Advanced PSF and MTF Calculation of Imaging System
Abstract

For practical imaging systems, their performance can be greatly affected by the apertures. In different system setups and under different illumination conditions, the actual shape of the apertures may vary a lot. To investigate such effects, an imaging system consisting of a collimation objective and human eye is modeled. By changing the illumination conditions, the cases with fully and partially illuminated apertures are studied by checking the PSF and MTF.
Modeling Task

- **collimation objective** (NA = 0.15)
- **human eye**
- **point source** (532 nm)
- **pupil aperture** (full illumination)
- **pupil aperture** (partial illumination)

PSF and MTF calculation with the aperture effect taken into account
Results
Results

full illumination

X
Z

MTF (normalized)

Numerical Data Array

Diagram  Table  Value at (x,y)

MTF (normalized)

Wave Number X [1E6 1/m]

0  0.5  1

Wave Number Y [1E6 1/m]

0  0.5  1

Numerical Data Array

Diagram  Table  Value at x-coordinate

MTF (normalized)

Wave Number X [1E6 1/m]

0  0.2  0.4  0.6  0.8  1  1.2  1.4  1.6
PSF calculation with partially illuminated aperture taken into account takes 9 seconds.
Results

comparison between MTFs with full and partial illumination of the aperture
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