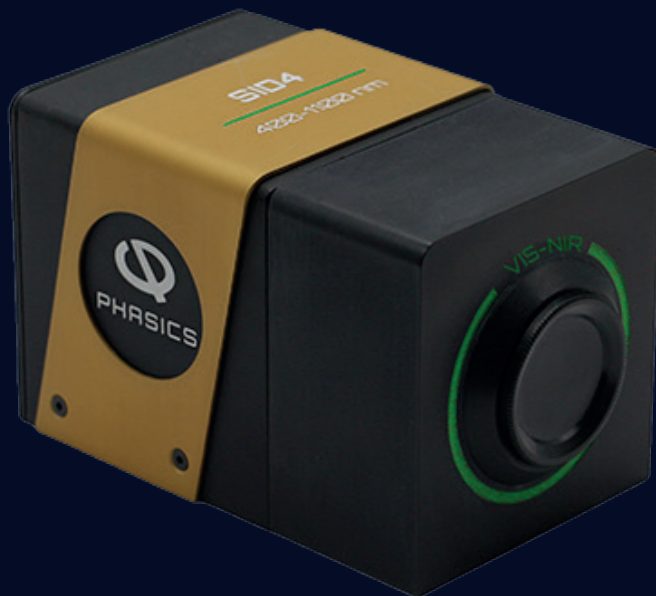
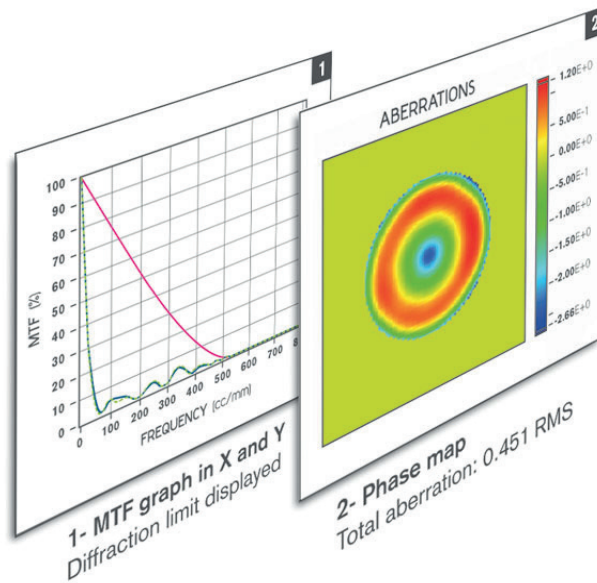


# KALEO products metrology of lenses & complex systems

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## Simple measurement, advanced results

PHASICS offers the most innovative solutions for **quality control of lenses and complex optical systems** in R&D and production. Relying on a unique wave front technology called quadriwave lateral shearing interferometry, PHASICS solutions provide **fast and complete characterization** of your optics.

### In a single acquisition...

#### ... get the MTF

- Along any direction
- For any pupil size
- On and off-axis
- Up to cut-off frequency
- With various focusing methods

#### ... and wavefront quality

- EFL, F#, NA
- Aberrations: Zernike, Legendre, Noll
- Real-time filtering of phase map (Zernike)
- Through focus MTF
- Comparison to design
- Chromatic aberrations

### → Direct measurement

Measuring diverging and converging beams with no relay lens, PHASICS sensors enable a compact and direct set-up:

- Simple alignment
- Same set-up to cover your full optics range
- Characterization in working conditions
- Easy measurement interpretation

### → High resolution

The unrivalled high resolution of PHASICS sensors ensure **reliability**, by enabling robust calculations and small defects detection.

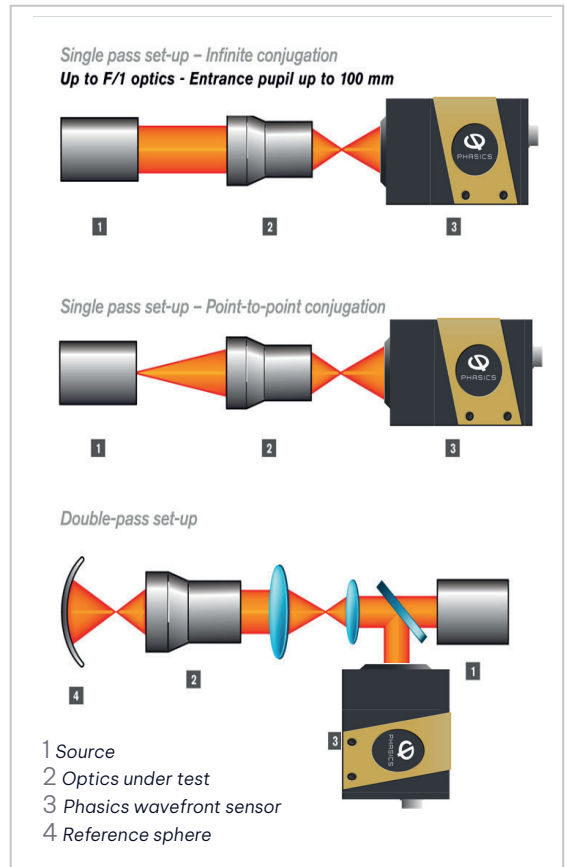
- Up to 554 x 554 measurement points
- Nanometer-level axial resolution

### → High dynamic range

PHASICS sensors measure **strongly aberrated optics** to detect non-compliant **sub-assemblies** before assembly. They also measure **aspheric lenses** in transmission.

### → Stability

PHASICS technology does not use any reference beam, making it **insensitive to vibrations**.



## Powerful technology

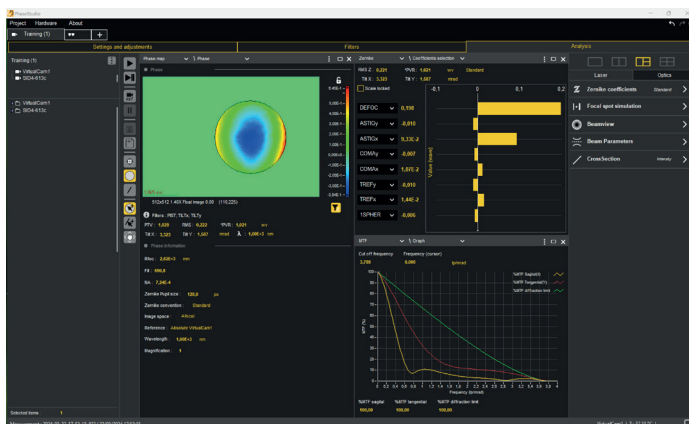
### → Achromaticity

Being inherently achromatic, PHASICS technology enables measurement **at any wavelength** without calibration:

- Focus shift & chromatic aberrations with wavelength
- MTF comparison at various wavelengths

## → Easy and rigorous analysis

- The software solution ensures **reliable** calculation and offers **flexibility**:
- Focusing methods (best or paraxial focus, MTF autofocus)
- Pupil size
- Advanced filtering options



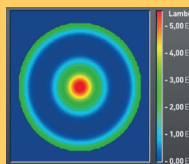
*Serving the ease of use of PHASICS solution, it manages measurement from settings and acquisition to advanced calculations:  
Lens database – Alignment helpers – Automated reports*

Direct phase measurement allows advanced analysis while simplifying the result interpretation.

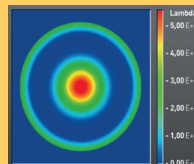
## Expert analysis software

### Compare to DESIGN

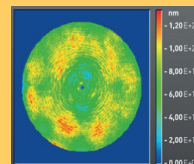
From the optical design file, this module simulates the nominal phase in the measurement plane and delivers the **residual wavefront error (WFE)**.



Measured Phase  
PV=57.4



Simulated  
wavefront from  
Zemax design



Residual wavefront

*Residual wavefront for a single CVX lens  
(PV=130mm)*

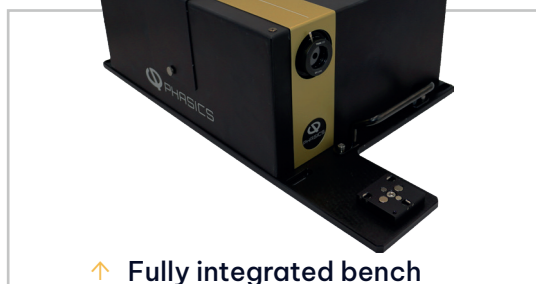
### Measured elements

- Single lens, component
- Complex assembly, zoom lens
- Strongly aberrated sub-assembly

### Applications

- New product development
- Process optimization
- Cost-effective lens alignment

# A full range of solutions for R&D and production



PHASICS provides OEM solutions combining wavefront sensor and software. PHASICS also designs benches fully dedicated to your needs. With a strong expertise in metrology, PHASICS works closely with your teams to analyze all your requirements (specification, throughput, budget...) and builds custom solutions mixing the right elements from its large collection

of solutions (alignment tools, choice of configuration and measurement conditions, analysis tools...). Dedicated software packages are developed on demand for easy insertion in your working environment, with special attention to safety standard compliance and ease of use for production.

## SID4 range from UV to IR

	Spectral range	Aperture dimension (mm <sup>2</sup> )	Spatial resolution	Phase sampling (pixels)	Phase accuracy (absolute)	Phase resolution	Vacuum compatibility
SID4 UV	190-400 nm	7.8 x 7.8	26 µm	300 x 300	15 nm RMS	2 nm RMS	-
SID4 UV HR	190-400 nm	13.3 x 13.3	26 µm	512 x 512	20 nm RMS	2 nm RMS	-
SID4 HR V	400-1100 nm	9.98 x 8.64	24 µm	416 x 360	20 nm RMS	2 nm RMS	10 <sup>-6</sup> 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	15.29 x 15.29	27.6 µm	554 x 554	-	5 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	1.2-2.2 µm	9.6 x 7.6	120 µm	80 x 64	<40 nm RMS*	<6 nm RMS*	-
eSWIR HR	1.2-2.2 µm	9.5 x 7.6	120 µm	159 x 127	<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	-

\*For coherent sources



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