Abstract Submitted
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Simulation and Testbed Studies Aimed at Detecting Earth-Like Exoplanets with NASA's Next-Generation Space-based SIM-Lite Astrometric Observatory[1] BENJAMIN DRAPER, AKHTAR MAHMOOD, Bellarmine University, BIJAN NEMATI, Jet Propulsion Lab — This research project was undertaken in conjunction with the Jet Propulsion Lab (JPL) involving a future NASA mission, called the SIM-Lite Astrometric Observatory. SIM-Lite's primary mission goal is to search for Earth-sized terrestrial planets in the habitable zone orbiting the nearby stars using astrometric techniques and to measure the precise positions of these stars to enable accurate mass determinations of the planets that orbit them with a precision equal to 1 microarcsecond. A simulation to evaluate wavefront error caused by lens aberrations in stellar interferometry was developed based on an algorithm for electron scattering proposed by D.H. Misell. This new technique could be used for any optical system to determine the distortions caused by imperfections in the lenses. We modified the Misell algorithm to evaluate the phase distortions produced by a parabolic mirror with aberrations using a HeNe Laser. The modified Misell algorithm employs Fourier transform to supply the phase information. We studied the lens aberrations and analyzed the actual data from taken from the SCDU (Spectral Calibration Development Unit) vacuum testbed at JPL. The simulation results obtained from the Misell algorithm will be presented.

[1]NASA-Kentucky Space Grant Consortium

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