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 it is shown that the PSF in the focal plane shows asymmetry. 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

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

aspheric lens
- asphericon AHL50-40
- NA = 0.54

PSF in focal plane

input field

x

z

50mm

30.398mm
Results

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

Calculation of PSF in the focal plane behind the high-NA lens takes 12 seconds.
Asymmetry in PSF is due to the relatively strong $E_z$ component.
## Document Information

<table>
<thead>
<tr>
<th>title</th>
<th>Advanced PSF Calculation in a High-NA Lens System</th>
</tr>
</thead>
<tbody>
<tr>
<td>version</td>
<td>1.0</td>
</tr>
<tr>
<td>VL version used for simulations</td>
<td>7.0.3.4</td>
</tr>
<tr>
<td>category</td>
<td>Technology Use Case</td>
</tr>
</tbody>
</table>