High Resolution Wavefront Technology for Optical Metrology
About PHASICS

PHASICS
French company - since 2003
Specialized in high resolution wavefront sensing
Unique patented technology

Applications

OPTICS
- Optics Quality Characterization
- Optical Surface Characterization

LASER
- Laser Beam Characterization
- Adaptive Optics

Global Presence

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Why wavefront sensing?

- Quality control and R&D characterization of Lens, Subassembly, Objectives, Mirrors…
- Alignment, matching & centering of lens, subassemblies, optical systems…
- Off axis and Chromatic behavior study
- Surface characterization
Our core technology

Innovative wavefront sensing technology

« 4-Wave Lateral Shearing Interferometry »

Unique patented technology

✓ High Resolution
  Sampling 400 x 300
  Spatial resolution 29.6µm

✓ Direct measurement

✓ High Dynamic range

✓ Easy Setup

✓ Achromaticity

Measurement Principle: source + SID4 + KALEO software

Adapted also to double pass and reflection setups.

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Phasics solutions for optics metrology

Covers the entire wavelength spectrum

<table>
<thead>
<tr>
<th>UV</th>
<th>Visible</th>
<th>IR</th>
</tr>
</thead>
<tbody>
<tr>
<td>190 - 400 nm</td>
<td>400 - 1100 nm</td>
<td>0.9 - 5.5 &amp; 8 - 14 µm</td>
</tr>
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Solutions for R&D and Production

**OEM**
- SID4 sensor
- Kaleo software

**Integrated Bench**
- Turn-key solution
- Customization possible

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Complete characterization

One measurement = Complete wavefront & MTF information

- Phase RMS & PtV
- Aberration (Zernike...)
  - Values
  - filtering
- Transmitted beam information: F#, RoC, NA
- MTF & PSF
  - along any image direction
  - for any pupil size
  - no target
  - easy alignment

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Application examples

Aspheric lens surface characterization

Measured PtV of the aspherical surface: 181.86 µm
Measured surface defaults: 240 nm PtV
(after removing the theoretical aspherical form)

![phase map](image1)

![phase map after filtering the theoretical aspherical form](image2)

IR lens (ZnSe) of diameter=25.4mm

<table>
<thead>
<tr>
<th>$\lambda_1 = 3.39 \mu m$</th>
<th>$\lambda_2 = 10.6 \mu m$</th>
<th>Difference</th>
</tr>
</thead>
<tbody>
<tr>
<td>$R_C (mm)$</td>
<td>$23,340mm$</td>
<td>$22,780mm$</td>
</tr>
<tr>
<td>$\text{Theory: 569µm}$</td>
<td>$\text{560µm}$</td>
<td>$\text{538µm}$</td>
</tr>
<tr>
<td>$F#$</td>
<td>2.58</td>
<td>2.70</td>
</tr>
<tr>
<td>$\text{Spherical Ab. (RMS)}$</td>
<td>513nm</td>
<td>498nm</td>
</tr>
</tbody>
</table>

High precision test bench

Optical test bench for high precision metrology and alignment of zoom components

- Single click measurement
- Synthetic report
- Advanced analysis tools

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