

Online Training

VirtualLab Fusion Applications, Technology and Workflows

Grating Modeling and Design

Date and Time (This Training will be held twice to adapt to different time zones worldwide):

01 – 04 February 2021 | 17:30 – 20:30 (CET)

08 – 11 February 2021 | 08:30 – 11:30 (CET)

Intended audience: Optical designers and engineers in the field of diffractive grating applications

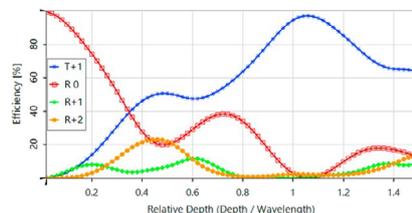
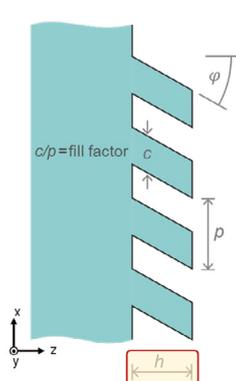
Technical environment: The online training will be implemented with the platform “WebEx”. Detailed technical instructions will be provided to participants in time before training.

Request an offer: [Via online form](#)

Gratings are the most widely applied diffractive optics elements in various optical systems. VirtualLab Fusion software provides the Fourier modal method (FMM a.k.a. RCWA) and the thin element approximation (TEA) for grating simulations. This interactive online training shows how to use the corresponding technologies from VirtualLab Fusion to solve practical grating modeling and design tasks for modern optics applications.

Learning Outcomes

- Learn how to construct the grating geometry and materials; understand the basic theory of the modeling technologies and their differences; use the software tools for grating analysis and design.
- Practice hands-on with selected rigorous modeling examples, including blazed grating, rectangular grating, slanted grating, holographic volume grating, and metagrating.
- Design workflow discussed along examples, like moth-eye anti-reflection grating, waveguide coupling grating, polarization-insensitive pulse compressor grating, and beam-splitting metagrating.



simulation by Fourier modal method (FMM), also known as RCWA, in VirtualLab Fusion

Grating Parameter	Value & Unit
relative depth	to be varied
slant angle φ	-30°
fill factor c/p	50%

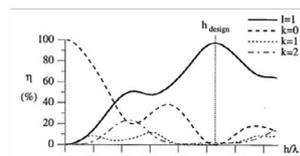


Figure from J. Michael Miller, *et al.*, Appl. Opt. 36, 5717-5727 (1997)

AGENDA

ONLINE TRAINING DAY I

- Grating construction and modeling
 - » Grating structure specifications: via surface or medium
 - » Thin element approximation (TEA)
 - » Fourier modal method (FMM, a.k.a. RCWA)
 - » Specific grating analysis tools
- Rigorous modeling examples
 - » Blazed grating for spectral separation
 - » Ultra-sparse dielectric nano-wire grid polarizers
 - » Parameter sweeping tool

ONLINE TRAINING DAY II

- Rigorous modeling examples
 - » Slanted grating simulation with varying parameters
 - » Volume holographic gratings and their sensitivity
 - » Diffraction property of a passive parity-time (PT) grating
 - » Analysis of CMOS sensors with microlens array
- Grating within optical system
 - » Angular-filter volume grating for higher diffraction order suppression
 - » Resonant waveguide grating and its angular/spectral property
 - » Using gratings as test objects in imaging system (Abbe's principle)

ONLINE TRAINING DAY III

- Grating design/optimization
 - » Optimization of slanted grating for waveguide coupling
 - » Parametric optimization tool
- Grating design/optimization
 - » Design of polarization-independent high-efficiency gratings
 - » Design of anti-reflection moth-eye structures

ONLINE TRAINING DAY IV

- Metagratings
 - » Rigorous analysis of nanopillars as metasurface building blocks
 - » Design of a blazed metagrating
- Metagratings
 - » Beam-splitting metagrating design
 - » IFTA for phase profile generation
- General Q&A

The course is based on the latest release of VirtualLab Fusion available at the course time. Depending on the group's dynamic, the order of the listed topics might vary.

