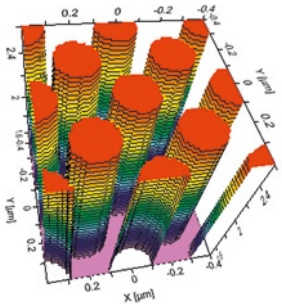
VirtualLab™4

Grating Toolbox

Electromagnetic analysis of microstructures

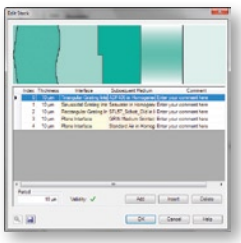


Surface profile of a 3D sub-wavelength grating used as antireflection structure.

The VirtualLab™ Grating Toolbox allows the rigorous electromagnetic analysis of 2D gratings, 3D gratings, and photonic crystals with features from nanometer to millimeter scale. Diffraction efficiency, near field, polarization, reflectance, transmittance, absorption and the field inside gratings can be calculated. Various customization features allow the analysis and optimization of gratings with user defined structures. These include the import of measured height profiles, as well as programmable height profiles and media which allow to enter a formula describing a height profile or a refractive index distribution.

In addition grating structures can be constructed by building stacks of predefined surfaces and media. The powerful parameter run of VirtualLab™ enables the investigation of tolerances and the optimization of gratings.

Your Benefit



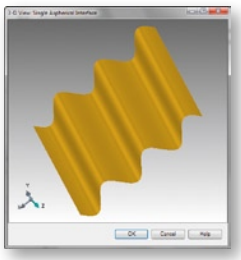
Customized 2D grating defined as a stack of predefined surfaces and index modulations.

- Electromagnetic and approximated analysis of surface and volume gratings as for example diffractive beam splitters, polarizers, anti reflection structures, diffractive optical elements, photovoltaic systems, holographic gratings, and spectroscopic gratings.
- 2D and 3D gratings with feature sizes from nanometer to millimeter scale.
- Calculation of diffraction orders, efficiency, near field, polarization, reflectance, transmittance, absorption and field inside grating.
- Investigation of tolerances and optimization by parameter run.

LightTrans

Grating Toolbox

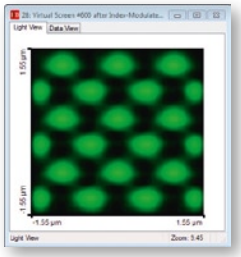
Selected Features



Surface profile of 2D sinusoidal grating.

Analysis of 2D gratings

The Grating Toolbox can perform a rigorous or approximated analysis of 2D gratings. Predefined gratings as for example sinusoidal, triangular, sawtooth, holographic gratings as well as customized grating structures can be modeled. Customization includes for example the import of measured height profiles, as well as programmable height profiles and media which allow to enter a formula describing a height profile or a refractive index distribution. Typical applications are the analysis of polarizers, spectroscopic gratings, diffractive beam splitters, 2D photonic crystals, gratings of fiber and wave guide coupling.



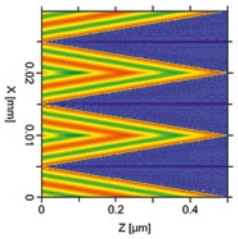
Transmitted field of a 3D pillar type grating with a period of two wavelengths.

Analysis of 3D gratings

3D gratings are modulated along the x-, y-, and z-direction and are periodic in x- and y-direction. These gratings are often used as antireflection sub-wavelength structures replacing coatings. The Grating Toolbox enables the analysis and optimization of 3D pillar type surface gratings.

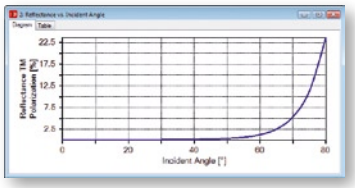
Evaluation of field distributions

Depending on grating applications various evaluations of simulation results are required. This includes for example the calculation of diffraction orders, efficiencies, near field, polarization, reflectance, transmittance, absorption and field inside grating.



Tolerance analysis and grating optimization by parameter run

The powerful parameter run of VirtualLab™ enables the variation of a single parameter, the multidimensional scanning parameter variation and a random (Monte-Carlo) parameter variation. This allows the analysis of tolerances and the optimization of predefined and customized grating structures.



Reflectance of 3D sub-wavelength pillar type medium.

EFRE
EUROPA FÜR THÜRINGEN
EUROPÄISCHER FONDS FÜR REGIONALE ENTWICKLUNG

This product sheet is financed in part by the European Union (EFRE) and the Free State of Thuringia (TMWTA).

More information concerning this toolbox including a list of all available features is shown on our website **www. lighttrans.com**

LightTrans GmbH, Wildenbruchstraße 15, D-07745 Jena, Germany
Phone +49. 36 41. 66 43 53, Fax +49. 36 41. 66 43 54, service@lighttrans.com