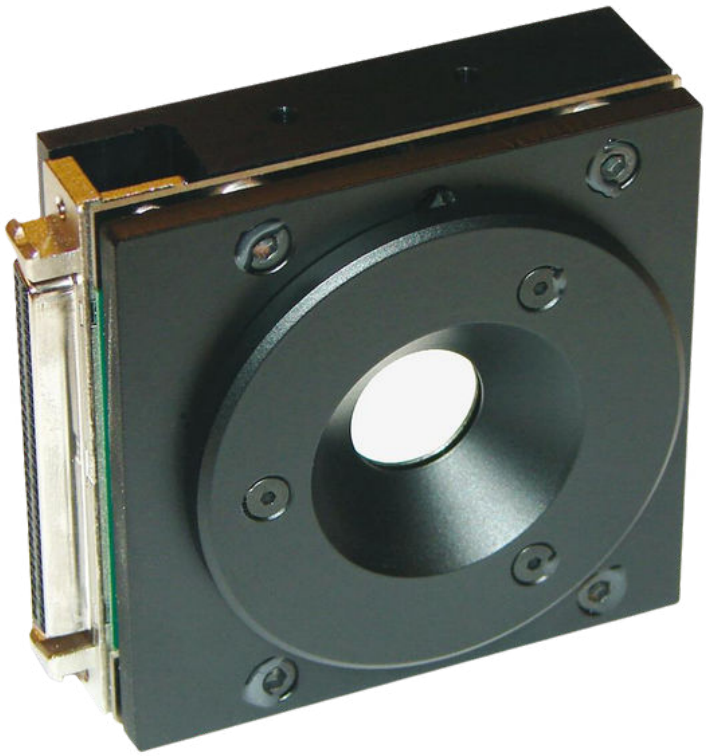
Mirao 52e

Electromagnetic deformable mirrors for microscopy and ophthalmlogy

High optical quality
& linearity

Large
dynamic range

Optional
high stabilization



mu-Imagine
a division of imagine optic

Applications

With Adaptive Optics (AO) for microscopy :

- Image deeper in your sample with correction capabilities that restore diffraction-limited Point Spread Function (PSF) in non-linear (like multiphoton) or light-sheet microscopy
- Navigate in 3D in Single Molecule Localization Microscopy (SMLM) by shaping the PSF to your needs, using astigmatism or tetrapod

With AO for retinal imaging :

- Explore retinal cells at high-resolution by correcting ocular aberrations in Optical Coherence Tomography (OCT), Scanning Laser Ophthalmoscopes (SLO) or flood illumination modalities

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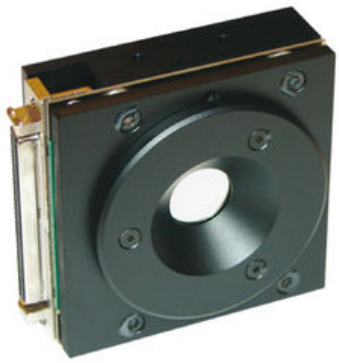
Features

- **Fast closed-loop convergence and accurate correction** with high linearity and very low hysteresis
- **Preserved photon budget** with achromatic, highly reflective and continuous membrane
- **Long-term stability** with stabilization option (Mirao 52es), allowing open-loop operation
- **Correction up to 6th Zernike order** enabled by 52 electromagnetic actuators
- **Protected version available** (Mirao 52ep) to prevent membrane mechanical damage

Boost your imaging performance :

Adaptive Optics made easy and efficient



Mirao 52e

Mirao 52ep (protected)

Mirao 52es (stabilized)

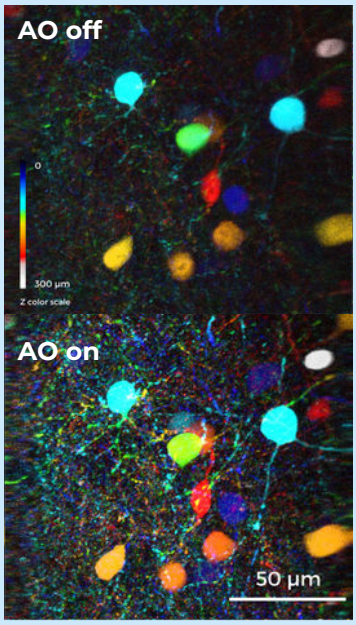
Specifications

Optical specs	
Surface quality	< 10 nm RMS
Coating	Protected silver
Linearity	> 95%
Histeresis	< 2%

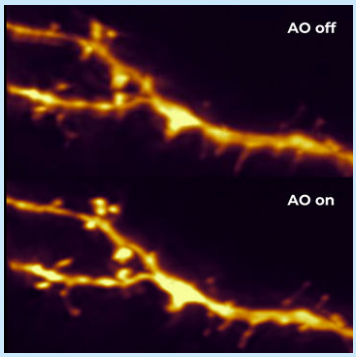
Operating specs	
Number of actuators	52
Maximum generated wavefront (PV)	± 50 µm
Effective diameter	15 mm
Spatial frequency correction	Zernike orders up to 6
Rise time	2.4 ms
Temporal stability	< 10 nm RMS over 12h (stabilized version)

MISC	
Dimensions (Mirao 52e unit)	64 x 64 x 23 mm³
Weight (Mirao 52e unit)	490 g
Dimensions (Mirao 52e controller)	24 x 23 x 10 cm³
Weight (Mirao 52e controller)	3 kg
Working temperature	20-25°C, 20-80% RH
Interface / Power consumption	USB 2.0 / 50 W

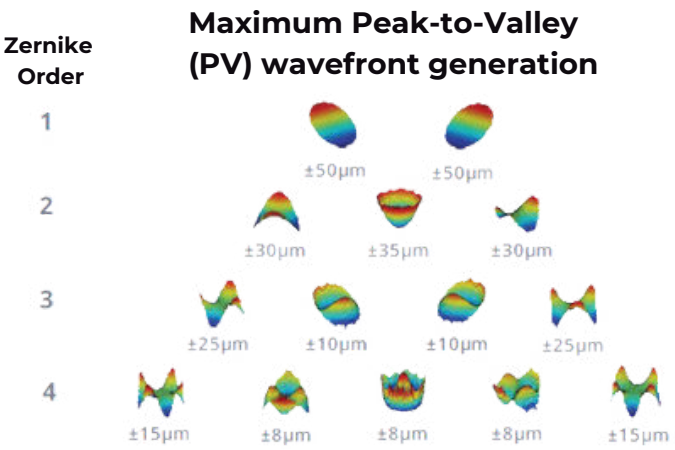
Operating system	Windows 10



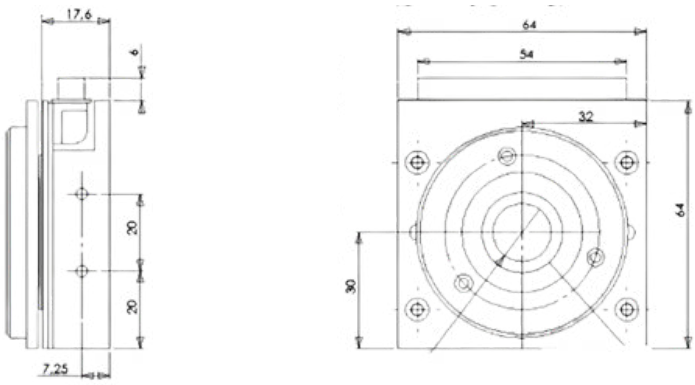
2 Photon imaging of GADGFP mouse brain slices, inhibitory neurons labelled.
Courtesy of S. Imperato (Laboratoire de Physique et d'Etude des Matériaux, IBENS, Imagine Optic)



Lattice light-sheet imaging of neuronal projections with 3N algorithm.
Courtesy of M. Malivert (BIC)



Dimensions



Available AO software

WAVETUNE

WaveTune is a unique software that seamlessly combines wavefront measurement and correction features with extensive instrument diagnostics. This software contains all the necessary tools to calibrate the Deformable Mirror (DM). It can also operate the DM in closed-loop with HASO wavefront sensor, as well as in open-loop and perform beam shaping.

WAVEKIT BIO

WaveKit Bio is a Software Developpement Kit (SDK), available in C++ and Python, specifically designed for microscopy applications. In particular, it contains all the necessary functions to implement sensorless AO, using image-based iterative algorithms (e.g. 3N).

Mounting & Accessories

Several mounting options are available, including adaptors for the most common mechanical stages, to simplify integration of any Mirao 52 device into an optical setup.

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Adaptive Optics adapted to microscopy

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