

Simulating a dual beam combiner at SUSI for narrow-angle astrometry

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Abstract The Sydney University Stellar Interferometer (SUSI) has two beam combiners, i.e. the Precision Astronomical Visible Observations (PAVO) and the Microarcsecond University of Sydney Companion Astrometry (MUSCA). The primary beam combiner, PAVO, can be operated independently and is typically used to measure properties of binary stars of less than 50 milliarcsec (mas) separation and the angular diameters of single stars. On the other hand, MUSCA was recently installed and must be used in tandem with the former. It is dedicated for microarcsecond precision narrow-angle astrometry of close binary stars. The performance evaluation and development of the data reduction pipeline for the new setup was assisted by an in-house computer simulation tool developed for this and related purposes. This paper describes the framework of the simulation tool, simulations carried out to evaluate the performance of each beam combiner and the expected astrometric precision of the dual beam combiner setup, both at SUSI and possible future sites.

Keywords Computer simulation · Optical interferometry · Visible wavelength · Phase-referencing · Astrometry

1 Introduction

A dual beam combiner setup was recently installed in SUSI. The main role of the new setup is to perform high precision narrow-angle astrometry of close binary stars.

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