Analysis of Folded Imaging System with Planar or Curved Waveguide
Abstract

In a near-to-eye display system, the image generation unit, the collimation optics, the waveguide and the in- and outcoupling gratings, form a complex folded imaging system. To evaluate the image quality of such systems, it is important to include the influence from the waveguide structure. In this example, a folded imaging system, with either a planar waveguide or a curved waveguide, is modeled, and the PSF and MTF on image plane are calculated.
Modeling Task

point source (532nm)

collimation objective (NA=0.15)

subsequent imaging optics

planar or curved waveguide

influence on PSF and MTF

image plane
Results

Ray-tracing analysis provides a fast overview of the complete system in space, with either planar or curved waveguide.
Results

incoupling grating region
- center at (0, 0 mm)
- size 2.7 × 2.7 mm

outcoupling grating region
- center at (15, 0 mm)
- size 2.7 × 2.7 mm

subsequent imaging optics
image plane

MTF
PSF
Results

incoupling grating region
- center at (0, 0 mm)
- size 2.7 × 2.7 mm

outcoupling grating region
- center at (15, 0 mm)
- size 2.7 × 2.7 mm

Curved waveguide
- radius 500 mm

Subsequent imaging optics

Image plane

MTF

PSF

[curved waveguide]
Results

comparison between MTFs with full and partial illumination of the aperture
### Document Information

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