Title:

Characterization and on-sky testing of high-resolution photonic, AWG-based astronomical spectrographs.

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Talk/Poster conference:

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Abstract:

Astrophotonics is an area of active technological developments that intends to meet the needs of next-generation instruments at a small footprint, low cost, and stability, compared to bulk-optics-based alternatives. The single-mode technological pathway in particular, is becoming highly relevant in an age of wide availability of adaptive optics systems that ensure more efficient and reliable injection. Much development effort is in great part driven by the stringent requirements of direct detection and characterization of extrasolar planets.

With this motivation in mind, our team is working on the characterisation of Arrayed-Waveguide Grating (AWG) chips for a photonics-based approach to high-resolution spectro-interferometry in the near infrared. AWG spectrographs allow us to test the feasibility of photonic spectro-interferometers for exoplanet characterization, another step towards the design and construction of fully photonic instruments for astronomy.

In this presentation, I will present the current status of our AWG characterisation effort in the H-band and report on a preliminary on-sky qualification campaign, at the focus of the AO system PAPYRUS at the Observatoire de Haute Provence. I will present the architecture of the spectrograph built for on-sky testing, and first light spectra of Arcturus (α Boo) and Betelgeuse (α Ori), recorded by our high-resolution (R~18000) AWG. This work will contribute to assess the capabilities of photonic spectroscopy for the development of more sophisticated compact instruments in the upcoming years.

Keywords: ***Photonics, astrophotonics, compact spectrographs, high resolution spectroscopy, exoplanet characterisation.***