WYROWSKI

VirtualLab FUSION

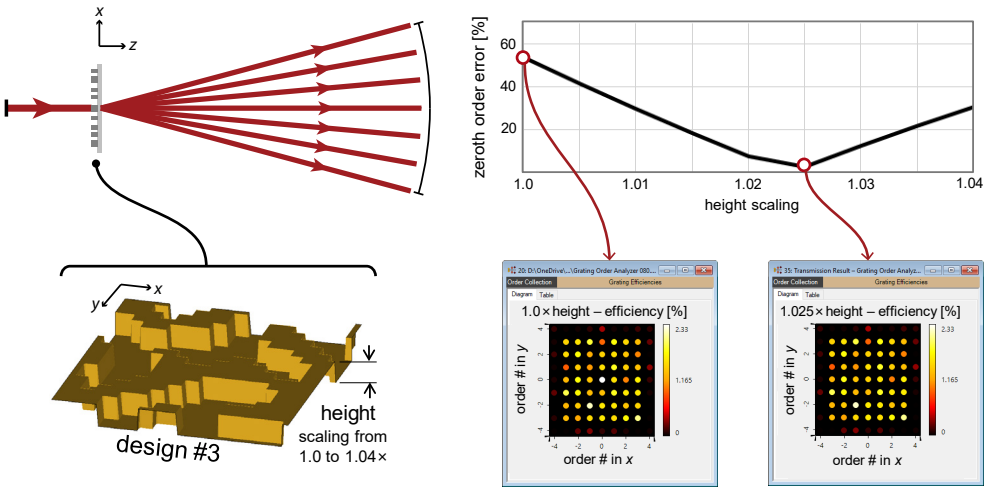
FAST PHYSICAL OPTICS SOFTWARE

# DOEs and Diffusers for Light Shaping

DOEs and diffusers are nowadays widely used in different optical applications. Such devices are often designed as single components under idealized illumination situations. But these conditions are not fulfilled in practice. The summer release 2019 of VirtualLab Fusion enables their inclusion in systems and therefore the evaluation of overall performance.

## Benefits in VirtualLab Fusion

- **In-built iterative Fourier transform algorithm (IFTA)** for initial calculation of the transmission function
- **Structure design** via thin element approximation (TEA)
- **Fourier modal method (FMM)** for rigorous evaluation of DOEs, especially for non-paraxial cases
- **Modeling of microstructured optical surfaces** within complete setups and consideration alongside all other components
- **Overall performance evaluation** of optical system with DOEs included as a whole





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## Iterative Fourier transform algorithm (IFTA)

- In-built IFTA generates a Fourier transform pair, which can be used to calculate the desired transmission function of the DOE.
- Use of IFTA in VirtualLab Fusion is accompanied by a convenient and stepwise software guide.
- Fabrication-related parameters can be specified during the design process. Tolerance analysis is included as well.

## Fourier modal method

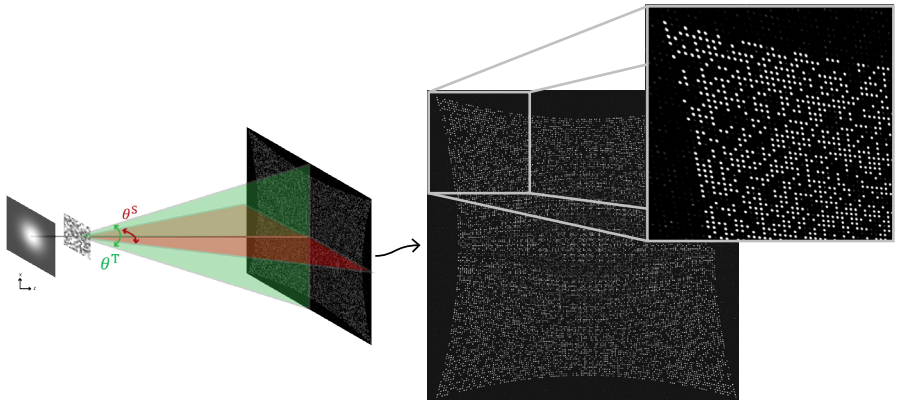
- VirtualLab Fusion has an in-built Fourier modal method (FMM/RCWA) for rigorous analysis of non-paraxial DOEs with relatively small feature sizes.
- Initial design of DOE structures can be evaluated rigorously before fabrication.
- Subsequent parametric optimization of the DOE structures is also possible with FMM as calculation kernel.

## Evaluation of complete optical setups including DOEs and diffusers

- DOEs and diffusers often need to be included in a system together with other components.
- The new microstructure component in the summer release enables the modeling of DOEs in general systems.
- Highlights include arbitrary input field, rotation/misalignment of DOEs, and so on.

## Advanced design algorithm for high-NA applications

- Algorithm can be configured according to a design target expressed in different magnitudes (e.g. irradiance, radiant intensity).
- Improved IFTA with additional filters and controllers can deliver a smoothed phase-only transmission.
- Subsequent parametric optimization can be realized with parametrized structure contour lines.

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