Modeling of Graded-Index (GRIN) Lens
Abstract

Graded-index (GRIN) media, with smooth variation of refractive indices, can be used to e.g. make a lens with flat surface, or reduce the aberrations. VirtualLab Fusion provides a physical-optics modeling technique for light propagation through GRIN media. With the same speed but far beyond ray, the physical-optics modeling takes fully electromagnetic fields into consideration, which includes the polarization crosstalk effects.
Modeling Task

How to model light propagation through GRIN media?

How to calculate field on focal plane behind a GRIN lens?
Results

• Ray tracing

Ray-tracing analysis of the complete system takes less than 2 seconds!

dot diagram on focal plane
Results

- Field tracing

Input field is linearly polarized along the x direction.

Fully vectorial modeling of field propagation through the GRIN medium takes less than 3 seconds!
Results

- Field tracing

![Field tracing diagram]

- GRIN medium

- PSF

- MTF (x)

- Amplitude of $E_x$

- Amplitude of $E_y$

- Amplitude of $E_z$
### Document Information

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