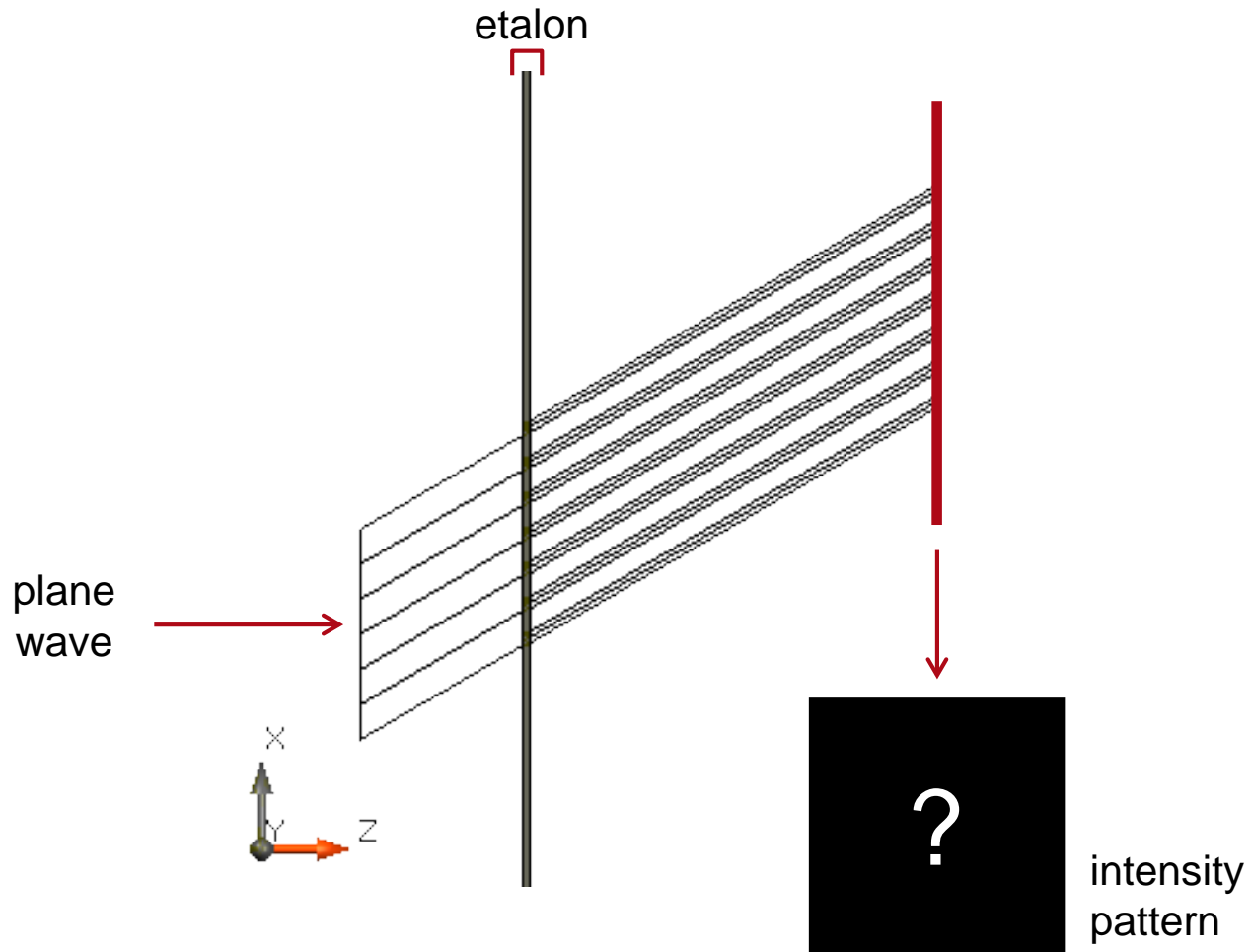


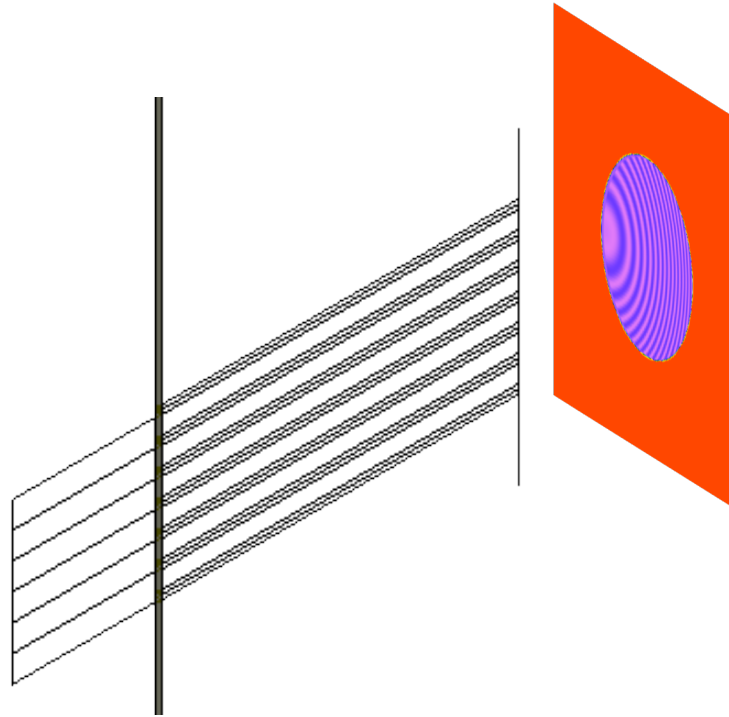
Virtual & Mixed Reality > Near-EyeDisplays

Simulation through Etalon Including Interference Effects

Task/System Illustration

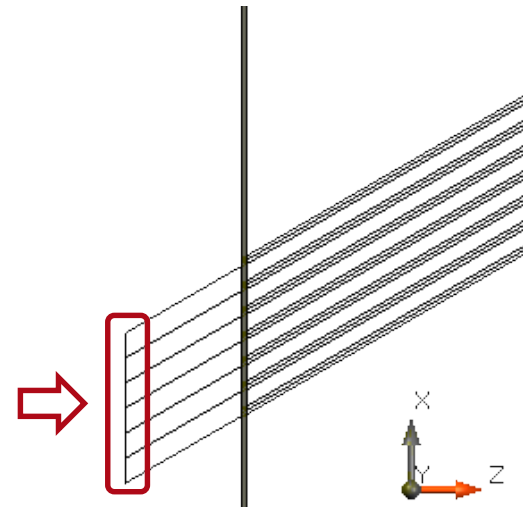
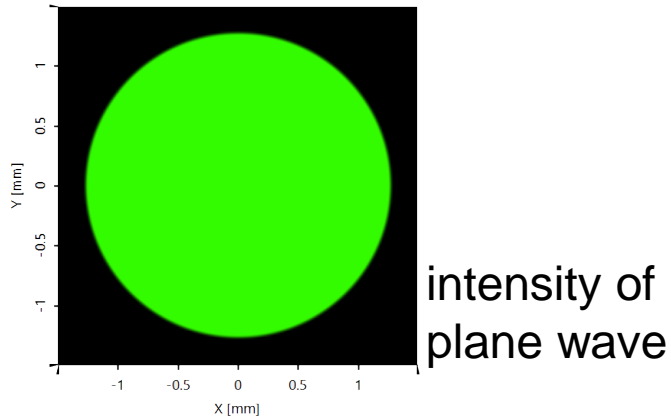


Highlights



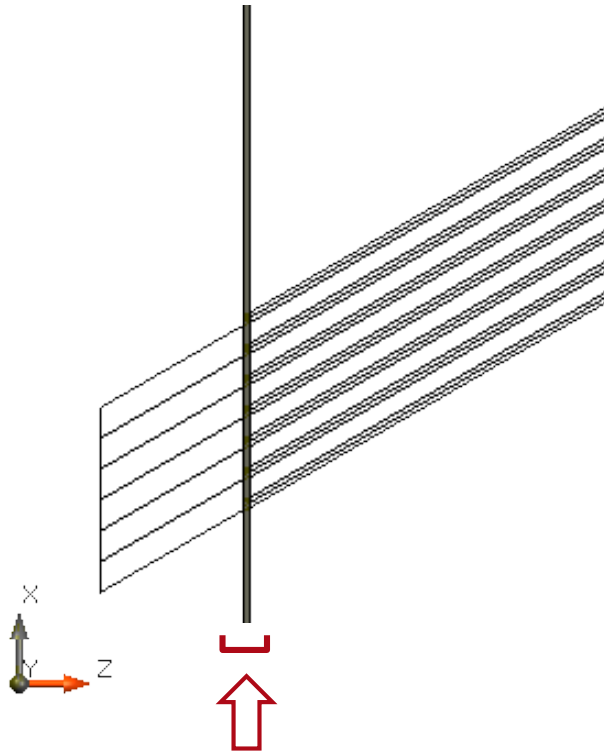
non-sequential field tracing
including coherence, polarization and energy effects

Specification: Light Source



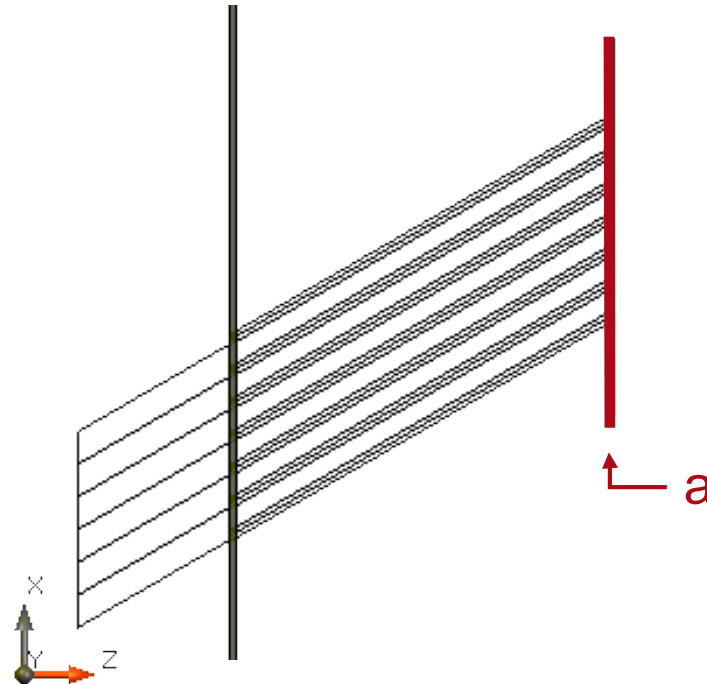
Parameter	Description / Value & Unit
type/number	Plane wave
wavelength	532nm
polarization	linear in x-direction 0° (90°)
incident angle	30° in relation to x-axis
aperture at next surface	2.5mm × 2.5mm

Specification: Etalon



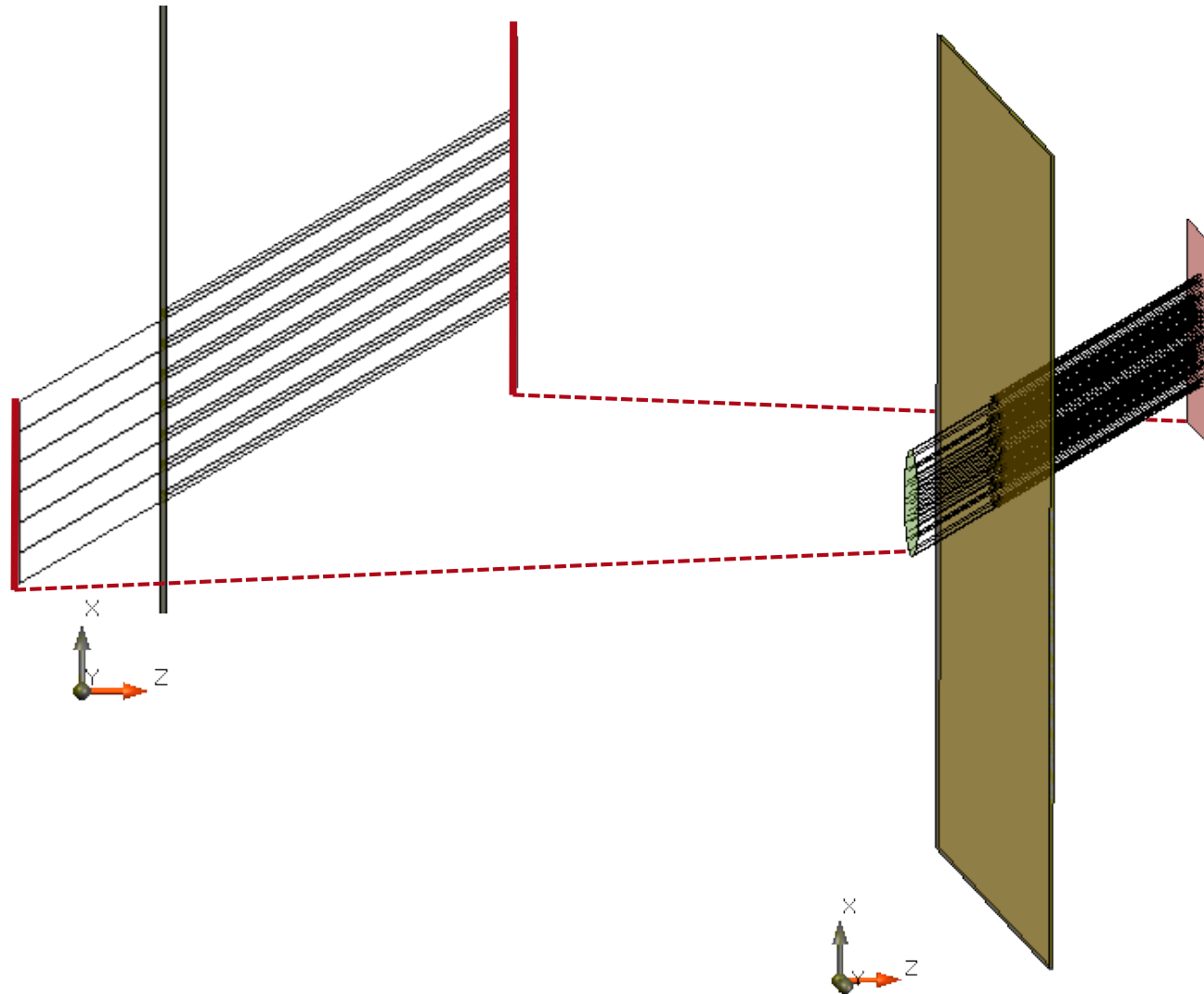
Parameter	Value & Unit
1st surface	different scenarios: 1. plane interface 2. plane interface with 0.1° tilt to x-axis 3. spherical surface with 1 m radius 4. cylindrical spherical surface with 1 m
2nd surface	plane interface (no tilt)
thickness	$100\mu\text{m}$ ($90\mu\text{m}$)

Specification: Detectors

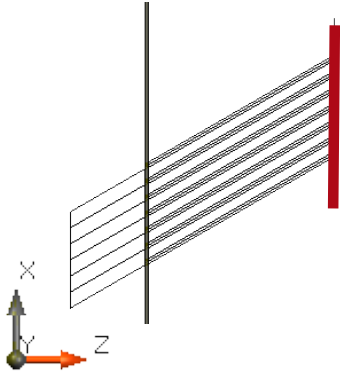


Position	Modeling Technique	Detector/Analyzer
full system	3D ray tracing system analyzer	3D ray tracing view with different channels activated
a	field tracing	intensity pattern (false color view) of 4 overlapping modes generated by different etalon specifications

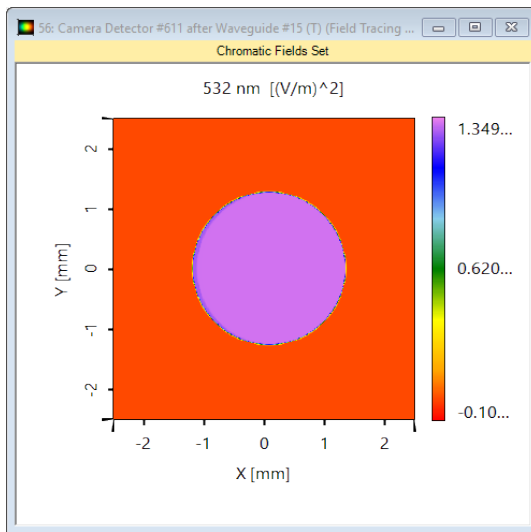
Results: 3D System Ray Tracing



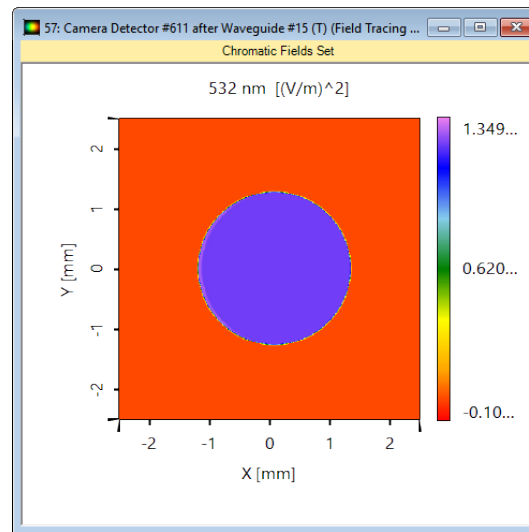
Results: Varying Thickness



constructive and destructive interference by varying the etalon thickness



intensity pattern with etalon thickness of 100 μ m



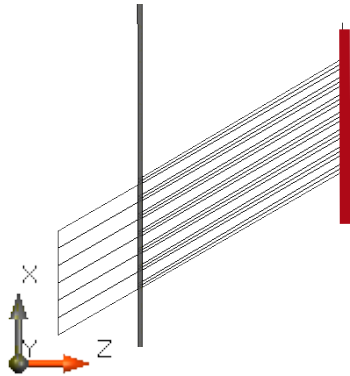
intensity pattern with etalon thickness of 90 μ m

Highlights

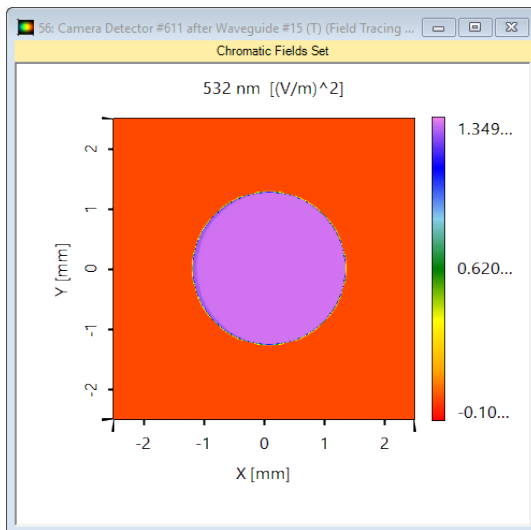
non-sequential field tracing including **coherence**, polarization and **energy effects**

Simulation Time ~2s

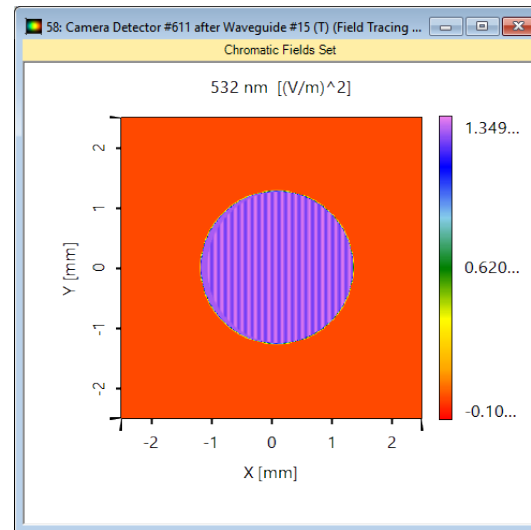
Results: Tilted 1st Planes



constructive and destructive interference by tilting the first plane surface about 0.1°



intensity pattern with no tilt



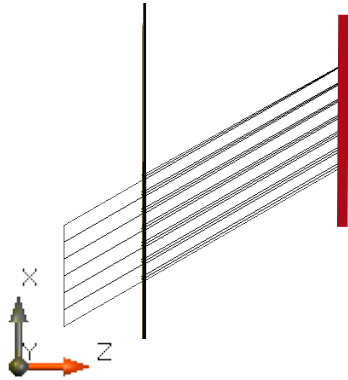
intensity pattern with tilt of first surface at 0.1°

Highlights

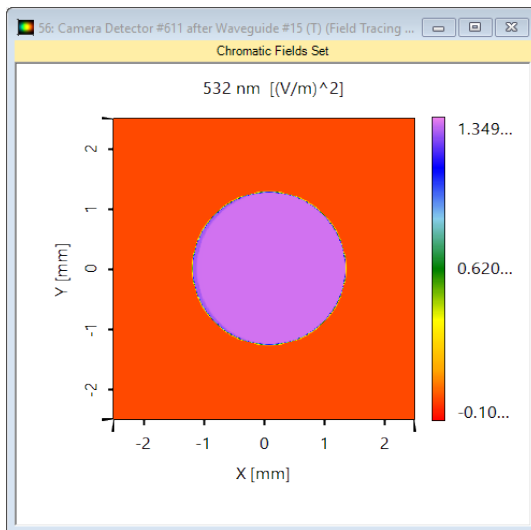
non-sequential field tracing including **coherence**, polarization and **energy effects**

Simulation Time ~2s

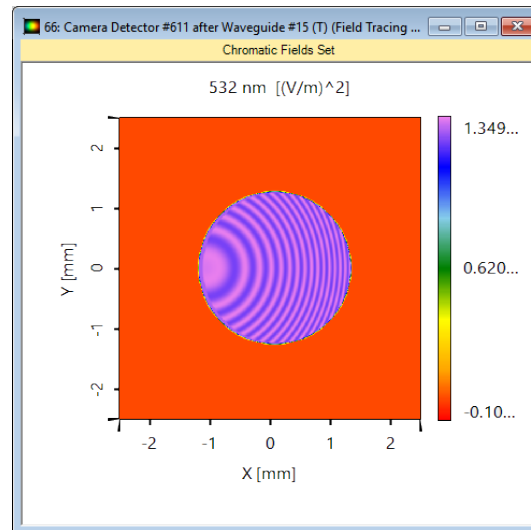
Results: Curved 1st Surface



constructive and destructive interference by introducing spherical curvature with 1m radius for 1st etalon surface



intensity pattern with plane surface



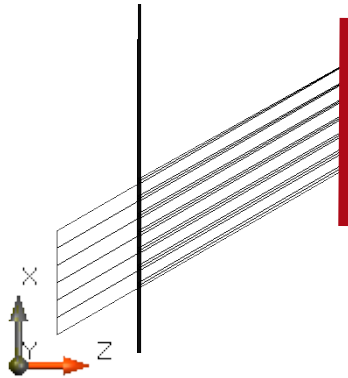
intensity pattern with spherical surface

Highlights

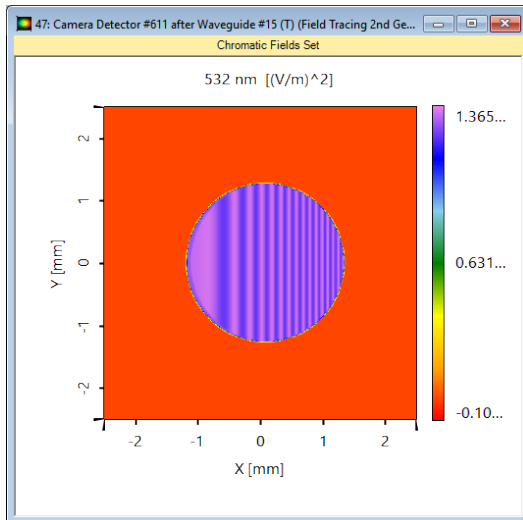
non-sequential field tracing including **coherence**, polarization and **energy effects**

Simulation Time ~2s

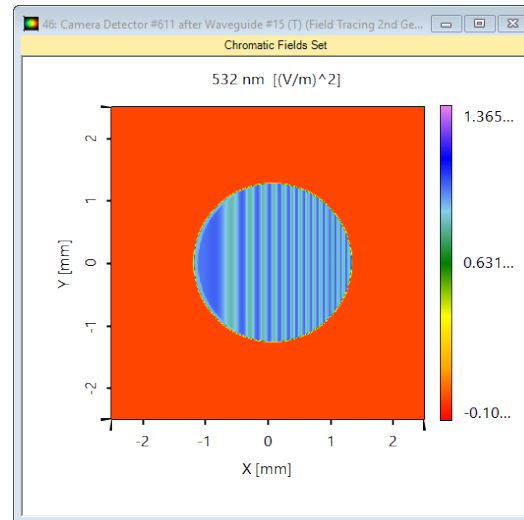
Results: Cylindrical 1st Surface



constructive and destructive interference by using cylindrical spherical curvature with 1 m radius for 1st etalon surface



intensity pattern with linear polarized light (0°)



intensity pattern with linear polarized light (90°)

Highlights

non-sequential field tracing including **coherence**, **polarization** and **energy effects**

Simulation Time ~2s

Document & Technical Info

code	NED.0003
version of document	1.0
title	Simulation through Etalon Including Interference Effects
category	Virtual & Mixed Reality > Near-Eye Displays (NED)
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