

HASO4

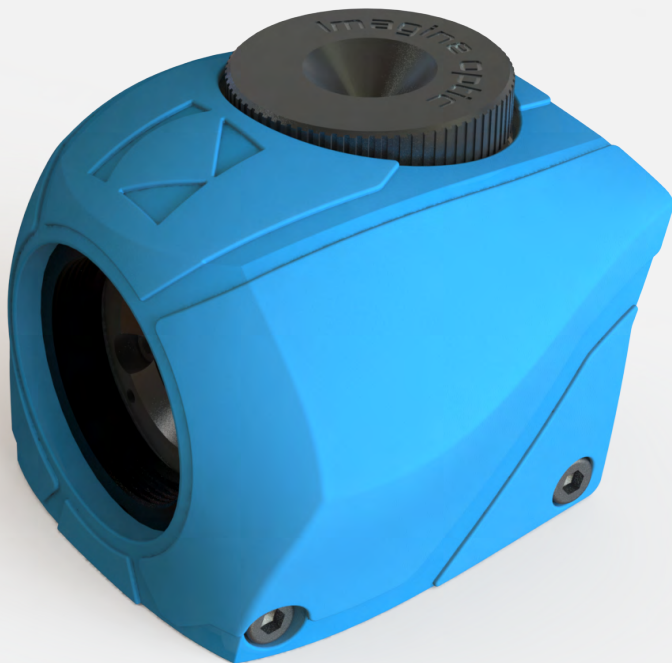
BROADBAND

ADVANCED
METROLOGY WAVEFRONT SENSOR

FULL CALIBRATION
 $\lambda = 400-1100$ nm

COMPACT
AND VERSATILE

EASY
TO USE



"An excellent instrument, indeed! So powerful and easy to use."

Bill Dougherty PhD, Senior Scientist
Applied Precision
A GE Healthcare Company

A UNIQUE SET OF ADVANTAGES

- Full spectral range calibration over $\lambda = 400-1100$ nm
- $\lambda/100$ rms absolute accuracy over 800 λ dynamic range
- Patented technology for simultaneous and independent measurements of phase and intensity
- 20 Hz acquisition frequency
- External trigger capability
- Optimized for polychromatic and monochromatic beams over the wide spectral range (400-1100 nm)
- C-mount compatible entrance aperture
- Easy to deploy with USB 3.0 connectivity or Ethernet interface
- Bundled with WaveView, the industry's most advanced metrology software
- Compatible with WaveKit (Software Development Kit) in C, MATLAB, and LabVIEW



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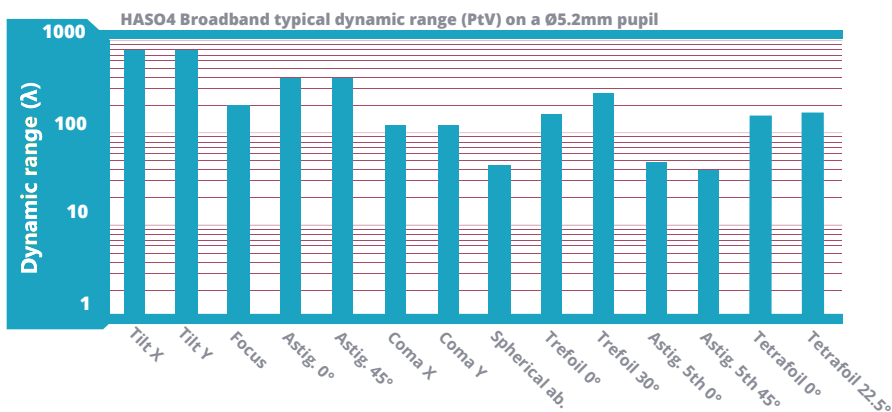
hikari, inc.

Imagine  optic

HASO4 BROADBAND THE ADVANCED METROLOGY WAVEFRONT SENSOR

Providing outstanding performance, the HASO Wavefront Sensor family is used in the most demanding applications in optical metrology, microscopy and laser diagnostics worldwide. We offer a unique combination of expertise in high quality microlens production, software development and accurate factory calibrations. This allows the HASO4 Broadband to provide a level of performance beyond comparison for application over the full spectral range of silicon (400-1100 nm).

- $\lambda/100$ rms absolute accuracy on a huge dynamic range (see the graph below)
- Patented wavefront correction algorithms for intensity beam variations (laser, Gaussian, hyper Gaussian, apodized beams...)
- Measurement up to 64 Zernike polynomials with individual accuracy better than 6nm rms
- Calibrated for the 400-1100 nm spectral range



OUTSTANDING PERFORMANCE EXAMPLES WITH **HASO4 BROADBAND**

- Beam collimation with an accuracy better than 300m radius of curvature
- A 20mm focal length measurement with a sensitivity of 1 μ m rms
- Direct wavefront acquisition of converging and diverging F/5 beams with an accuracy of about $\lambda/100$ rms including astigmatism and high order aberrations
- Control and adjustment of axial laser beam deviation better than 3 μ rad rms
- 3D localization of a focal spot up to 0.1 μ m rms and 1 μ m rms for lateral and axial resolution respectively (0.1 NA beam)

SOFTWARE

- WaveView is the most advanced wavefront measurement and analysis software. It offers more than 150 features and tools optimized for a wide range of highly demanding applications. WaveView development philosophy is based on tens of years of customer's feedback, improving the user experience at each version. Modules dedicated to PSF, Strehl ratio, MTF, M² are available.
- WaveKit is a SDK in C, LabVIEW and MATLAB, providing the basis blocks on which one can build a fully customized software for specific HASO based applications or WaveView data processing routines. WaveKit is available on request.

Aperture dimension	7.0 x 5.2 mm ²
Number of microlenses	68 x 50
Tilt dynamics range	> $\pm 3^\circ$
Focus dynamics range	± 0.026 m to $\pm \infty$
Repeatability	< $\lambda/200$ rms
Wavefront measurement accuracy in absolute mode λ between 400-600 nm λ between 600-1100 nm	≤ 6 nm rms $\sim \lambda/100$ rms *
Spatial sampling	$\sim 105 \mu$ m
Maximum acquisition frequency	20 Hz
External trigger	TTL signal
Calibrated wavelength range	400 - 1100 nm
Dimension / Weight	46 x 57 x 57 mm ³ / 150g
Working temperature	15 - 30 $^\circ$ C
Interface / Power consumption	USB 3.0 / 2.9 W Ethernet / 2.9 W
Operating system	Windows 7 and 10

* The absolute accuracy may slightly decrease for the wavelengths longer than 800nm. Above 950nm, the accuracy is ensured for light sources with coherence length smaller than 3 mm.

www.imagine-optic.com