

On-sky experiments using CANARY SCAO with point-diffraction interferometers: CAWS & iMZ

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Wavefront sensing using interferometry to directly measure the phase has been a goal for many years, since it directly measures the observable and so can provide measurements regardless of defects such as vortices or disconnected apertures. A compelling class of such sensors are the point-diffraction interferometers and this paper presents two implementations; the Complex Amplitude WFS (CAWS; CfAI, Durham) and the Integrated Mach-Zehnder (iMZ; CRAL, Lyon). In particular, the results of their first on-sky tests in the visible behind the CANARY AO experiment in July/2019 at the 4.2m William Herschel Telescope are discussed. Implementation challenges for both WFSs are described and initial results are presented using both monochromatic and polychromatic light, measuring static aberrations and on-sky AO residuals. In the context of the experimental conditions, we highlight the successes and how these suggest future implementations for future experiments.

Authors: SCHOTT, Clement (CRAL, Univ.Lyon 1); THIÉBAUT, Eric (CRAL, Univ.Lyon 1); OSBORN, James (CfAI, Durham Uni.); BARDOU, Lisa (CfAI, Durham Uni.); LOUPIAS, Magali (CRAL, Univ.Lyon 1); COHEN, Mathieu (CNRS. Fr); LANGLOIS, Maud (CRAL, Univ.Lyon 1, CNRS); Dr TALLON, Michel (CRAL, Univ.Lyon 1); Dr BHARMAL, Nazim (CfAI, Durham Uni.); DUBOST, Nicolas S. (CfAI, Durham); MORRIS, Timothy J. (CfAI, Durham Uni.)

Presenter: Dr BHARMAL, Nazim (CfAI, Durham Uni.)