OPTICS/PHOTONICS

Device for measuring the curvature and defects of a reflective surface

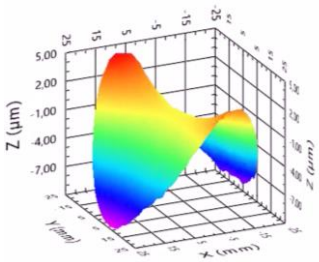
Several techniques (based in particular on laser systems) are used to monitor the curvature of reflective objects in a non invasive way and in real time with high precision. However, their implementation is usually complex and it involves expensive devices which can only work in specific experimental conditions.

The system presented herein consists of a portable device made of simple optical elements which can work in any environment. It enables one to measure the curvature and defects of any surface which exhibits a minimum level of reflectivity in an absolute way and with high precision, over a long period of time without requiring further optical alignments.

DESCRIPTION*

- System composed of a luminous object, a camera with a lens, a beam splitter and an analysis software
- Formation of the virtual image of the object through the surface and analysis of the variations of the formed image in real time
- Possibility of using the system with the luminous object and the camera placed at any incidence angle with respect to the surface perpendicular
- Absolute measurement of curvature in real time, surface 3D reconstruction

Shape of a GaAs wafer, measured by the device in 30ms. From LAAS-CNRS



TECHNICAL SPECIFICATIONS

Wavelength	No specific wavelength imposed	
Medium	No specific constraint (possibility of use in a gaseous or liquid medium not free of dust and vibration)	
Continuous measurement	> 18h	
Absolute measurement	Yes	
Curvature accuracy	1,33 x 10-5 (value obtained with the current prototype and depending on experimental conditions: vibrations...)	
Min curvature radius	5 mm	(value obtained with the current prototype and depending on experimental conditions)
Max curvature radius	280 km	
Surface dimensions	No specific constraint	

*Technology under license.

TOULOUSE TECH TRANSFER

COMPETITIVE ADVANTAGES

- Quick setup
- Robust system
- Device adaptable to any type of surface (of any dimensions, which may exhibit defects)
- Possibility of use in any environment
- Absolute measurement in real time
- High precision on the measured curvature
- Surface 3D reconstruction
- Low cost

APPLICATIONS

- Real time process or post-process monitoring (example: annealing, epitaxial growth…)
- Numerous possible application domains:
  - Astronomy
  - Aerospace
  - Automotive
  - Health…

INTELLECTUAL PROPERTY

- Patent
- Know-how
- Software

DEVELOPMENT STAGE

- Technology validated at lab level

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LABORATORY

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CONTACT

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