
A rotational shearing interferometer to sense across-the-spider phase discontinuity at ELT.

Lorenzo Busoni^{*1}, Simone Esposito², Giulia Carla³, Guido Agapito¹, Cedric Plantet¹,
and Marco Bonaglia¹

¹INAF - Osservatorio Astrofisico di Arcetri – Italy

²INAF - Osservatorio Astrofisico di Arcetri – Italy

³INAF - Osservatorio Astrofisico di Arcetri – Italy

Abstract

A solution to the many control issues created by pupil fragmentation in the ELT consists in the direct measurement of the phase discontinuities across the spider shadows. In this work we propose yet another concept for an optical device tailored for such a task. The device exploits the rotational symmetry of the ELT pupil to produce interference between adjacent islands of the pupil, in such a way that the optical path difference between the sectors is encoded in the signals. The device is particularly suited to measure phase differences generated across the spider or in its proximity, like in the case of low-wind effect. We present the main features of the sensor, a possible optical implementation and numerical simulations based on the MAORY/MORFEO use case.

^{*}Speaker