LIGHTTRANS
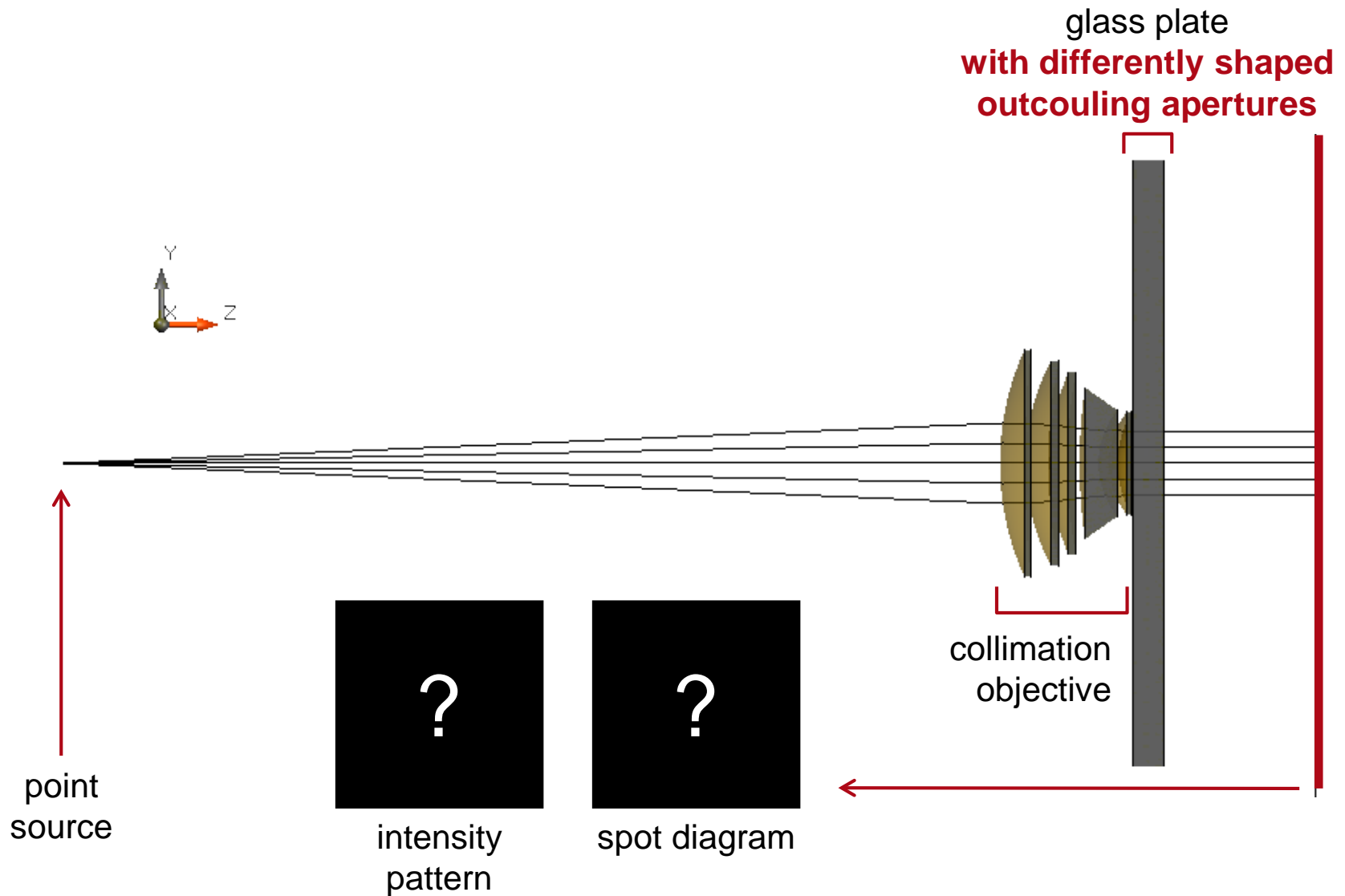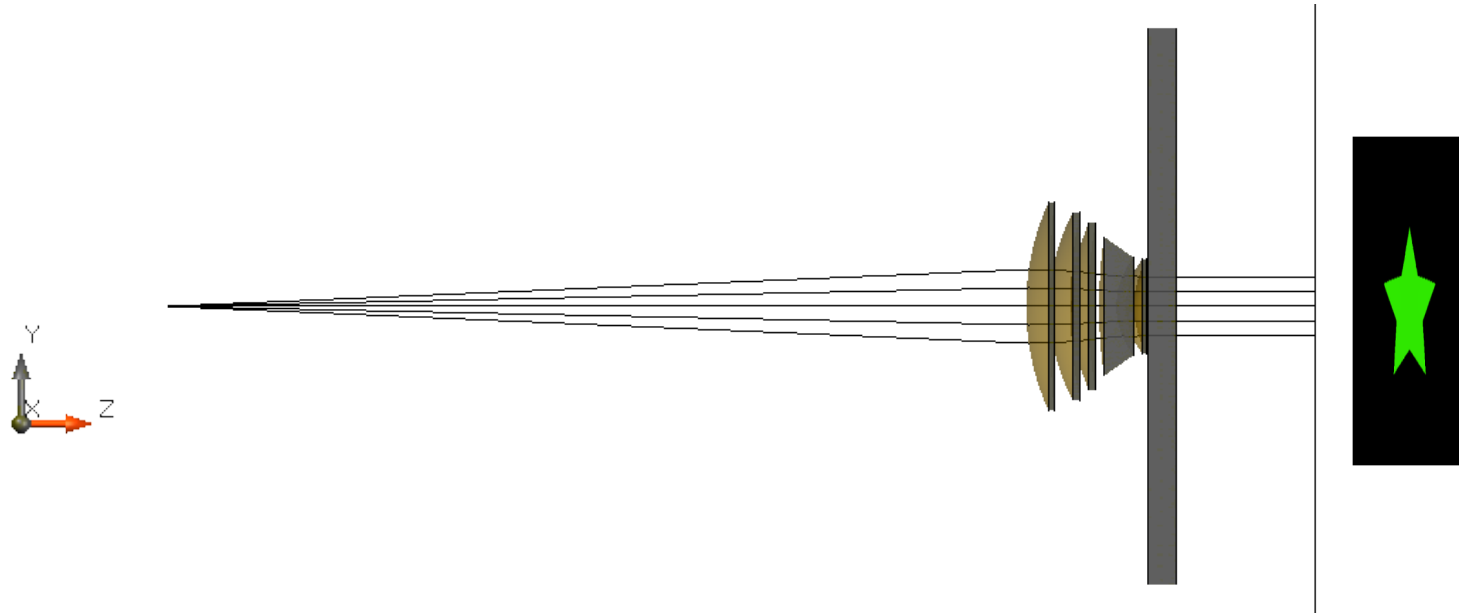
Virtual & Mixed Reality > Near-Eye Displays

Tailored Light Outcoupling from Glass Plate with Arbitrarily Shaped Apertures

Task/System Illustration

glass plate
with differently shaped outcouling apertures

Y

X   Z

collimation objective

point source
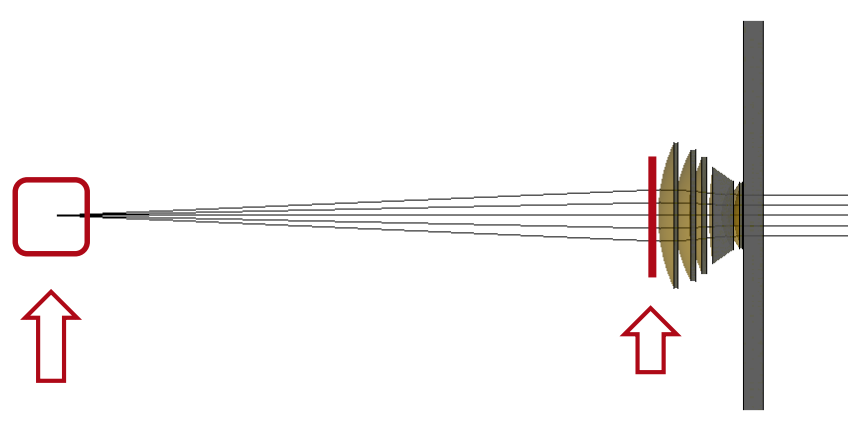
intensity pattern

spot diagram

?   ?

Highlights

- definition & simulation of arbitrary shaped incoupling/outcoupling apertures of a waveguide via advanced region concept
- simulation of fully or partly illuminated apertures

Specification: Light Source

Parameter	Description / Value & Unit
type/number	spherical wave (point source)
wavelength	532 nm
polarization	linear in x-direction (0°)
lateral offset	0 × 0
distance to next surface	30.955 mm
aperture at next surface	2.5 mm × 2.5 mm

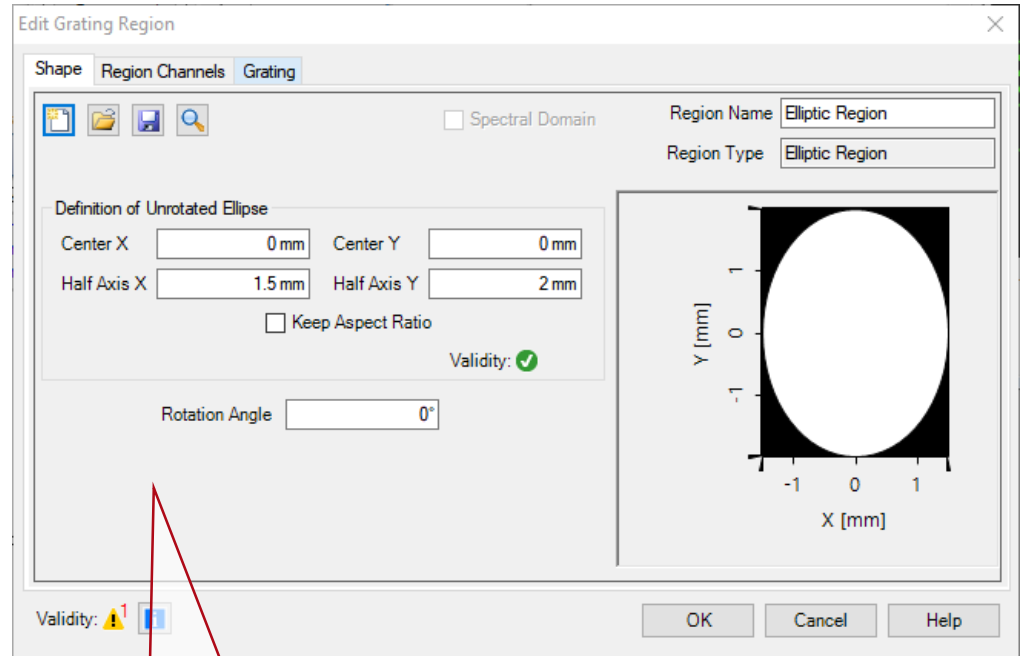# Specification: Collimating Lens
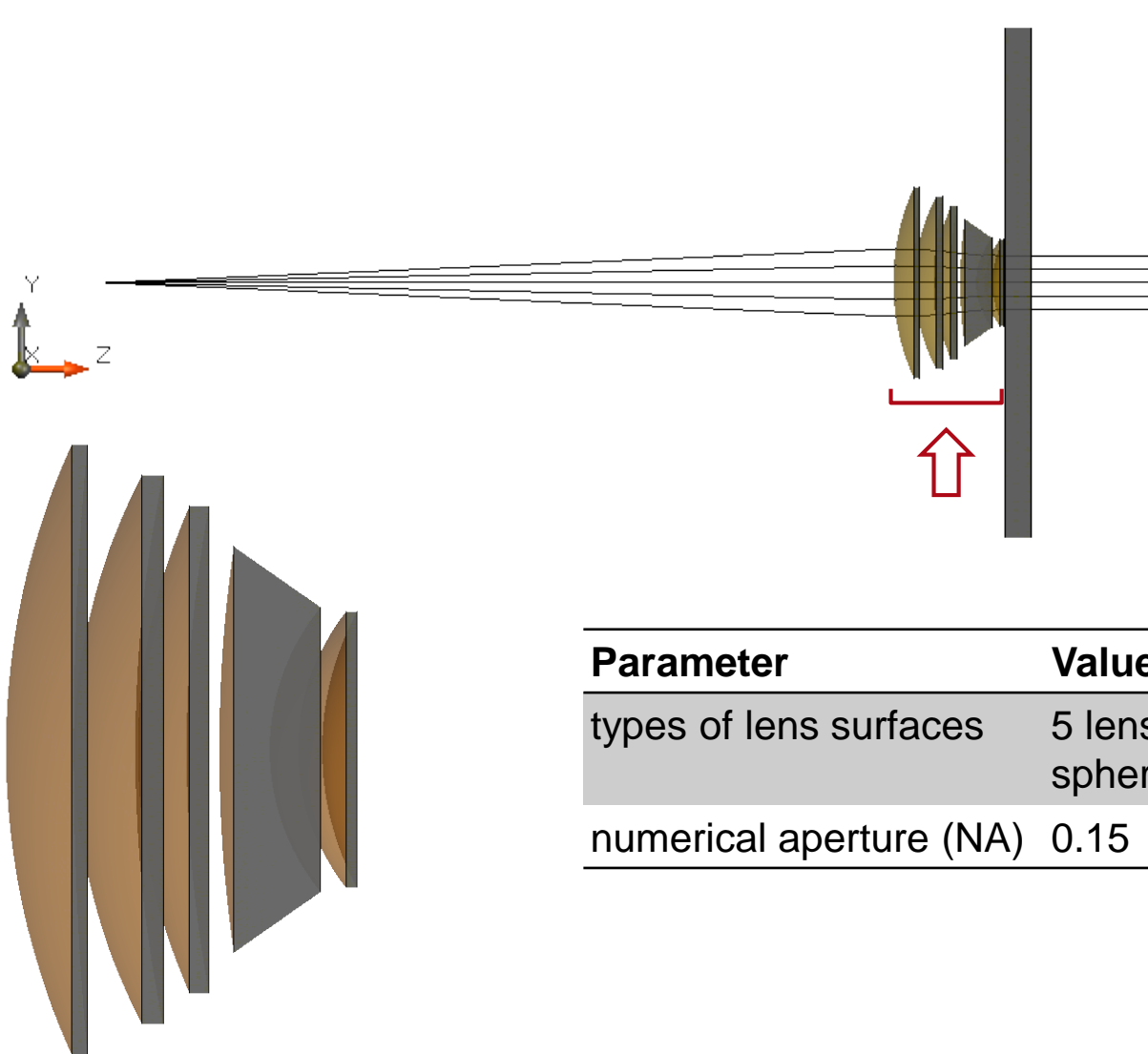
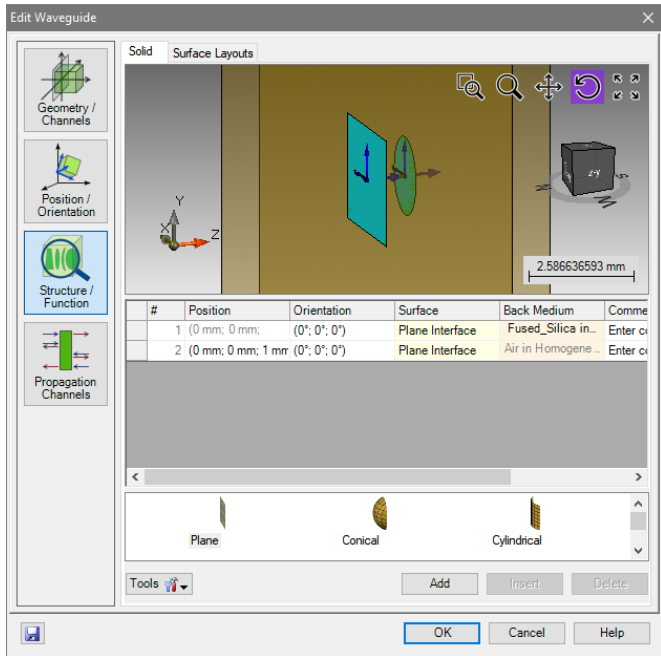| Parameter	Value & Unit
types of lens surfaces	5 lenses with 10 spherical surfaces
numerical aperture (NA)	0.15

Specification: Glass Plate
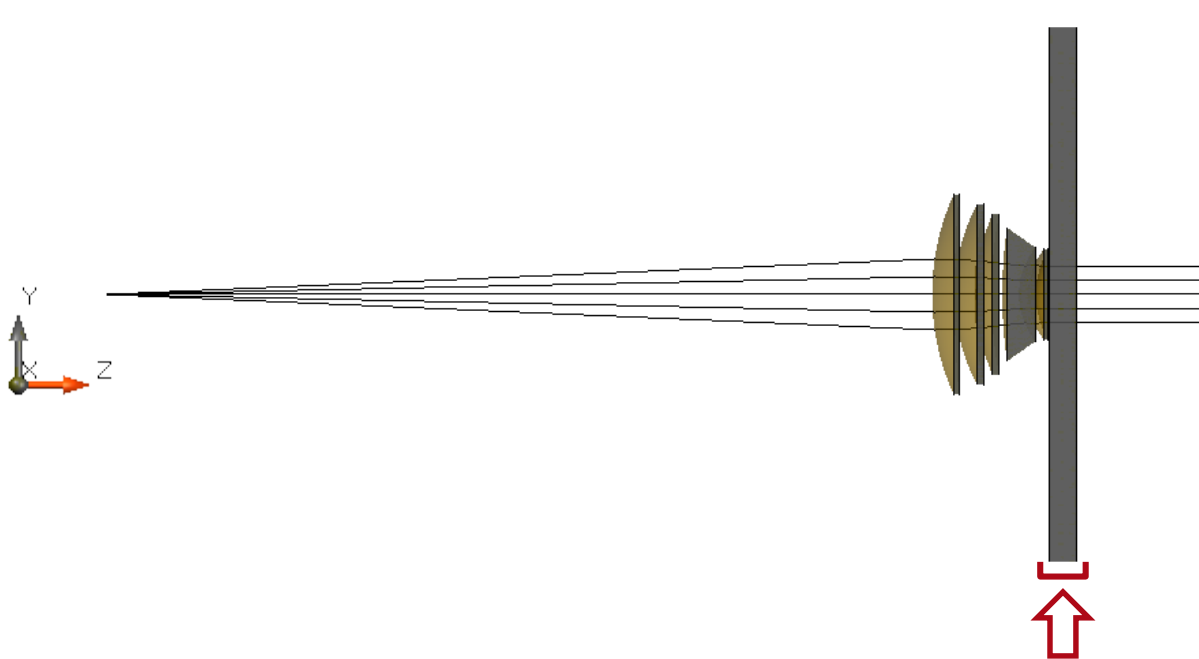
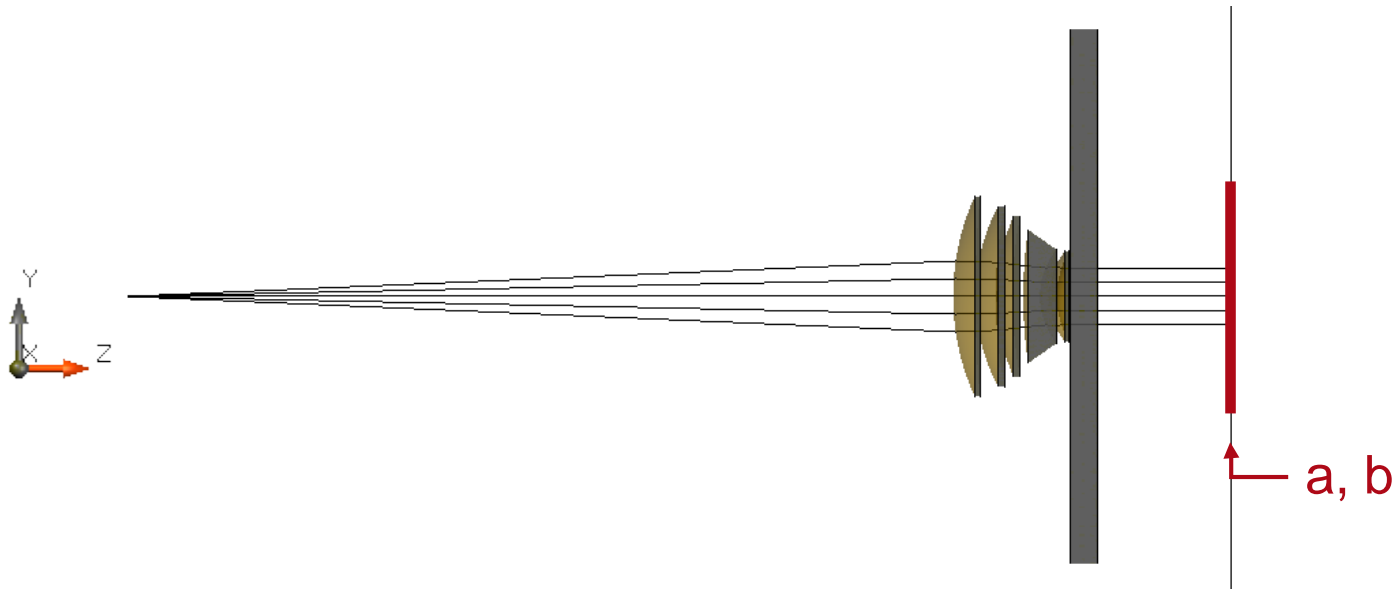| Parameter	Value & Unit
type	parallel planes
thickness	1 mm
material	fused silica

Specs: Region Concept

at each interface of the waveguide component various numbers of regions can be defined

region types:
- rectangular
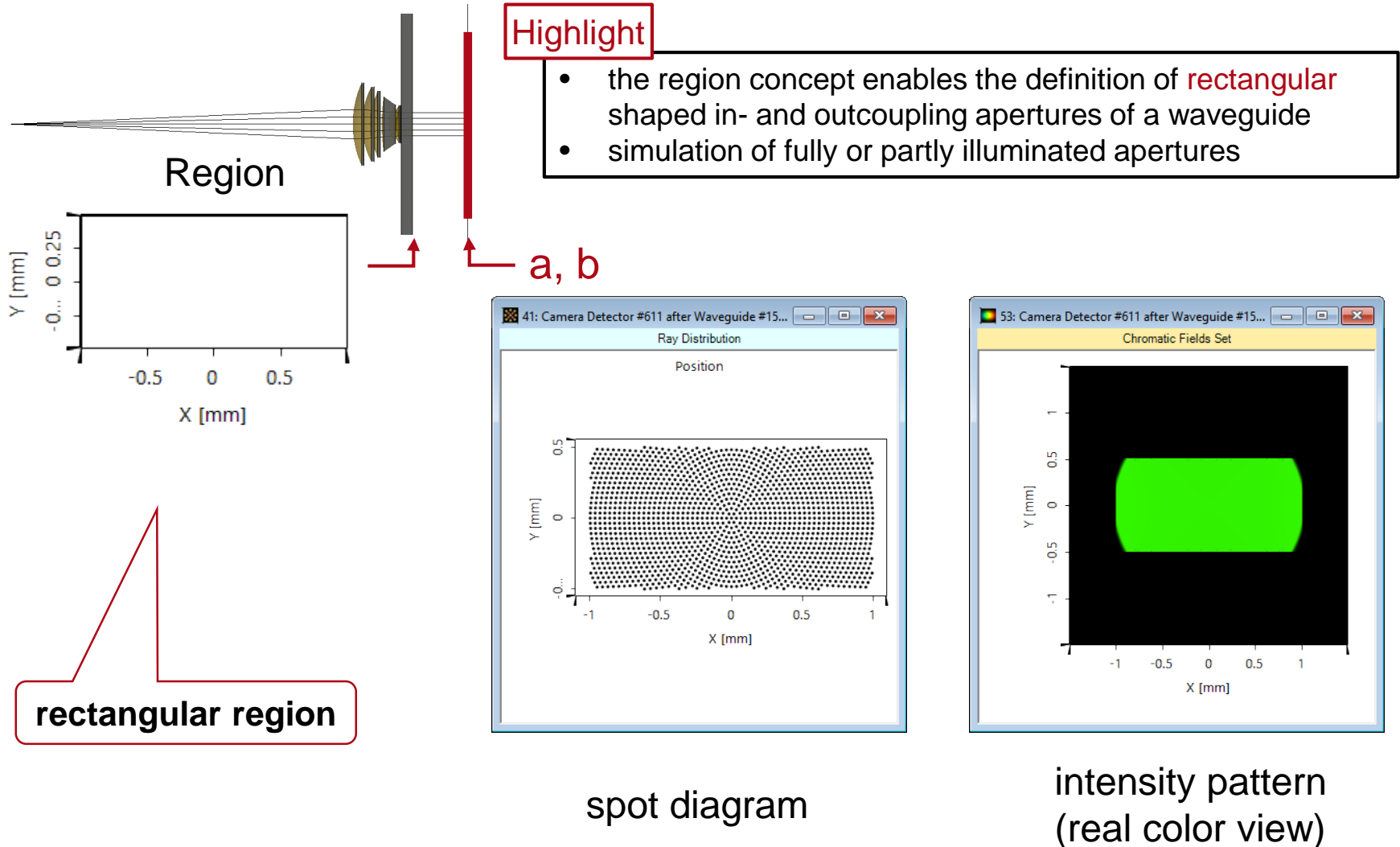- elliptical
- polygon
- sampled
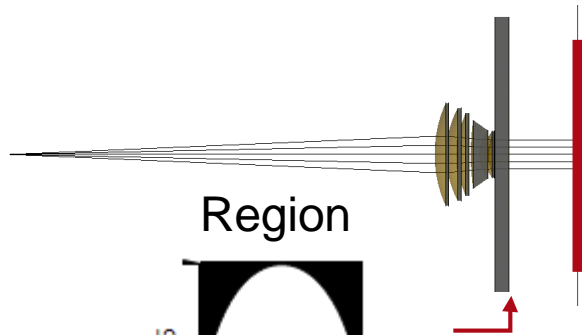- composed

Specification: Detectors

Position	Modeling Technique	Detector/Analyzer
a	ray tracing	dot diagram
b	field tracing	intensity pattern

Results: Rectangular Aperture

Region

Highlight

- the region concept enables the definition of rectangular shaped in- and outcoupling apertures of a waveguide
- simulation of fully or partly illuminated apertures
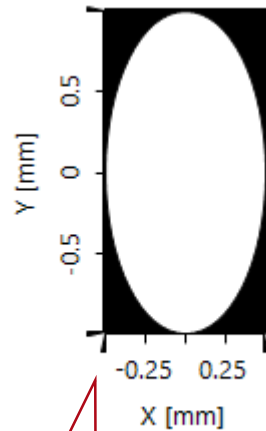
a, b

rectangular region

spot diagram

intensity pattern
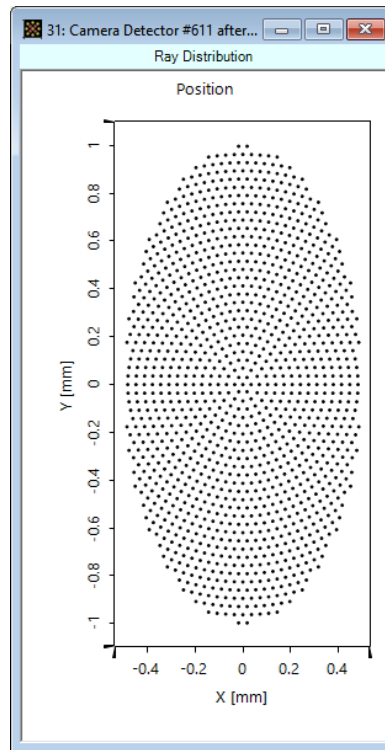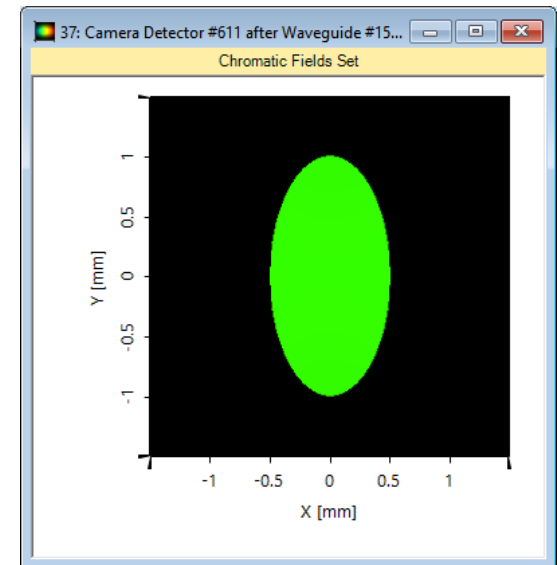(real color view)

Results: Ellicptical Aperture

Region

elliptical region

Highlights

- the region concept enables the definition of elliptical shaped in- and outcoupling apertures of a waveguide
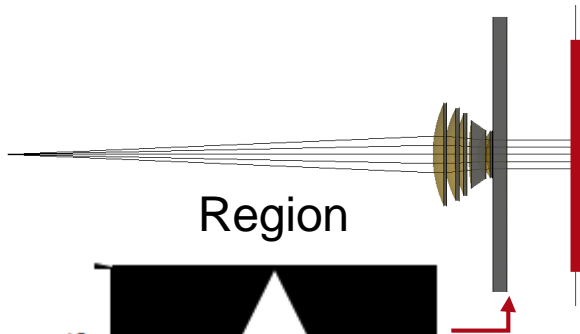
spot diagram
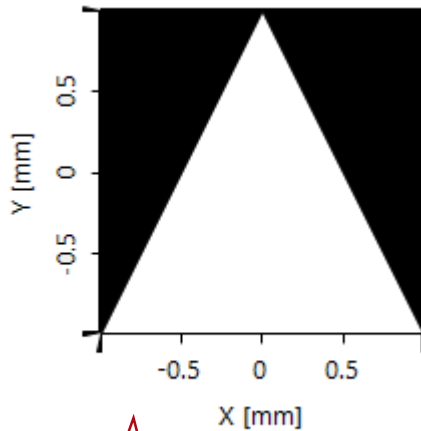
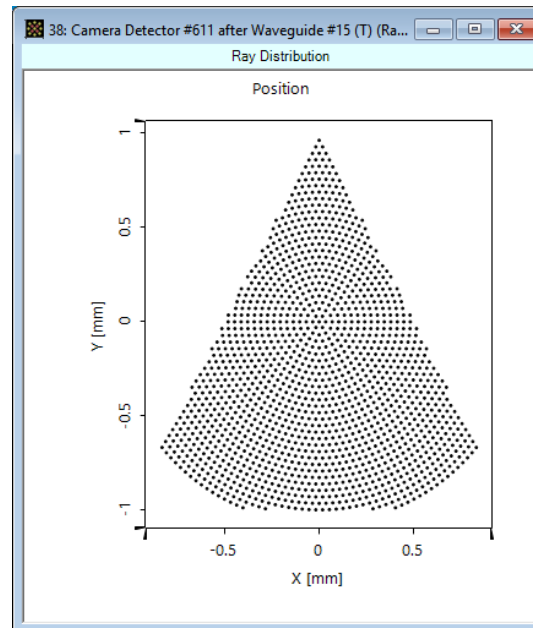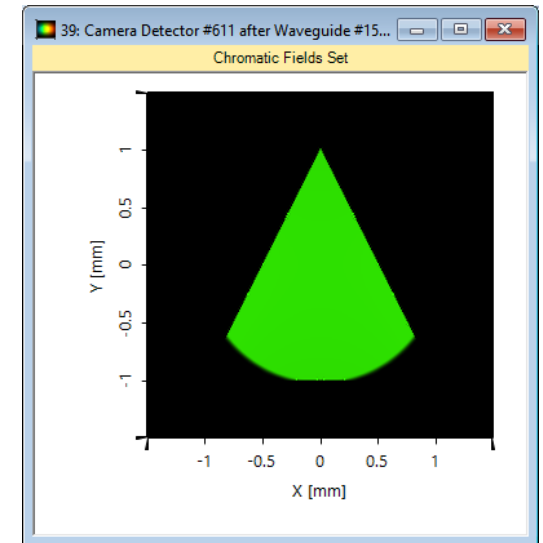intensity pattern
(real color view)

Results: Polygonal Aperture

Region

polygonal region

- the region concept enables the definition of polygon shaped in- and outcoupling apertures of a waveguide
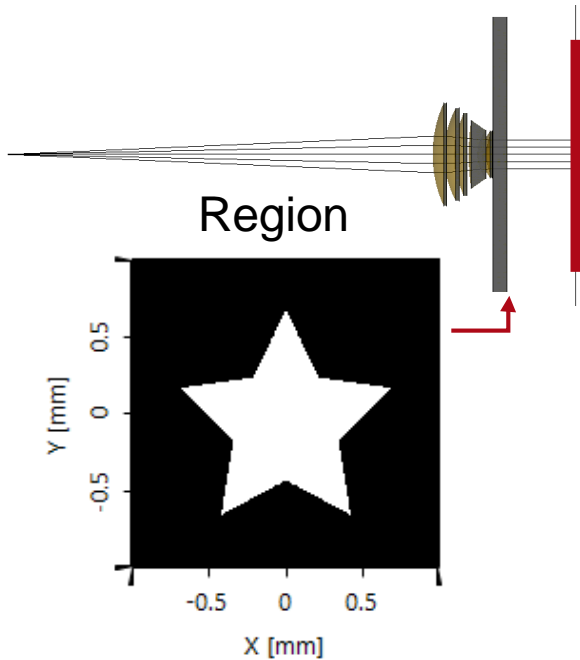- simulation of fully or partly illuminated apertures

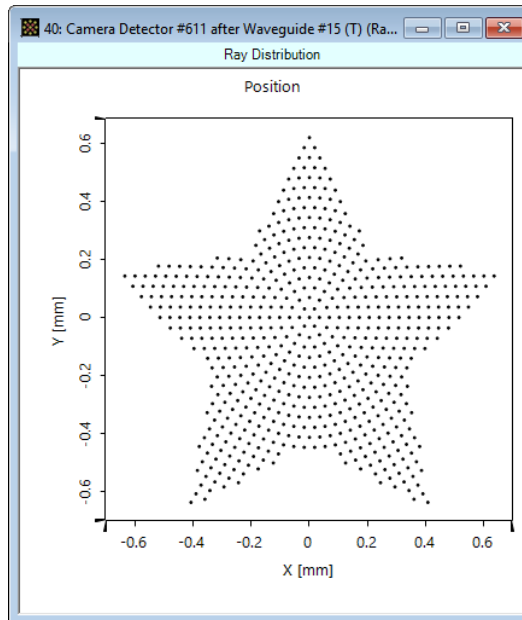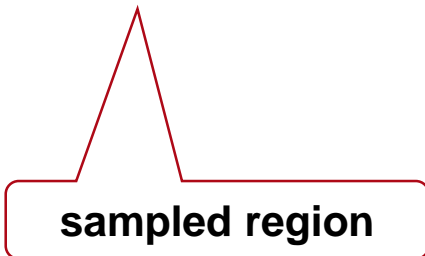38: Camera Detector #611 after Waveguide #15 (T) (Ra...

Ray Distribution

Position

spot diagram

39: Camera Detector #611 after Waveguide #15...

Chromatic Fields Set

intensity pattern
(real color view)

Results: Aperture Based on Sampled Data

Region

sampled region
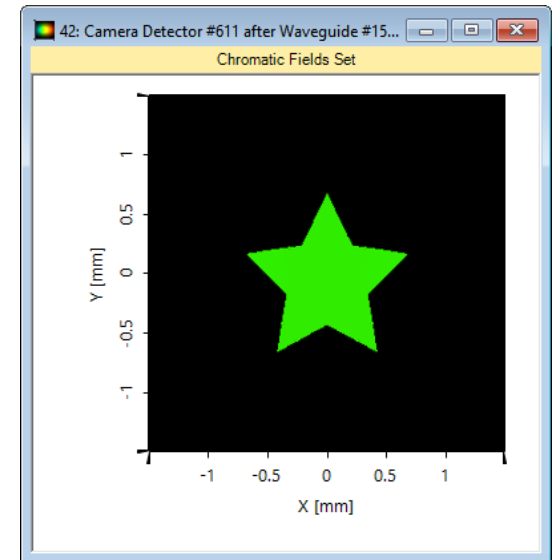
- the region concept enables the definition of arbitrary shaped in- and outcoupling apertures of a waveguide

spot diagram

intensity pattern
(real color view)

Document & Technical Info

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author	Roberto Knoth (LightTrans)
used VL version	7.0.0.29

Specifications of PC Used for Simulation

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