

Electric Field Conjugation WF Correction

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Abstract:

High-contrast imaging uses extreme adaptive optics for high Strehl wavefront correction, and high performance coronagraphs reducing scattered light to a minimum. However, due to imperfections in the optical train and non-common path aberrations, the final image is dominated by a pattern of bright speckles which remain static over a period of many hours, limiting the achievable contrast.

Electric field conjugation, EFC, was proposed as a complementary wavefront correction algorithm. Opposite deformations are introduced to the DM, their effect on the final image modeled and compared to camera measurements. This allows an estimation of the electric field in the image plane due to aberrations, and the computation of a DM shape to minimize the residual intensity in a predefined region of the science image.

ESO's High Order Testbench, HOT, features all the components to test EFC performance with a coronagraphic extreme adaptive optics system under realistic, turbulent conditions. This talk will give an overview the EFC algorithm in the light of the pending implementation on HOT.