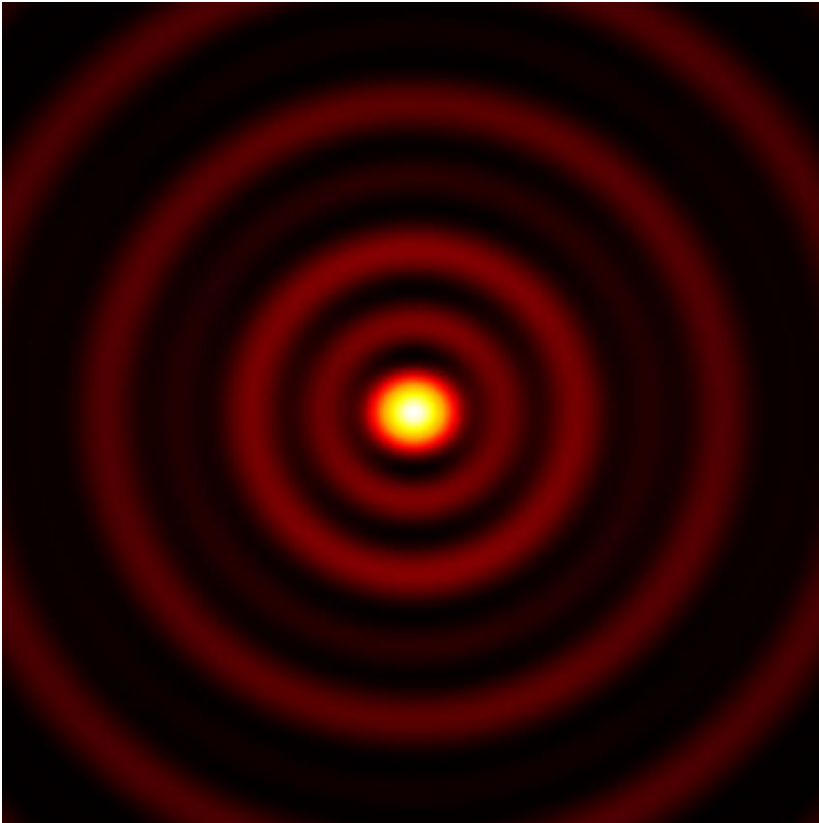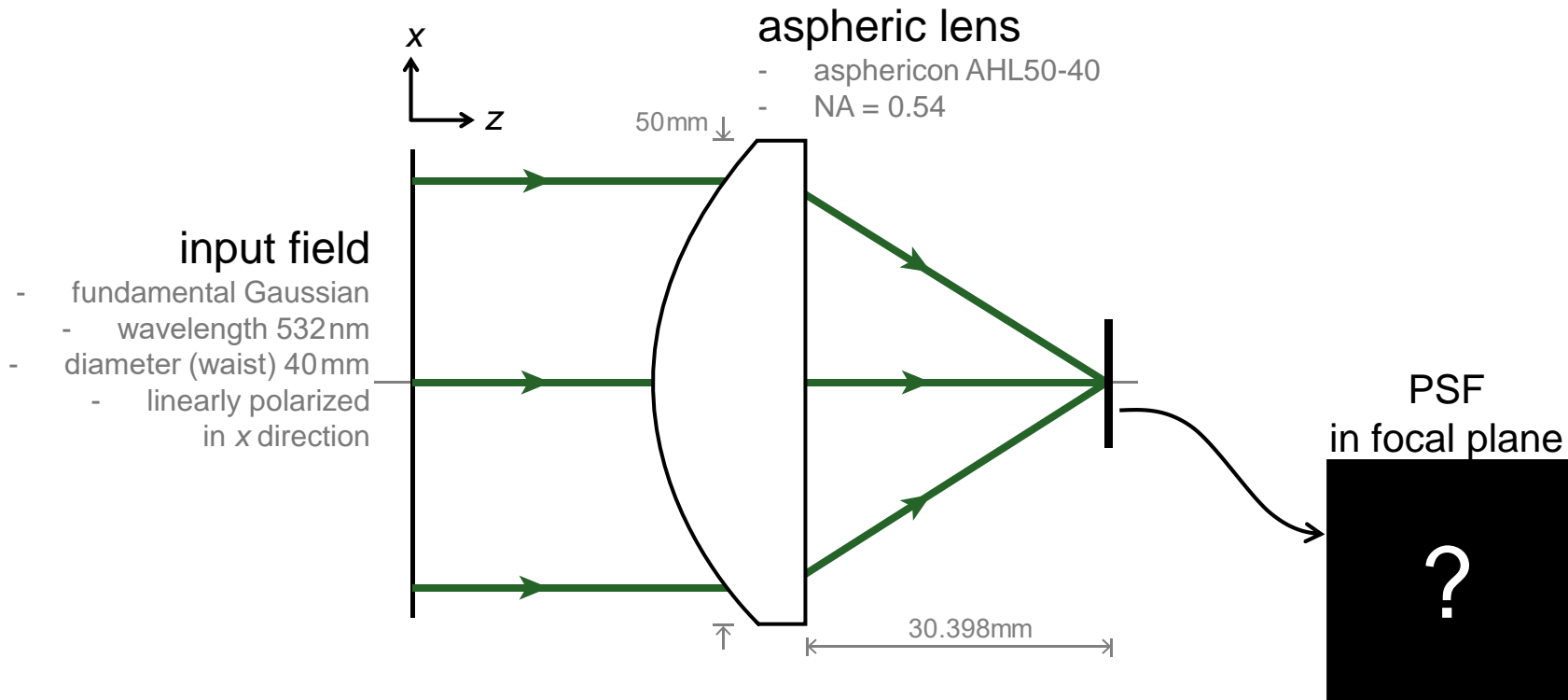# Advanced PSF Calculation in a High-NA Lens System
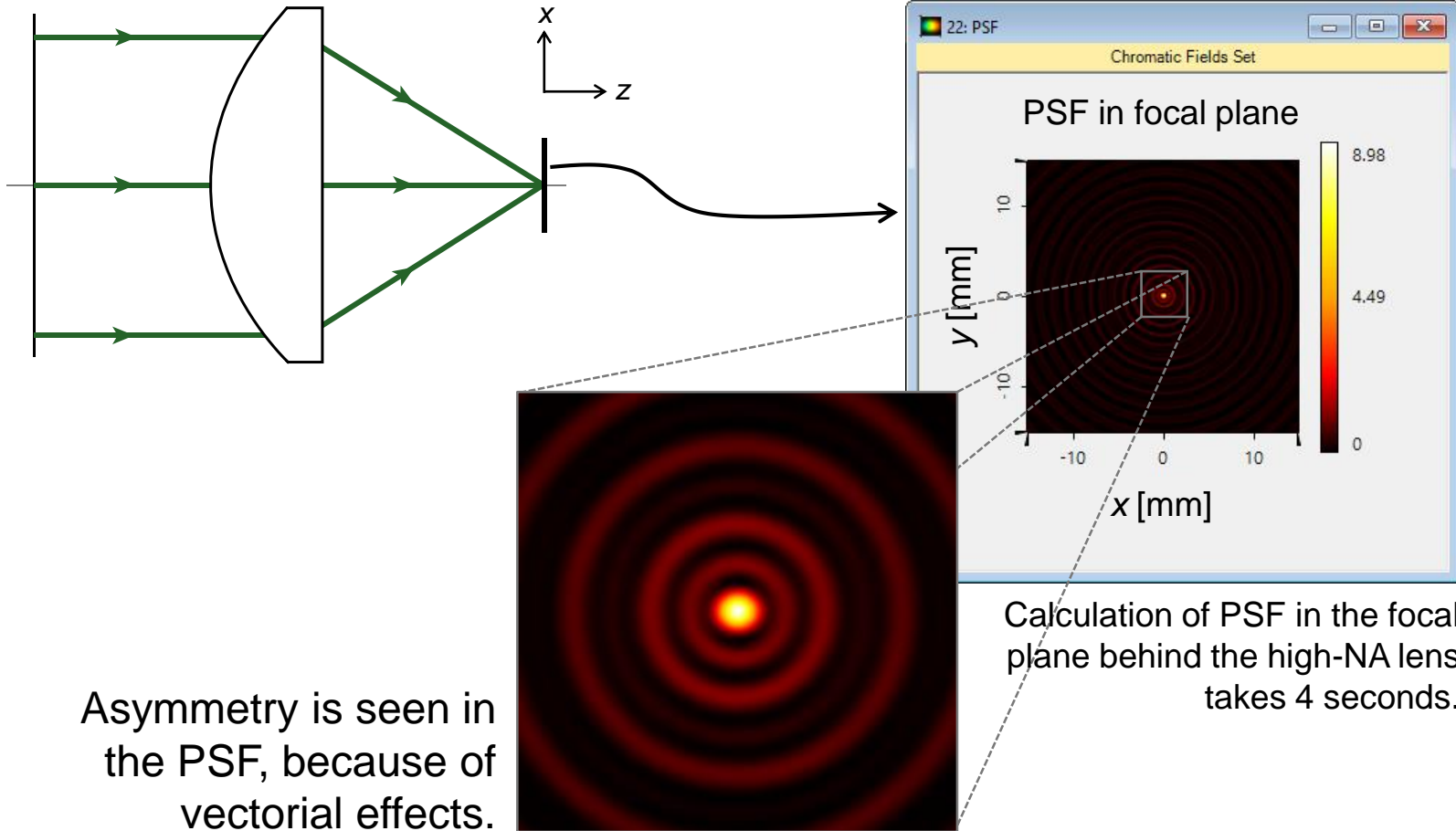
Abstract

It is known that the vectorial nature of light plays a non-negligible role in high-NA focusing situations. In this example, focusing of a linearly polarized Gaussian beam by a high-NA aspheric lens is presented, and the asymmetric PSF in the focal plane is shown. By examining the electromagnetic field components in the focal plane, it can be found that the asymmetry is caused by a relatively strong E_z component.
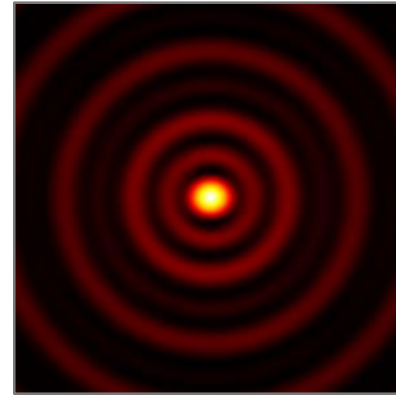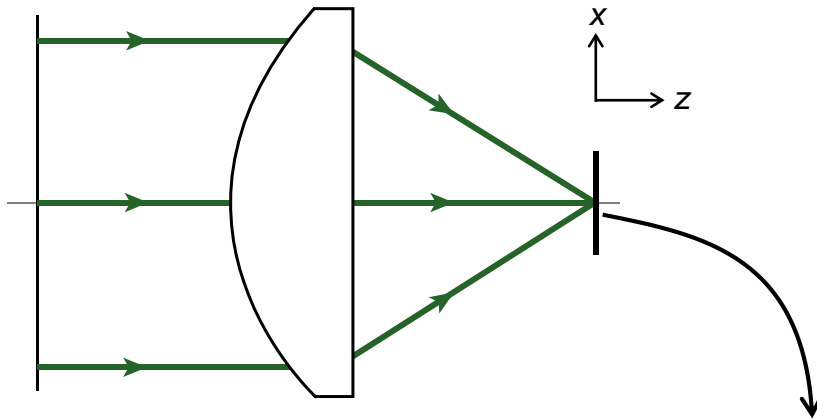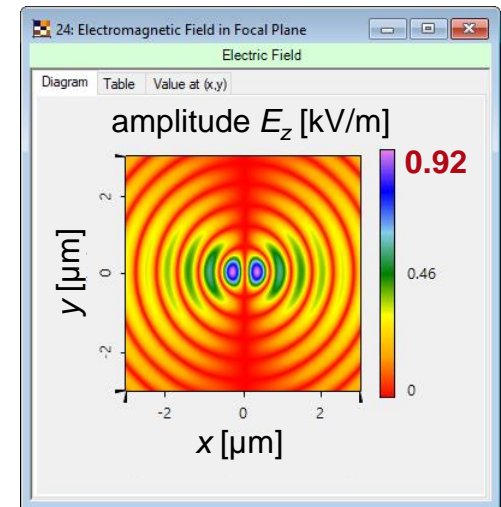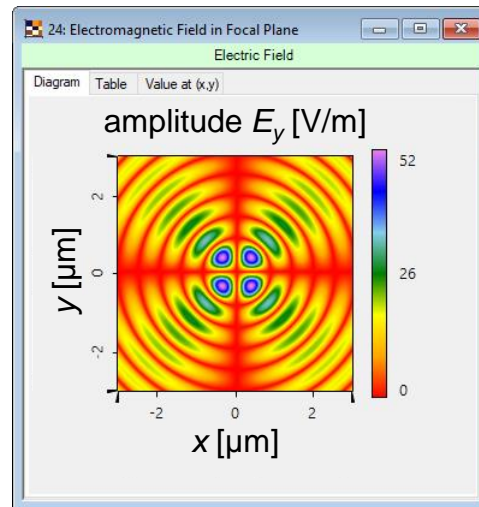
Modeling Task

x

z

aspheric lens
- asphericon AHL50-40
- NA = 0.54

50mm ↓

input field
- fundamental Gaussian
- wavelength 532 nm
- diameter (waist) 40 mm
- linearly polarized in x direction

30.398mm

PSF
in focal plane

?

Results

Asymmetry is seen in the PSF, because of vectorial effects.

PSF in focal plane

Calculation of PSF in the focal plane behind the high-NA lens takes 4 seconds.

Results

Asymmetry in PSF is due to the relatively strong E_z component.

amplitude E_x [kV/m]

amplitude E_y [V/m]

amplitude E_z [kV/m]
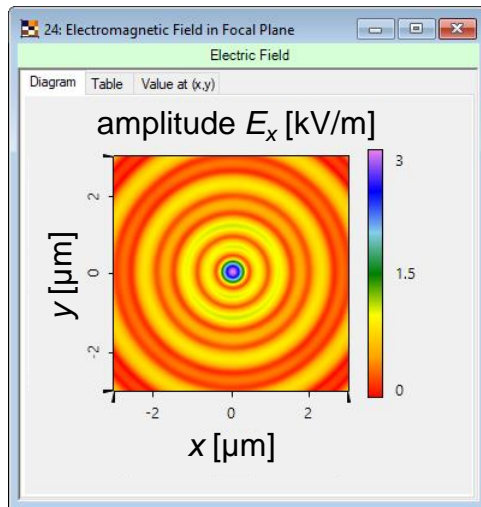
Document Information

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