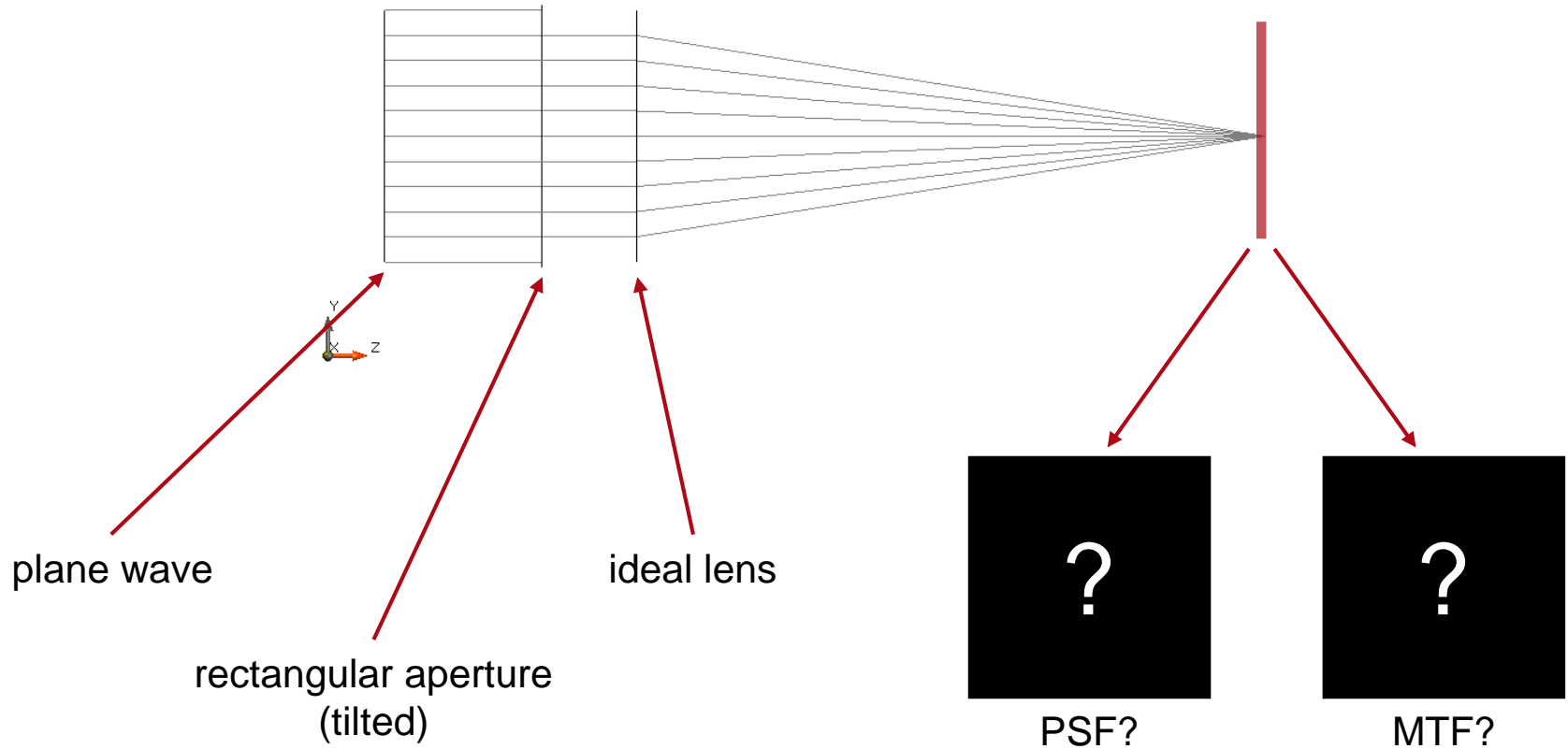


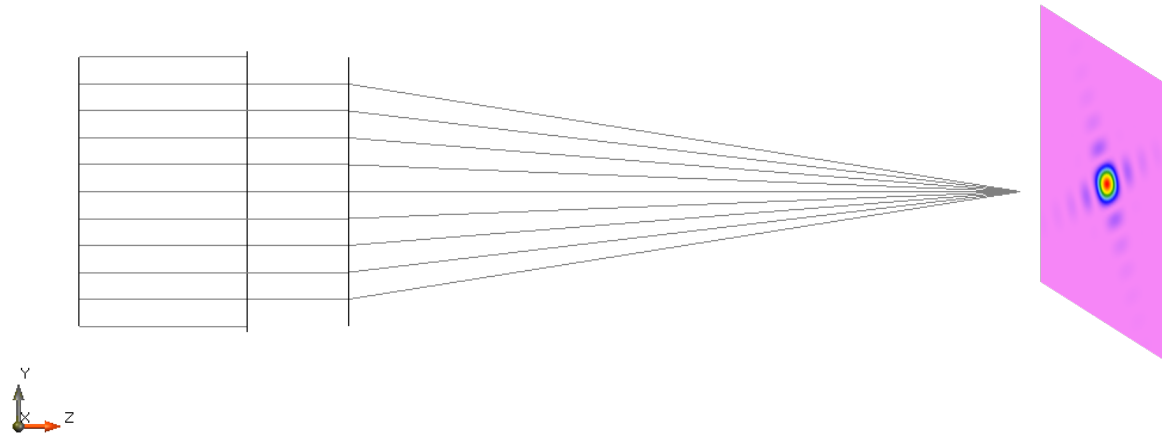
Imaging Systems

Advanced PSF & MTF Calculation for System with Rectangular Aperture

Task/System Illustration

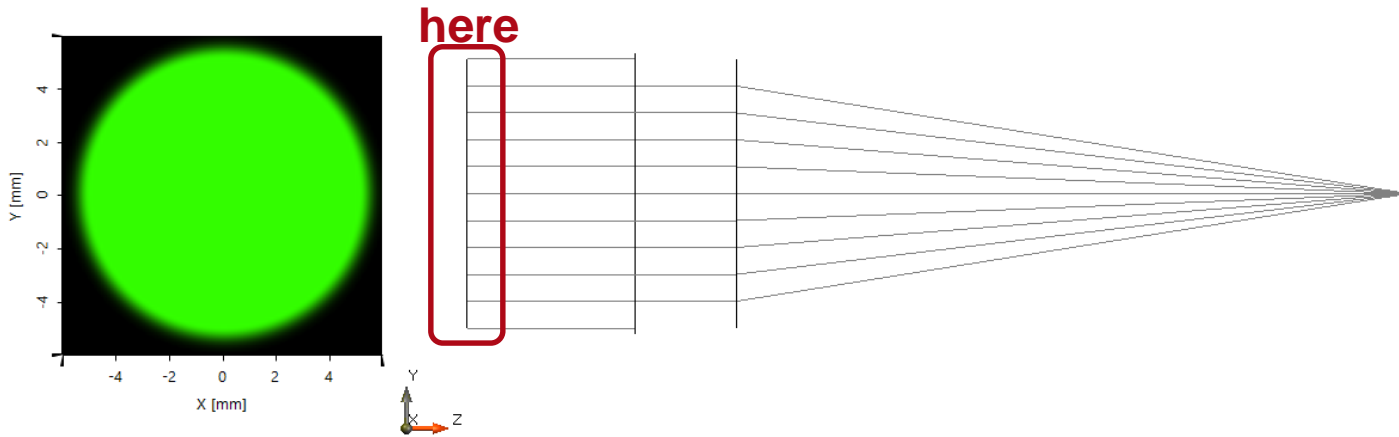


Highlights



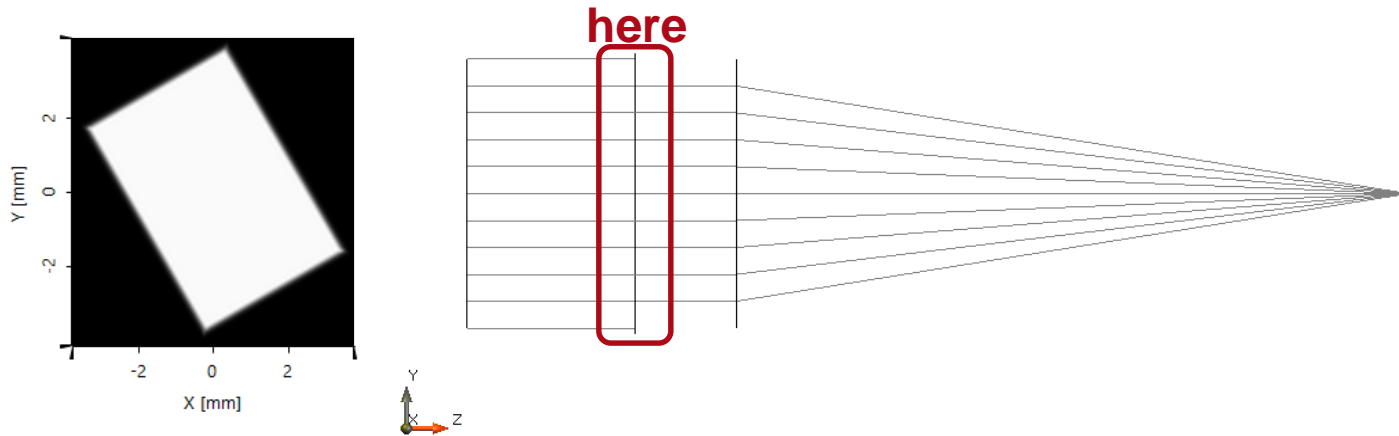
- calculation of 2D PSF & MTF of systems with arbitrary shaped apertures
- 2D PSF & MTF evaluation for not fully illuminated apertures
- 2D PSF & MTF analysis for arbitrary amplitudes

Specification: Light Source



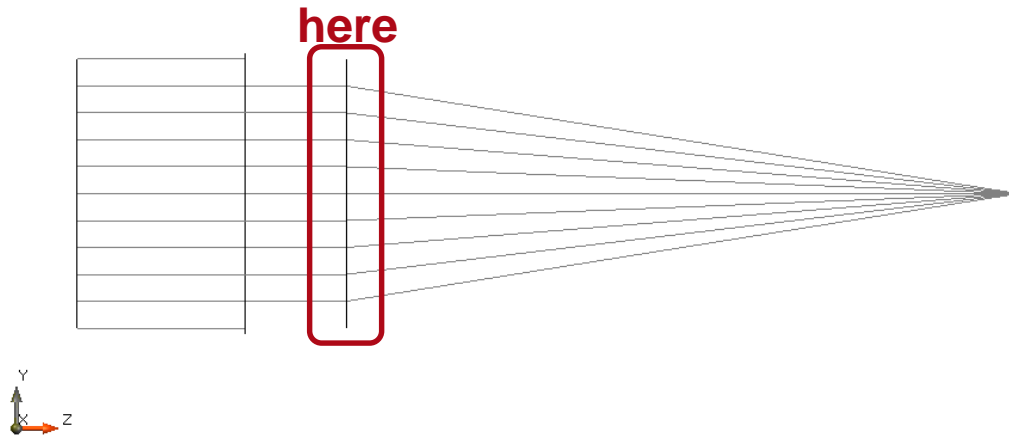
Parameter	Description / Value & Unit
type	plane wave
wavelength	532nm
polarization	linear in x-direction (0°)
shape & size	round; various diameters: 4mm, 6mm, 10mm

Specification: Aperture



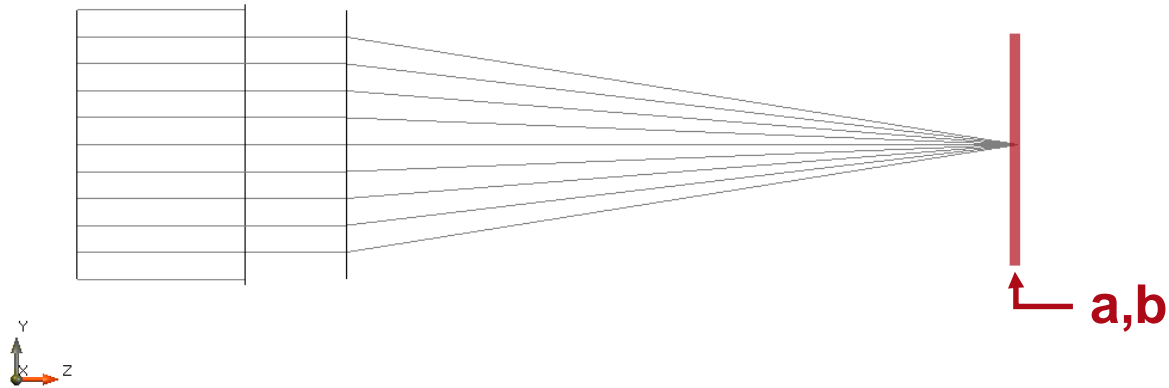
Parameter	Description / Value & Unit
type	aperture
shape & size	rectangular; 40mm × 60mm
tilt	30° in x-y plane
edge width	10%

Specification: Ideal Lens



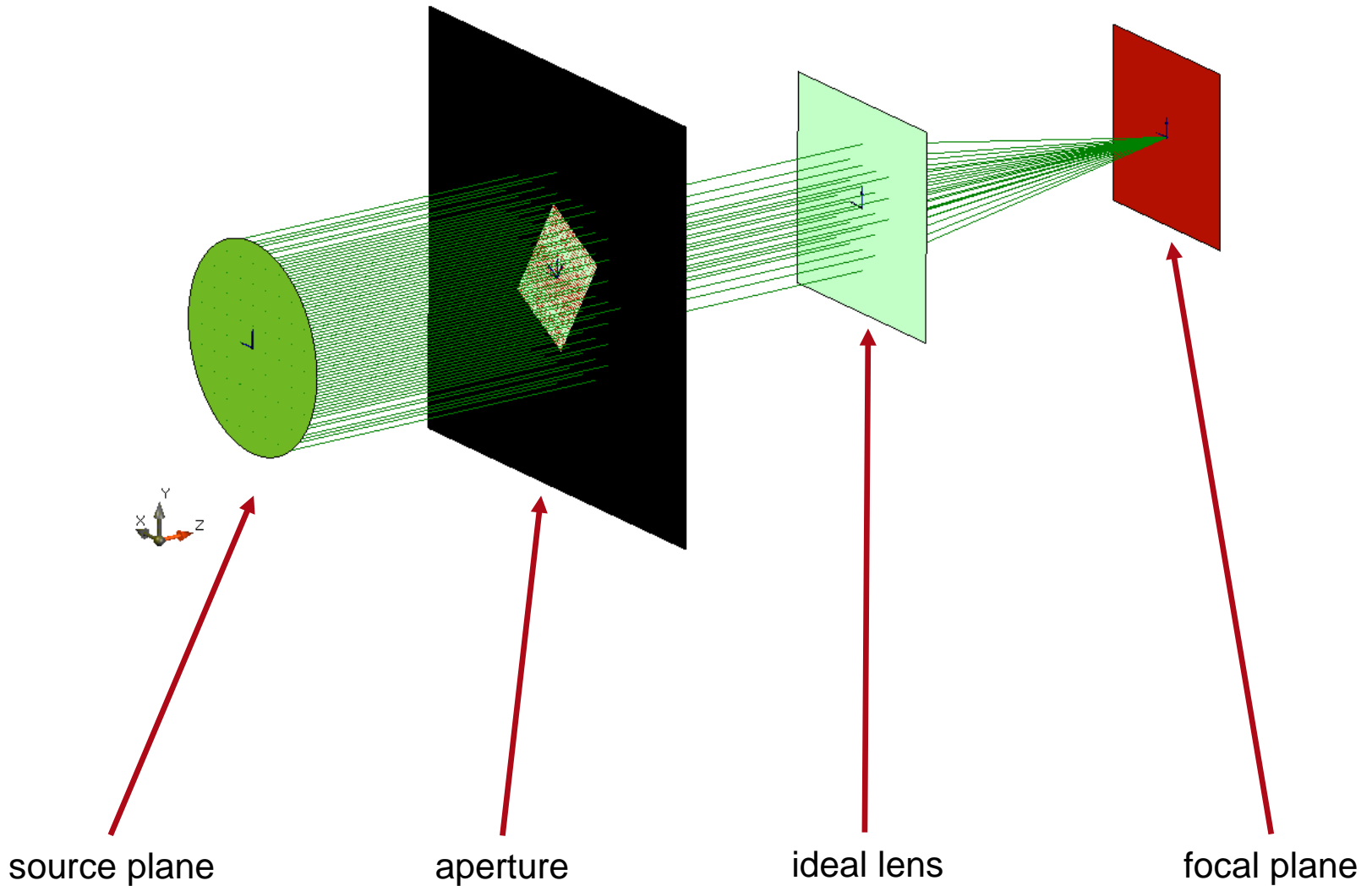
Parameter	Description / Value & Unit
type	ideal lens
focal length	20mm

Specification: Detectors

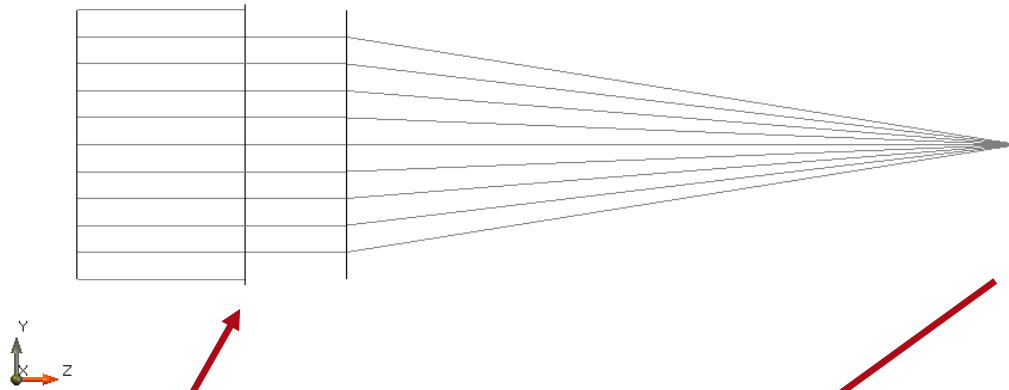


Position	Modeling Technique	Detector/Analyzer
full system	3D ray tracing	3D ray tracing system visualization
a	field tracing	2D PSF calculation in focal plane (false color view)
b	field tracing	2D MTF calculation in focal plane (false color view)

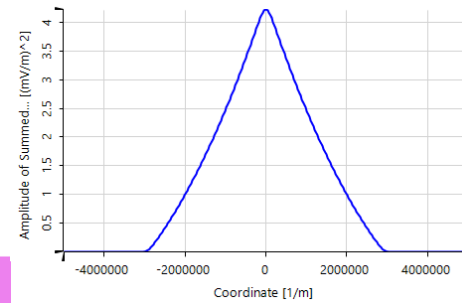
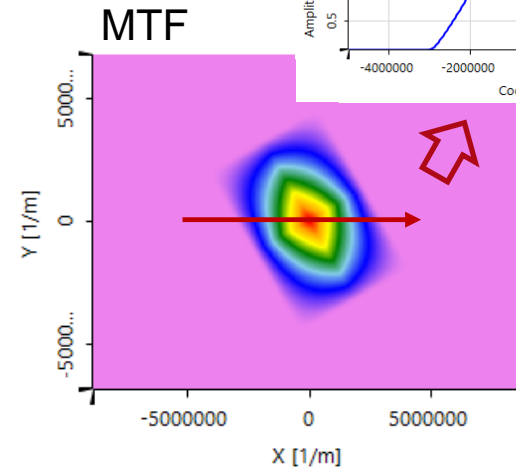
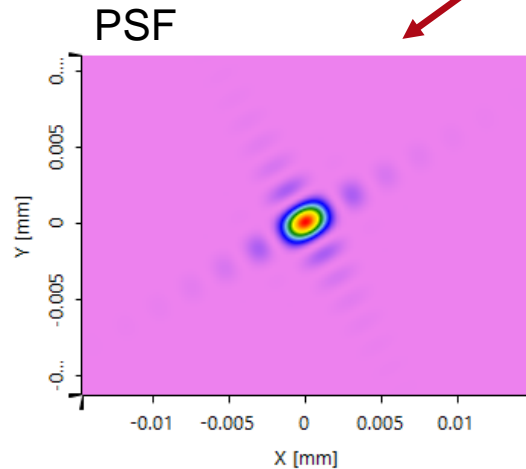
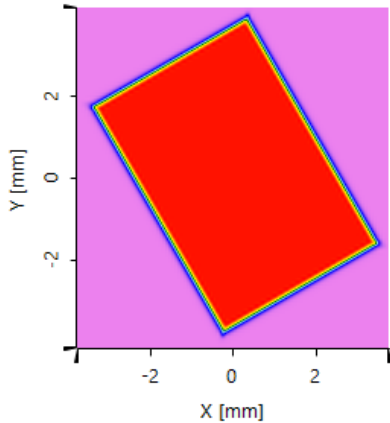
Result: 3D Ray Tracing



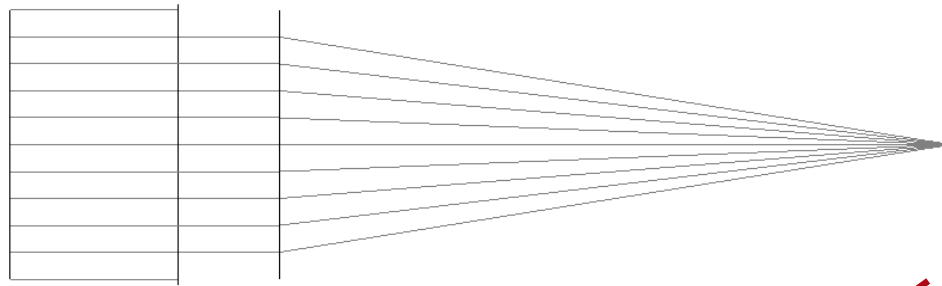
Result: Field Tracing / PSF & MTF calculation



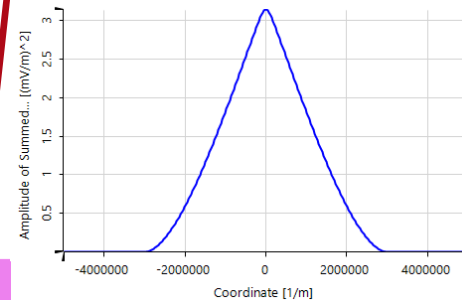
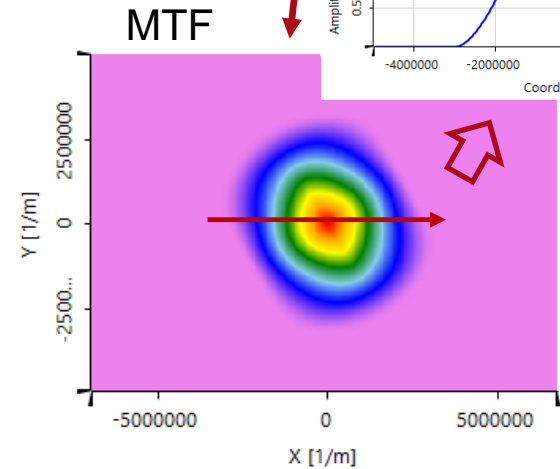
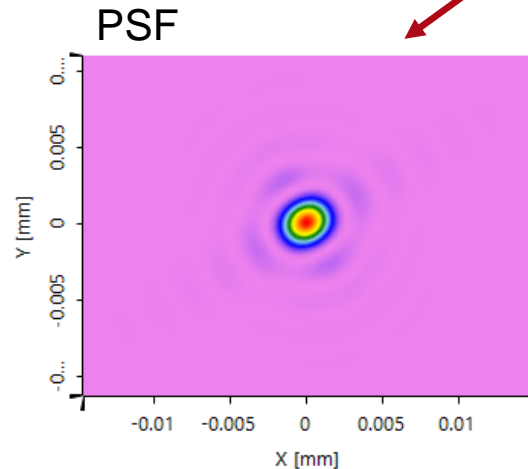
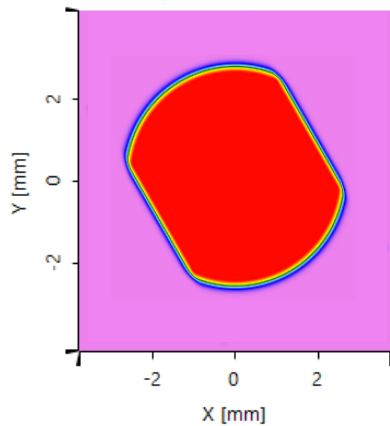
field diameter: 10mm
→ fully illuminated



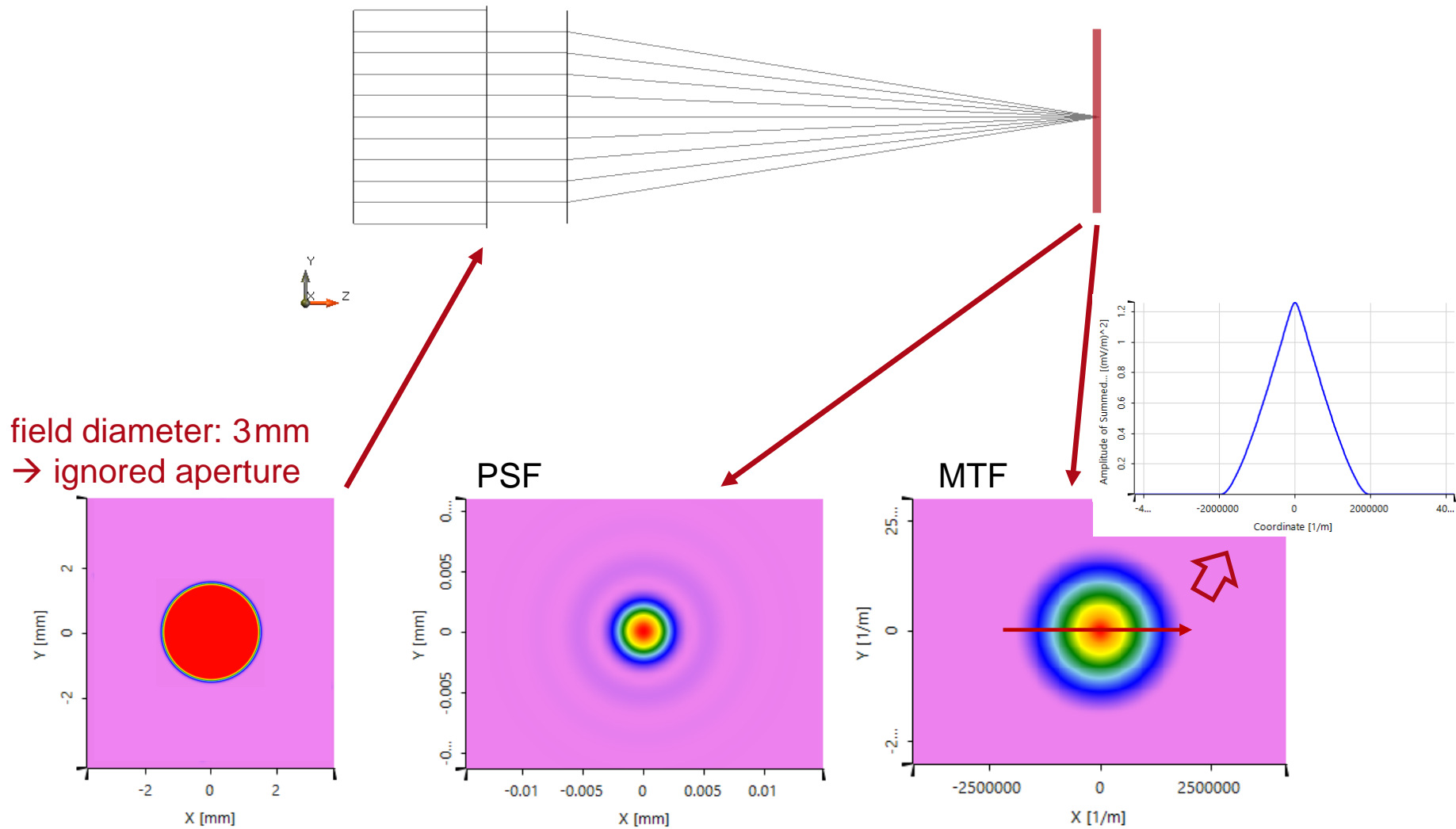
Result: Field Tracing / PSF & MTF calculation



field diameter: 5 mm
→ partially illuminated



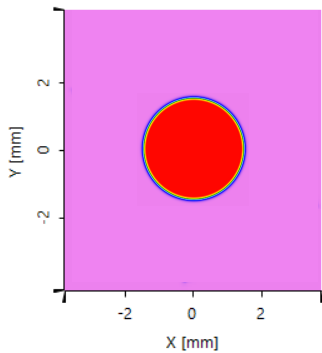
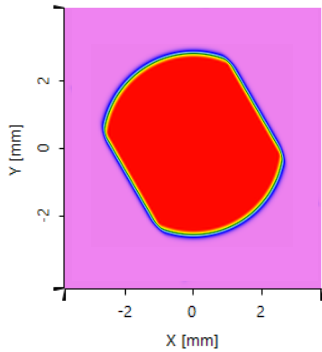
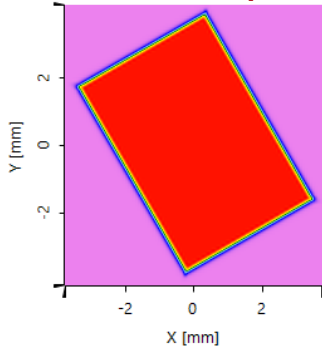
Result: Field Tracing / PSF & MTF calculation



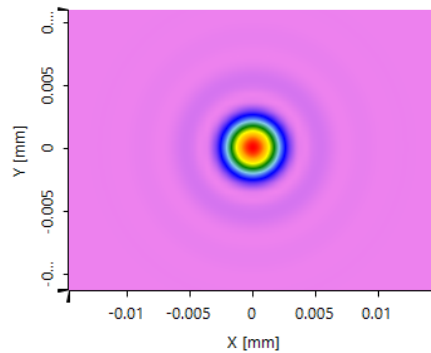
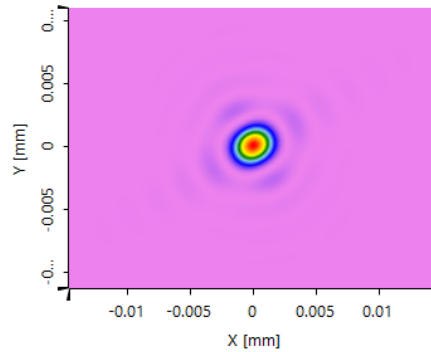
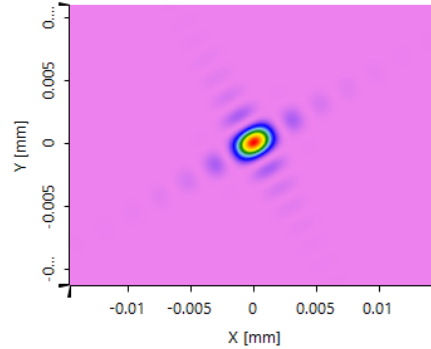
Result: Overview

reducing field size

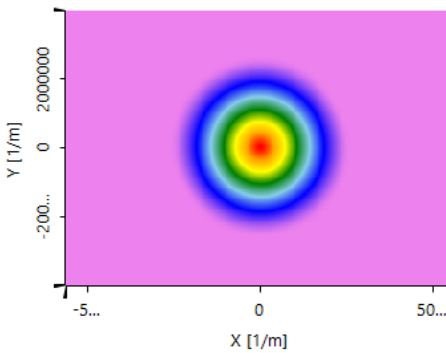
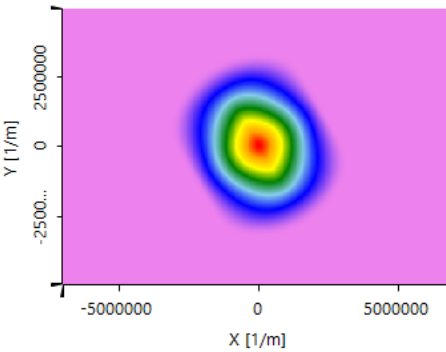
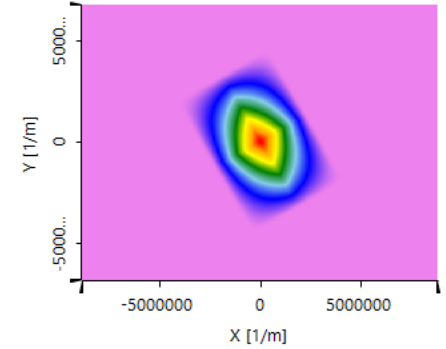
field behind aperture



spot in focus (PSF)



MTF



Document & Technical Info

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category	Imaging Systems > Advanced PSF & MTF
author	Stefan Steiner (LightTrans)
VL version used for simulations	7.0.0.28

Specifications of PC Used for Simulation

Processor	i7-4910MQ (4 CPU cores)
RAM	32 GB
Operating System	Windows 10