
PAPYRUS at Observatoire de Haute Provence : Second stage Adaptive Optics

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Abstract

The Provence Adaptive optics Pyramid Run System (PAPYRUS) is a pyramid-based Adaptive Optics (AO) system installed at the Coude focus of the 1.52m telescope (T152) at the Observatoire de Haute Provence (OHP). PAPYRUS is a young researcher project that aims to strengthen our knowledge in AO. This bench is use as an education tool and technological platform to test and better understand Fourier Filtering Wave-Front sensors operating on sky.

First images and characterisations of the pyramid-based AO bench were obtained last year. The next steps are implementing an optical gain compensation and implementing a second stage AO. The aim of this second stage is to significantly improve the AO correction of the first stage by reducing the temporal error which is the main limit of the PAPYRUS bench. To do so, the second stage will work in the NIR and with a low-order Deformable Mirror with fast control frequency. Furthermore, the wave-front sensor of this second stage will be a Fourier Filtering wave-front sensor (FFWFS). The main idea with this second is to test

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different FFWFS starting with the Zernike mask.

With its two-stage AO system, PAPYRUS will provide high spatial resolution for a high spectral resolution instrument using an echelle spectrometer based on the use of VIPA (Virtually Images Phased Array).

We present the optical setup of this second stage based on a Zernike mask. We also present first experimental results regarding the second stage obtained on the LOOPS bench.

Keywords: Second stage AO, High angular resolution, Fourier Filtering Wavefront sensor