

Analysis and Calibration of Effective Wavelengths in SIM

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Abstract

The effective wavelength determination is the one of the key calibration issues for the Space Interferometry Mission (SIM). In order to obtain micro-arcsecond accuracy in astrometry, it is critical to have accurate wavelengths for the multiple spectral channels because the wavelength errors directly affect the fringe phase estimates. However, spectral response of SIM is a complicated and changing function, which is related to synthesized spectral response of mirrors, prism and detector, and is related to the thermal and mechanical changes in optical systems. In particular, the significant biases of effective wavelength measurements are a function of colors of different stars.

MAM, a Micro-Arcsecond Metrology system, provides a testbed for SIM. Measurement data from MAM are used for study of systematic biases and measurement errors in wavelength calibration. At present three approaches are developed for wavelength calibrations in MAM. The latest results and accuracy comparisons are described in detail.

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