
Implementation of the crossed-sine wavefront sensor

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Abstract

The crossed-sine wavefront sensor (WFS) is a pupil plane wavefront sensor that measures the first derivatives of the wavefront, which is also called ASONG (Analyseur de Surface d'Onde de Nouvelle Génération) in French. ASONG achieves a simultaneous high spatial resolution at the pupil of the tested optics and absolute measurement accuracy comparable to that attained by laser-interferometers, but with a much more compact, cheaper set-up, compatible with polychromatic light (1, 2). It is made by three main components: a gradient transmission filter (GTF) built from a product of sine functions rotated by 45 degrees around the optical axis (3), a 2x2 mini-lens array (MLA) at the focus of the tested optical system and a detector array located on a plane conjugated to the pupil. The basic principle consists in acquiring four pupil images simultaneously, each image being observed from different points located behind the GTF. After the simulation work which demonstrated the wavefront reconstruction capability, we are now in the phase of implementation of the prototype in the lab. In this work we demonstrate recent tests and results and make comparisons with that of the laser-interferometer.

References

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