Influence of the Position of the Stop in a Lens System on Point Spread Function (PSF)
Stop in a lens system is important because it directly determines the light interaction with the edge of the aperture of the lens surface, which existed physically in the manufactured lens system. Therefore, different positions of the stop might have an influence on the Point Spread Function (PSF). VirtualLab Fusion provides an ease way to investigate this influence by considering the diffraction, if necessary, from the edge of each surface, especially with inclined illumination.
Scenario

How is the PSF influenced by the different positions of the stop in the cases of normal and inclined incidence?
Building the System in VirtualLab Fusion
System Building Blocks
Solvers for Components

Components | Solvers
---|---
Lens system | Local Plane Interface Approximation (LPIA)
Ray Tracing Simulations
Ray Tracing Results: Normal Incidence

Stop at the Front

Stop in the Middle

Stop at the End
Ray Tracing Results: Inclined Incidence

Stop at the Front

Stop in the Middle

Stop at the End
Fast Physical-Optics Simulations
Field Tracing Result: Normal Incidence

\[ |E_x|^2 + |E_y|^2 + |E_z|^2 \]

The results have slight difference, which means the position of stop is not important in the case of normal incidence.
Field Tracing Result: Inclined Incidence with Angle 8°

Stop at the Front

\[ |E_x|^2 + |E_y|^2 + |E_z|^2 \]

Stop in the Middle

\[ |E_x|^2 + |E_y|^2 + |E_z|^2 \]

Stop at the End

\[ |E_x|^2 + |E_y|^2 + |E_z|^2 \]

The results have difference, which means the position of stop needs to be considered well in the case of normal incidence.
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| further reading | - [Debye-Wolf Integral Calculator](#)  
- [Analyzing High-NA Objective Lens](#)  
- [Resolution Investigation for Microscope Objective Lenses by Rayleigh Criterion](#) |