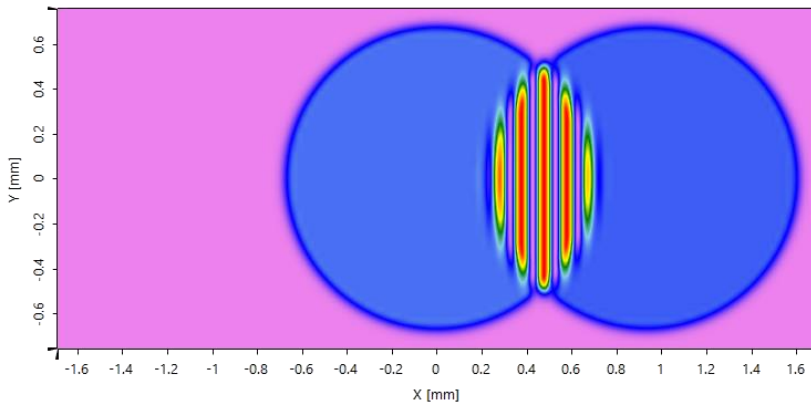


System Analysis with Sequential and Non-Sequential Tracing

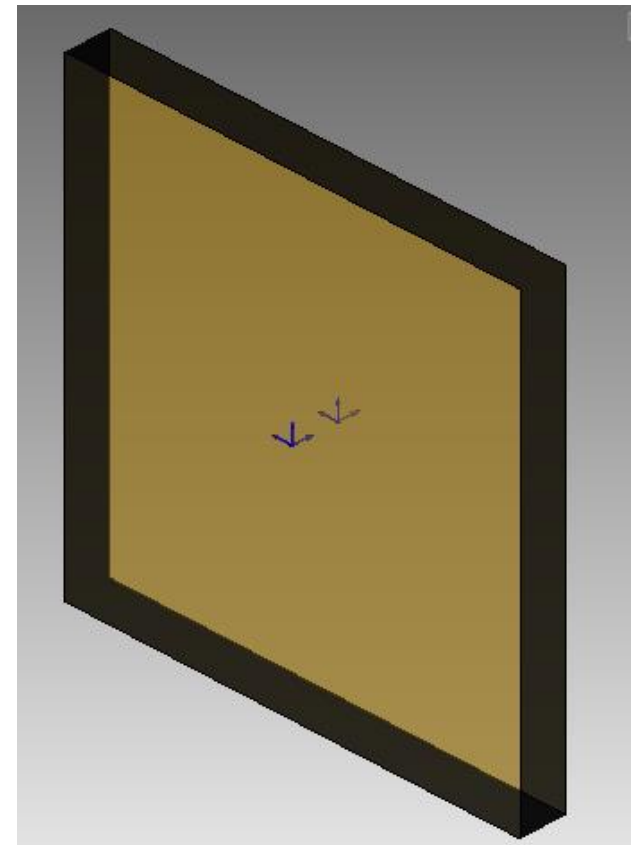
Abstract



VirtualLab enables the user to build up an optical system once and analyze it with different tracing techniques. This includes ray tracing as well as field tracing. With the non-sequential extension of VirtualLab it is easy to switch between sequential and non-sequential analysis of the optical setup. This use case demonstrates how the non-sequential analysis of your setup can be performed. As a demonstration example we will use a plate with a slightly tilted plane on the second surface.

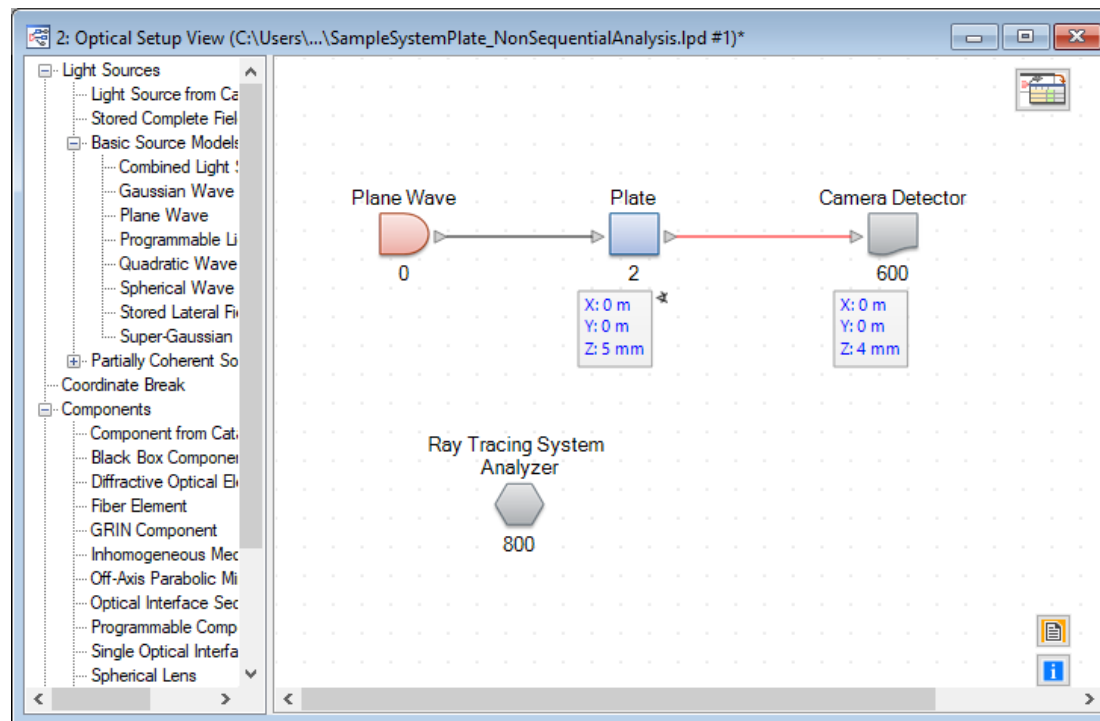
Modeling Task

- Within this use case we like to demonstrate how easy the user can switch between sequential and non-sequential system analysis.
- For demonstration purpose we use a plane wave to illuminate a plate.
- We are interested in the light which is reflected by the plate.
- The component consists of two plane interfaces, where the second one is tilted by 0.1°

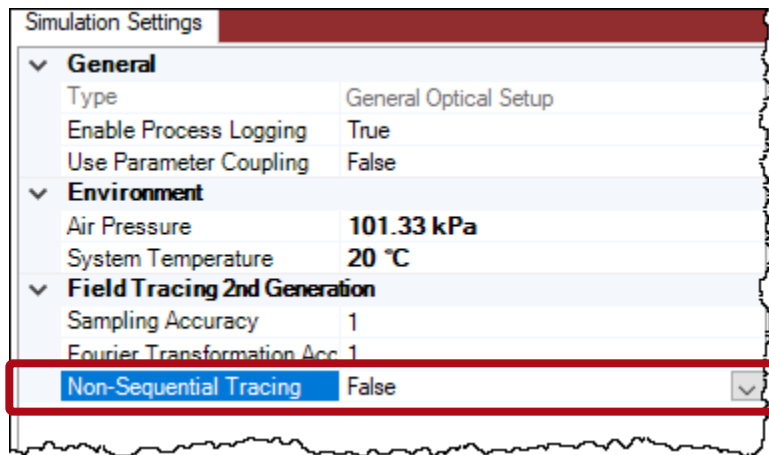


The Sample System

- The specification of the system is done by the optical setup document.

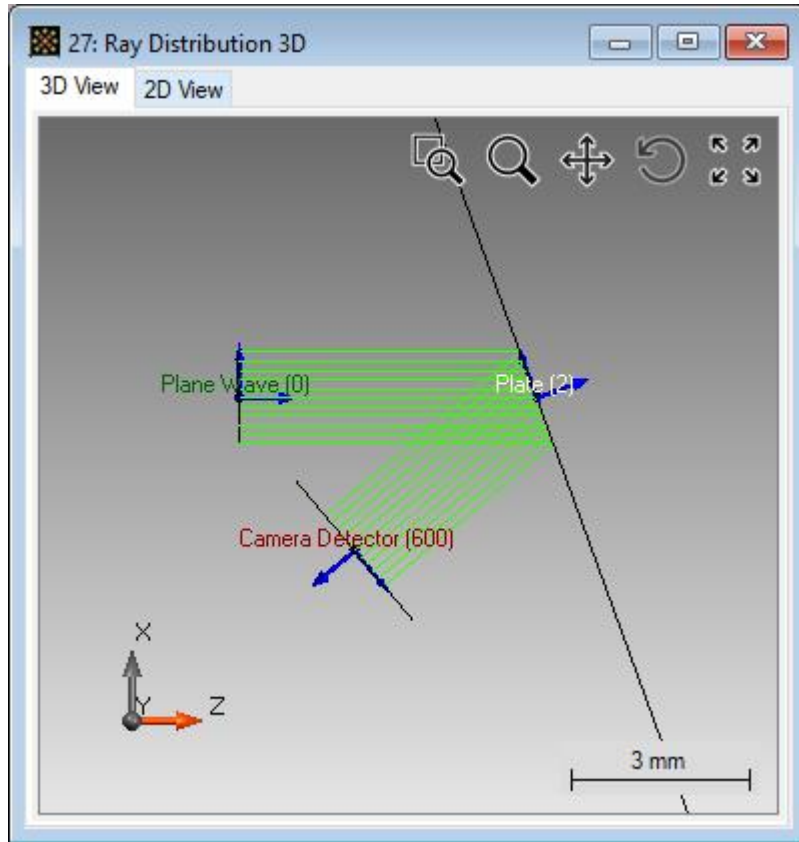


Selection of Non-Sequential Tracing



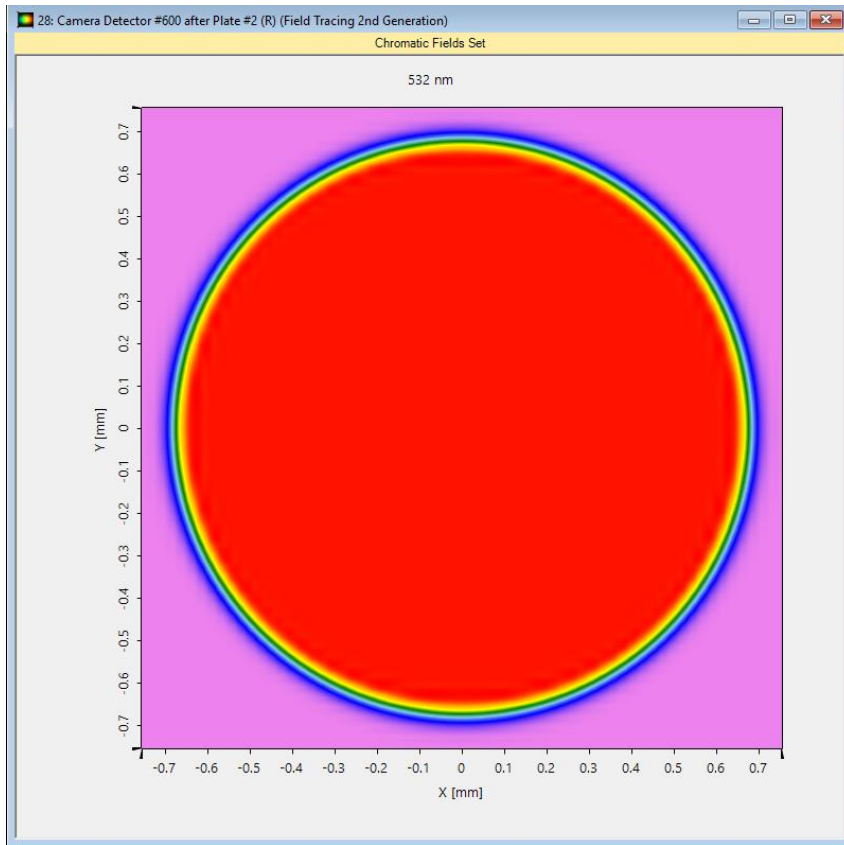
- Within the property browser of the optical system you can select whether to perform sequential or non-sequential tracing.
- The selection of this option has effect on the following engines:
 - Ray tracing
 - Ray tracing system analyzer
 - 2nd generation field tracing

Results for Sequential Ray Tracing



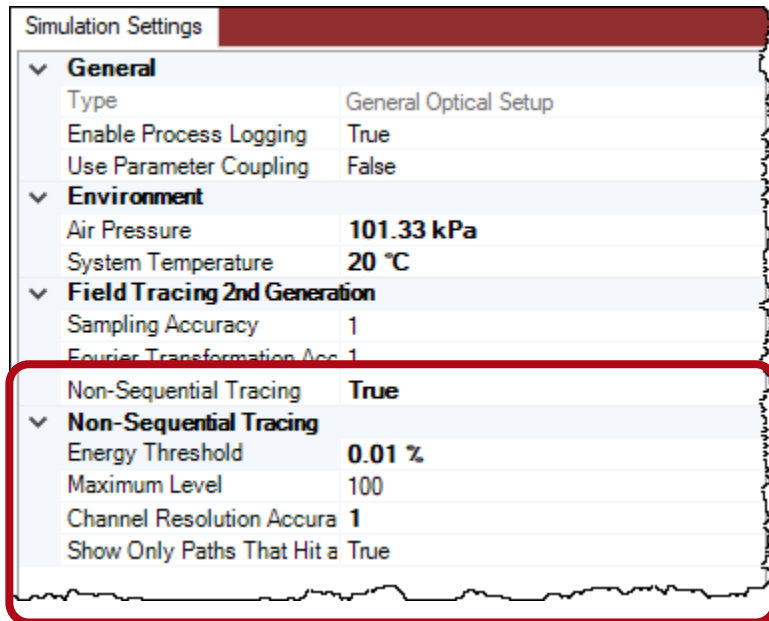
- By performing the ray tracing system analyzer a 3D ray distribution is shown.
- In case of sequential ray tracing only the reflective light at the first surface is evaluated.

Results for Sequential Field Tracing



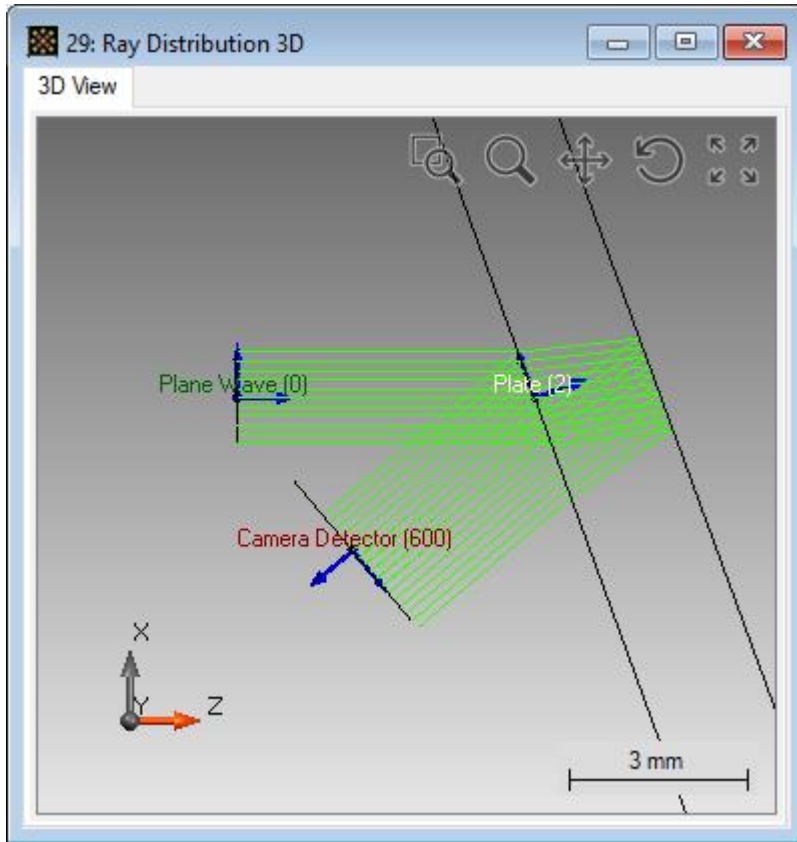
- The detector in this setup is realized by the camera detector.
- It calculate the energy density distribution in the detector plane.
- For sequential field tracing a single plane wave illuminated the detector and is shown by a chromatic fields set.

Selection of Non-Sequential Tracing



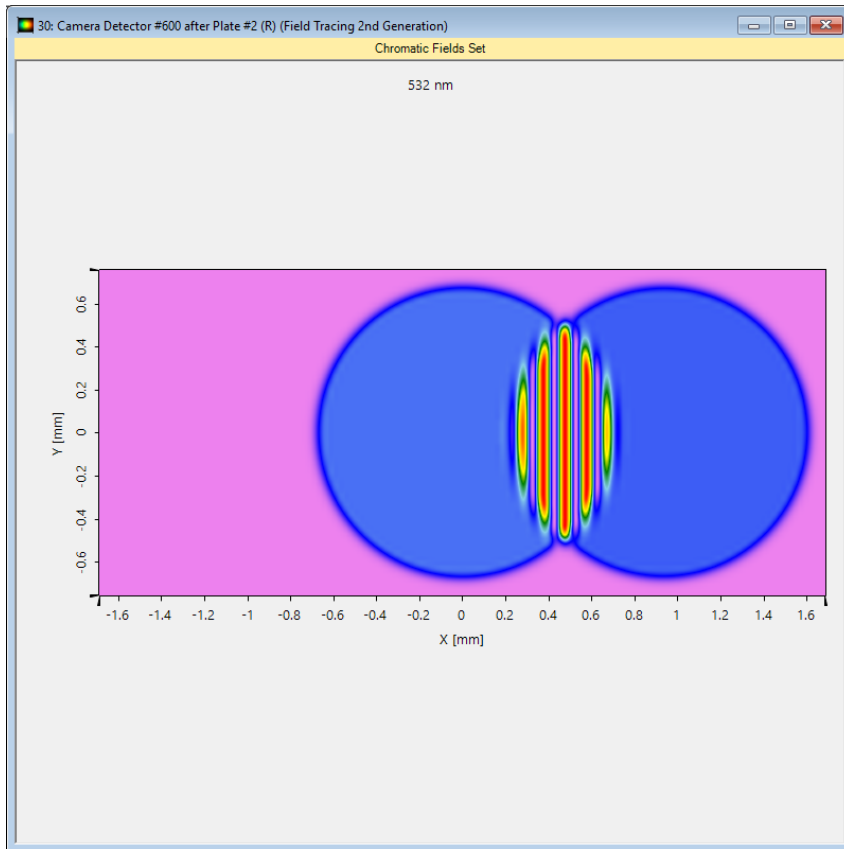
- The non-sequential analysis can be activated by changing the property *Non-Sequential Tracing* in the property browser.
- If this option is selected VirtualLab provides several options to control the non-sequential tracing techniques in addition.
- These options are described in an additional use case.

Results for Non-Sequential Ray Tracing



- The screenshot on the left side shows the result of the ray tracing 3D analyzer.
- One can see that now also the internal reflection between the first plane and the second plane is handled by the ray tracing engine.

Results for Non-Sequential Field Tracing



- The camera detector is now illuminated with two plane waves.
- The displayed intensity distribution shows an interference pattern of these modes.
- This interference pattern is caused by a small tilt of the second surface in comparison to the first surface of the plate.

Document Information

title	System Analysis with Sequential and Non-Sequential Tracing
version	1.0
VL version used for simulations	7.3.0.41
category	Feature Use Case
