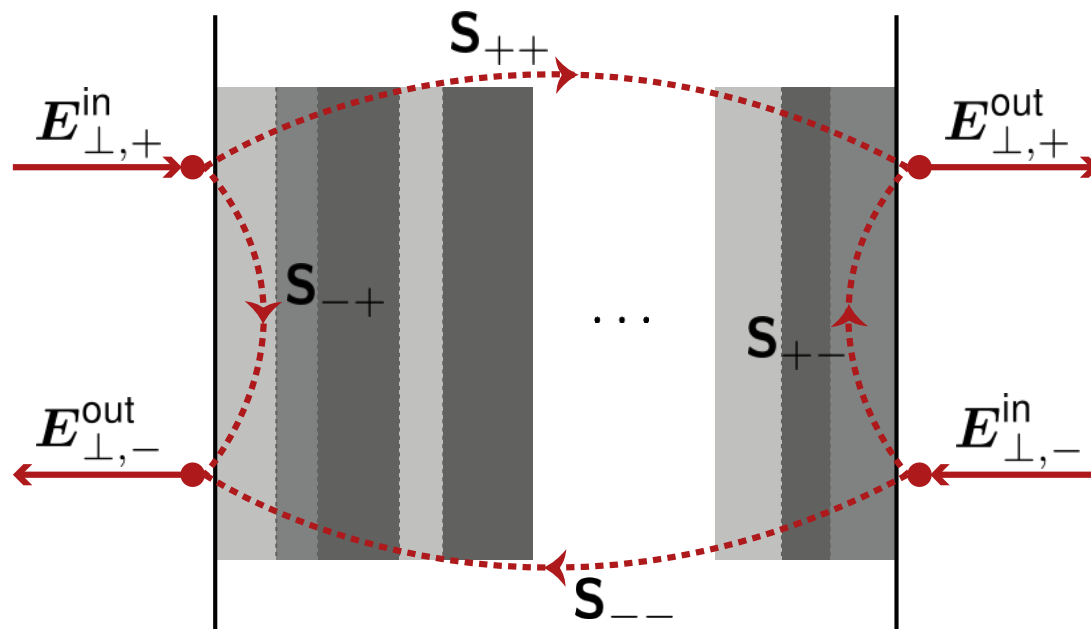


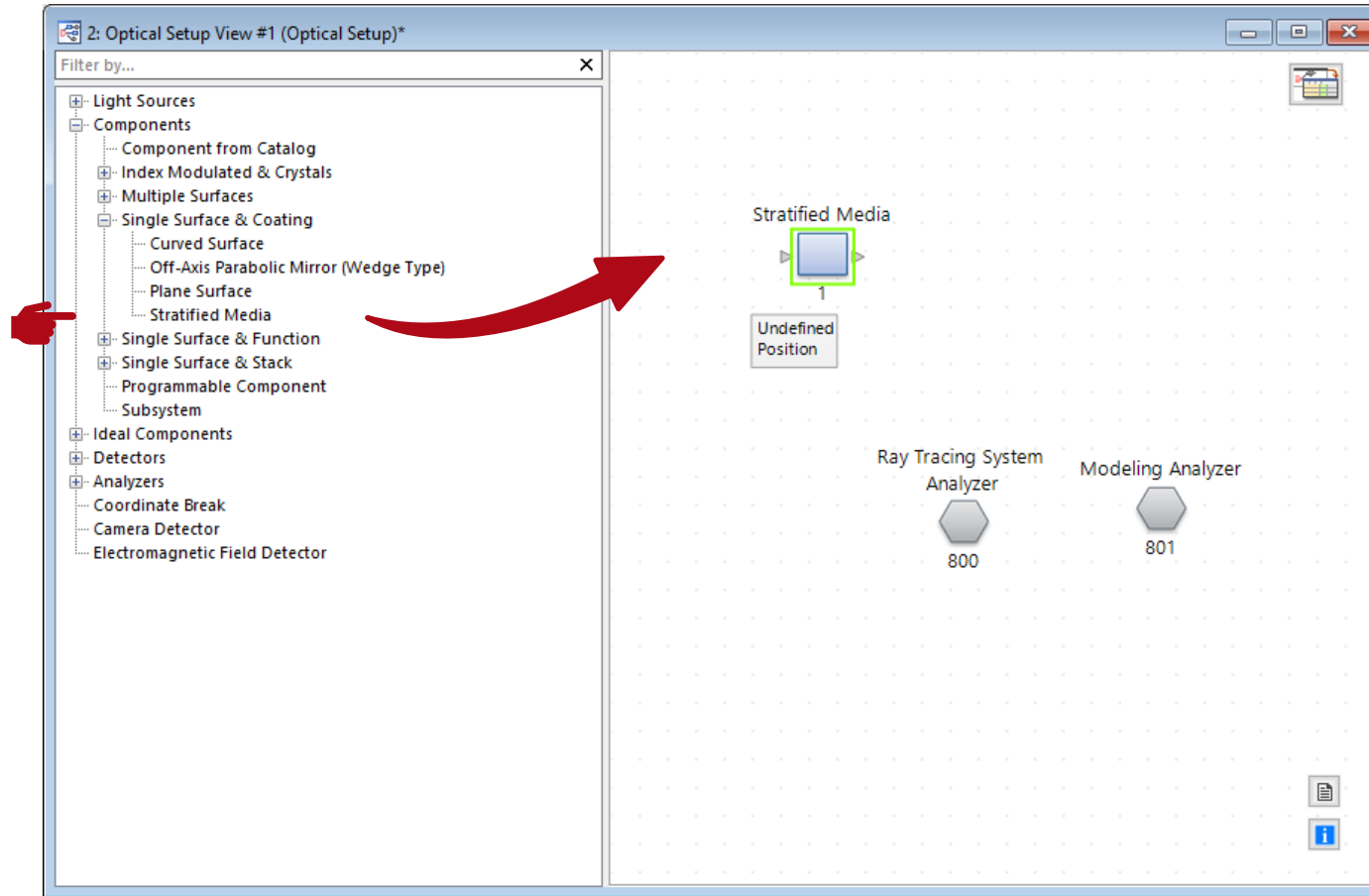
Stratified Media Component

Abstract



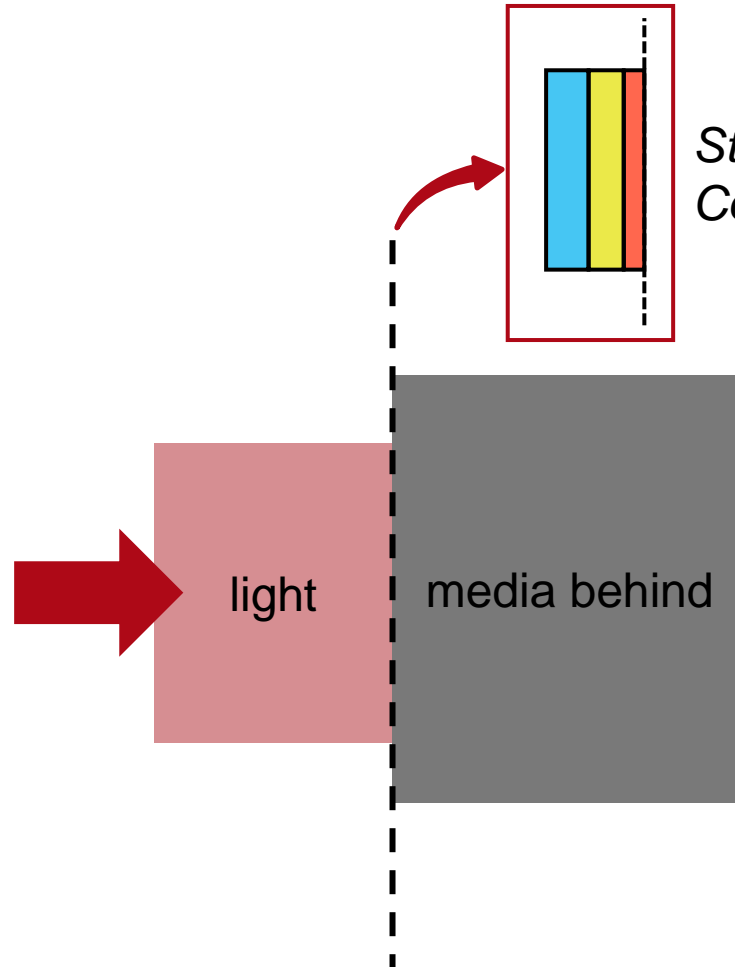
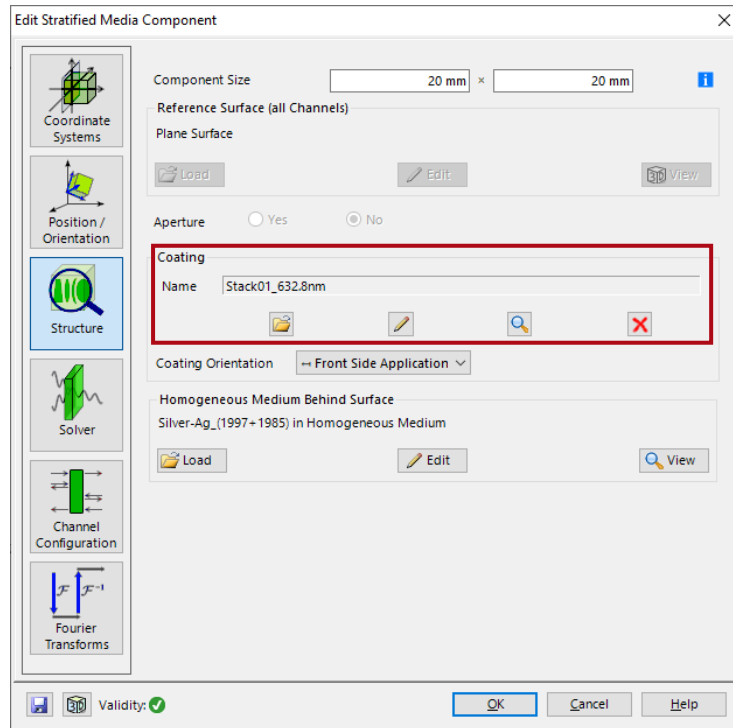
The Stratified Media component is intended for the rigorous and fast analysis of a sequence of plane layers of homogeneous (isotropic or anisotropic) media. Such configurations are of particular interest in e.g. coating applications. In this use case we show how such structures can be defined in VirtualLab Fusion and provide an in-depth look into its features.

Where to Find the Component?



The *Stratified Media* component can be found under *Components* > *Single Surface & Coating*.

Configuration of the Structure

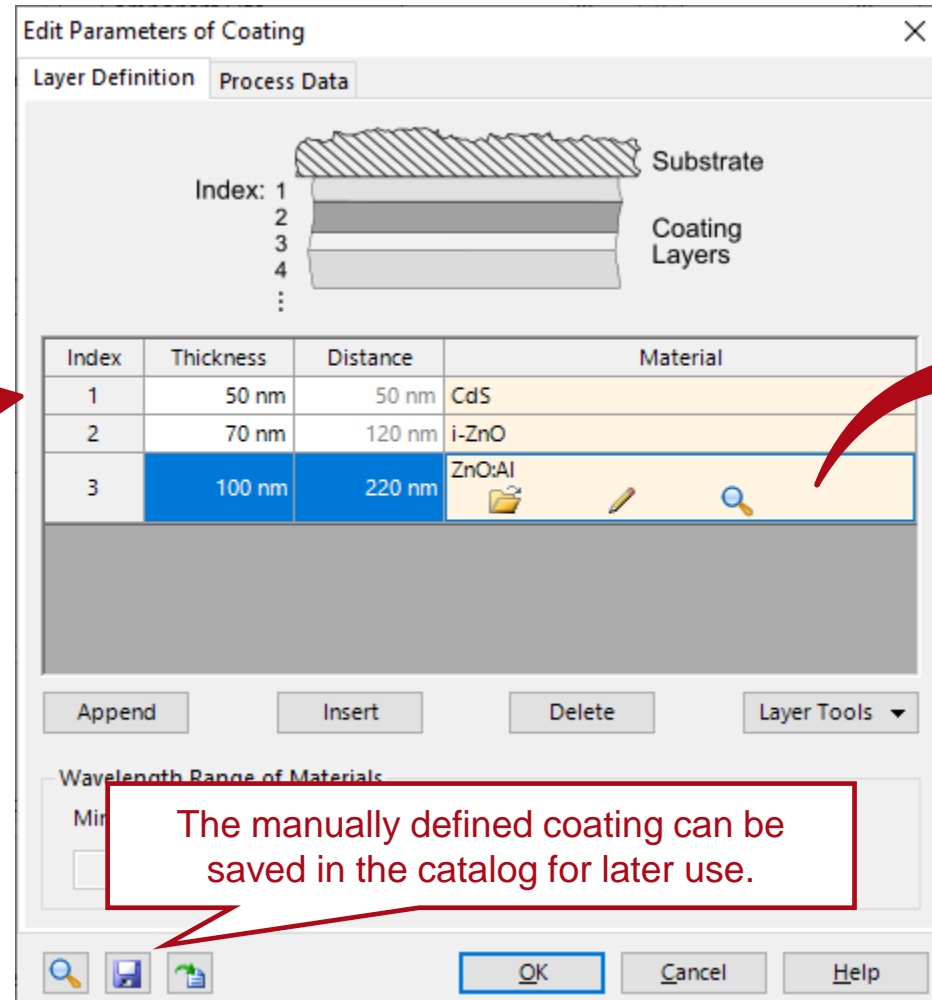
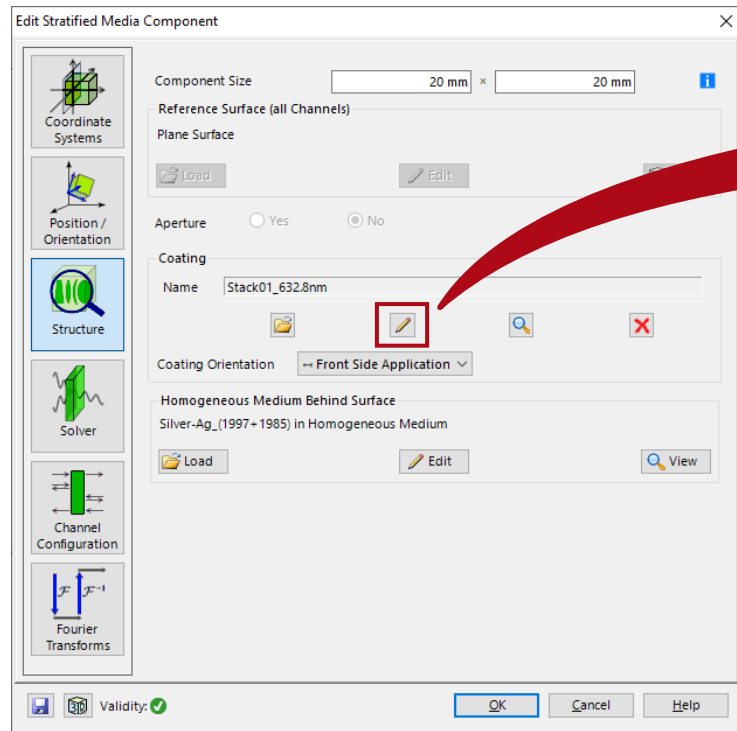


Stratified Media Component

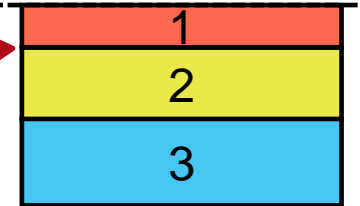
The *Stratified Media Component* in VirtualLab Fusion is defined as an ideal plane surface separating two homogeneous isotropic media, on which an x, y-invariant layered structure can be applied in the form of a coating stack

Configuration of the Structure

The user can configure their own stratified medium as a coating. Here a manually defined 3-layer coating is presented.



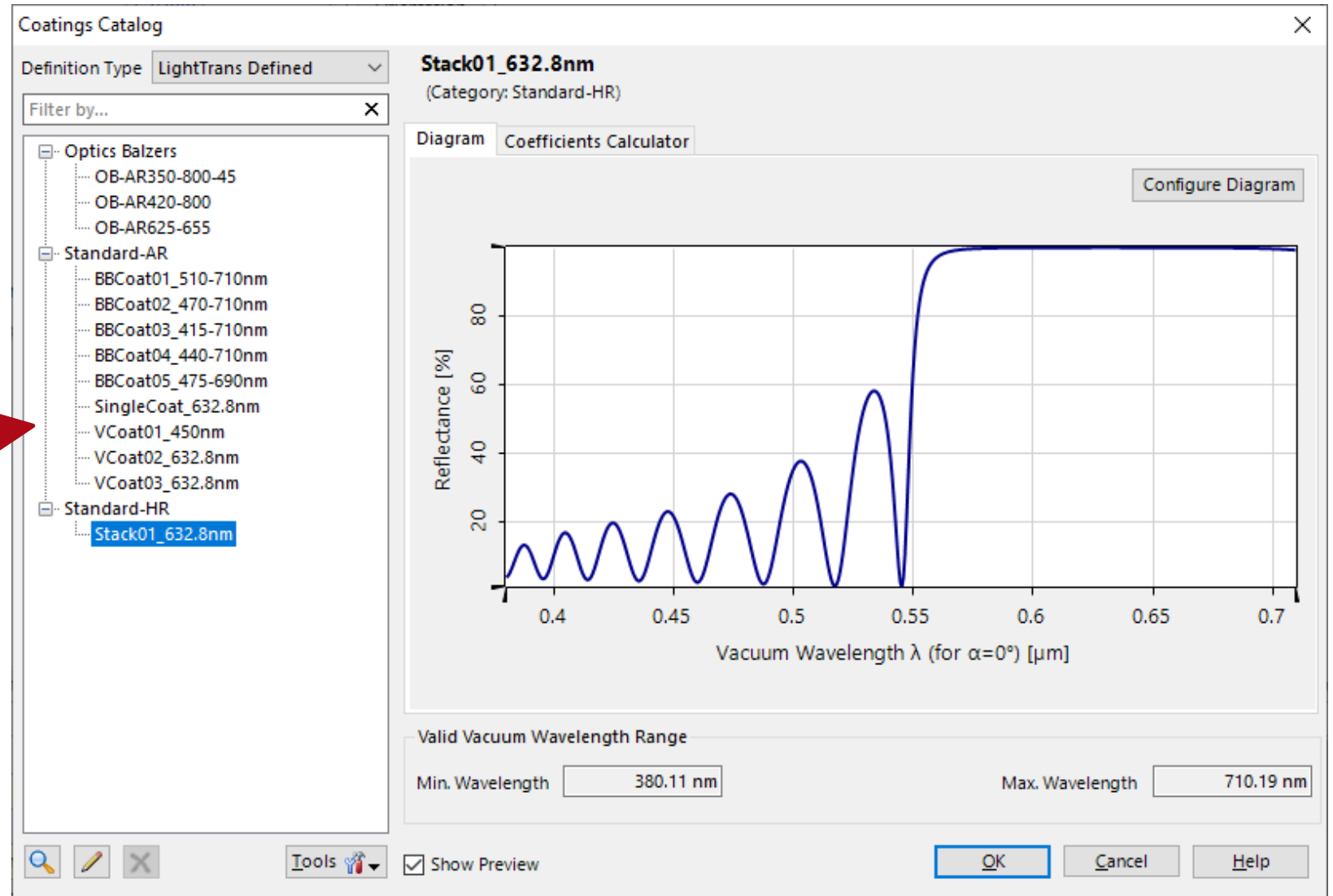
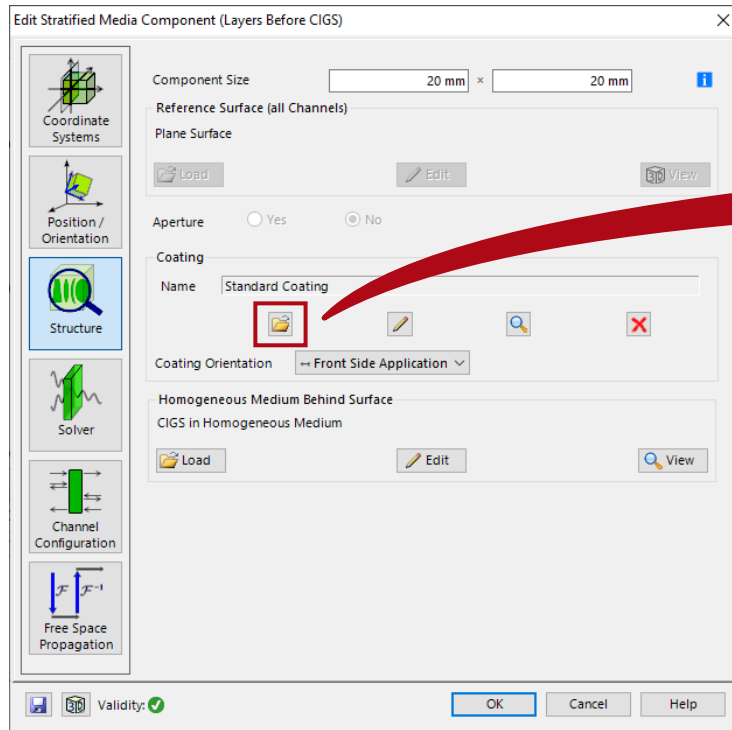
The user can set the material and thickness of each individual layer here.



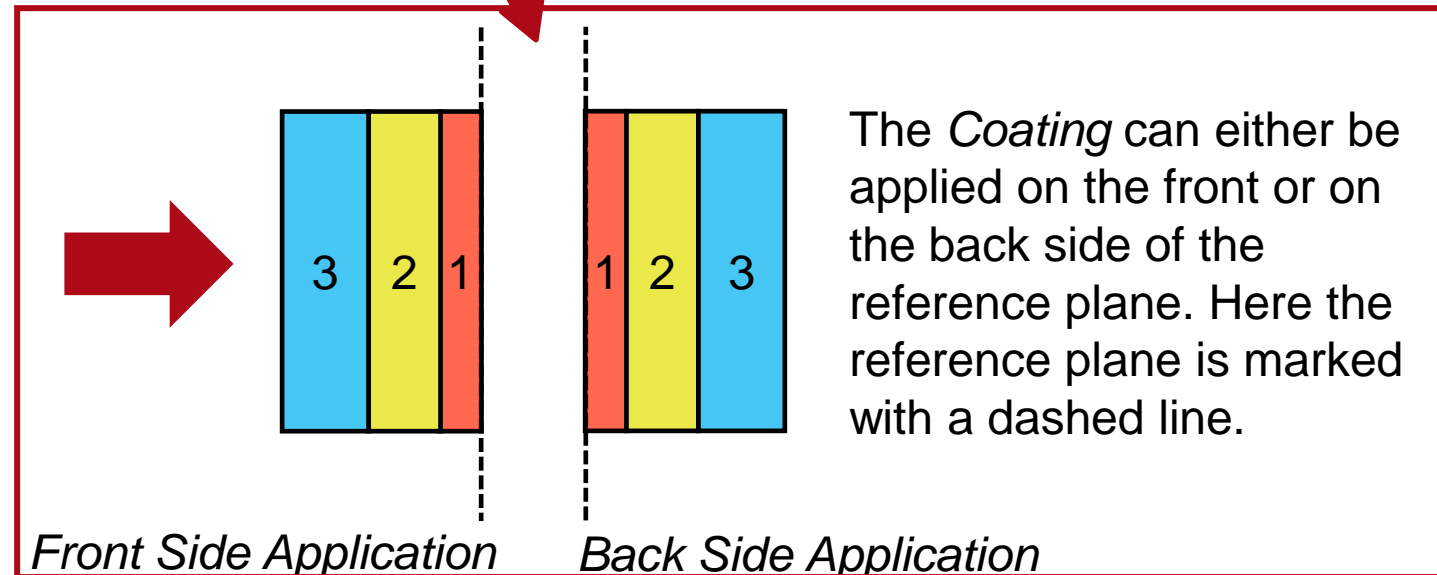
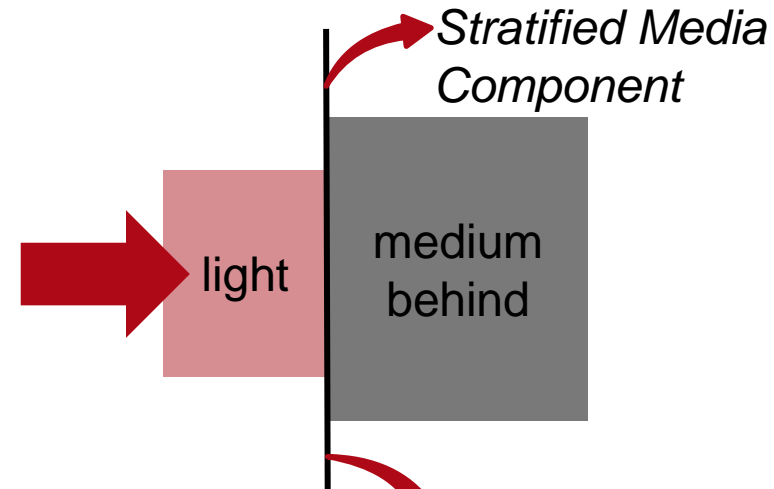
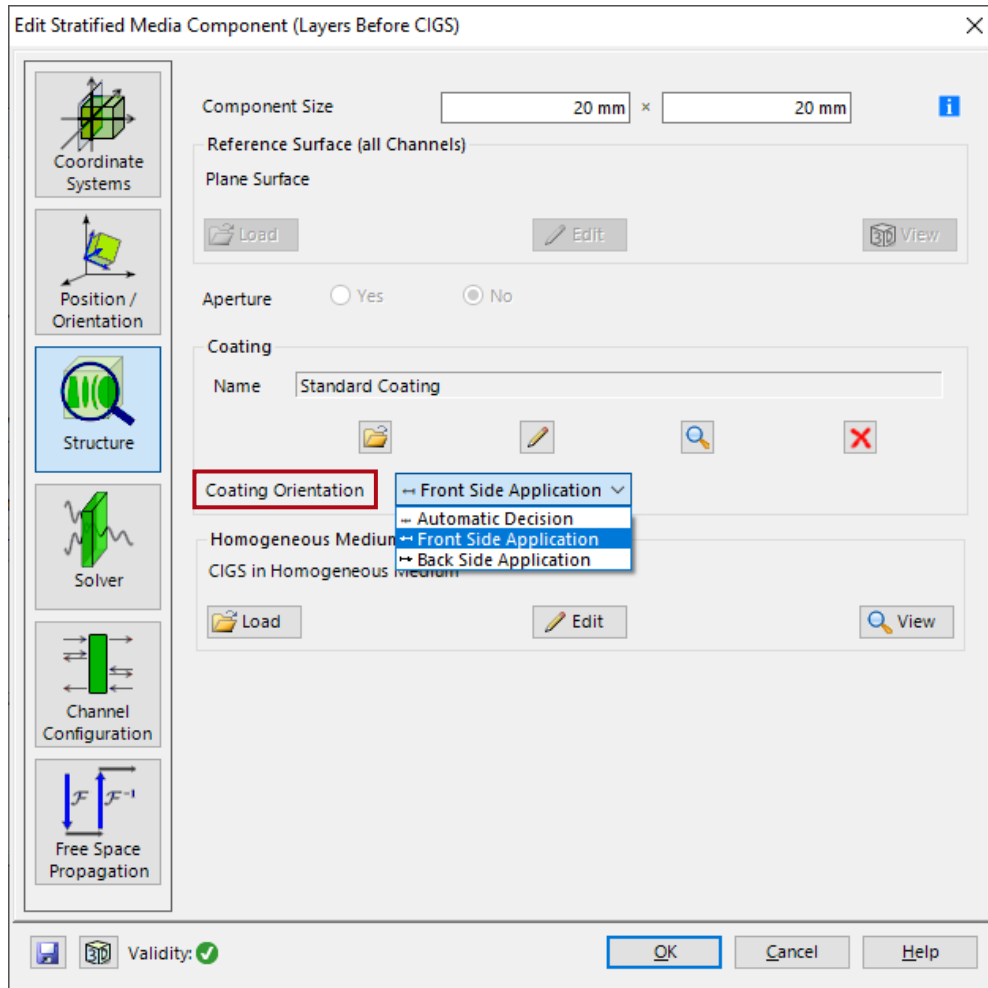
The manually defined coating can be saved in the catalog for later use.

Coating Import

The user can also employ our in-built off-the-shelf coatings from the catalog.

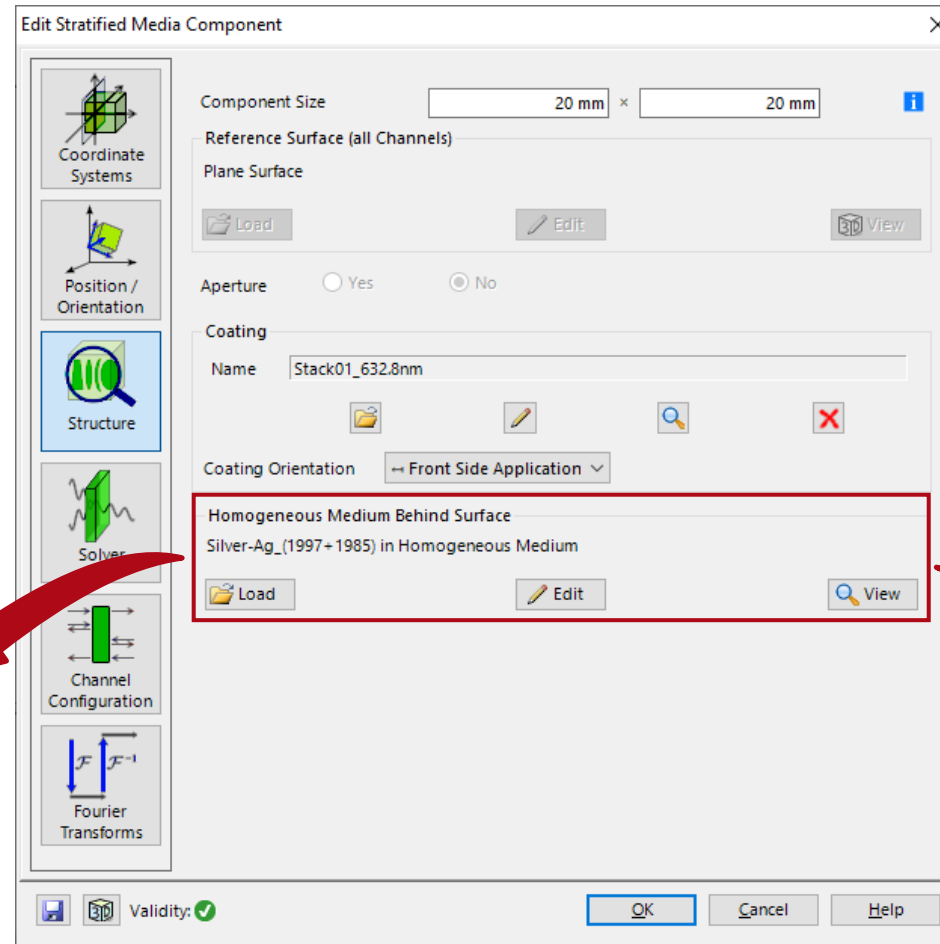
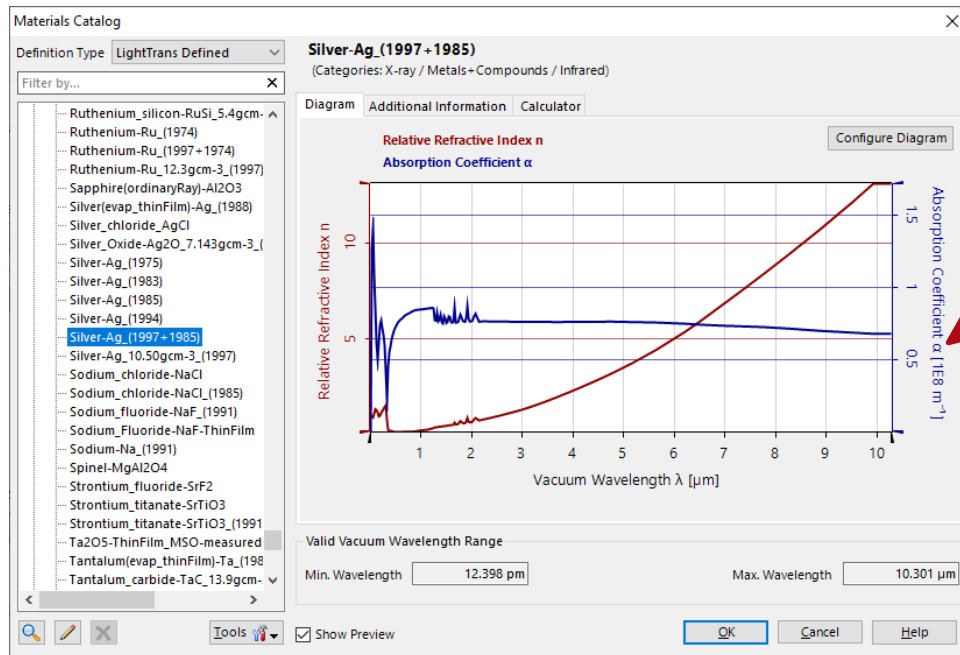


Orientation of the Layer Sequence

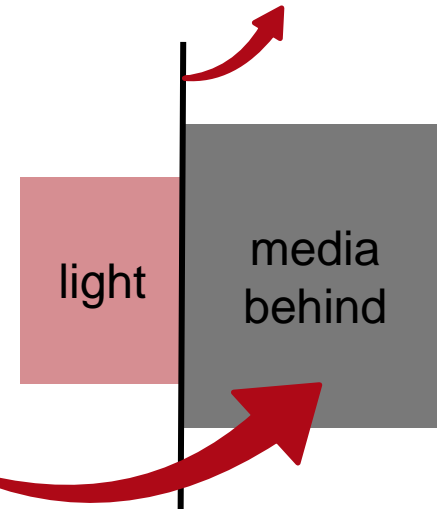


Medium Behind Layer Structure

Here the user can configure the homogeneous medium behind the layered structure. Our catalog puts at your disposal an extended library of different materials to choose from, or you can define your own custom materials by importing n , k data or using different dispersion formulas like the Sellmeier Equation.



Stratified Media Component

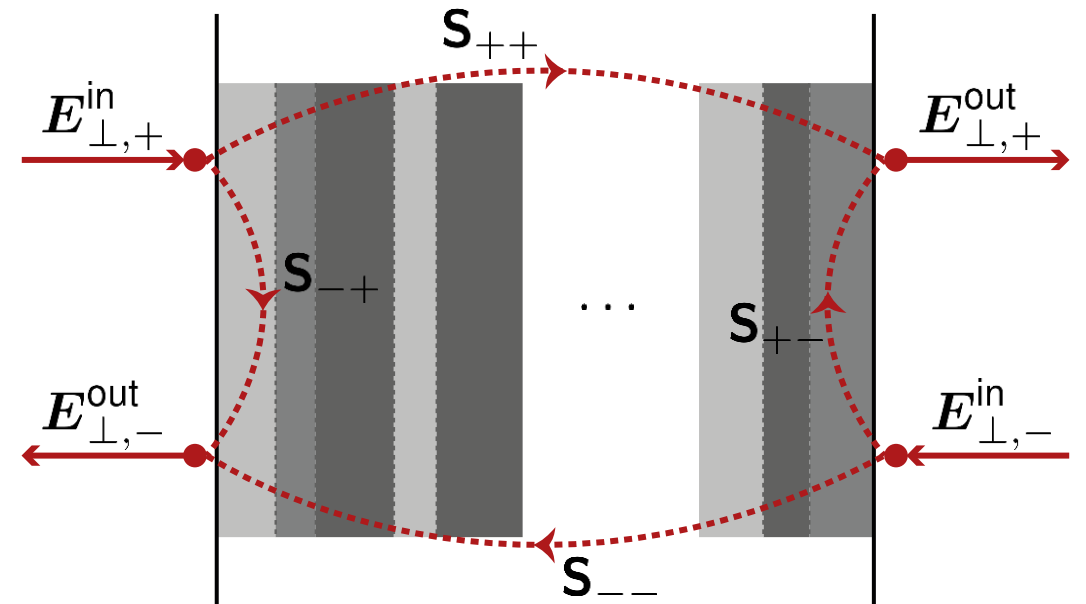


Layer Matrix Solver

The *Stratified Media Component* uses the layer matrix electromagnetic field solver. This solver works in the spatial frequency domain (**k domain**). It consists of

1. an eigenmode solver for each homogeneous layer and
2. an S-matrix for matching the boundary conditions at all the interfaces.

The eigenmode solver computes the field solution in the k-domain for the homogeneous medium in each layer. The S-matrix algorithm calculates the response of the whole layer system by matching the boundary conditions in a recursive manner. This is a method well-known for its unconditional numerical stability since, unlike the traditional transfer matrix, it avoids the exponentially growing functions in the calculation steps.



For further information:
[Layer Matrix \[S-Matrix\]](#)

Document Information

title	Stratified Media Component
document code	SWF.0005
document version	1.1
software edition	VirtualLab Fusion Basic
software version	2021.1 (Build 1.180)
category	Feature Use Case
further reading	<ul style="list-style-type: none">- <u>Effects of Mirror Coating on Pulse Characteristics</u>- <u>Absorption in a CIGS Solar Cell</u>