

# HASO4 FAST

**HIGH PERFORMANCE**  
WAVEFRONT SENSOR

**COMPACT**  
AND VERSATILE

**HIGH**  
ACQUISITION RATE

**EASY**  
TO USE



Shack-Hartmann wavefront sensor for fast inspection,  
fast adaptive optics and free-space communication

## A UNIQUE SET OF ADVANTAGES

- Acquisition frequency up to 1 kHz
- $\lambda/100$  RMS absolute accuracy
- Large wavelength range: 400 -900 nm
- 16 x 16 sampling points on 1.19mm x 1.19mm sensor pupil
- External trigger capability
- Patented technology for simultaneous and independent measurements of phase and intensity
- Bundled with WaveView, the industry's most advanced metrology software
- Compatible with WaveKit (Software Development Kit) in C, MATLAB, and LabVIEW

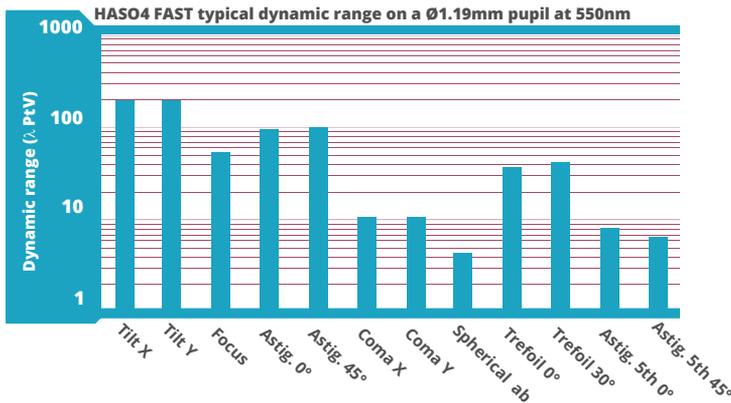
Contact us for more information: [contact@imagine-optic.com](mailto:contact@imagine-optic.com) or +33 1 64 86 15 60

imagine  optic

# HASO4 FAST : 1KHZ WAVEFRONT SENSOR WITH HIGH ACCURACY

Providing outstanding performance, the HASO4 FAST is recommended for optical metrology, that needs high speed and high wavefront measurement accuracy, adaptive optics and free-space communication. We offer a unique combination of expertise in high quality microlens production, software development and accurate wavefront sensor calibration at factory. This allows the HASO4 FAST to provide an unprecedented level of performance.

- Large dynamic range (see the plot below)
- Patented wavefront correction algorithms for intensity beam variations (laser, Gaussian, hyper Gaussian, apodized beams...)
- Measurement up to 36 Zernike polynomials at 1kHz
- Optimized for polychromatic applications



## OUTSTANDING PERFORMANCE EXAMPLES WITH : HASO4 FAST

- Direct wavefront acquisition of converging and diverging F/5 beams with an accuracy of  $\lambda/100$  rms including astigmatism and high order aberrations
- Perfect knowledge of the measurement time by using the external trigger feature
- Latency optimized to less than 2.2ms, including wavefront measurement, allowing high performance adaptive optics
- Only 1 nW power level needed on the sensor to acquire the wavefront with an accuracy of  $\lambda/100$  rms at 1kHz

## SOFTWARE

- WaveView is the most advanced wavefront measurement and analysis software. It offers more than 150 functions 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,  $M^2$  are available.
- WaveKit is a SDK, 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.

## SPECIFICATIONS

Aperture dimension	1.19 x 1.19 mm <sup>2</sup>
Number of microlenses	16 x 16
Tilt dynamic range	> $\pm 3^\circ$
Focus dynamic range	$\pm 0.008$ m to $\pm \infty$
Repeatability	$\lambda/200$ nm rms
Wavefront measurement accuracy in absolute mode	6nm rms for 400-600 nm $\lambda/100$ nm rms for 600-900 nm
Spatial sampling	74.4 $\mu$ m
Maximum acquisition frequency	1 kHz
External trigger	TTL signal
Wavelength range	400-900 nm
Dimensions (LxWxH) / weight	60 x 48 x 42 mm <sup>3</sup> / 185g
Working temperature	15 - 30° C
Interface / Power supply	USB 3.0 / 3 W via USB
Operating system	Windows 7 and 10
Required power	1nW for the largest round pupil at 1kHz

[www.imagine-optic.com](http://www.imagine-optic.com)