Twyman-Green Interferometry

2D-measurement of planarity

Laser interferometry is used for the measurement of displacement along one axis with nanometre resolution. In a Twyman-Green interferometer an expanded laser beam is used in combination with a CCD camera, Fig.1. This set-up allows to compare the surface shape of a specular object with a reference plane (mirror). Typical applications on microsystems are given in Figs. 2 – 4.

Specifications:

Laser wavelength	632 or 532	nm
Laser power	5 or 25	mW
Object size (diameter)	1 – 50	mm
Best resolution	2	nm
Measurement uncertainty	> 10	nm
Maximum non-planarity	20	µm

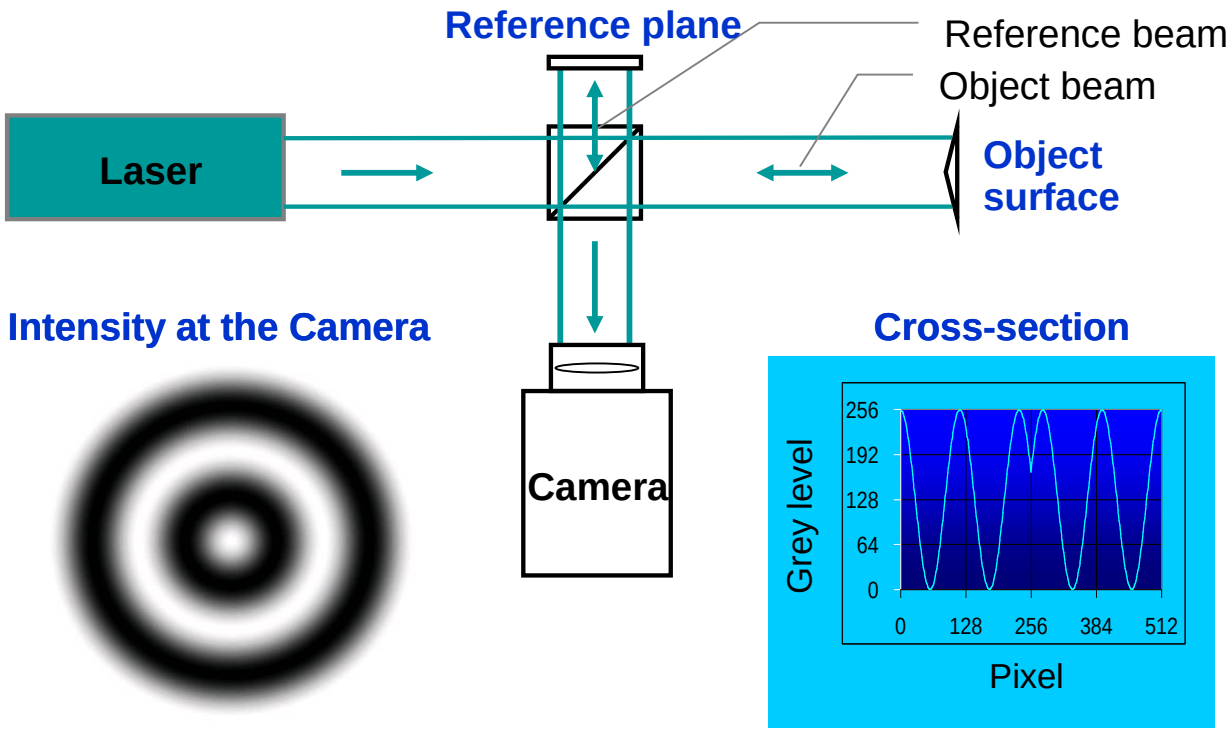
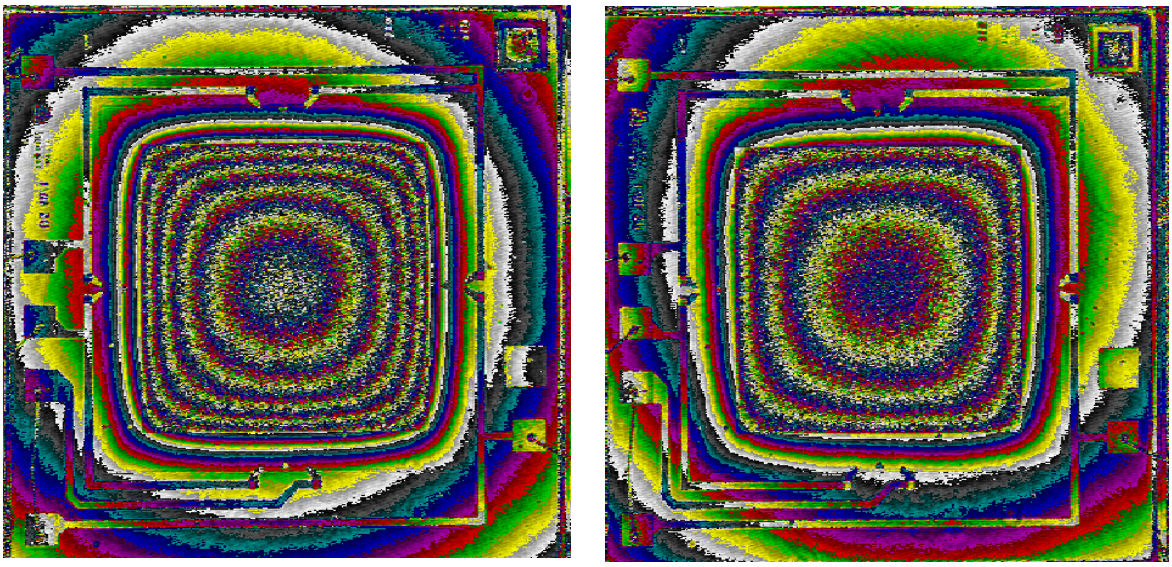


Fig. 1: Schematic of a Twyman-Green Interferometer.

Some applications



0% r.H. ***90% r.H.***

Fig. 2: Shape of a silicon humidity sensor in dry (left) and humid conditions (right). Image size is about 2x2 mm^2. One interference fringe corresponds to a height level of 316 nm.

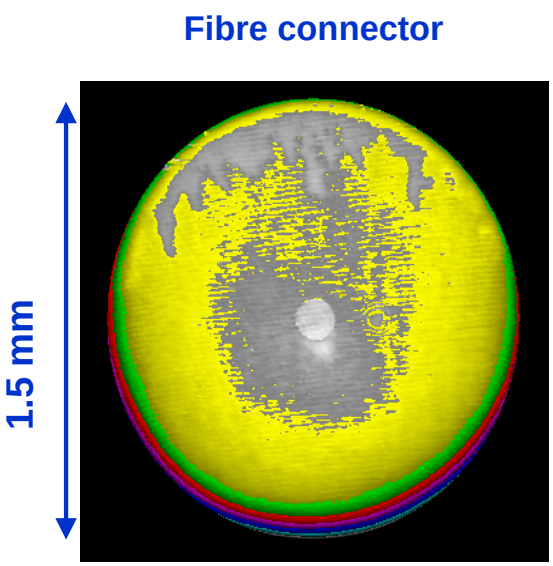


Fig. 3: Surface shape of a fibre optic connector. Precipitations of a few nm thickness are clearly identified.

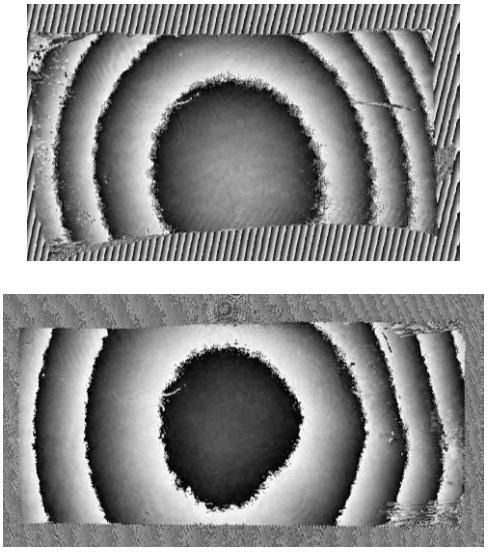


Fig. 4: Warp of a silicon wafer caused by a homogeneous (top) and an inhomogeneous (bottom) coating, respectively.