Assessing the photometric and astrometric capabilities of the ELT METIS imager on the centre of our Milky Way

João Aveiro*†[1], Carlos Correia[1,2], Koraljka Muzic[1,3], and Paulo J V Garcia[1,3]

[1]Faculdade de Engenharia da Universidade do Porto – Portugal
[2]Space ODT - Optical Deblurring Technologies – Portugal
[3]Centro de Astrofísica e Gravitação - CENTRA – Portugal

Abstract

Context:
ESO's Extremely Large Telescope (ELT) will provide unprecedented performance in ground-based infra-red imaging and spectroscopy. Improvements in astrometry and photometry, derived from the expected increase in sensitivity and angular resolution, will empower challenging astronomical observations, such as imaging closed-packed stellar clusters.

Aims:

Before instrument completion, it is of utmost importance to assess its expectable astrometric and photometric accuracy, and evaluate its suitability for different observation targets. In this work, we analyse the mid-infrared ELT imager and spectrograph (METIS) instrument capabilities in L/M band imaging and attest its performance in observations of the centre of our galaxy.

Methods:

We utilise well established photometry packages to analyse synthetic images of the centre of the galaxy to estimate the astrometric and photometric accuracy of the instrument. The synthetic images are generated from a catalogue of objects using the ScopeSIM package, an astronomical instrument simulator, and OOPAO, an Adaptive Optics simulation suite, which allow us to closely model the optical system considered.

Results:
We compare the astrometric and photometric performance metrics obtained from the simulations with the ELT METIS L/M imager top-level requirements. Additionally, we assess the viability of the instrument in further constraining physical parameters of t

Keywords: ELT, simulation, photometry, astrometry, galactic center

*Speaker
†Corresponding author: javeiro@fe.up.pt