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**Title: IM derotation algorithm and performance for NAOMI AO control**

**Abstract:**

NAOMI is the future adaptive optics system for the 1.8 m Auxiliary Telescopes (ATs) of the VLTI that will replace the Tip-tilt (TT) correction stage consisting of a TT mirror (M6) and the STRAP sensor. NAOMI baseline consists of a low-order Shack-Hartman WFS with 4x4 subapertures on the visible, a real time computer based on the ESO Sparta-light and the corrective optics (deformable mirror and tip-tilt mount).

In NAOMI the DM is located at M6 and it is rotating with the AT azimuth axis. The WFS, which signals are used to drive the DM, is not fixed with respect to the telescope basement, therefore not co-rotating with the DM. The net result is that when the telescope is tracking an object on the sky the DM image on the WFS is rotating depending on the azimuth angle of the telescope and therefore the projection of the actuators position over the WFS subapertures is not constant.

The straightforward solution for this problem would be to insert in front of the WFS an optical derotator. In order to avoid the use of this component we developed an algorithm to derotate via software the DM commands. we will present the concept of the software derotation as well as the performance obtained from end-to-end AO simulations.