
Numerical Simulation of Astrometry Field with MORFEO on the ELT

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Abstract

We present the results of our numerical simulations on astrometry measurements using the Multi-conjugate adaptive Optics Relay For ELT Observations (MORFEO) instrument on the Extremely Large Telescope (ELT). Our simulation considers the spatially variable point spread function (PSF) of MORFEO, as well as the geometric distortion of MORFEO and its variation with rotation angle. We used the SIMCADO and/or SCOPESIM simulation packages to generate images of the astrometry field and test various data analysis software for achievable performance. Our study investigates the feasibility and accuracy of astrometry measurements with MORFEO in moderately crowded fields, demonstrating its potential for ELT astrometry.

Our findings provide valuable insights into the use of MORFEO for the ELT and will provide information on future observational campaigns, contributing to the development of astrometry applications. We will begin by considering moderately crowded fields and later increase the crowding level to assess the potential of these instruments for high-precision astrometry measurements of dense stellar systems, including globular cluster targets in our simulations. Ultimately, our results will contribute to the development of astrometry science cases for the ELT and inform future observational campaigns.

Keywords: Astrometry, Extremely Large Telescope (ELT), Multi conjugate adaptive Optics Relay For ELT Observations (MORFEO), Geometric distortion, Spatially variable PSF

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