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MAORY AO Real Time control Overview

MAORY is a post-focal adaptive optics module for the E-ELT first light. MAORY offers at least two adaptive optics modes to support the MICADO nearinfrared camera: MCAO and SCAO. In the MCAO mode, MAORY uses the adaptive mirror M4 and tip-tilt mirror M5 in the telescope and up to two post-focal adaptive mirrors (DM1 and DM2) to achieve high performance with excellent uniformity of the PSF across the scientific FoV of about 1 arcmin diameter. In order to ensure high sky coverage, wavefront sensing is based on a constellation of up to six LGS projected from the telescope side in a constellation up to 2.5 arcmin angular diameter and three NGS positioned over a 3 arcmin technical FoV. The former are used for high-order wavefront sensing; the latter are necessary for low-order wavefront sensing to measure the modes which cannot be accurately sensed by the LGSs. In the SCAO mode, MAORY uses only the telescope's M4 and M5 and a single NGS SCAO wavefront sensor to achieve excellent performance on a narrow FoV around the NGS itself. The MAORY SCAO mode development is made jointly by the MAORY and MICADO consortia. A seeing enhancer mode is also under investigation. In this mode, MAORY uses M4, M5 and the post-focal DMs, relying only on LGS wavefront sensing. Low order wavefront sensing could be operated by the adaptive telescope WFSs, that count on a very large technical FoV (10 arcmin). This mode might not provide a diffraction limited PSF, but instead seeing enhanced images across the full sky.

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