WYROWSKI PHOTONICS

Feature.0011

Channel Setting for Non-sequential Tracing

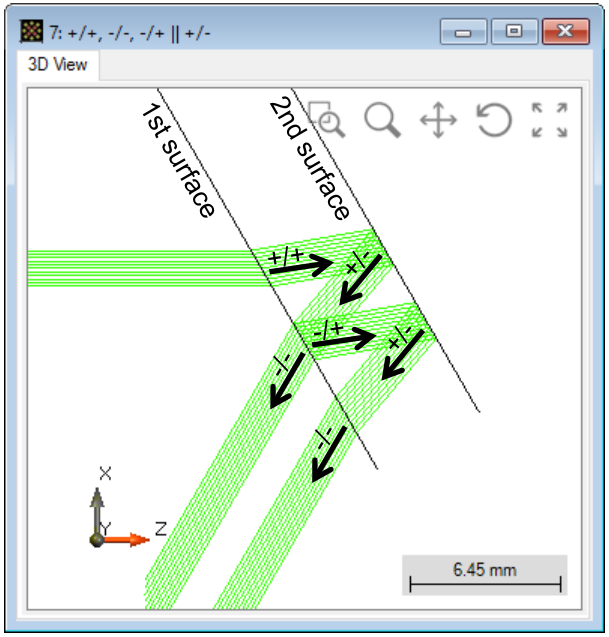
Explanation to the concept of channels, definition of channels on different levels, and how the channels settings influence the non-sequential tracing in VirtualLab

About This Use Case

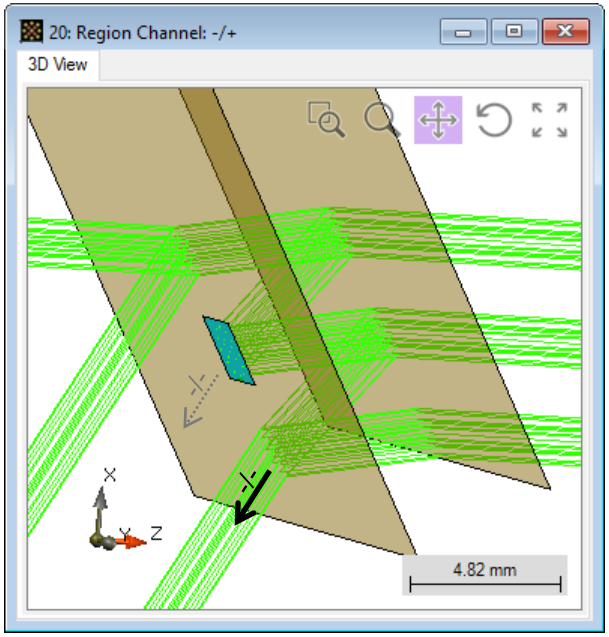
- The following toolbox is required
  - Waveguide toolbox
- This use case is produced with VirtualLab Fusion (Build 7.0.0.35).

This Use Case Shows ...

- how to adjust the channels on surface and region levels, and the consequences from these settings.



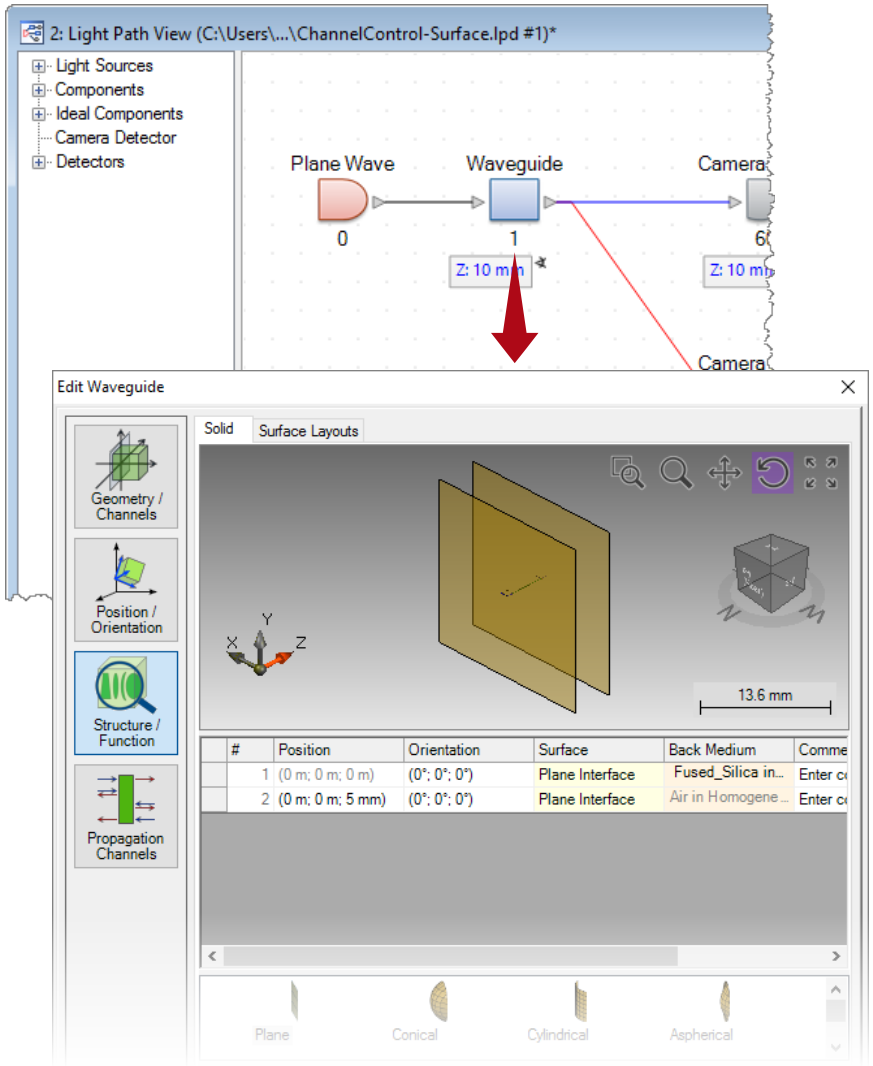
Different channels of surfaces



Additional channel control from region(s) on surface(s)

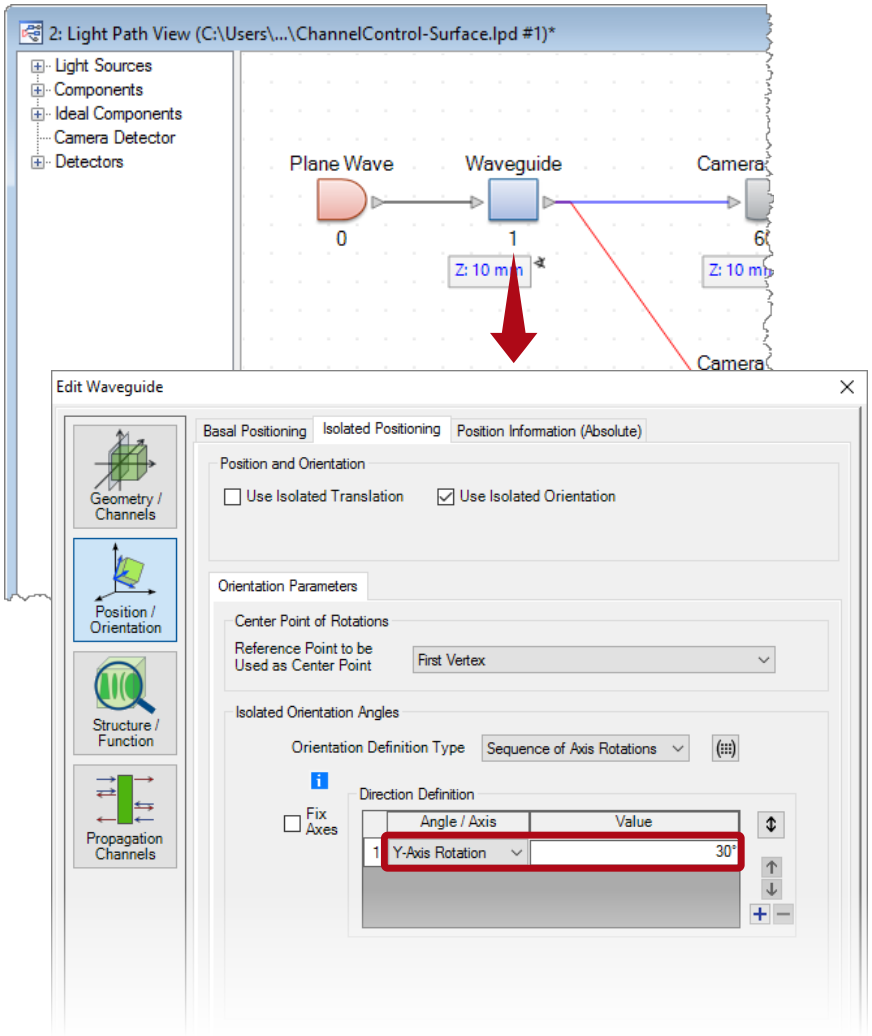
Surface Channels

- Initialization
  - Create a planar waveguide made of fused silica, with a thickness of 5mm, by using two plane interfaces without regions on them.



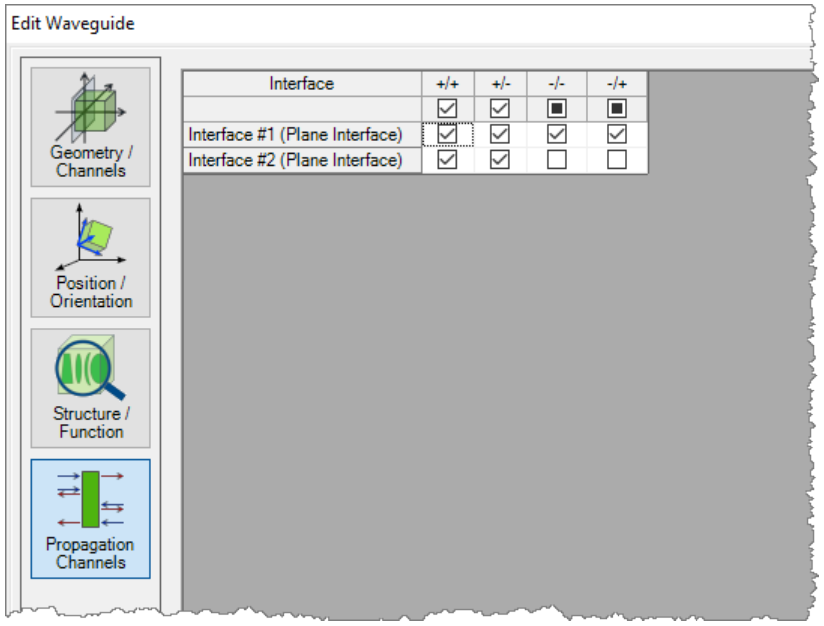
Surface Channels

- Initialization
  - Create a planar waveguide made of fused silica, with a thickness of 5mm, by using two plane interfaces without regions on them.
  - For better illustration, define an isolated *Y-Axis Rotation* of 30° for the waveguide.



Surface Channels

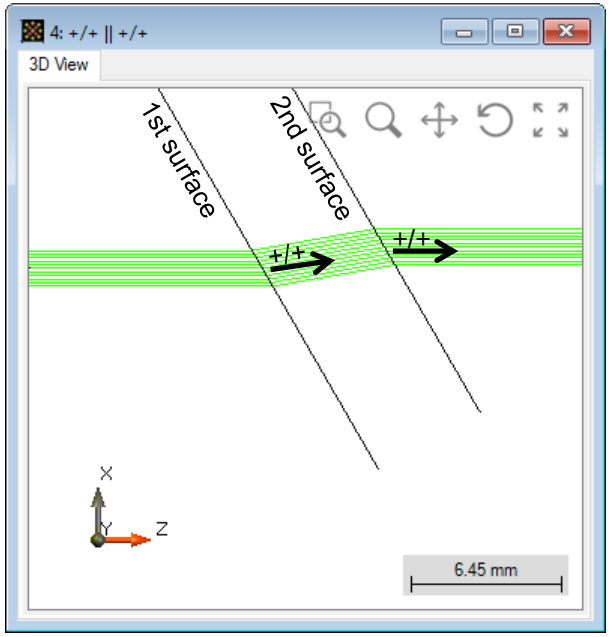
- Channel definition
  - There are four possible channels for each surface, at least one should be activated for the tracing.
  - Channels can be defined for each surface individually.
  - Different settings on channels leads to different tracing logic in VirtualLab.



Channel	Description
+/+	transmission (forward)
+/-	reflection (forward)
-/+	reflection (backward)
-/-	transmission (backward)

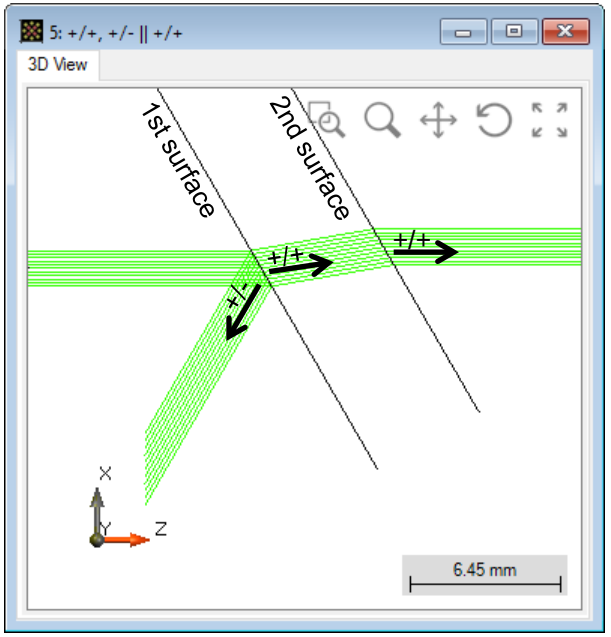
Surface Channels

- Setting A



Surface	+/+	+/-	-/-	-/+
1st	×			
2nd	×			

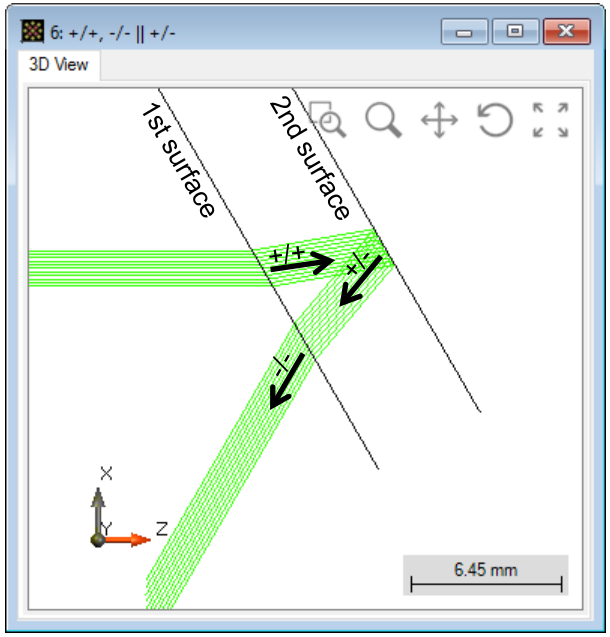
- Setting B



Surface	+/+	+/-	-/-	-/+
1st	×	×		
2nd	×			

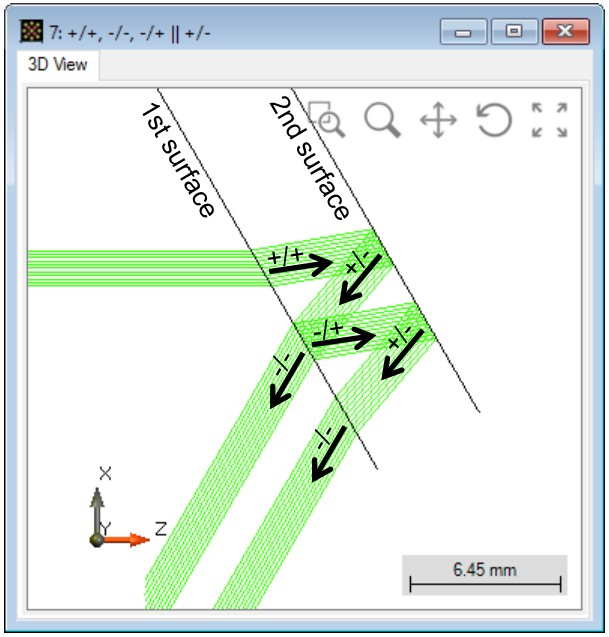
Surface Channels

- Setting C



Surface	+/+	+/-	-/-	-/+
1st	×		×	
2nd		×		

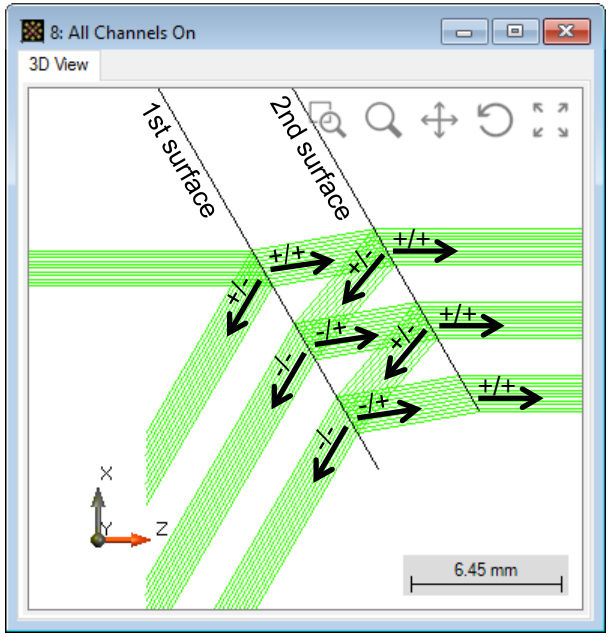
- Setting D



Surface	+/+	+/-	-/-	-/+
1st	×		×	×
2nd		×		

Surface Channels

- Setting E

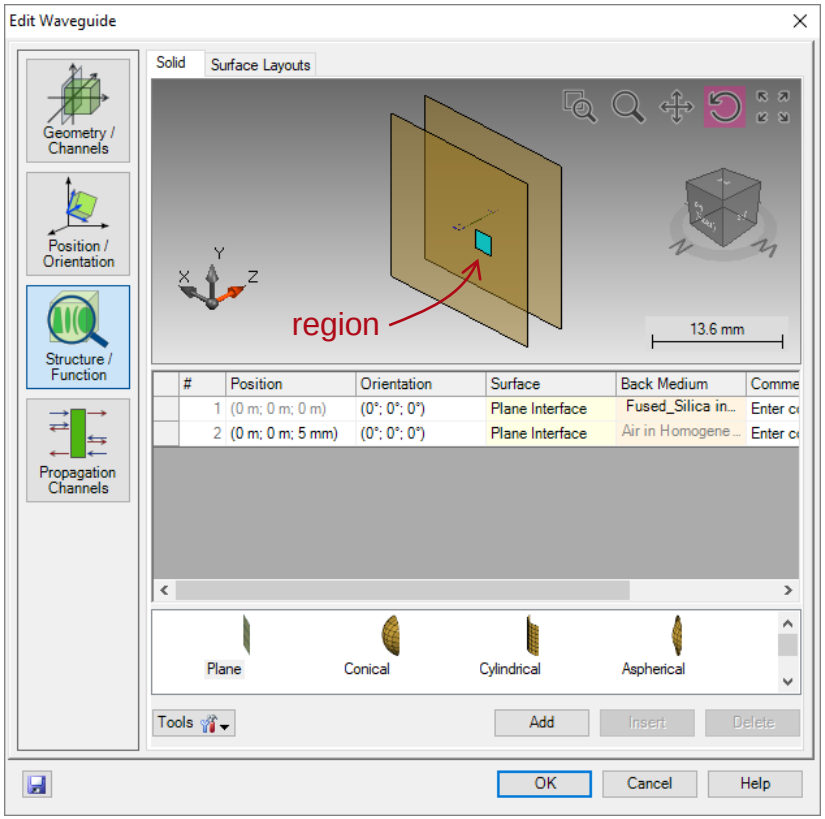


Surface	+/+	+/-	-/-	-/+
1st	×	×	×	×
2nd	×	×	×	×

Note: an activated channel does not necessarily leads to corresponding light path(s). E.g., the -/- and -/+ channel of 2nd interface do not influence the tracing, because there is no backward incidence.

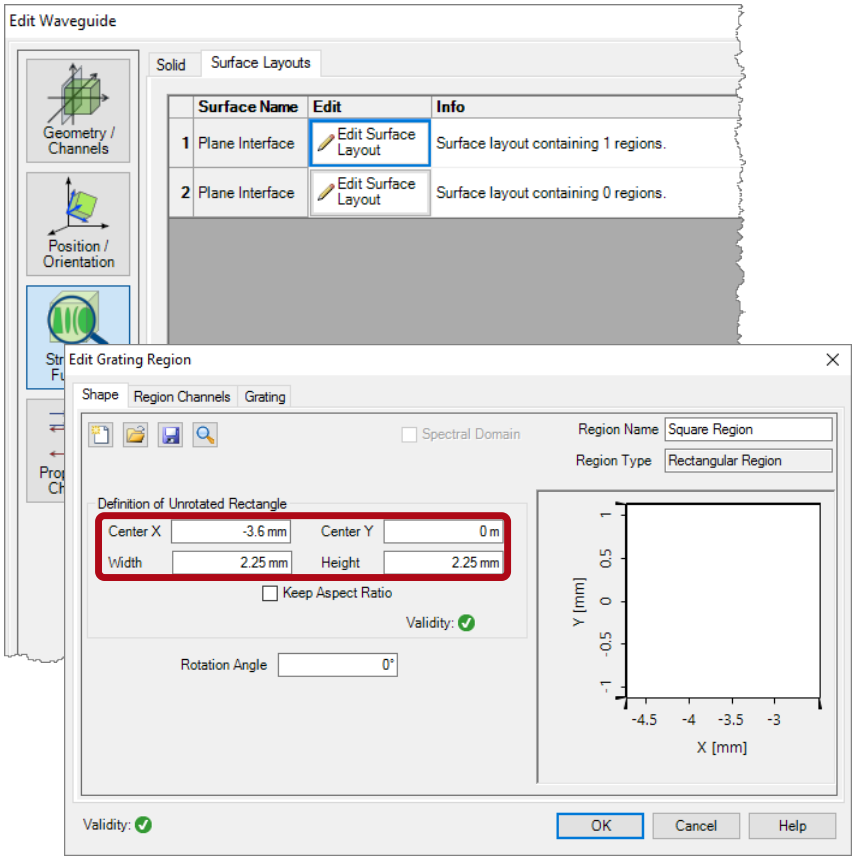
Region Channels

- Region(s) on surface
  - It is possible to define individual *Regions* on a surface and define their optical properties individually, including the channel settings.



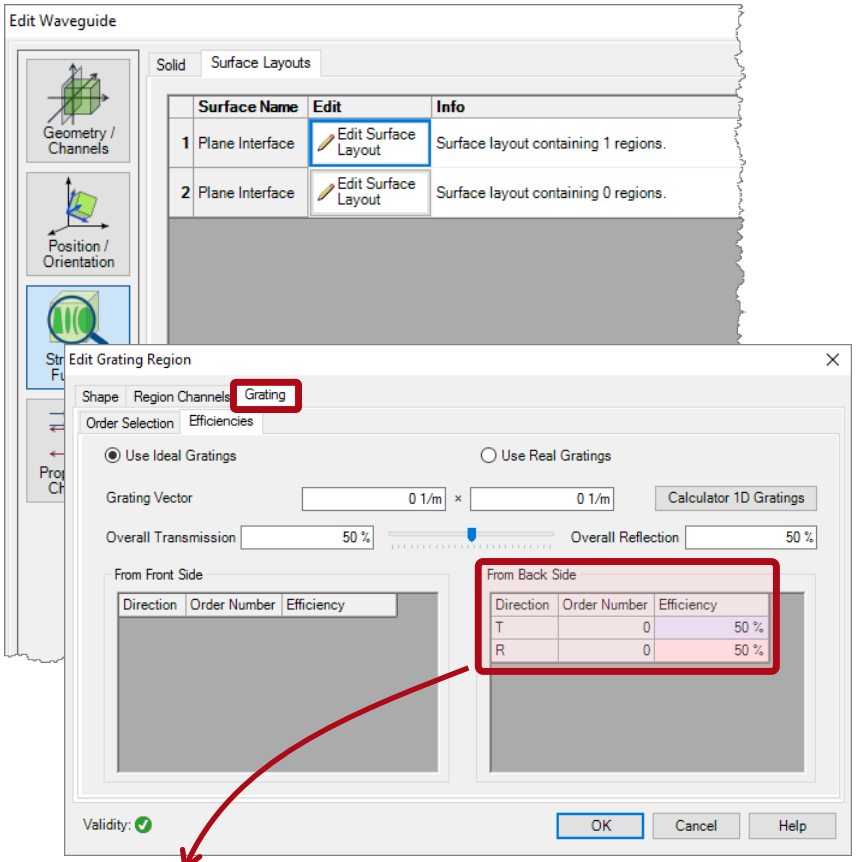
Region Channels

- Region definition
  - Create a rectangular region on 1st surface.
  - Set the region size as 2.25 x 2.25 mm, and its center at -3.6 mm along x-direction.



Region Channels

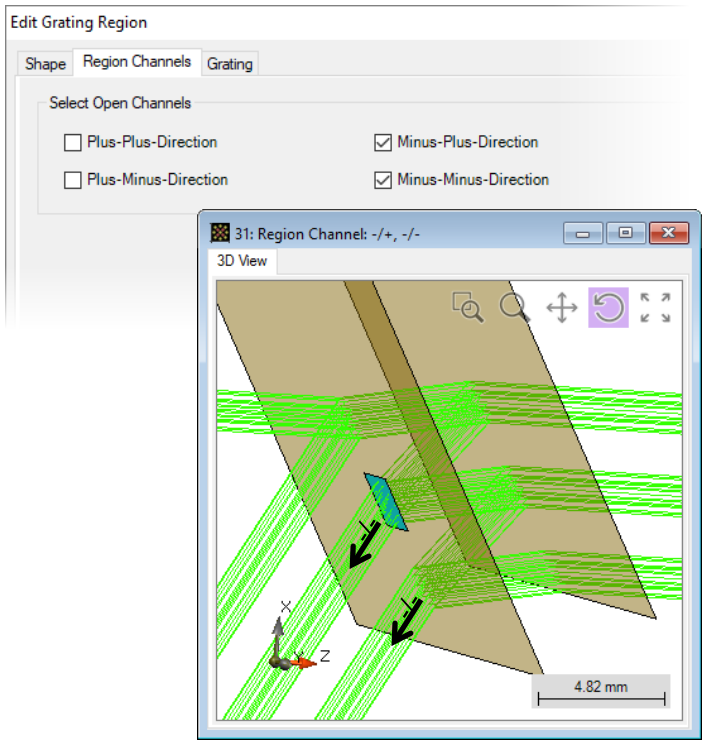
- Region definition
  - Create a rectangular region on 1st surface.
  - Set the region size as 2.25 x 2.25 mm, and its center at -3.6 mm along x-direction.
  - Define this region as grating with single transmission order T0 = 50%, and single reflection order R0 = 50%, which makes a semi-reflective mirror.



Efficiencies are given with respect to incidence from back side; in this example, T and R corresponds to -/- and -/+ channels respectively.

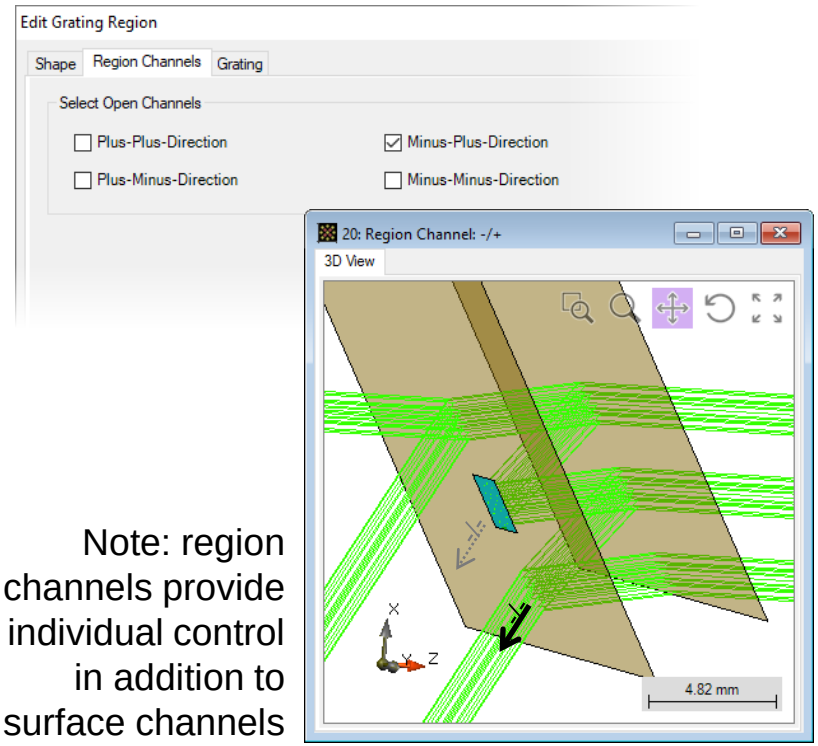
Region Channels

- Region definition
  - Set up the channels for this region, following the same rule as for the surfaces.



region channels -/+, -/- on

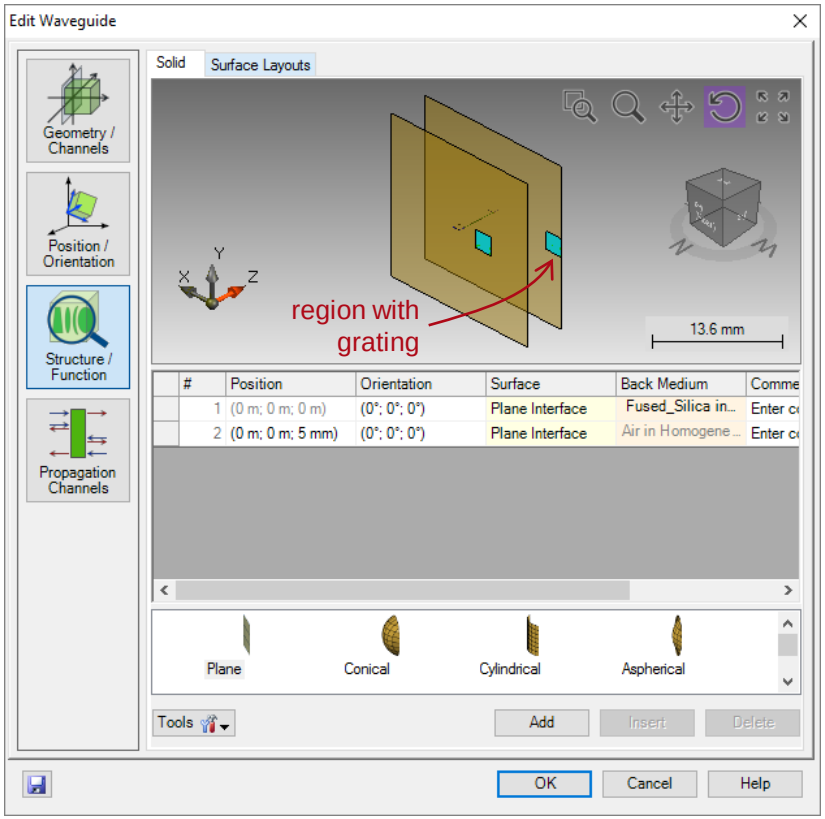
Note: region channels provide individual control in addition to surface channels



region channel -/+ on only

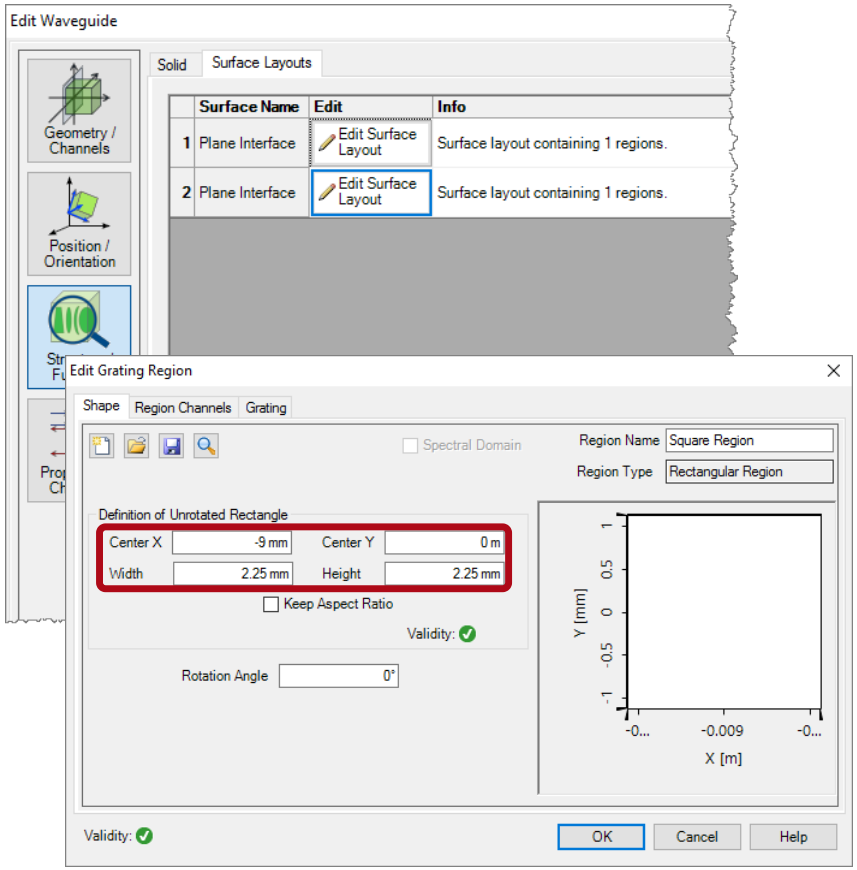
Region Channels with Grating

- Region definition
  - It is possible to define a diffractive grating on a given region.



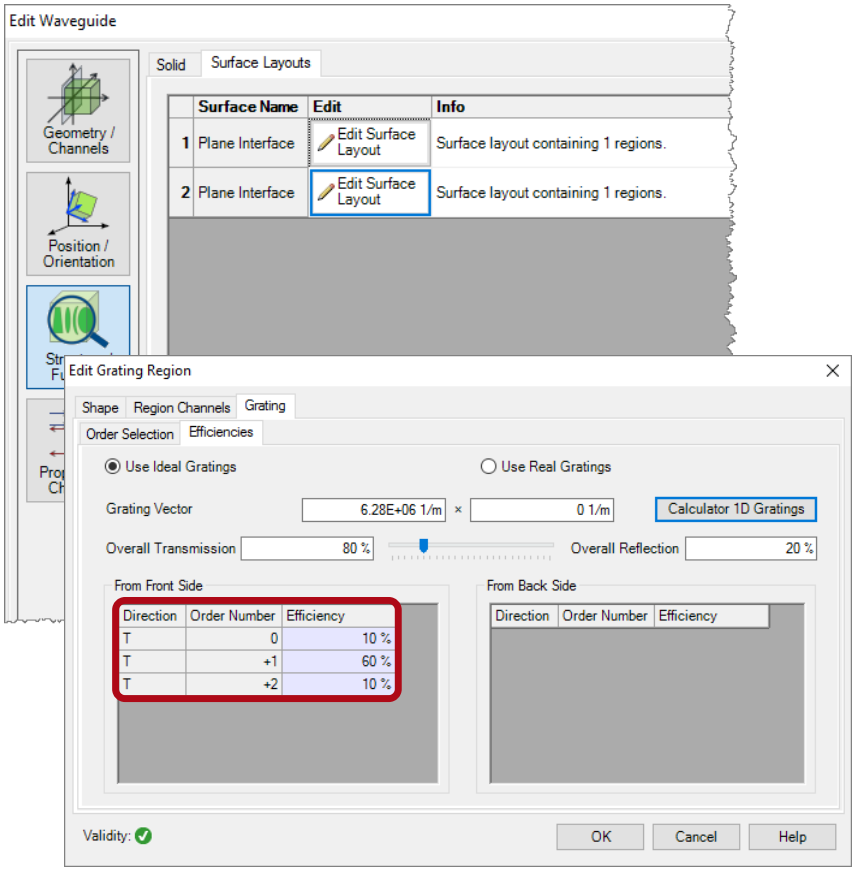
Region Channels with Grating

- Region definition
  - It is possible to define a diffractive grating on a given region.
  - We add a rectangular region on 2nd surface, centered at -9 mm along x-direction.



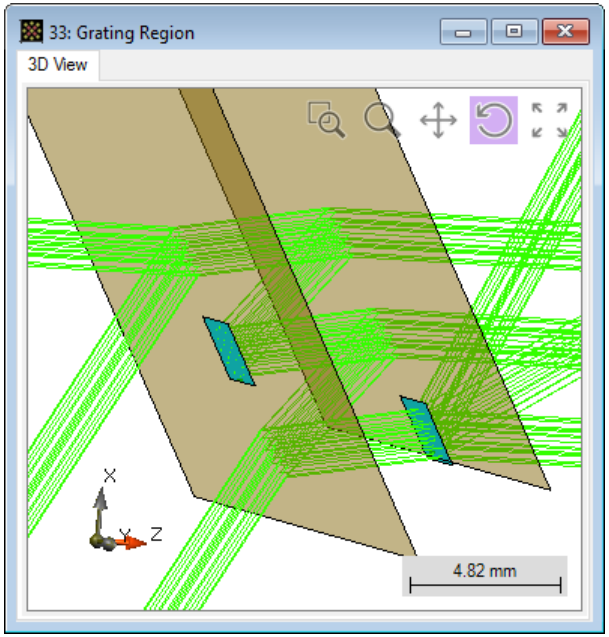
Region Channels with Grating

- Region definition
  - It is possible to define a diffractive grating on a given region.
  - We add a rectangular region on 2nd surface, centered at -9 mm along x-direction.
  - Define an ideal grating with 1 µm period, and specified diffraction coefficients as T0 = 10%, T+1 = 60%, T+2 = 10%.



Region Channels with Grating

- Region definition
  - It is possible to define a diffractive grating on a given region.
  - We add a rectangular region on 2nd surface, centered at -9 mm along x-direction.
  - Define an ideal grating with 1 µm period, and specified diffraction coefficients as T0 = 10%, T+1 = 60%, T+2 = 10%.



Region on surface 1: -/+ channel on
Region on surface 2: +/+ channel on
[with T0, T+1, T+2 diffraction orders]

Document & Technical Info

code	Feature.0011
version of document	1.0
title	Channel Setting for Non-sequential Tracing
category	Configuration
author	Site Zhang (LightTrans)
used VL version	7.0.0.35
Last modified on	August 25, 2017