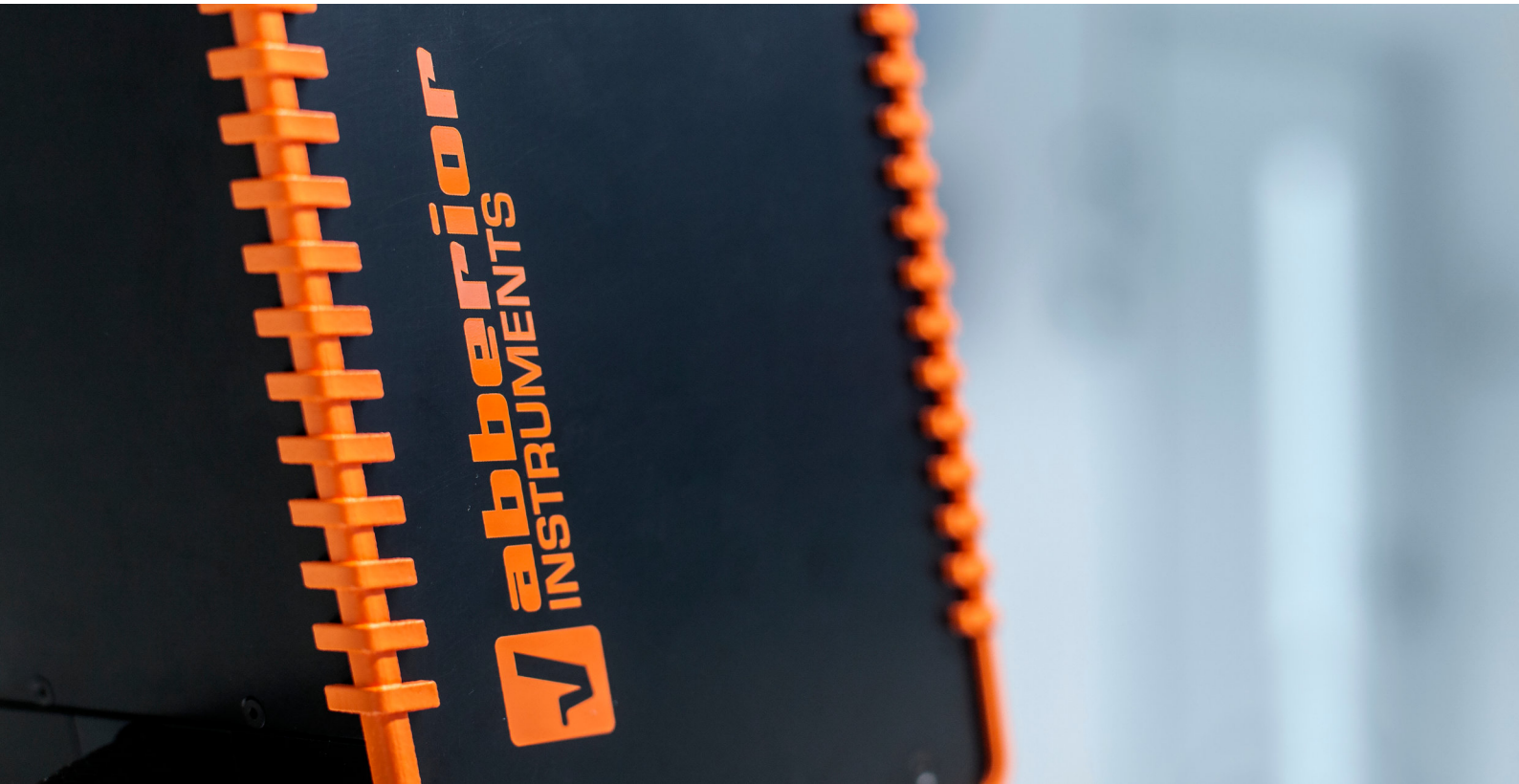
- ✓ **Lasers**

405 cw | 488 | 561 | 640 | 775 (STED) — all pulsed

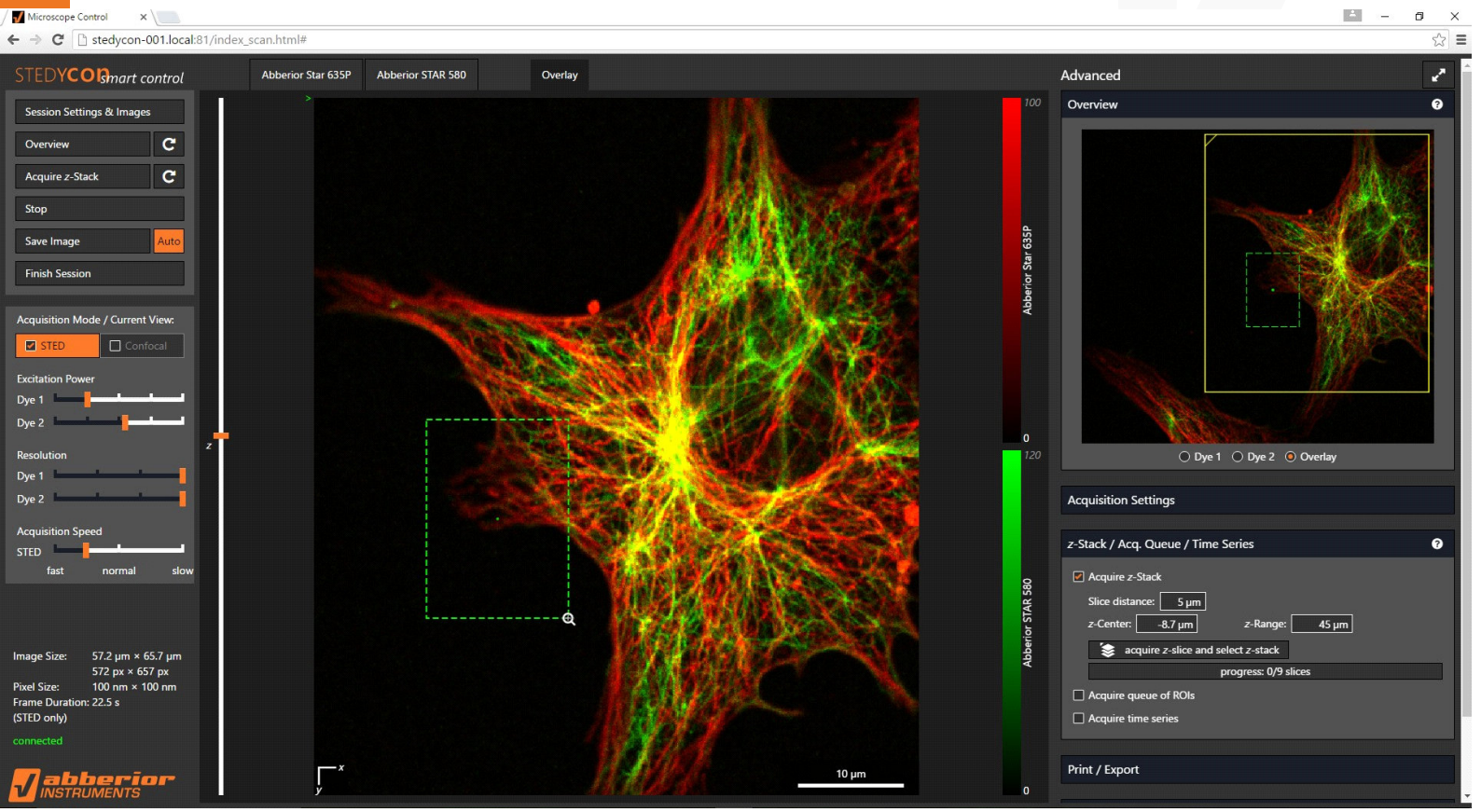
19 cm

55 cm

- ✓ **2-color STED imaging / 4-color confocal imaging**
- ✓ **2D STED resolution < 40 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
  line frequency up to 800 Hz
- ✓ **Pinhole** motorized pinhole with 12 different positions
- ✓ **3D sectioning capability** z-focusing piezo drive
- ✓ **Imaging options** xyz, ROI queues, field of view rotation, time series
- ✓ **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.

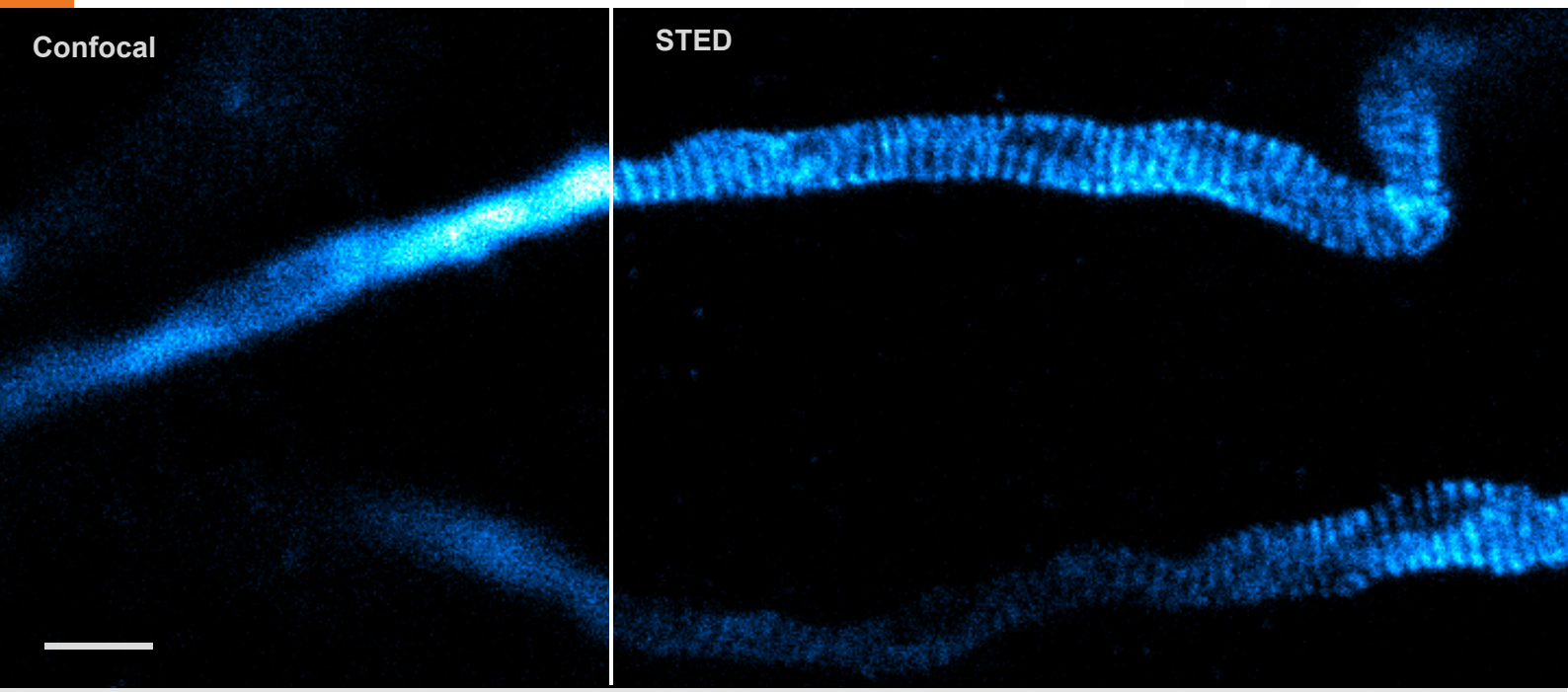
STEDYCON smart control was designed to provide the highest possible usability completing the overall STEDYCON concept of easy installation, intuitive usage, and maintenance-free operation.

Beginners can image with superresolution within minutes. Smart control runs on every device with a modern web browser like Windows-based PCs, Linux-based PCs, Apple PCs or even tablets.

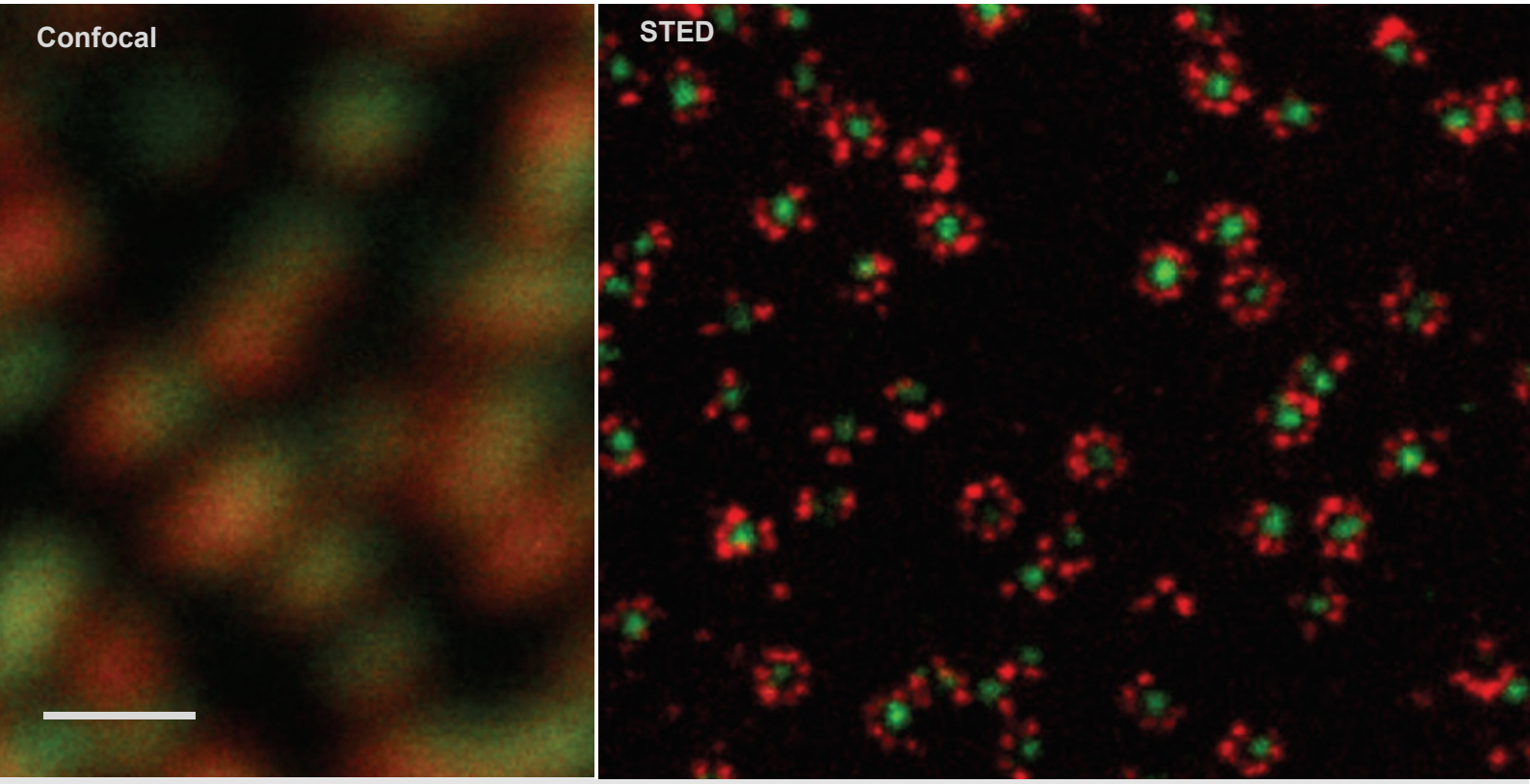
- ✓ **Intuitive operation**
- ✓ **3 clicks** from zero to your STED image
- ✓ **Only minutes of training** for confocal and STED imaging
- ✓ **Browser-based software**, platform independent
- ✓ **Image acquisition** in xy, xyz, xyzt, ROI queues, time series
- ✓ **Analysis software package** with line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


STEDYcon
POWER
STANDBY/READY
EMISSION
SCANNING
1026111080
BUDGET FIT
FOR ANYONE
TOP IMAGES

Images



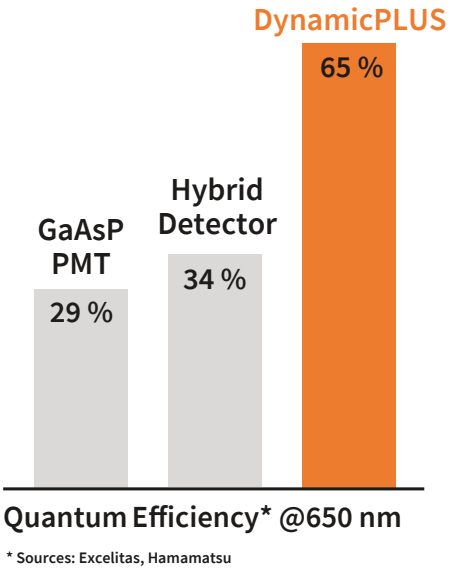
βIV-spectrin labelled with Alexa594. 20 µm cryo-section of mouse neocortex. Sample kindly provided by Dr. Maren Engelhardt, Institute of Neuroanatomy, Medical Faculty Mannheim, Heidelberg University. Shown are raw data. Images were acquired by a STEDYCON on a Zeiss Axioimager. Scale bar: 1 µm.

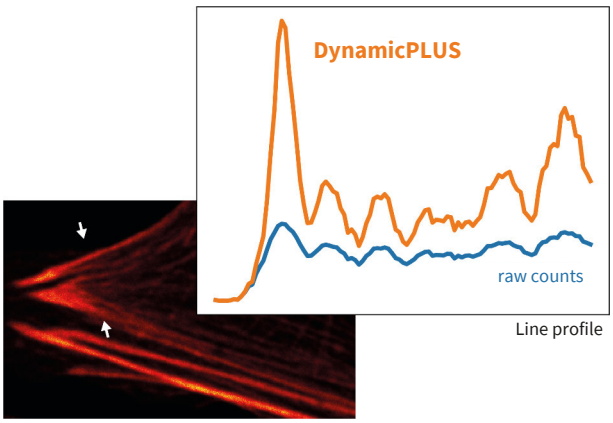


Two subunits of the nuclear pore complex were immunolabelled using antibodies against gp210 and antibodies with multiple specificities (PAN4/5) and secondary antibodies coupled to Abberior STAR580 and Abberior STAR635P. Shown are raw data. Images were acquired by a STEDYCON on a Nikon Eclipse NI. Scale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

DynamicPLUS

Capture everything from the faintest details...





...to the brightest confocal images

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.

- ✓ **Unrivaled performance** with STED and confocal applications
- ✓ **Superior quantum efficiency** compared to hybrid detectors
- ✓ **High dynamic range** together with excellent signal-to-noise ratio

Dyes

Abberior Instruments and its sister company Abberior bundle their expertise to provide the best dyes for your STED experience. Abberior's STAR and LIVE dyes are excellent for high quality STED imaging at highest resolutions.

	confocal imaging		STED imaging	
exc. Laser	405	488	561	640
Dyes for fixed imaging	DAPI Hoechst Alexa 405	**Oregon Green** Alexa 488 STAR 488 Atto 488 FITC	**Alexa 594** STAR 580 STAR 600 Atto 594 Atto 590 Cy3	**STAR RED** STAR 635P STAR 635 Atto 647N Atto 633
Dyes for live imaging	CFP	GFP YFP	**Atto 590** STAR580	**SiR** mNeptun2

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

For confocal imaging only, any dyes that fit the spectrum can be chosen for 561 nm and 640 nm excitation. For STED imaging, please refrain from using blinking dyes such as Alexa647 or Cy5, as they start blinking under high laser powers.

Mounting

Standard mounting media are suitable for STED imaging. Abberior mounts are optimized for best resolution and lowest bleaching STED imaging. 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.

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

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 by the STEDYCON. Laser safety will be adjusted by us depending on the microscope body.

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

- **Upright microscope bodies**
  Zeiss Axio Imager Z2, Nikon NiE, Olympus BX53/63, Leica DM2500 ...
- **Inverted microscope bodies**
  Zeiss Axio Observer, Nikon TiE, Nikon Ti2, Olympus IX83/73, Leica DMI6000 ...
- **Objectives**
  Zeiss 100x/1.46, Zeiss dip-in 60x/1.0, Olympus 100x/1.4, 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.

The Abberior Instruments GmbH Team in our headquarters in Göttingen (Germany).

The Abberior Instruments headquarters are located in Göttingen, Germany. Our company is constantly expanding, with company locations in Heidelberg (Germany), Basel (Switzerland), Jupiter (Florida, USA) and Cambridge (Massachusetts, USA).

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

Abberior Instruments, the award winning company:

INNOVATIONSPREIS DER DEUTSCHEN WIRTSCHAFT

Microscopy TODAY 2014 Innovation Award

STEP AWARD

2016 GOLD STEVIE WINNER GERMAN STEVIE AWARDS

Literature

STED microscopy

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

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STED microscopy in mitochondrial biology

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STED microscopy in virology

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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

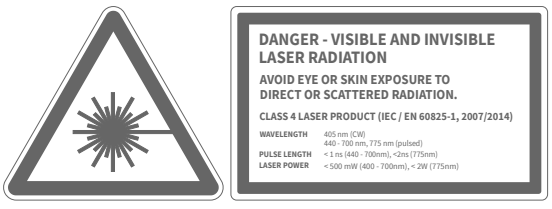
Dimensions

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.



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