

Fraunhofer Institute for Applied Optics and Precision Engineering IOF

horos Highly sensitive optical roughness and defect sensor

Complex sample geometries, fast, robust



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Fig.1 Robot-based sensor set-up for full surface characterization.



The scattering sensor *horos* is a compact instrument for 3D angle resolved light scattering measurements (3D-ARS), which combines highest sensitivities towards imperfections, surface roughness, particles, and defects with an easy operation.

The scattering data can be used to determine the surface roughness, the power spectral density function, and isotropy properties (Fig. 1). These results are equivalent with evaluated topography measurement techniques such as white light interferometry (Fig. 2).

The integration of a microscope directly into the sensor also allows for a detailed analysis of particles and defects in addition to their optical impact (Fig. 3).

Applications scenarios

- Integration directly in optical fabrication processes for quality control (high vibration insensitivity and non-contact measurement principle)
- Fully automated measurements of plane and complex (freeform) surfaces based on CAD data over entire surface area

Specifications

Light Scattering

- Characterization wavelength: 650 nm
- Absolute measurements: ARS / BSDF according to ISO 19986
- Scattering angles: ±7° around specular reflected light
- Sensitivity: ARS < 10⁻⁵ sr⁻¹, rms < 0.3 nm
- Measurement time: < 1 s</p>
- Compact dimensions: 387 x 200 x 105 mm³

Microscopy

- Bright and dark field operation
- Defect / particle characterization according to DIN ISO 10110-7 und DIN ISO 14997
- Smallest detectable defect size: Ø = 2 μm (< 0.4 μm through light scattering)



Fig. 3: Roughness and defect analysis of freeform surface using light scattering and microscopy.



Fig. 2: Roughness measurements using horos and white light interferometry.

Contact

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