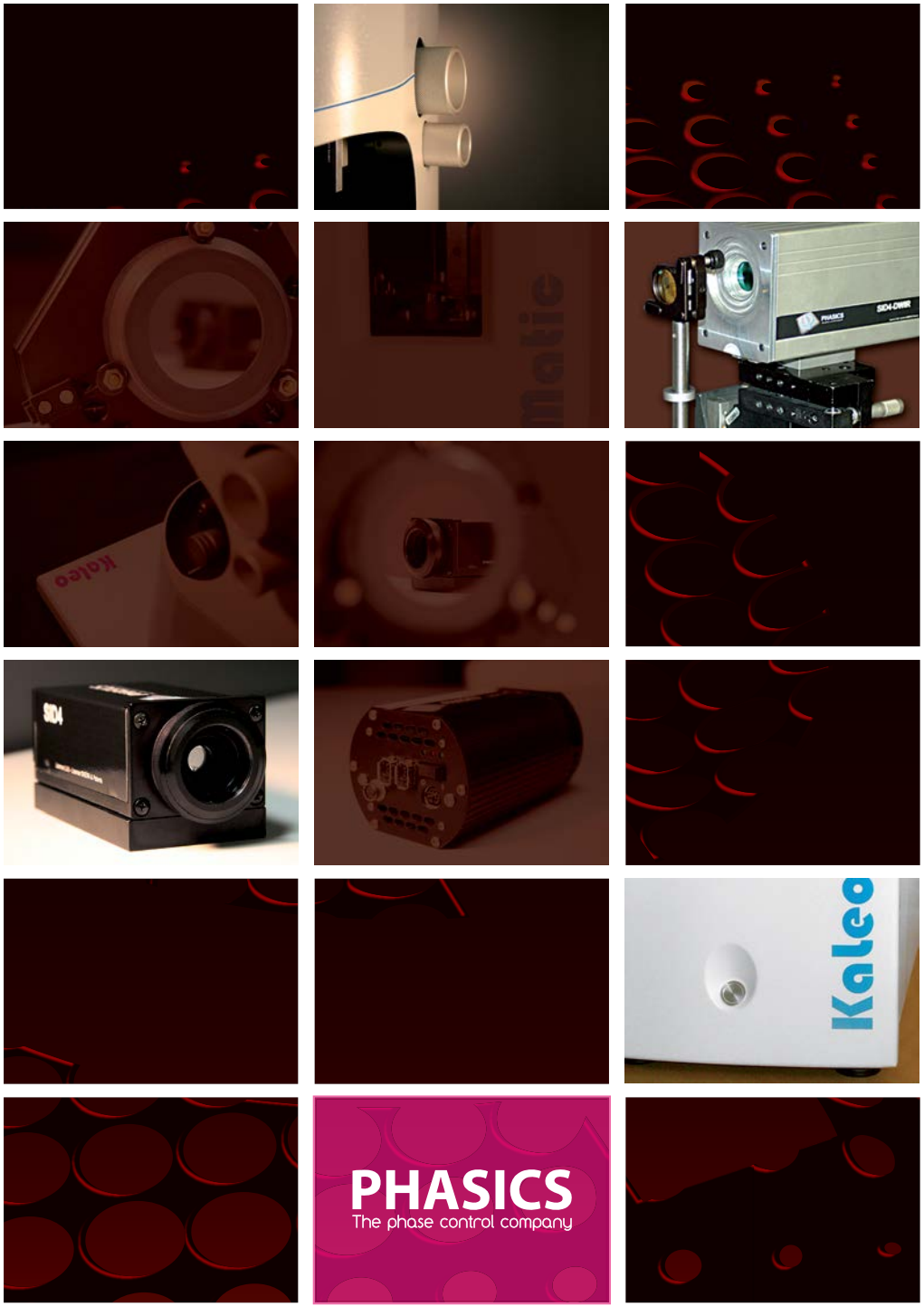
Kaleo T



PHASICS

The phase control company

Kaleo T

"SIMPLE MEASUREMENT, ADVANCED RESULTS"

➜ PHASICS offers the most innovative solutions **for lens and objectives quality control in R&D** and production. Relying on a unique wavefront technology, the quadriwave lateral shearing interferometry*, PHASICS solutions provide a **fast and complete characterization** of your optics.

MEASURED ELEMENTS

- Lens
- Objective, Zoom
- Strongly aberrated subassembly

APPLICATIONS

- New product development
- Process optimization
- Cost-effective alignment of objectives

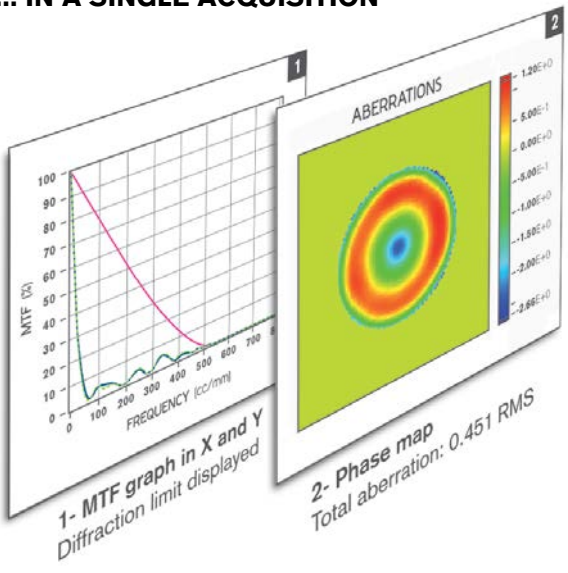
↘ GET THE MTF...

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

... AND WAVEFRONT QUALITY

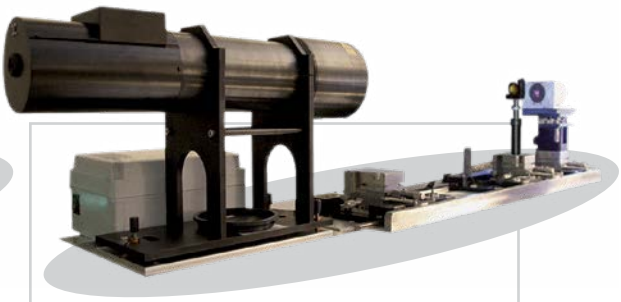
- EFL, F#, NA
- Aberrations: Zernike, Seidel
- Real time filtering of phase map (Zernike, Kernel...)
- Through focus MTF
- Comparison to design
- Chromatic aberrations

... IN A SINGLE ACQUISITION



PHASICS - The phase control company

↑ **OEM SOLUTION**



↑ **FULLY INTEGRATED BENCH**

"A FULL RANGE OF SOLUTIONS FOR R&D AND PRODUCTION"

PHASICS provides **OEM solutions** combining the wavefront sensor and the software. PHASICS also **designs benches** fully dedicated to your needs. With its strong expertise in metrology, the company 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 an easy insertion in your working environment with a **special attention to safety standard** compliance and ease of use for production.

↘ OVER THE LARGEST SPECTRUM FROM UV TO FAR IR

	UV HR	Visible	Visible-HR	SID4 IR-MCT	DWIR	LWIR 640
Wavelength range	190–400 nm	350–1100 nm	350–1100 nm	1,2–5µm	3–5 & 8–14 µm	8–14 µm
Aperture dimension (mm^2)	8.0 x 8.0	3.6 x 4.8	8.9 x 11.8	9.6 x 7.68	13.44 x 10.08	16 x 12
Spatial resolution	32 µm	29.6 µm	29.6 µm	60 µm	140 µm	100 µm
Phase and intensity sampling	250 x 250	160 x 120	300 x 400	160 x 128	96 x 72	160 x 120
Accuracy (Absolute)	10 nm RMS	10 nm RMS	10 nm RMS	10 nm RMS	75 nm RMS	75 nm RMS
Sensitivity	0.5 nm RMS	3 nm RMS	2 nm RMS	3 nm RMS	25 nm RMS	25 nm RMS
Acquisition rate	30 fps	60 fps	10 fps	140 fps	50 fps	24 fps
Analysis rate (Full resolution)	1 fps	> 10 fps	> 3 fps	20 fps	20 fps	< 10 fps
Dimensions (W x H x L) (mm)	95 x 105 x 84	49 x 35 x 110	76 x 63 x 132	135 x 140 x 240	85 x 116 x 179	96 x 110 x 90
Weight	900 g	250 g	620 g	≈ 3.5 Kg	≈ 1.6 Kg	850 g
Sensor technology	CCD			Cooled MCT	Broadband Micro bolometer	Micro bolometer

↘ DIRECT MEASUREMENT

Measuring diverging and converging beams **with no relay lens**, PHASICS sensor enables compact **direct set-up**:

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

→ HIGH RESOLUTION

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

- Up to 300 x 400 measurement points
- Nanometer level axial resolution

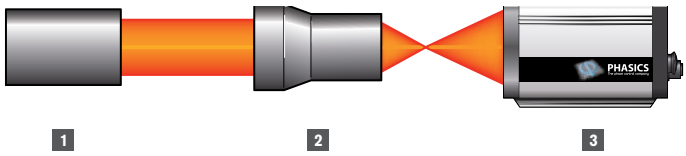
→ HIGH DYNAMICS

PHASICS sensor measures strongly **aberrated optics** to detect non-compliant **subassemblies** before assembly. It also measures **aspheric lenses** in transmission.

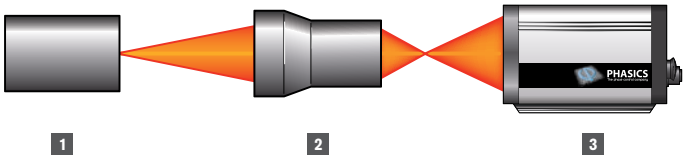
→ STABILITY

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

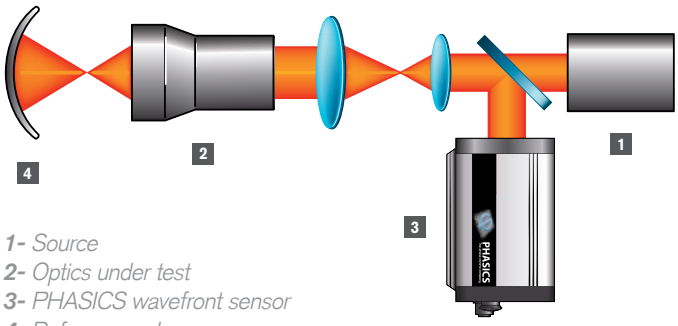
Single pass set-up – Infinite conjugation
Up to F/1 optics - Entrance pupil up to 100 mm



Single pass set-up – Point-to-point conjugation



Double-pass set-up



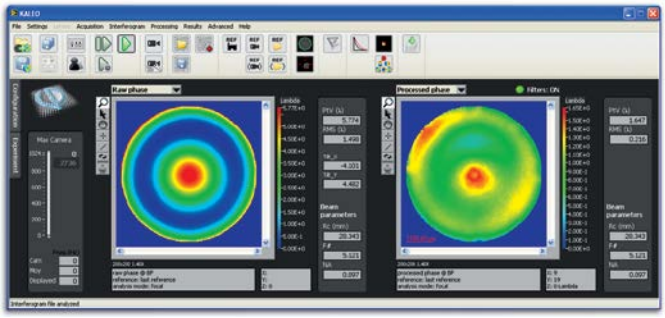
1- Source
2- Optics under test
3- PHASICS wavefront sensor
4- Reference sphere

"POWERFUL TECHNOLOGY"

→ ACHROMATICITY

Inherently achromatic, PHASICS technology makes possible measurement **at any wavelength** without any calibration:

- Focus shift with wavelength
- MTF comparison at various wavelengths



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

"EXPERT ANALYSIS SOFTWARE"

← EASY AND RIGOROUS ANALYSIS

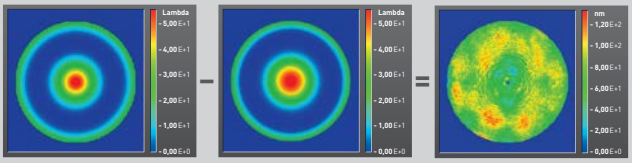
Taking advantage of our technology, the software solution ensures **reliable** calculation and offers **flexibility**:

- focusing methods (best or paraxial focus, MTF autofocus)
- pupil size
- advanced filtering options

Direct phase measurement makes possible **advanced analysis** while **simplifying the result interpretation**.

DESIGNPRO MODULE →

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=57.4λ | **Simulated wavefront from Zemax design** | **Residual wavefront**

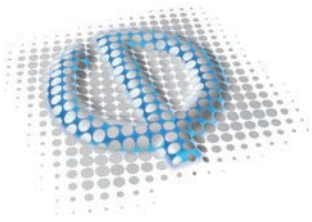
Residual wavefront for a single CVX lens (PV=130 nm)

RETROPRO MODULE →

Direct measurement enables back propagating the measured wavefront to provide the **OPD information in the exit pupil** of the tested element.

The measurement can then easily be compared to optical design. It is of real interest for **off axis** measurement interpretation.

MTF and Zernike coefficients can be provided in the exit pupil of the optical element for on and off axis measurement, thus enabling an easy comparison to design data



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