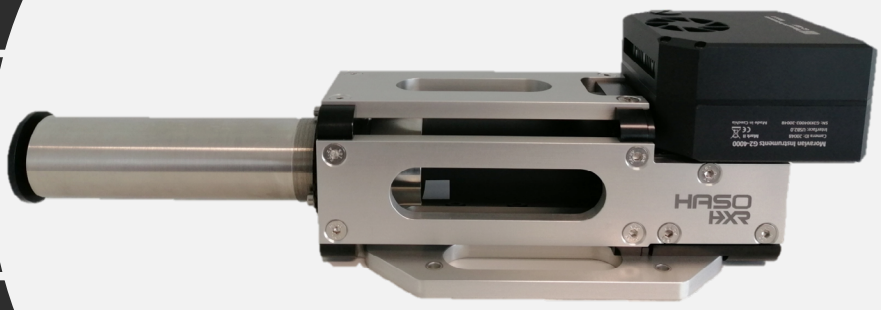
HASO HXR

LIVE, SINGLE-SHOT
WAVEFRONT SENSING

ACHROMATIC
MEASUREMENT

BROADBAND
5 - 25 KEV ENERGY RANGE

COMPACT
& EASY TO USE



Broadband hard X-Ray wavefront sensor for live beamline characterization and alignment

UNIQUE SET OF ADVANTAGES

- Mature Hartmann technology
- Single-shot, live visualization of the wavefront (no post-processing required)
- High accuracy wavefront characterization (better than lambda/10 RMS)
- Multiple calibration options available
- Characterization of focalization without requiring access to the focal point
- Real-time alignment of optical systems (e.g. KB, toroidal mirrors, elliptical mirrors, etc.)
- Comprehensive metrology software with focal spot profile calculation module
- C/C++, Labview & Python SDK for optical metrology and adaptive optics

Contact Imagine Optic for more details: contact@imagine-optic.com or +33 1 64 89 15 60

Product image for illustration purpose. Design is subject to change without notice .

imagine optic™

THE ADVANCED HARD X-RAY WAVEFRONT SENSOR

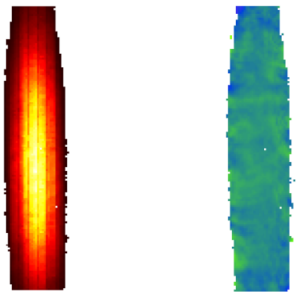
Imagine Optic's HASO HXR wavefront sensor is the only device of its kind that offers extreme precision and live measurement for today's advanced scientific research.

Applications

Source characterization

The HASO HXR provides live measurement of the optical quality of your beamline at strategic positions such as after the monochromator, after an optics or a sample. Fluctuations of the position of a focal point can also be characterized.

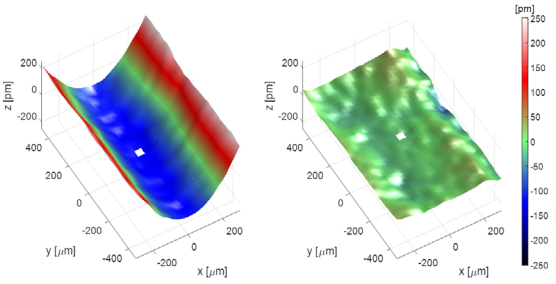
Exemple of a wavefront collected in collaboration with BNL at 11.5 keV, 1s exposure time and 50 averaged images. The beam size is 3x0.5mm² on the wavefront sensor. Left: Intensity profile. Right: Wavefront map with 0.108λ RMS wavefront error.



Beamline alignment

The HASO HXR facilitates live beamline alignment at wavelength. It can be used to automatically align a focusing optics such as a Kirkpatrick-Baez system or toroidal mirrors, and control active optics for optimizing the focal spot.

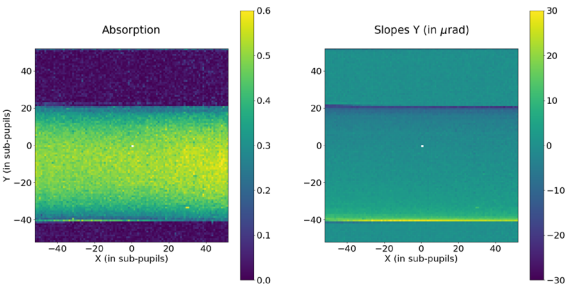
3D wavefront before (left) and after correction (right) of the thermal deformation due the higher-power incident X-ray beam with a novel active mirror system, D. Cocco, Opt. Exp. 20 (2020) 19242.



Phase imaging

Intensity and phase information can be retrieved instantaneously. The system is adapted to biological imaging such as nanoparticles in tissues or organs of small animals.

Absorption (left) and deflection (right) maps of a 1mm-diameter PMMA rod at 9.2 keV. The maps were obtained in relative mode, by comparing images with and without sample.



Specifications	HASO HXR
Aperture dimension	Up to 3 x 3 mm²
Number of sub-apertures dedicated for analysis	Up to 150 x 150
Maximum beam divergence	1.5 mrad
Sensitivity (rms)	λ/35
Wavefront measurement accuracy (rms)	Better than λ/10
Tilt measurement sensitivity (rms)	80 nrad
Spatial sampling	20 µm
Typical flux needed at 1s exposure	10^{11} photon/s
Exposure time range	100 ms - 900 s
Working photon energy (wavelength)	5 - 25 keV (50 pm – 250 pm)
Operating system	Windows 10
Dimension	480 x 155 x 135 mm³
Interface	USB

www.imagine-optic.com