

Wavefront Phase Imaging sensor (WFPI)

Tuesday 29 October 2019 10:00 (20 minutes)

We will discuss here the applications of the Wavefront Phase Imaging sensor (WFPI) on Adaptive Optics (AO) for Astronomy. The WFPI sensor is based on registering the intensity distribution at two different optical planes by a conventional imaging sensor. In the geometrical approximation, the light can be considered as a collection of light rays which bends according to Snell's law. In the context of this approximation, with boundary conditions, and using the probability density function of photons, we calculate the photon displacement between both intensity images and the associated wavefront slope. Our results using WFPI sensor show high resolution wavefront maps, real time working, high dynamic range, and improved repeatability and reproducibility related to classical wavefront sensors. It is currently being used in a variety of demanding fields as silicon metrology, optical characterization, and ocular laser surgery. Extreme AO, co-phasing, and MCAO are suitable applications of the WFPI sensor.

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