MicAO 3DSR

CONTROL THE PSF
CORRECTION AND OPTIMIZATION

TEMPORAL STABILITY
LONG-TERM IMAGING

FLEXIBILITY
CONTROL THE AMOUNT OF ASTIGMATISM

DEEP IMAGING
FROM 0 UP TO 50µm DEPTH

ADAPTIVE OPTICS ACCESORRY FOR 3D PALM/STORM IMAGING: THE UNPARALLELED ACCURACY AND IMAGING DEPTH

A UNIQUE SET OF ADVANTAGES

- **Correct aberrations and restore diffraction-limited PSF.**

- **This aberration correction technique delivers the best 2D and 3D localization precision for PALM/STORM imaging.**

- **Double the amount of detected photons and improve localization precision.**

- **Enables single molecule imaging deep in biological samples.**

- **Compatible with 60x and 100x objective lenses and FOVs of most sCMOS cameras.**

- **Stable wavefront for >12 hours and day-to-day PSF reproducibility.**

- **Optical bypass option available.**

- **High optical transmission in the visible wavelength range.**

- **Device is also available for infrared spectral range.**

- **MicAO adaptive optics software includes 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 system for 3D single molecule 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 near-diffraction-limited resolution and axial symmetry of the PSF. As a result, the number of detected photons is increased, which in turn improves the localization precision in all three dimensions. Moreover, the deformable mirror inside MicAO 3DSR can introduce a pure, aberration-free astigmatism and maintain it for a long period of time, which enables precise and quasi-isotropic 3D imaging.
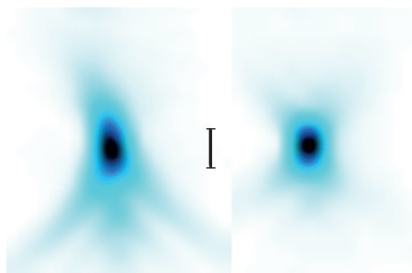

PSF of a typical microscope

PSF corrected with MicAO 3DSR

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 focal area. 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 the adaptive optics community. The software can be operated standalone with its own user interface or via plug-in available for certain versions of µManager©, Metamorph© and NIS Elements©. MicAO software is constantly beeing improved and updated.
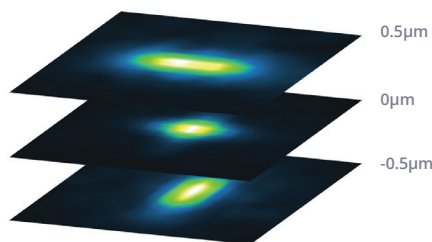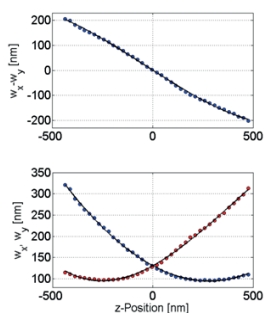
Left: A calibration curve obtained using MicAO 3DSR features aberration-free axial symmetry (lower panel) and high lateral separation of astigmatic PSF along the whole Z range (upper panel).
Right: A representative stack of astigmatic PSF at three planes.

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 depths reaching 50µm.

Objective compatibility	60x NA<1.49 and 100x NA>1.4
Microscope compatibility	Standard inverted-frames
Deformable mirror	Mirao 52es deformable mirror, silver coating, dust proof
Optical transmission	95% at 525-675nm
Operating wavelength range	500-700nm (700-1100nm for IR)
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 176mm³ / 9kg

www.imagine-optic.com