



PHASICS
The phase control company

SID4

COST-EFFECTIVE, HIGH RESOLUTION WAVEFRONT SENSOR

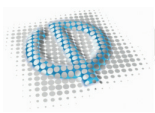
Our entry level yet high resolution wavefront sensor covering the visible and NIR range, SID4 is the perfect versatile tool for any laser or optical metrology application.

APPLICATIONS: [Laser industry](#) | [High intensity laser facilities](#) | [Aerospace](#) | [Defense](#)

SPECIFICATIONS

Wavelength range	400 - 1100 nm
Aperture dimensions	5.02 x 3.75 mm ²
Phase spatial resolution	27.6 μm
Phase & Intensity sampling	182 x 136
Resolution (Phase)	< 2 nm RMS
Accuracy (Absolute)	10 nm RMS
Acquisition rate	60 fps
Real-time processing frequency	10 fps (full resolution)*
Interface	Giga Ethernet
Dimensions	62 x 64 x 94 mm ³
Weight	~ 400g

* with SID4 software



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海纳光学

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SID4 DWIR

DUAL BAND WAVEFRONT SENSOR FOR THE 3-5 μm AND 8-14 μm BANDS

SID4 DWIR is the first off-the-shelf high resolution wavefront sensor for dual band infrared from 3 to 5 μm and 8 to 14 μm . It is well suited to characterize IR optics, blackbody sources, 3.39 μm or 10.6 μm laser beams and systems.

APPLICATIONS: [Laser industry](#) | [Defense](#) | [Optical components & assemblies](#) | [Aerospace](#)

SPECIFICATIONS

Wavelength range	3-5 μm and 8-14 μm
Aperture dimensions	10.08 x 8.16 mm ²
Phase spatial resolution	68 μm
Phase & Intensity sampling	160 x 120
Resolution (Phase)	25 nm RMS
Accuracy (Absolute)	75 nm RMS
Frame rate	50 fps
Real-time processing frequency	> 10 fps (full resolution)*
Interface	Giga Ethernet
Dimensions	85 x 118 x 193 mm ³
Weight	~ 1.6kg

* with SID4 software



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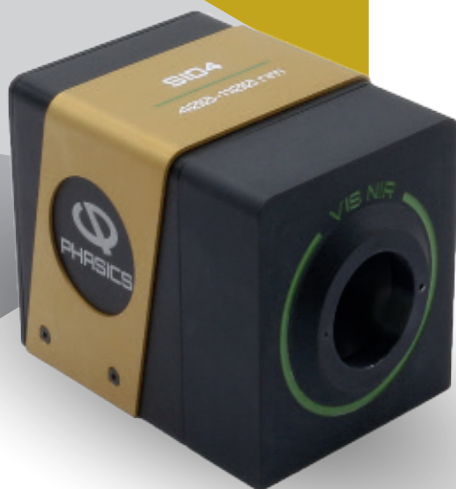
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SID4

for metrology &
high energy physics

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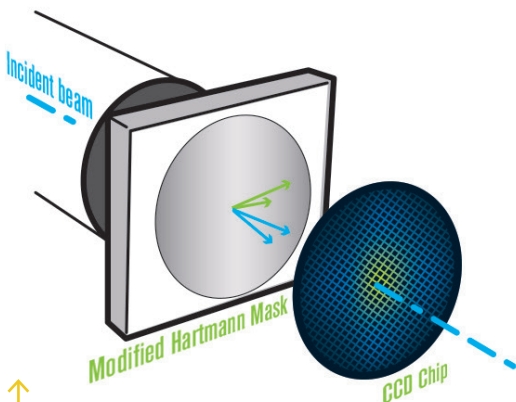




"ONE SINGLE VERSATILE WAVEFRONT SENSOR..."

PHASICS wavefront sensors stand out for both their unrivalled **high resolution** and their **ease of use**. As they cover beam testing, adaptive optics and plasma characterization, PHASICS instruments offer full **versatility** to engineers and researchers in high power laser facilities (Petawatt, Terawatt...).

EXCLUSIVE TECHNOLOGY: 4-WAVE LATERAL SHEARING INTERFEROMETRY



PHASICS technology was introduced to overcome the Shack-Hartmann sensor limitations, especially resolution. This ultra-high resolution enables accurate wavefront measurement for robust calculations of beam parameters.

1 HIGH RESOLUTION

- Up to 120 000 measurement points
- High repeatability
- Robust calculations

2 HIGH DYNAMIC RANGE

- Measurement of strong aberrations

3 DIRECT MEASUREMENT OF DIVERGING BEAM

- Easy set-up & alignment
- High NA with no relay lens
- The after last parabola wavefront measurement

4 SELF REFERENCED

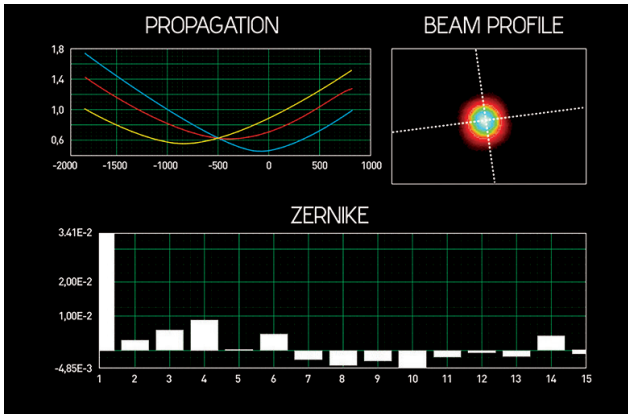
- Compact
- Insensitive to vibration

5 ACHROMATIC

- Compatible with broadband sources: Femtosecond laser, white light or LED
- Cost-effective multi-wavelength solution

...TO MEET ALL YOUR CHALLENGES

I - ACCURATE BEAM CHARACTERIZATION AT ANY POINT OF THE LASER CHAIN



- High resolution of both phase & intensity for robust calculations of all laser beam parameters
- Set-up with no relay lens at any point of the laser chain
- Easy parabola and optics alignment

Aberrations: Zernike, Legendre

Beam propagation: M^2 (ISO 11146), waist, Rayleigh length, divergence

PSF: Strehl ratio, encircled energy

Advanced measurements: Annular or rectangular pupils, multiple pupils, piston, tilt

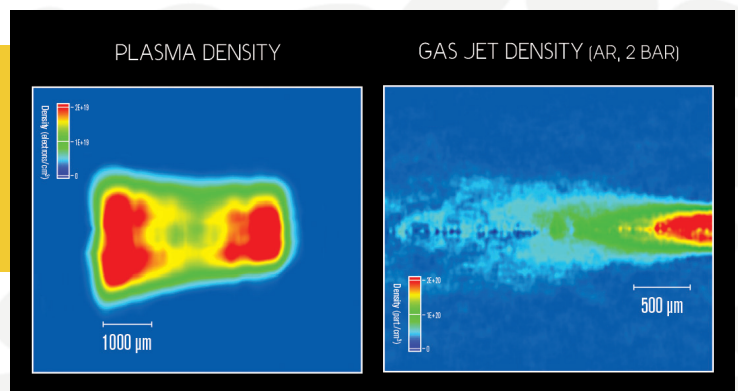
Beam profile: Energy distribution, intensity centroid

II - GAS & PLASMA DENSITY HIGH SENSITIVITY & REPEATABLE MEASUREMENT

- High sensitivity (8x lower noise than Mach-Zender interferometer)
- Accurate at low gas pressure
- Repeatable shot-to-shot measurements to compare homogeneity (nozzle selection, laser pulse illumination...)

EASY & COST-EFFECTIVE SET-UP

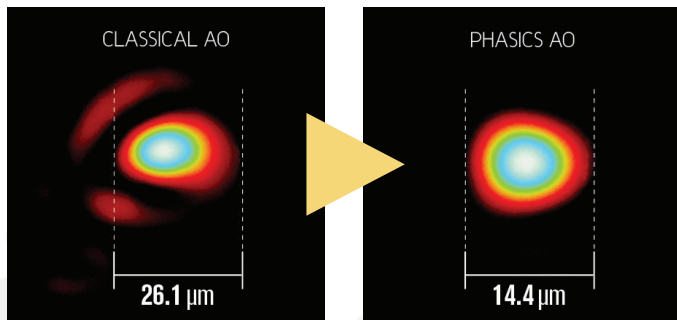
- No reference arm
- Any probe source :
fs-laser, LED, halogen...



IN LASER EXPERIMENTS"

III - ADVANCED ADAPTIVE OPTICS WITH ANY DEFORMABLE MIRROR

- Telescope aberrations removal
- 3D dynamic pointing



↑ Correction after the last parabola without any additional device to achieve the best possible focal spot



IV - OPTICS ALIGNMENT & TESTING

EASY DOUBLE PASS MEASUREMENT
WITH R-CUBE INTEGRATED
ILLUMINATION ADD-ON



- Large mirror measurement in the laser chain
- Telescope aberrations removal
- Lens test and alignment in all the laser chain
- Diagnostic beamline calibration

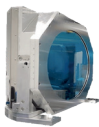
HIGH RESOLUTION WAVEFRONT SENSORS

SID4 RANGE FROM UV TO IR



	Spectral range	Aperture dimension (mm²)	Spatial resolution	Phase sampling (pixels)	Phase accuracy (Absolute)	Phase resolution	Vacuum compatibility
UV	250-400 nm	7.4 x 7.4	29.6 µm	250 x 250	10 nm RMS	2 nm RMS	-
UV HR	190-400 nm	13.84 x 10.89	38.88 µm	355 x 280	10 nm RMS	1 nm RMS	-
SID4 V	400-1100 nm	4.73 x 3.55	29.6 µm	160 x 120	10 nm RMS	<2 nm RMS	> 10 ⁻⁶ mbar
SID4	400-1100 nm	5.02 x 3.75	27.6 µm	182 x 136	10 nm RMS	<2 nm RMS	-
SID4 HR	400-1100 nm	9.98 x 8.64	24 µm	416 x 360	20 nm RMS	<2 nm RMS	-
SID4 UHR	400-1100 nm	15.16 x 15.16	29.6 µm	512 x 512	-	<2 nm RMS	-
SWIR	0.9-1.7 µm	9.6 x 7.68	120 µm	80 x 64	15 nm RMS	<2 nm RMS	-
SWIR HR	0.9-1.7 µm	9.6 x 7.68	60 µm	160 x 128	15 nm RMS	<2 nm RMS	-
eSWIR	0.9-2.35 µm	9.6 x 7.68	120 µm	80 x 64	<40 nm RMS*	<6 nm RMS*	-
DWIR	3-5 µm & 8-14 µm	10.08 x 8.16	68 µm	160 x 120	75 nm RMS	25 nm RMS	-
LWIR	8-14 µm	16 x 12	100 µm	160 x 120	75 nm RMS	25 nm RMS	-

*For coherent sources

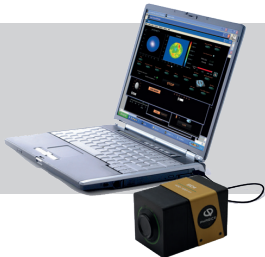


WITH ANY DEFORMABLE MIRROR

	High Power Laser			Imaging correction	Imaging correction & beam shaping
Technology	Piezo electric (small diameter)	Piezo electric (large diameter)	Mechanical of the latest generation (stepper motor)	Membrane	SLM
Number of actuators	up to 36	up to 150	up to 60	up to 80	800 x 800 or 1080 x 1920
Diameter	15-25 mm	300-400 mm	22-500 mm	10-30 mm	7-16 mm
Damage threshold	Very high (on-demand coating)			High	Medium
Loop speed	5-10 Hz	5-10 Hz	1 Hz	5-10 Hz	5-10 Hz

DEDICATED SOFTWARE PACKAGES

- **SID4 Density module** for plasma diagnosis
- **OASys module** for adaptive optics
- **SID4** for beam analysis





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SID4-LWIR

HIGH RESOLUTION WAVEFRONT SENSOR FOR THE LONG WAVE INFRARED

SID4-LWIR brings high resolution wavefront sensing to the long wave infrared region (from 8 μm to 14 μm), for CO₂ or OPO laser beam metrology, as well as characterization of IR components and lenses used in thermal imaging, security and safety vision.

APPLICATIONS: [Laser industry](#) | [Semiconductor](#) | [Optical components & assemblies](#)

SPECIFICATIONS

Wavelength range	8-14 μm
Aperture dimensions	16.00 x 12.00 mm ²
Phase spatial resolution	100 μm
Phase & Intensity sampling	160 x 120
Resolution (Phase)	25 nm RMS
Accuracy (Absolute)	75 nm RMS
Acquisition rate	24 fps
Real-time processing frequency	10 fps (full resolution)*
Interface	Giga Ethernet
Dimensions	90 x 96 x 110 mm ³
Weight	~ 850g

* with SID4 software



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SID4 SWIR

COST-EFFECTIVE SHORT WAVE IR WAVEFRONT SENSOR

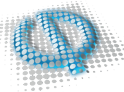
The SID4 SWIR wavefront sensor integrates PHASICS patented technology with an InGaAs detector. Thanks to its high spatial resolution (80 x 64 phase pixels) and high sensitivity, it offers accurate wavefront measurement from 900 nm to 1.7µm. SID4 SWIR is an innovative solution for testing SWIR lens used in optical communications, inspection instruments or night vision in military and surveillance devices.

APPLICATIONS: [Laser industry](#) | [FSOC](#) | [Automotive](#) | [Aerospace](#) | [Optical components](#)

SPECIFICATIONS

Wavelength range	0.9 - 1.7 µm
Aperture dimensions	9.60 x 7.68 mm ²
Phase spatial resolution	120 µm
Phase & Intensity sampling	80 x 64
Resolution (Phase)	< 2 nm RMS
Accuracy (Absolute)	15 nm RMS
Frame rate	30 fps
Real-time processing frequency	>7 fps (full resolution)*
Interface	Giga Ethernet
Dimensions	100 x 55 x 63 mm ³
Weight	~ 500g

* with SID4 software



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SID4 UV

COST-EFFECTIVE, HIGH RESOLUTION UV WAVEFRONT SENSOR

Bringing high-resolution wavefront sensing as low as 250 nm, SID4 UV is perfectly suited for UV optics testing, UV laser characterization (used in lithography or semiconductor applications) and surface inspection of lenses and wafers.

APPLICATIONS: [Laser industry](#) | [Semiconductor](#) | [Astronomy](#) | [Aerospace](#) | [AR/VR](#)

SPECIFICATIONS

Wavelength range	250 - 400 nm
Aperture dimensions	7.4 x 7.4 mm ²
Phase spatial resolution	29.6 μ m
Phase & Intensity sampling	250 x 250
Resolution (Phase)	2 nm RMS
Accuracy (Absolute)	10 nm RMS
Frame rate	> 30 fps
Real-time processing frequency	2 fps (full resolution)*
Interface	Giga Ethernet
Dimensions	45 x 30 x 100 mm ³
Weight	~ 250g

* with SID4 software



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SID4 UV HR

UV WAVEFRONT SENSOR SENSITIVE DOWN TO 190 NM

Based on Phasics patented technology, the SID4 UV HR wavefront analyzer offers both an unrivalled high resolution (355x280 measurements points) and a high sensitivity (1 nm RMS) in the ultraviolet spectrum from 190 nm to 400 nm. Consequently, the SID4 UV HR is perfectly adapted for optical components characterization (used in lithography, semiconductor...) and surface inspection (lens and wafers...).

APPLICATIONS: [Laser industry](#) | [Astronomy](#) | [Semiconductor](#) | [Aerospace](#)

SPECIFICATIONS

Wavelength range	190 - 400 nm
Aperture dimensions	13.84 x 10.89 mm ²
Phase spatial resolution	38.88 µm
Phase & Intensity sampling	355 x 280
Resolution (Phase)	1 nm RMS
Accuracy (Absolute)	10 nm RMS
Frame rate	30 fps
Real-time processing frequency	3 fps (full resolution)*
Interface	CameraLink
Dimensions	78 x 88.1 x 70.8 mm ³
Weight	~ 575g

* with SID4 software



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SID4 V VACUUM COMPATIBLE HIGH RESOLUTION WAVEFRONT SENSOR

PHASICS is innovating by proposing the first off-the-shelf vacuum compatible wavefront sensor on the market.

SID4 V is designed to perform wavefront measurements **under high vacuum**. The wavefront measurement is realized in-situ in the same conditions as the experiment. With PHASICS' unique strategy for **adaptive optics**⁽¹⁾ it is now possible to correct the aberrations of every single optical element up to the target location inside the vacuum chamber.

It is also used to characterize laser beams **after compression** inside the compressor vessel.

Finally, gas jet and plasma density⁽²⁾ are now measured as close to the target as possible.

KEY FEATURES



Large spectral
range acceptance



High resolution
160 x 120 phase pixels



Diverging beam
compatible



Low outgassing



Operating under vacuum
& atmospheric pressure



Compactness

Application notes: (1) After last focusing optics correction with Phasics Adaptive optics loop - (2) Wavefront-based plasma characterization

SID4 V VACUUM COMPATIBLE

HIGH RESOLUTION WAVEFRONT SENSOR

ADVANTAGES

- 1 Invariant to thermal and mechanical vacuum constraints
- 2 Tolerates vacuum-cycles without any performance decrease
- 3 MTBF > 10 years

DESIGNED FOR VACUUM DOWN TO 10^{-6} mbar
NO CONTAMINATION IN THE VACUUM CHAMBER

SPECIFICATIONS

Vacuum compatibility	> 10^{-6} mbar
Wavelength range	400 - 1100 nm
Aperture dimensions	4.73 x 3.55 mm ²
Maximun NA*	0.2
Spatial resolution	29.6 μ m
Phase and intensity Sampling	160 x 120
Accuracy	10 nm RMS
Resolution (Phase)	< 2 nm RMS
Frame rate	60 fps
Real-time processing frequency	10 Hz (full resolution)
Dimensions	54 x 46 x 75.3 mm ³
Weight	~250 g

** Optional software module necessary*



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