Feature.0010

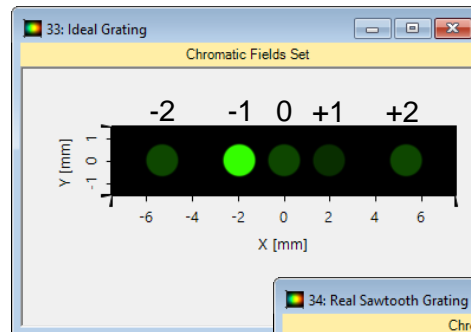# Specification of Diffraction Efficiencies for Grating Regions

Diffraction efficiencies for a grating region can be either specified ideally with given values or calculated from real grating structures.

About This Use Case

- The following toolbox is required
  - Waveguide toolbox
- This use case was produced with VirtualLab Fusion (Build 7.0.0.35).

This Use Case Shows...

- how to specify the diffraction efficiencies for a grating region by either defining their values manually or calculating them from real grating structures.
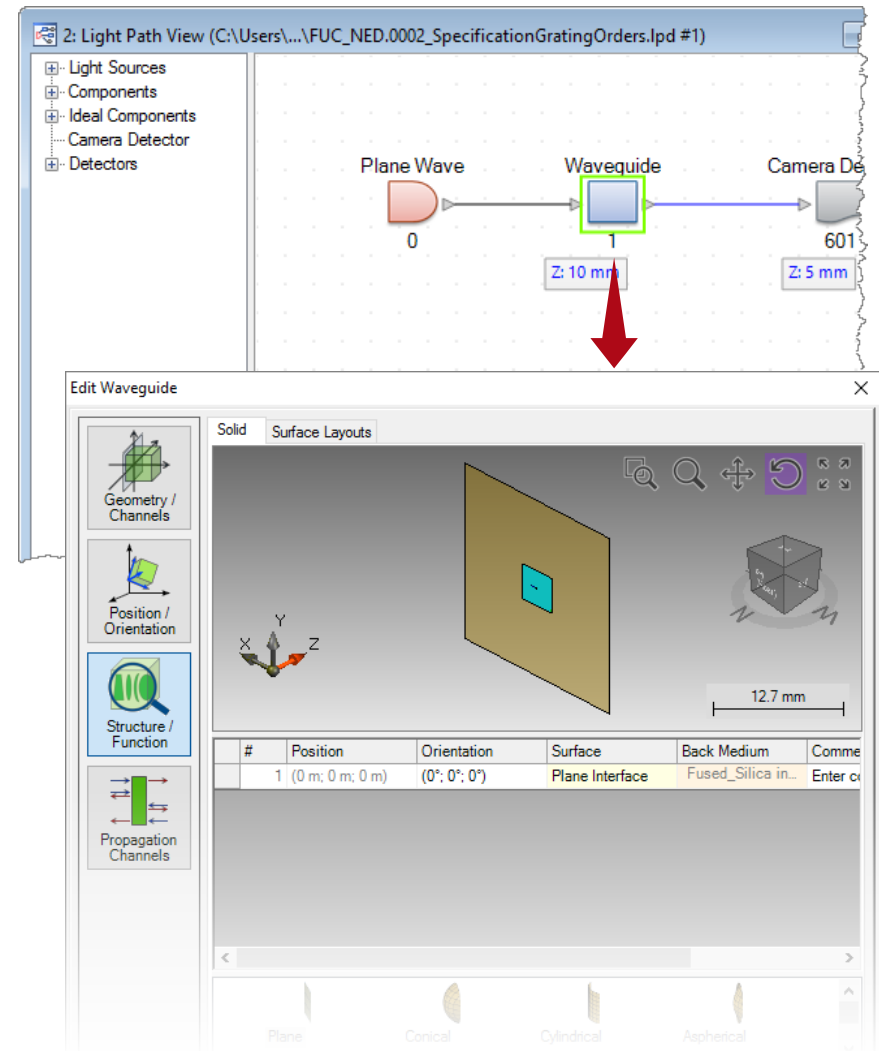

Ideal grating with manually defined diffraction efficiencies
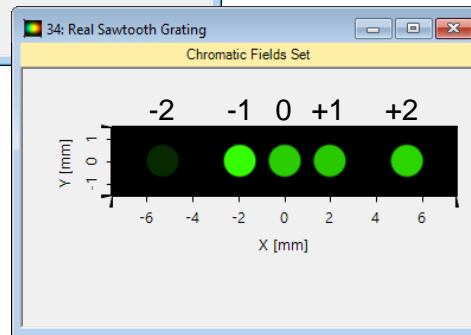
Real sawtooth grating with rigorously calculated diffraction efficiencies by FMM

System Construction

- Initialization
  - Pre-define a grating region on a single plane interface.
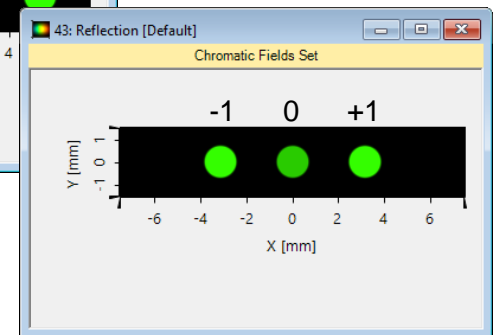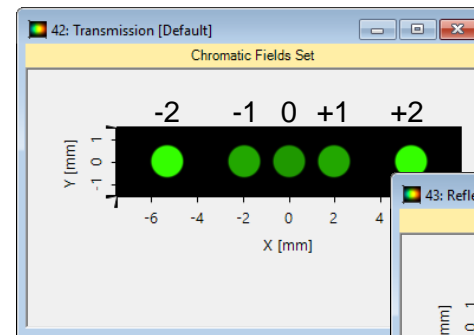
Diffraction Efficiency Settings

- Grating definition
  - Define an ideal linear grating with period of 1 µm.
  - By default, the overall transmission-reflection efficiency is preset at 80-20%, and they are uniformly distributed over all propagating orders.
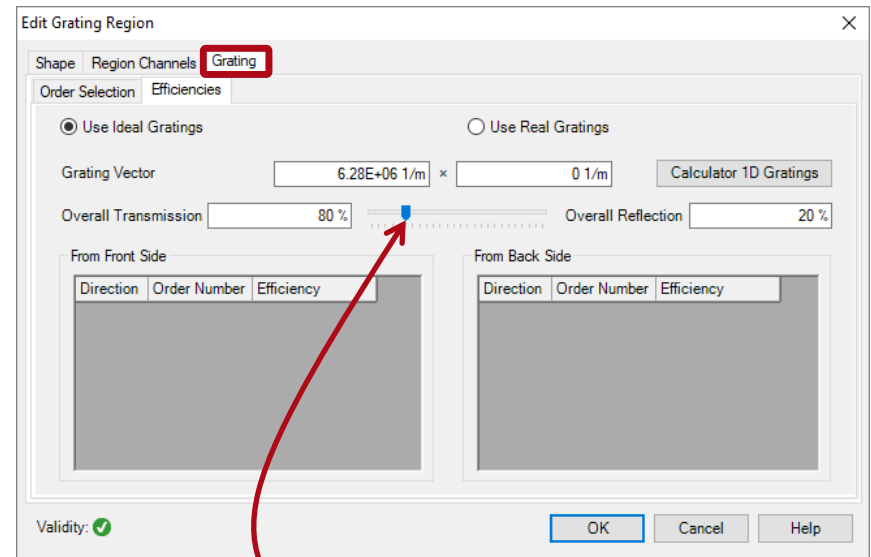
Drag the slide bar to adjust the overall transmission-reflection efficiency, or type in the values.
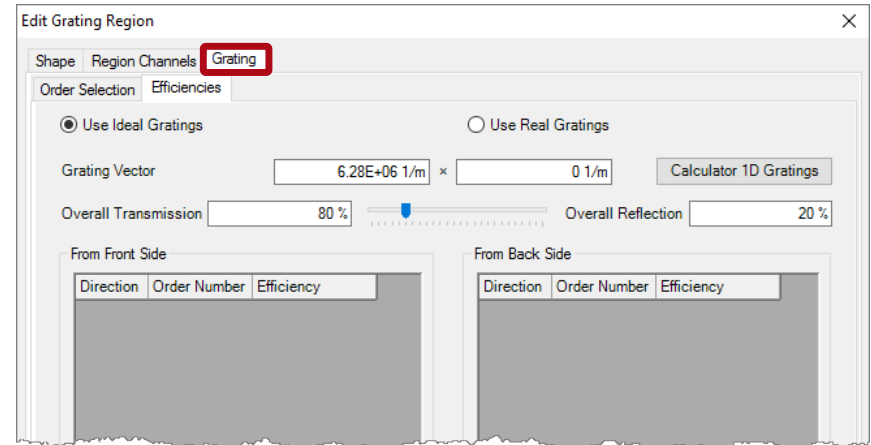
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Field Tracing Simulation

- Grating definition
  - Define an ideal linear grating with period of 1 µm.
  - By default, the overall transmission-reflection efficiency is preset at 80-20%, and they are uniformly distributed over all propagating orders.
 - Run field tracing simulation.

Diffraction Efficiency Settings

- Grating definition
  - To define certain orders with given efficiencies, one must specify these orders first under the *Order Selection* tab.
  - Then define the efficiency for the specified diffraction orders, e.g., T-1=75% and R+1=19%, under the *Efficiencies* tab.
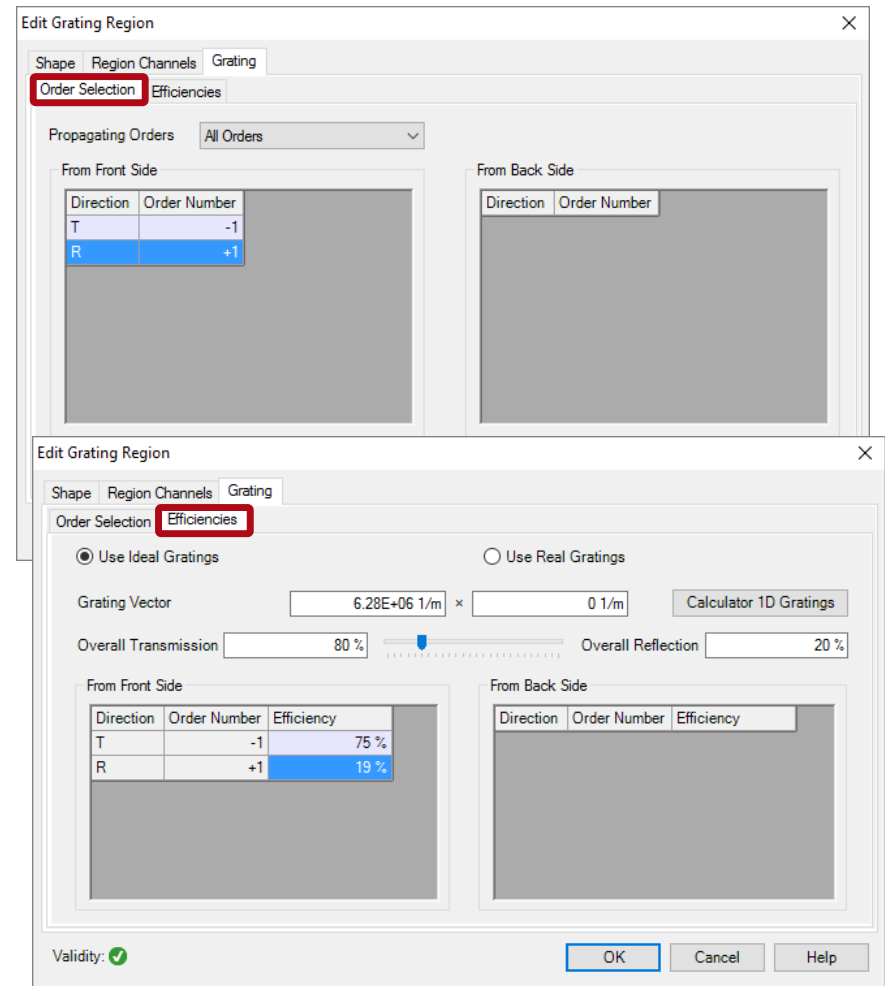
Field Tracing Simulation

- Grating definition
  - To define certain orders with given efficiencies, one must specify these orders first under the *Order Selection* tab.
  - Then define the efficiency for the specified diffraction orders, e.g., T-1=75% and R+1=19%, under the *Efficiencies* tab.
 - Run field tracing simulation.
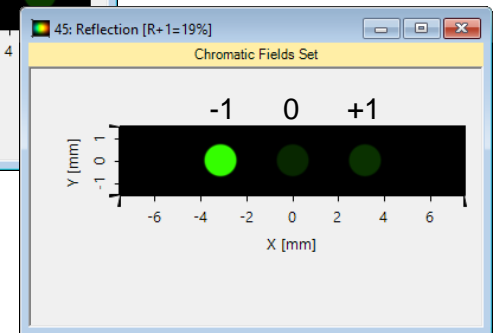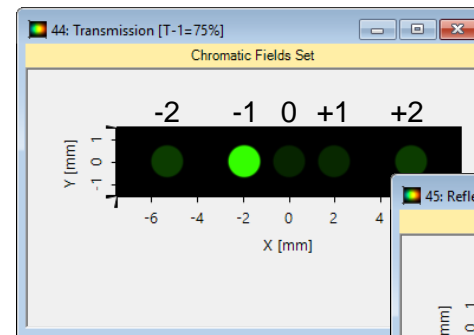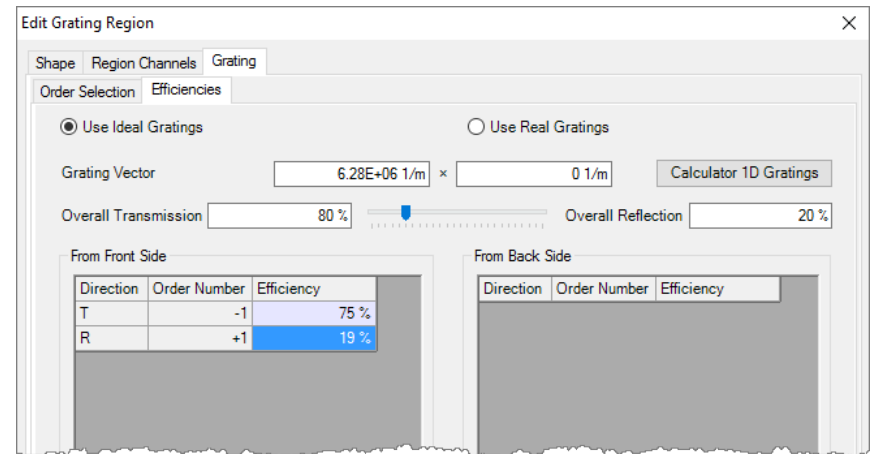
Grating Configuration

- Grating definition
  - Next we *Use Real Gratings* instead of ideal ones.
  - VirtualLab can calculate automatically the real grating period according to the ideal grating vector.
  - To keep the grating period as defined ideally, we choose Yes in the pop-up window.
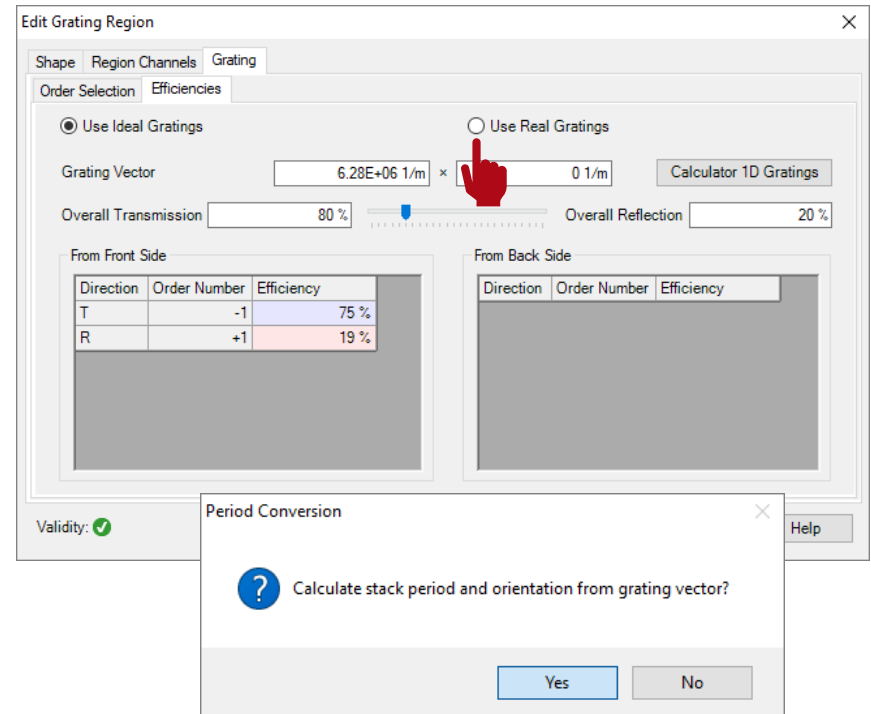
Grating Configuration

- Grating definition
 - Set up the default *Sawtooth Grating* with 1 µm modulation depth (check Grating Toolbox for more info).
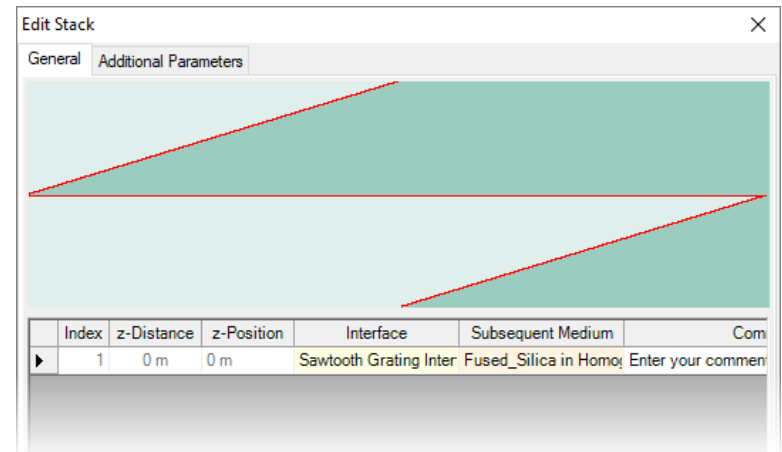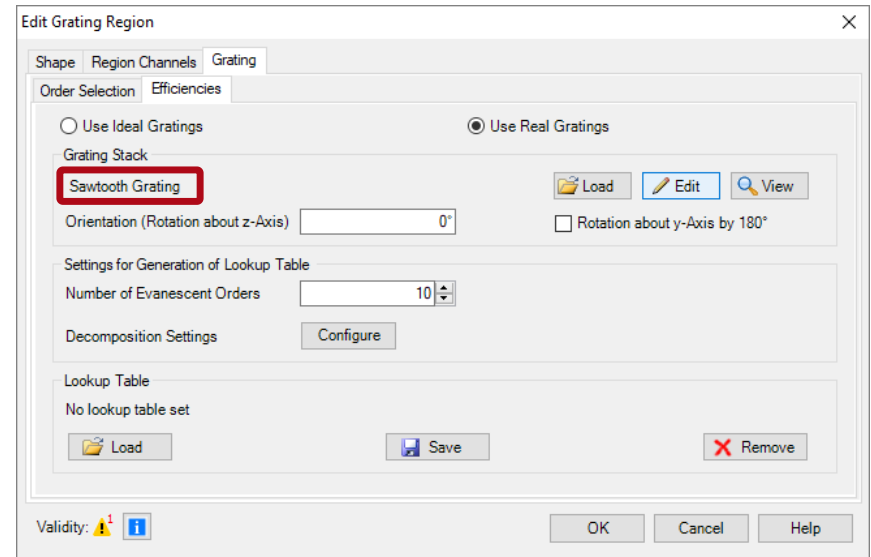
Grating Configuration

- Grating definition
  - Set up the default Sawtooth Grating with 1 µm modulation depth (check Grating Toolbox for more info).
  - Following the same way, we also set up a *Sinusoidal Grating* with the same period and modulation depth, for comparison.
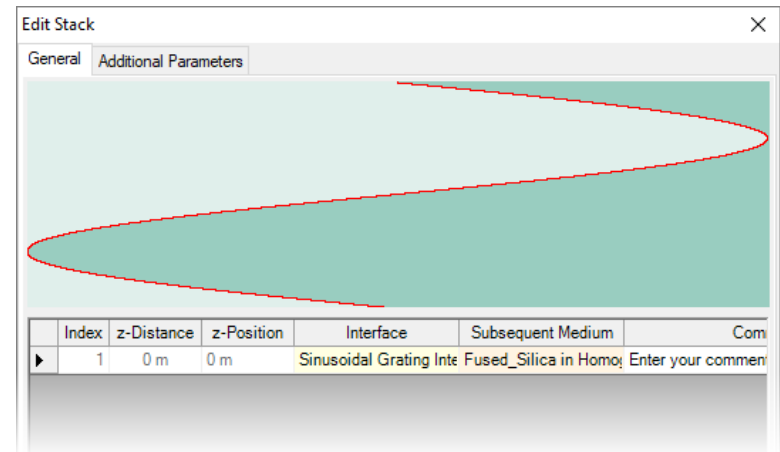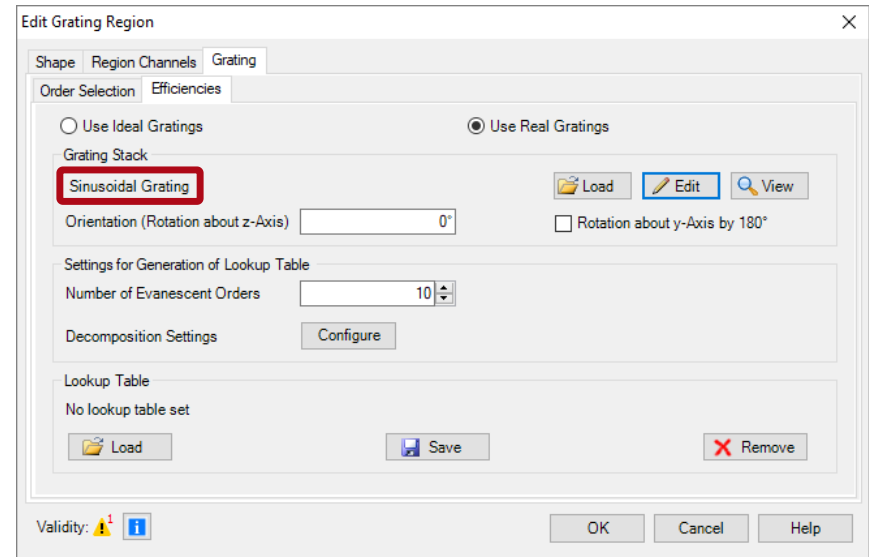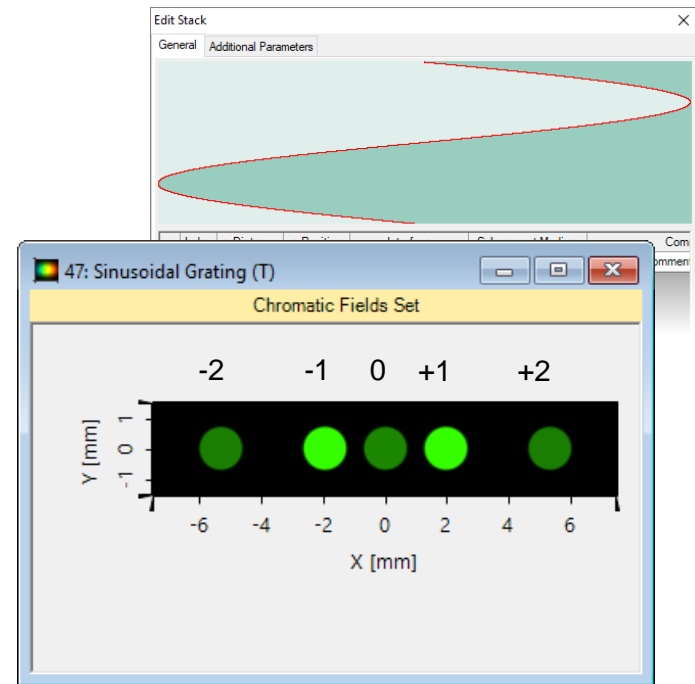
Field Tracing Simulation

- Grating simulation
  - Run field tracing simulation for both the sawtooth and the sinusoidal gratings.
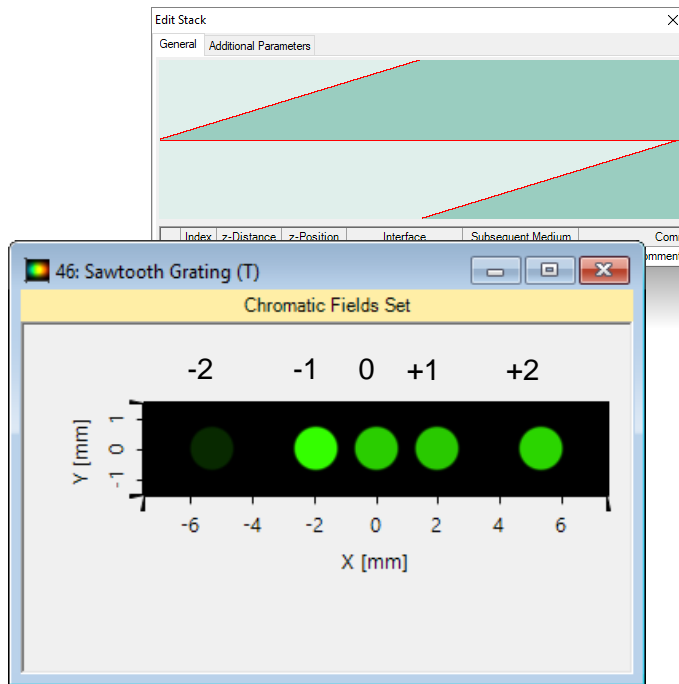
Sawtooth grating shows asymmetry in diffraction efficiencies

Sinusoidal grating provides symmetric efficiencies around zeroth order

Document & Technical Info

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