# HASO4
# FAST

Wavefront sensor
**The kHz**

High-speed
High accuracy
Compact & versatile

compatible


imagine optic

# HASO4 FAST +

**Ideal for measuring rapid changes in wavefronts, the HASO4 FAST Shack-Hartmann Wavefront Sensor, with a frame rate of 1 kHz, meets all demanding dynamic applications.**

Compatible with the Optical Engineer Companion modular system: easily combine the accessories you need.

## APPLICATIONS

Successfully used in the most demanding applications in optical metrology that require high speed and high wavefront measurement accuracy, fast adaptive optics correction and free-space communications, the HASO4 FAST performs multiple functions :

+ Quantify the transitional regime of active optical elements such as variable focal length lenses
+ Quantify the pointing stability of high frame rate laser
+ Drive a deformable mirror in high frame rate adaptive optics setups
+ Fast inspection: measure the optical system's aberrations and verify that the optics comply with specifications

## FEATURES

+ Direct wavefront acquisition of converging and diverging F/5 beams with an accuracy of λ/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 2.2 ms, 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 λ/100 RMS at 1 kHz
+ Patented technology for simultaneous and independent measurements of phase and intensity

# SPECIFICATIONS*

### OPERATING SPECS

| | |
|---|---|
| Aperture dimension | 1.2 x 1.2 mm² |
| Number of microlenses | 16 x 16 |
| Maximum acquisition frequency | 1.25 kHz |
| Calibrated wavelength range | 400 - 900 nm |
| Minimum power | 0.15 nW |
| External trigger | TTL signal |

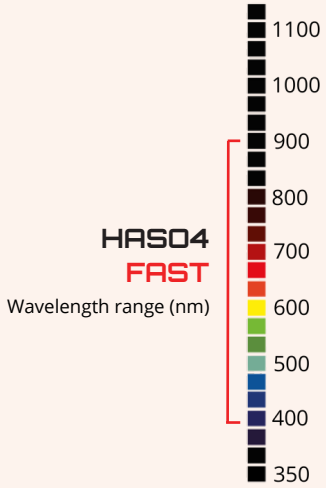
**OPERATING SYSTEM** **Windows 10**

### OPTICAL SPECS

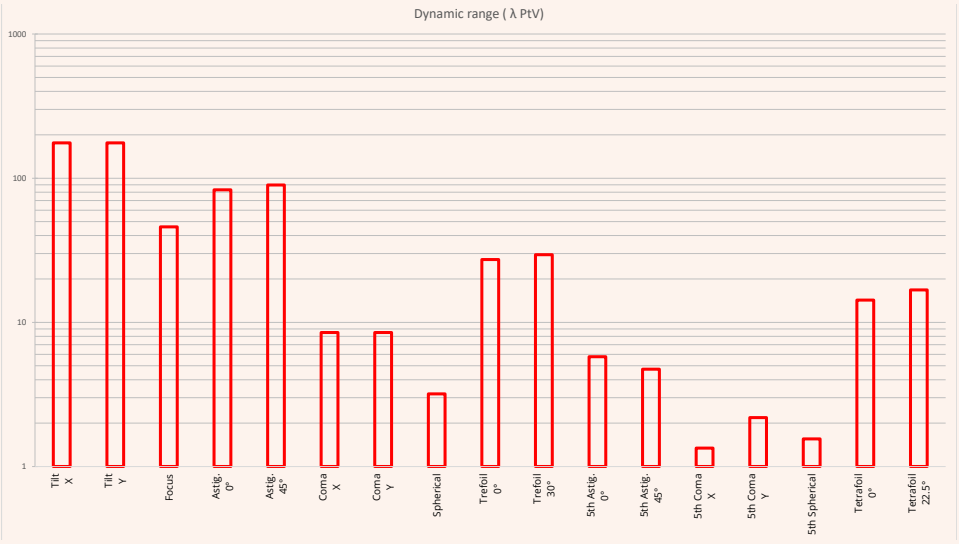
| | |
|---|---|
| Repeatability | λ/200 RMS |
| Absolute wavefront measurement accuracy | |
| • λ between 400 - 600 nm | ≤ 6 nm RMS |
| • λ between 600 - 900 nm | ~ λ/100 RMS |
| Spatial sampling | ~ 75 µm |
| Tilt dynamics range | > ± 3° |
| Focus dynamics range | ± 0.008 m to ± ∞ |

### MISC

| | |
|---|---|
| Dimensions (Height x Width x Length) | 42 x 48 x 60 mm³ |
| Weight for USB version | 185 g |
| Working temperature | 15 - 30 °C |
| Interface | USB 3.0 |
| Power consumption | 3 W |

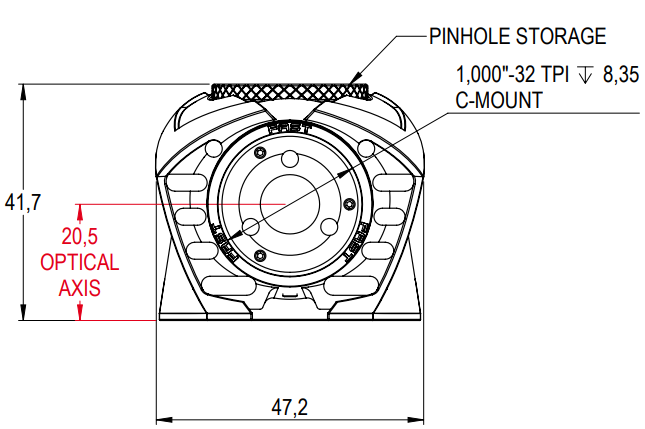


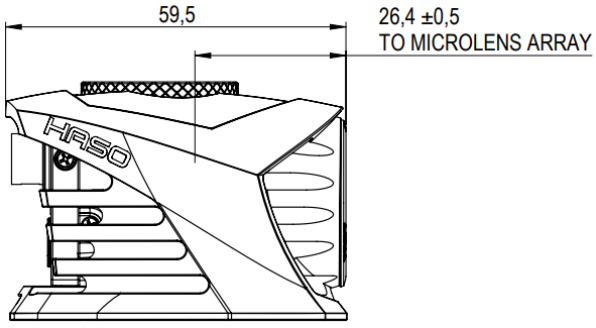

**HASO4 FAST**
Dynamic range at λ = 635 nm




*Subject to changes without further notice

# DIMENSIONS (mm)



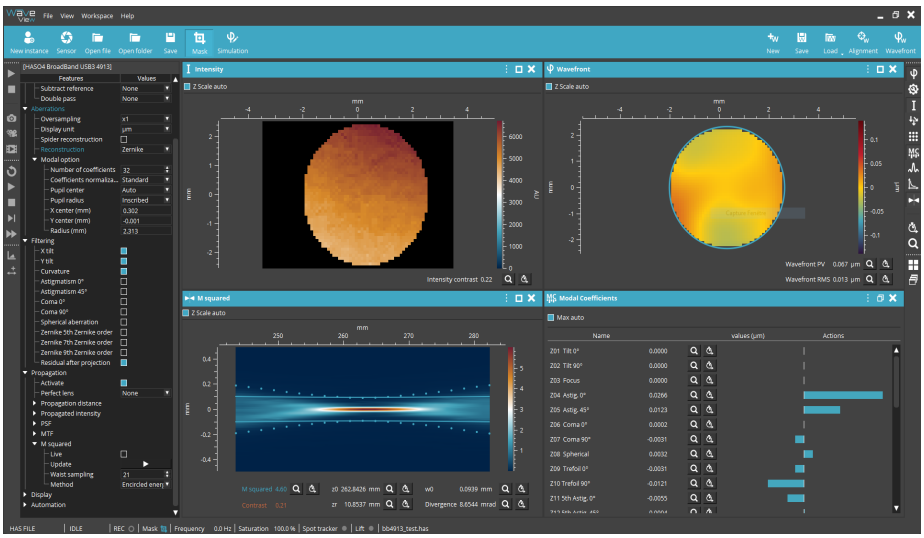
# SOFTWARE

## WAVEVIEW™
## Metrology 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.

**Options :**

+ Extensions for PSF, MTF and Strehl ratio
+ Optional SDK in C/C++, LabVIEW and Python

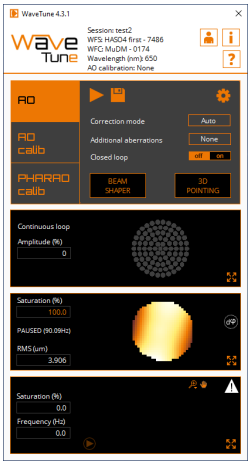


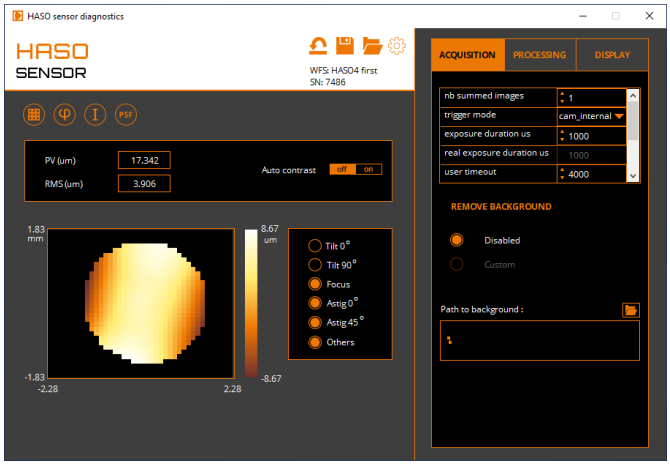
## WAVETUNE™
## Adaptive Optics Software

WAVETUNE™ is a unique software that seamlessly combines wavefront measurement and correction features with extensive instrument diagnostics.
It is perfectly adapted to our HASO wavefront sensors, ILAO STAR, MIRAO and mu-DM deformable mirrors, as well as to a wide range of active components.

**Options :**

+ Optional SDK in C/C++, LabVIEW and Python





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