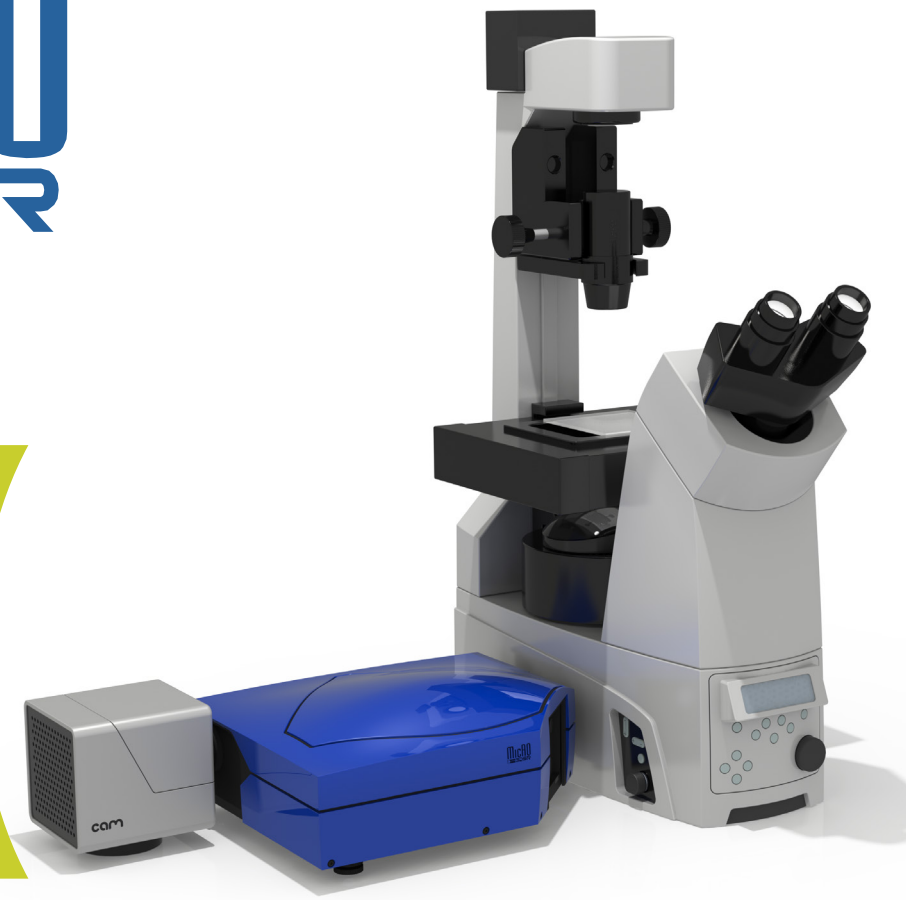
MicAO 3DSR



CONTROL THE PSF
OF YOUR OPTICAL SETUP

INCREASE
THE NUMBER OF DETECTED PHOTONS

BEST 3D
LOCALIZATION PRECISION

COMPATIBLE
WITH 60X AND 100X OBJECTIVES

NEW GENERATION ADAPTIVE OPTICS DEVICE, DESIGNED TO ENHANCE THE QUALITY OF 3D SINGLE MOLECULE MICROSCOPY

A UNIQUE SET OF ADVANTAGES

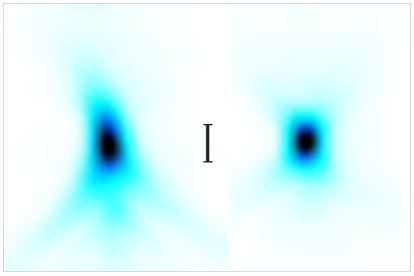
- Correct aberrations and restore diffraction limited PSF
- Aberration-free technique delivers the best 2D and 3D localization precision for single molecule imaging
- Double the amount of detected photons and improve localization precision
- Possible to perform single molecule imaging deeper in water-based samples
- Easy implementation on standard inverted frame microscopes
- Compatible with 60x and 100x objective lenses and FOV of most sCMOS cameras
- Stable wavefront for >12 hours and day-to-day PSF reproducibility
- Optical bypass option when adaptive optics is not required
- Very high optical transmission (up to 95%) in the visible wavelength range
- MicAO software - the most complete adaptive optics software, which includes a number of aberration detection methods and correction models

Contact us for more details: contact@imagine-optic.com or +33 (0) 1 64 86 15 60

imagine optic™

Integrated adaptive optics solution for single molecule 3D localization microscopy

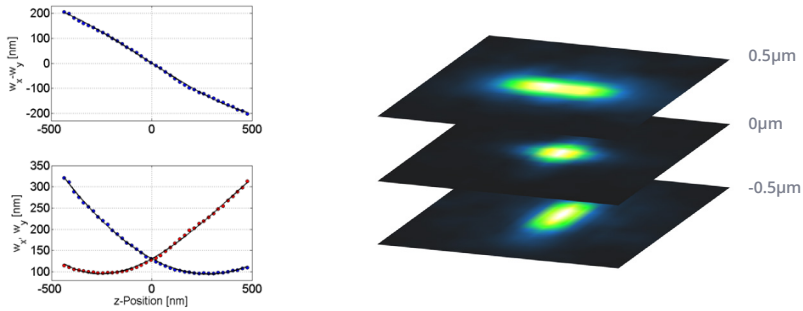
MicAO 3DSR is the first plug & play adaptive optics device dedicated to 3D single molecule localization microscopy techniques. The quality of the point spread function (PSF) is extremely important in these methods. By correcting aberrations, MicAO 3DSR restores the near-diffraction-limited resolution and axial symmetry of the PSF. As a result, the number of detected photons is increased, which improves the localization precision in all three dimensions. Moreover, the deformable mirror inside MicAO 3DSR can introduce a pure, aberration-free astigmatism and hold it for a long period of time, which enables precise and quasi-isotropic 3D imaging.



The axial view of a typical point spread function (PSF) before correction (left) and after correction (right) of aberrations. The correction of aberrations increases the axial symmetry of the PSF and almost doubles the amount of detected photons in the focus. This improves localization precision by 40% in all three dimensions.

Scale bar is 300nm.

The user-friendly MicAO software contains sensorless (image-based) aberration detection algorithms developed by adaptive optics community. The software can be operated as stand alone with its own user interface or via plug-in for certain versions of µManager©, Metamorph© and NIS Elements©. The software is constantly improved and updated.



Left: A calibration curve obtained using MicAO 3DSR features aberration-free axial symmetry (lower panel) and high lateral separation of astigmatic PSF along the whole Z range (upper panel).
Right: A representative stack of astigmatic PSF at three planes.

Aberration detection methods and models allow MicAO 3DSR users to perform single molecule imaging even deeper inside biological samples. MicAO 3DSR can correct for spherical aberration and restore the axial symmetry of the calibration curve in water-based biological samples up to typically 50µm depth, depending on experimental conditions.

Objective compatibility	60x NA<1.49 and 100x NA>1.4
Microscope compatibility	Standard inverted-frames
Deformable mirror	Mirao 52ER deformable mirror, silver coating, dust proof
Optical transmission	95% at 475-675nm
Operating wavelength range	400-700nm
Software	MicAO software
Working environment	20-25°C, 20-80% RH
Wavefront temporal stability	<10nm RMS for min. 12h in working environment conditions
Power supply	110-220V / 50-60Hz
Dimensions / weight	430 x 360 x 176mm^3 / 9kg

www.imagine-optic.com