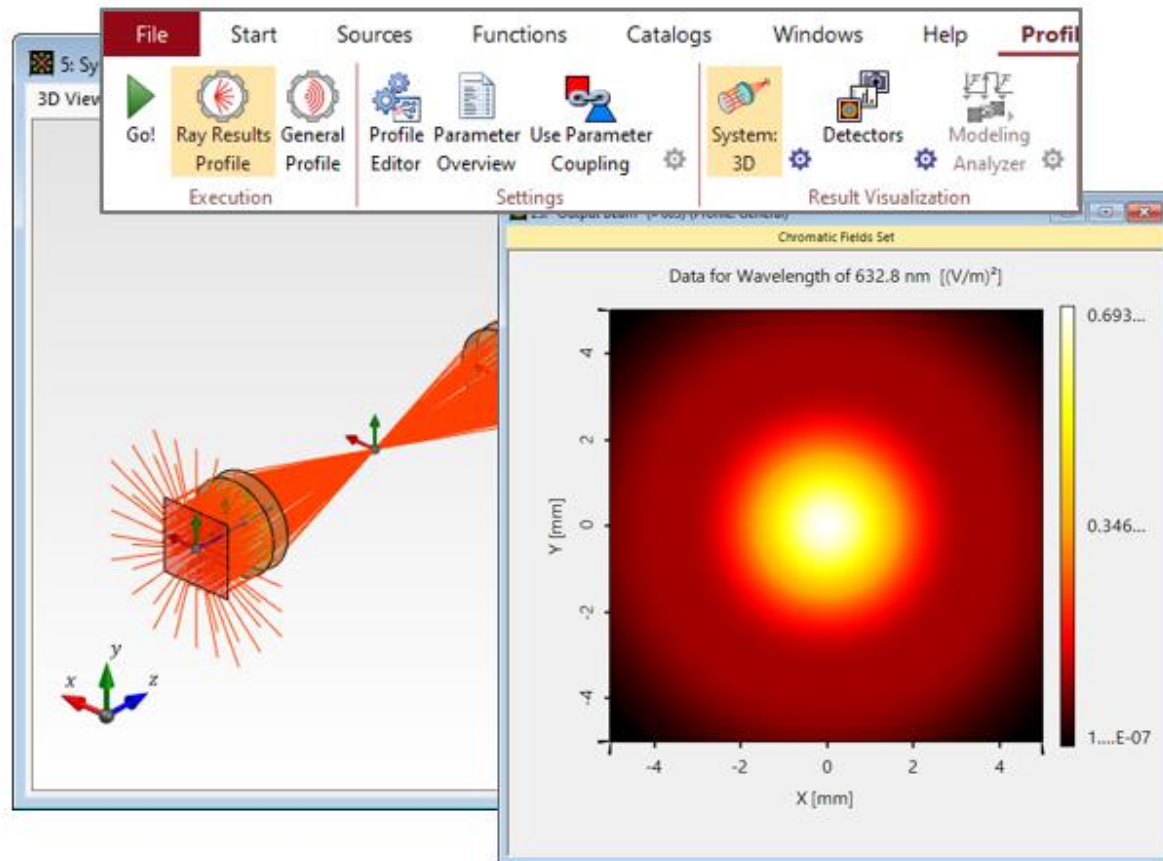


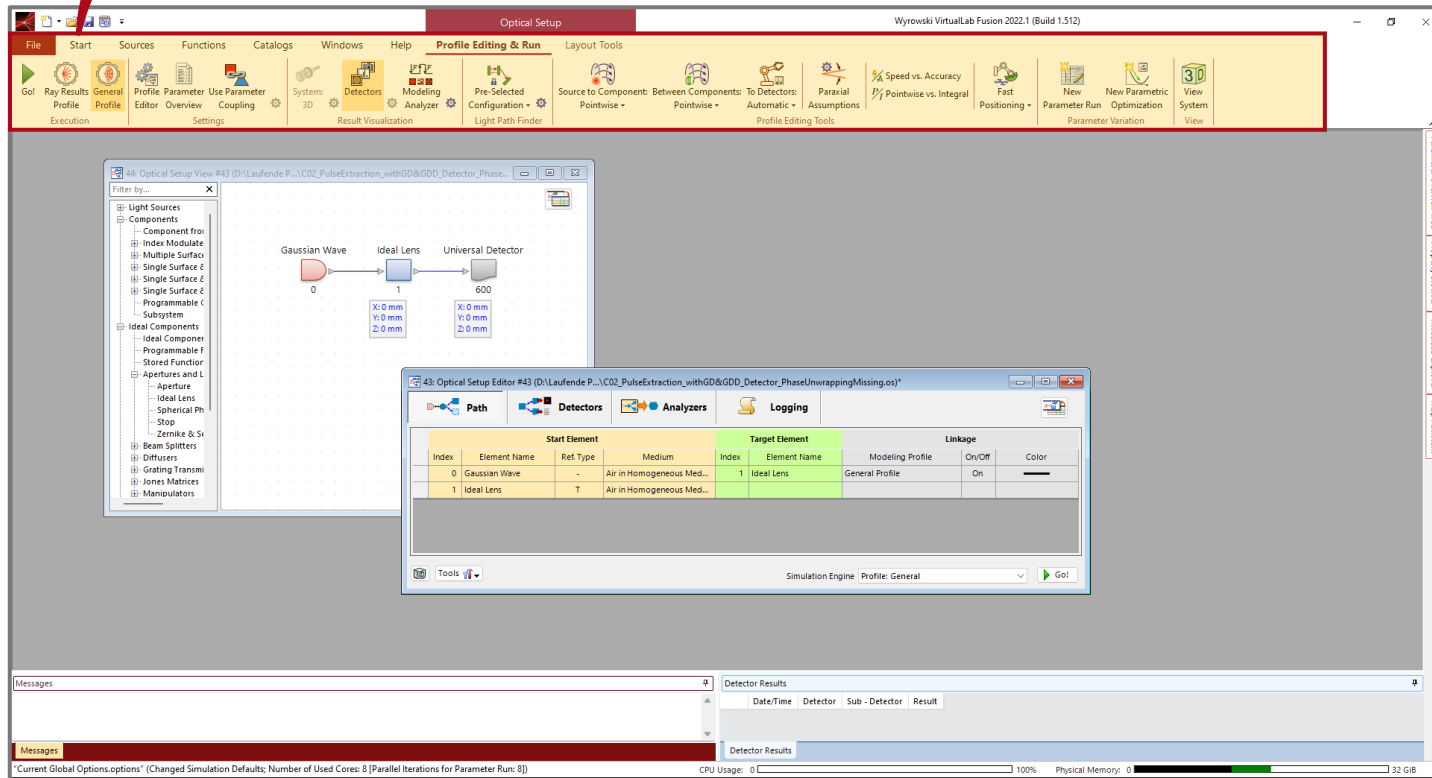
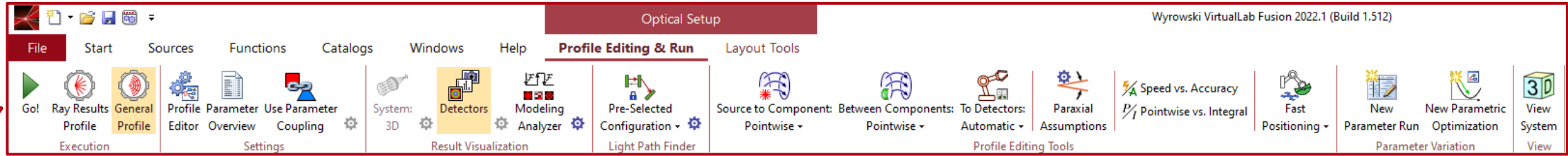
# Configuring Your Simulation in VirtualLab Fusion

# Abstract



VirtualLab Fusion is a fast physical optics modeling and design software that offers optical designers the necessary tools to tackle a multitude of systems from a broad range of fields of application. This means that flexibility in the modeling strategy and configuration of the system is key. In this use case we provide an overview of the different aspects of the setup process that it makes sense to keep in mind when building the system, in order to tailor the configuration to the specific requirements of your scenario and to produce the desired results in the most convenient way possible. For more in-depth information about each of the topics, simply click on the links provided on the corresponding pages.

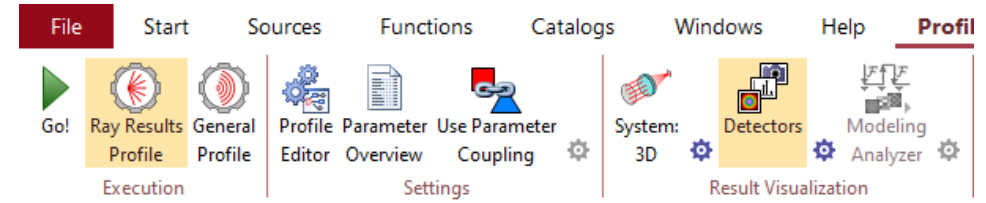
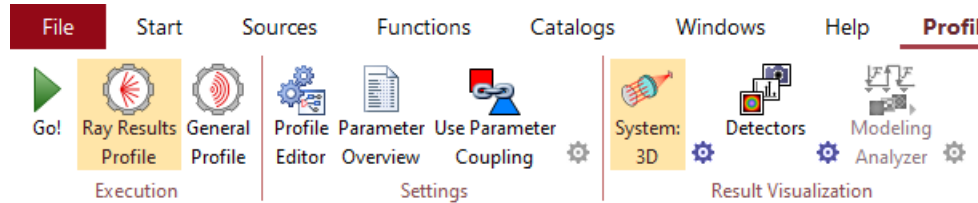
# The Profile Editing & Run Ribbon



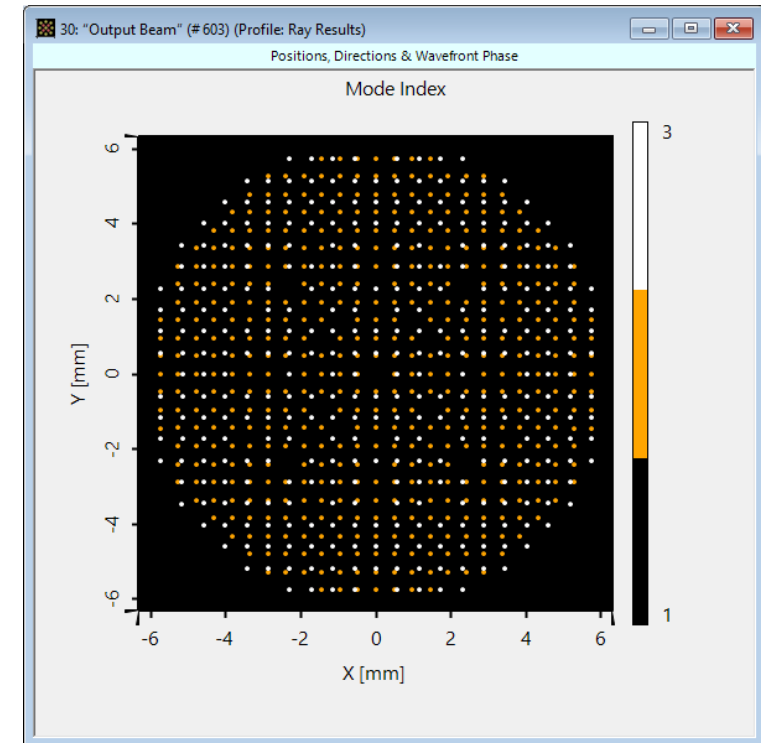
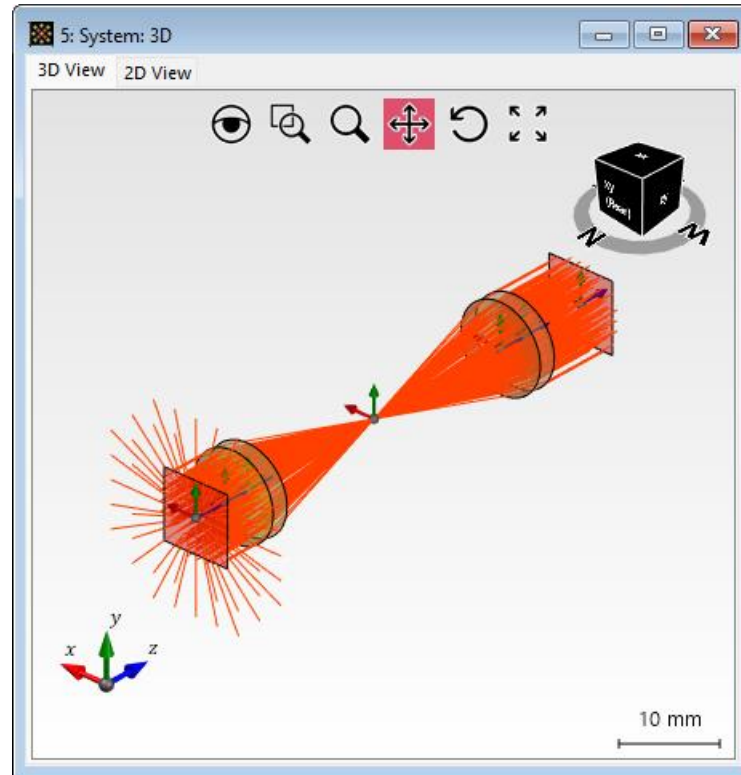
When an *Optical Setup* document is active, a new tab, *Profile Editing & Run*, will automatically be available in the menu.

This tab contains a variety of tools and options to specify the simulation settings, like the configuration related to the selection of Fourier transform algorithms, and also access to other convenience tools that are applied on the current system, like the *Parameter Run*, to perform parameter sweeps on the system.

# Ray Results Profile



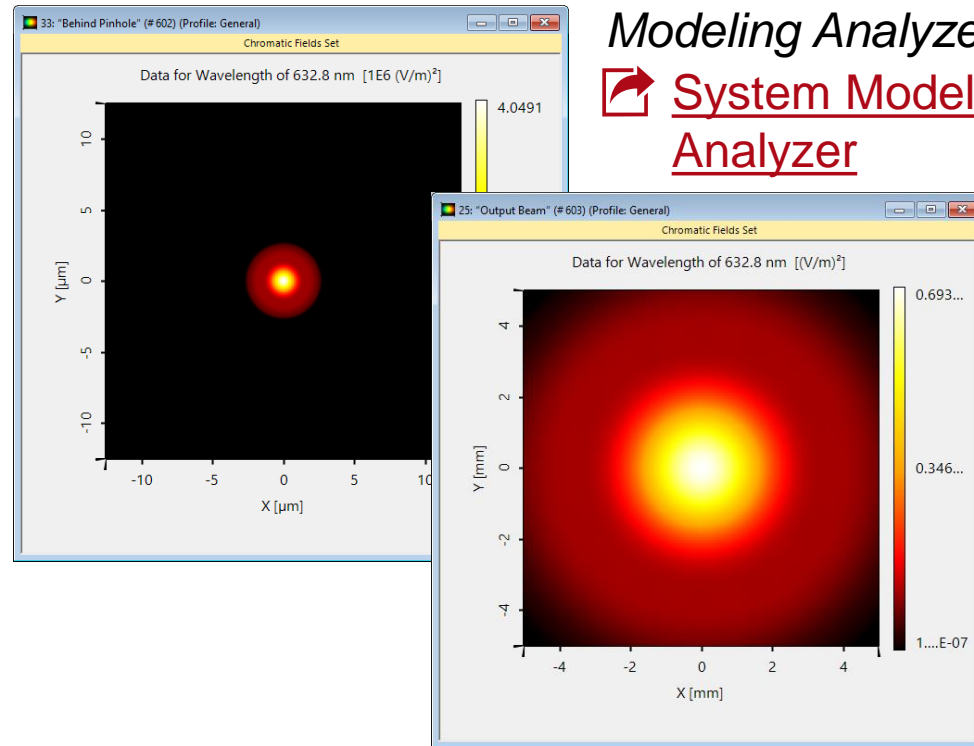
Depending on the simulation profile used, different *Result Visualizations* are available. In case of the *Ray Results Profile*, the user can either generate a 3D visualization of the system or 2D dot diagrams from the active detectors.



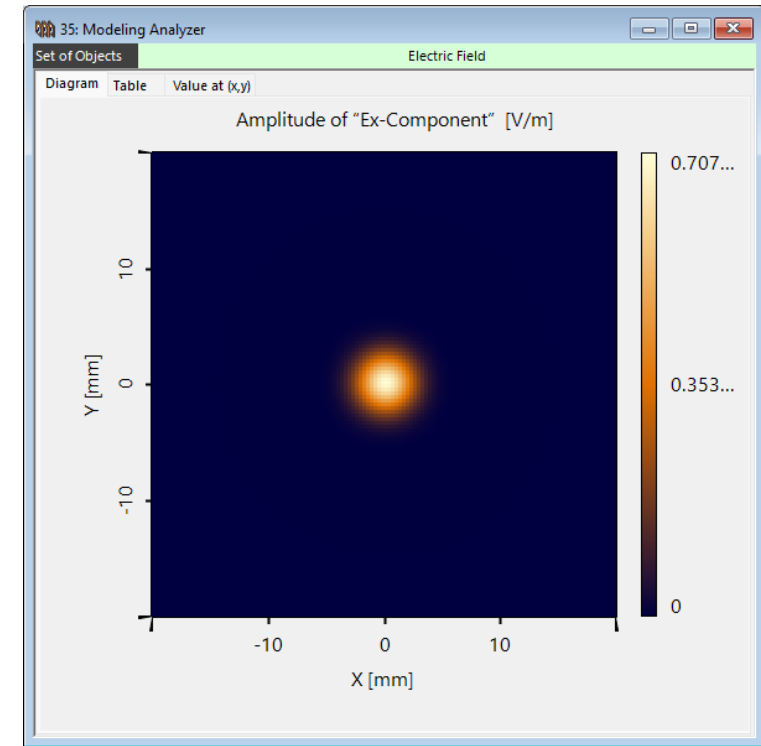
See the full Use Case: [↗ Laser Beam "Clean-Up" with Spatial Filter](#)

# General Profile

The same principle applies to the *General Profile*. In this case, instead of a 3D visualization of the system, the *Modeling Analyzer* is offered, which generates a set of results that show the field in the space (x) and spatial frequency (k) domains at every plane of interest in the system.

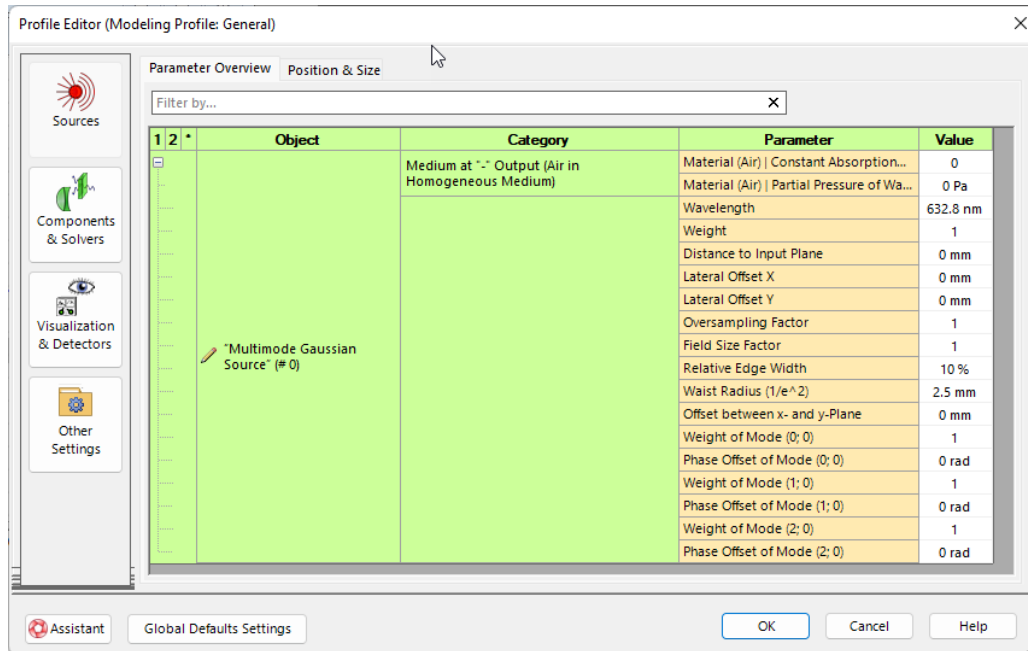
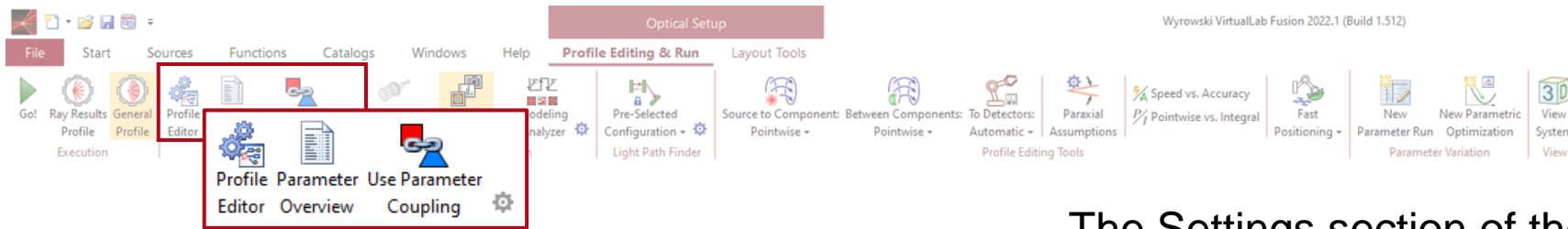


*Modeling Analyzer:*  
[System Modeling Analyzer](#)



See the full Use Case: [Laser Beam "Clean-Up" with Spatial Filter](#)

# Settings



The Settings section of the ribbon contains tools that allow for an easy overview, adjustment and coupling of system parameters.

- **Profile Editor.** Adjust all parameters in the system according to your preference. This includes sampling parameters and Fourier Transform settings. More information under: [Profile Editor](#)
- **Parameter Overview.** A list of all the system parameters
- **Use Parameter Coupling.** Allows for automatic adjustment of multiple parameters according to a specified (programmable) rule. More information under:

[Coupling of Parameters in VirtualLab Fusion](#)

# Channel Configuration: Non-Sequential Settings

VirtualLab Fusion provides the user with the option to either simulate the system sequentially or to automatically detect the light paths by using a *Channel* concept. Find more information here:

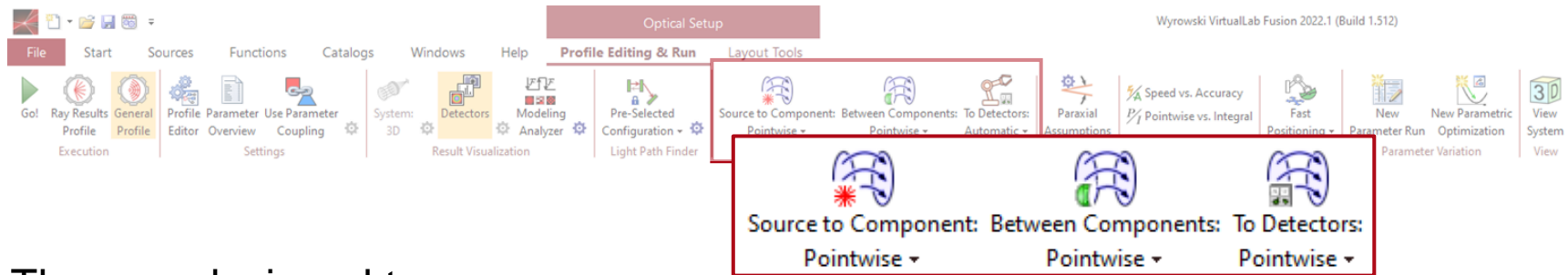
[↗ Light Path Finder](#)

The image displays the VirtualLab Fusion interface with several key components highlighted:

- Optical Setup Editor:** The main window showing the 'Profile Editing & Run' tab. A 'Manual Configuration' dropdown menu is visible, with 'Manual' selected.
- Edit Channel Configuration Dialog:** A dialog box with the following settings:
  - Channel Configuration Option: Manual
  - Settings for Manual Channel Configuration:
    - Energy Threshold: 0.01 %
    - Maximum Level: 100
    - Channel Resolution Accuracy: 1
  - Show Only Paths That Hit a Detector in 3D View
- Property Browser:** Two instances are shown. The left one is in the 'Simulation Settings' tab, showing:
  - General: Process Logging Level Normal
  - Environment: Air Pressure 101.33 kPa, System Temperature 20 °C
  - Profile: Channel Configurator Pre-SelectedThe right one is in the 'General' tab, showing:
  - General: Process Logging Level Normal
  - Environment: Air Pressure 101.33 kPa, System Temperature 20 °C
  - Manual Channel Configuration: Energy Threshold 0.01 %, Maximum Level 100, Channel Resolution Accuracy 1, Show Only Paths That Hit a Detector in 3D View True
  - Profile: Channel Configurator Manual

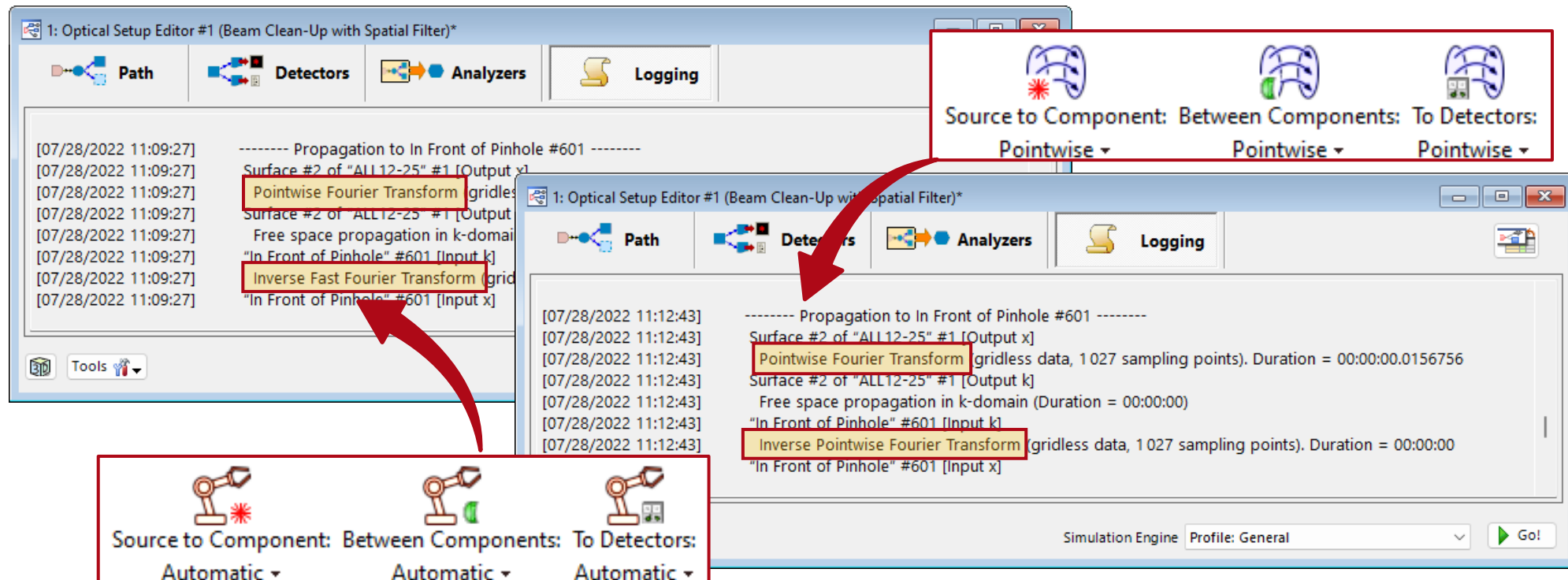
Depending on the setup, the options in the *Property Browser* will change.

# Configuration Tools for the Free Space Propagation Operators



The next section of this tab offers a series of fast controls to adjust the behavior of the free-space propagation between elements by adjusting the used Fourier Transforms.

They are designed to offer more general, pre-defined "configuration packages" to facilitate the experience for beginner users. These are versatile enough to tackle the vast majority of systems.





# Detailed Customization of Fourier Transform Algorithms

The screenshot displays the software interface with two wizard windows open. The 'Wizard: Speed vs. Accuracy' window shows sliders for 'Speed' and 'Accuracy', a 'Power Portion for Field Size Estimation' set to 99.9999%, and a 'Gridless Sampling Factor' set to 1. The 'Wizard: Pointwise vs. Integral' window shows a 'Selection Mode' section with 'Individual' selected, and a table for selecting Fourier transform algorithms for different components.

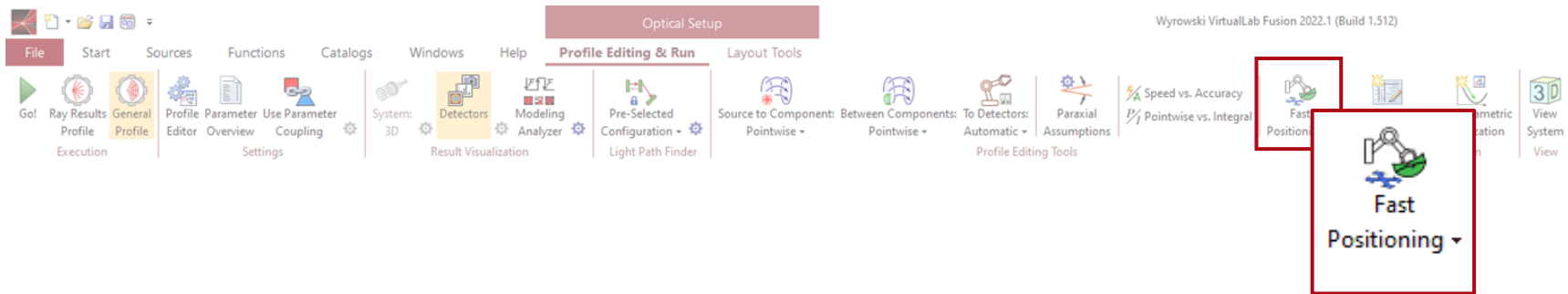
	To Component	To Detector
From Source	<input checked="" type="radio"/> Pointwise <input type="radio"/> Integral <input type="radio"/> Automatic Selection	<input checked="" type="radio"/> Pointwise <input type="radio"/> Integral <input type="radio"/> Automatic Selection
From Component	<input checked="" type="radio"/> Pointwise <input type="radio"/> Integral <input type="radio"/> Automatic Selection	<input checked="" type="radio"/> Pointwise <input type="radio"/> Integral <input type="radio"/> Automatic Selection
Inside Component	<input checked="" type="radio"/> Pointwise <input type="radio"/> Integral <input type="radio"/> Automatic Selection	

It is, however, important to note that many of these aspects can be adjusted at different points in the user interface of the software. Other control tools give you the possibility to tailor the configuration in a fully flexible, pinpointed way, for more advanced users with very specific requirements (e.g. it is possible to manually enforce a given selection of Fourier transform algorithms for a single free space propagation step).

*Fourier Transforms:* [Fourier Transform Settings](#)

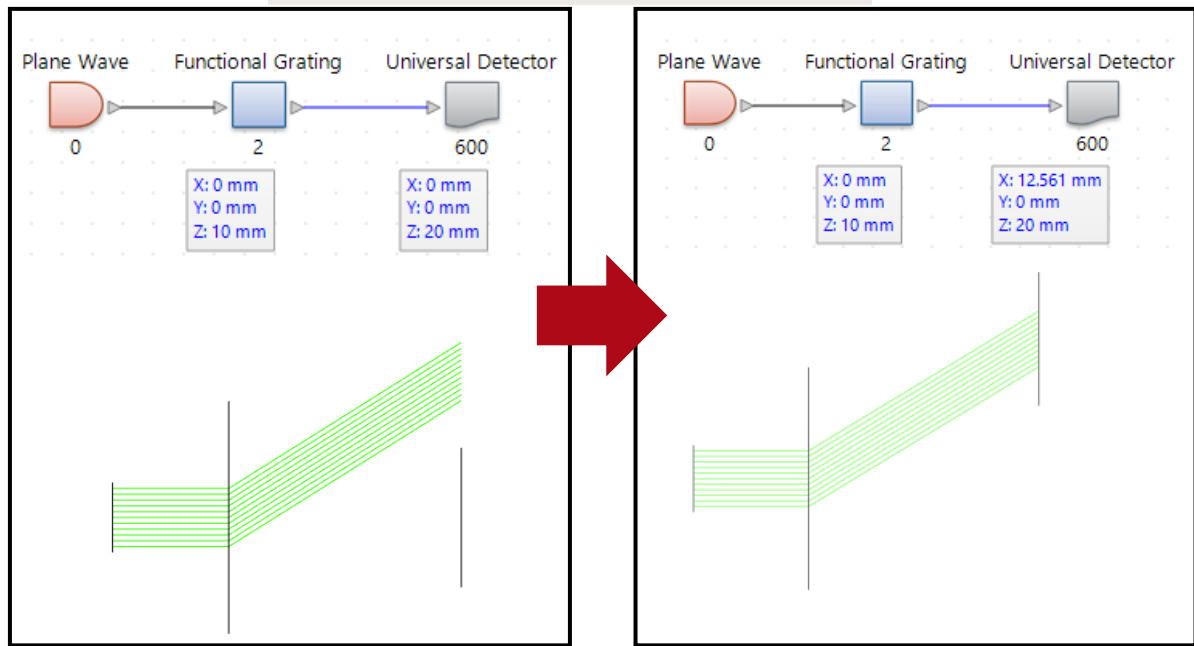
*Speed vs Accuracy :* [Speed vs Accuracy Tool](#)

# Fast Positioning Tools

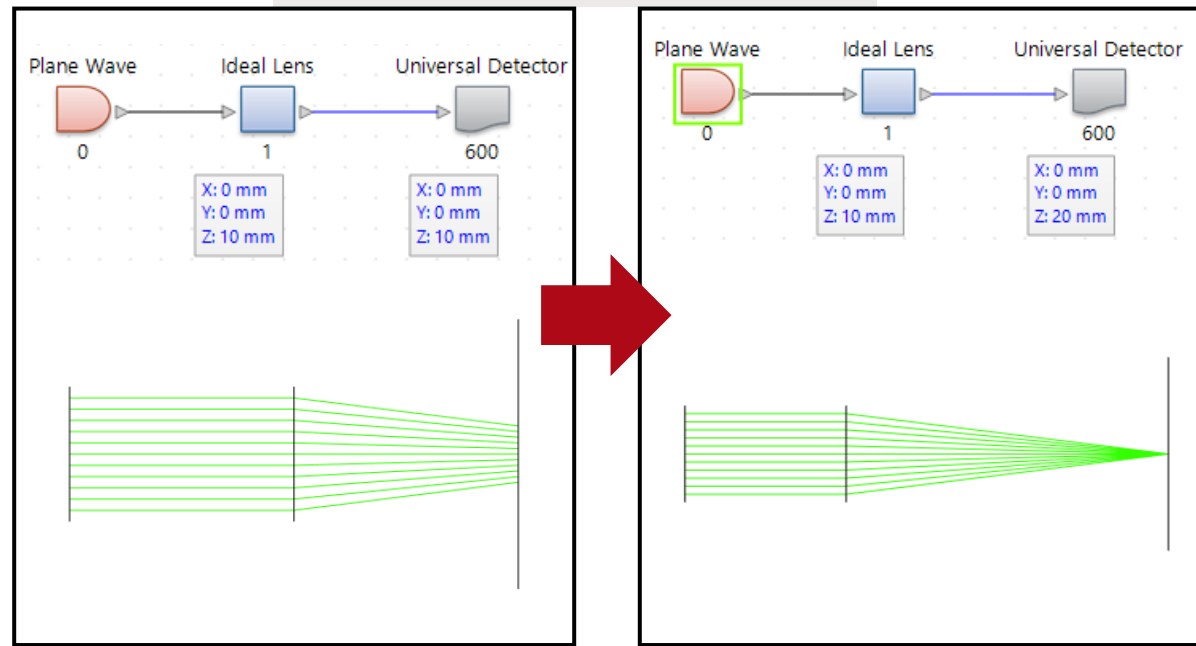


The software will perform *Ray Results Profile* simulations in the background and automatically adjust the detector position!

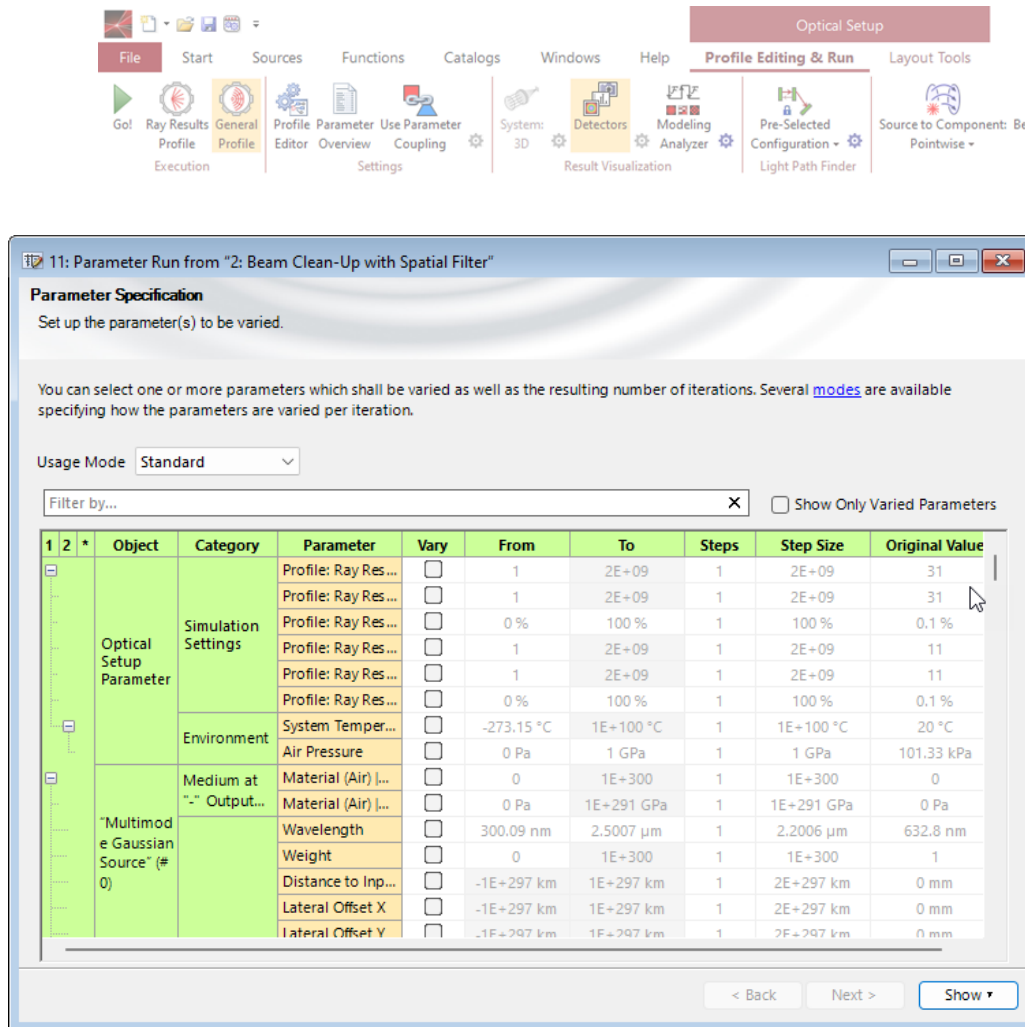
Optimize Detector Positions



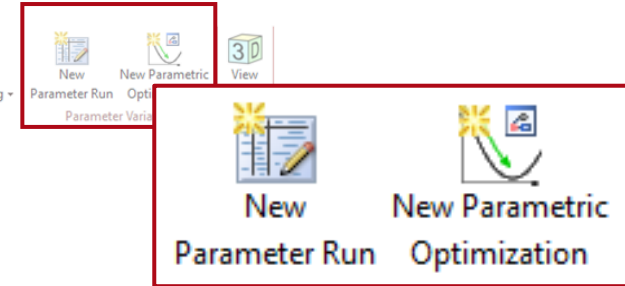
Find Focus Position



# Parameter Variation Tools



Wyowski VirtualLab Fusion 2022.1 (Build 1.512)



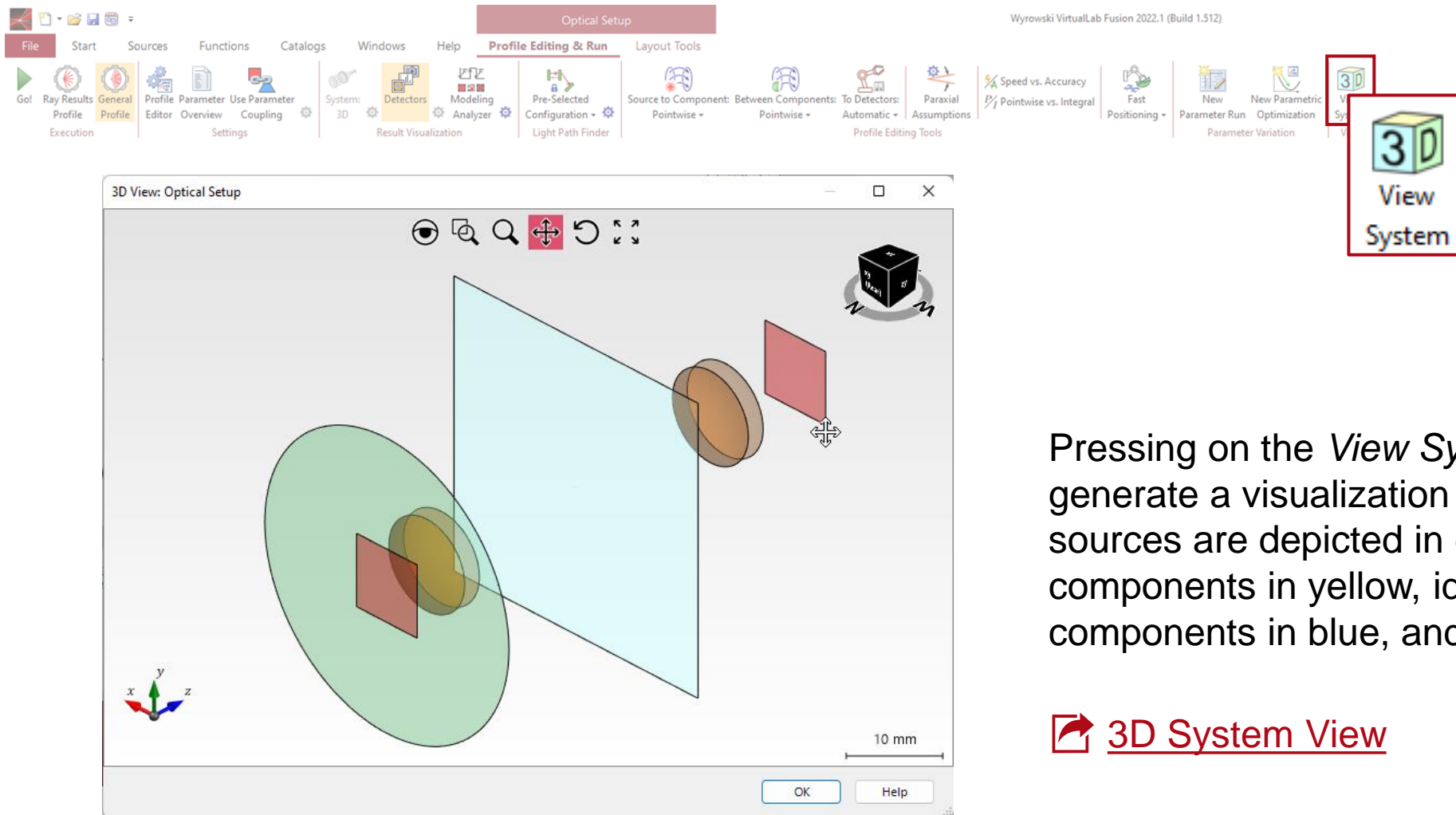
*Parameter Runs* and *Parametric Optimizations* can be started with a click on the corresponding button.

For more information see the following use cases:

[Usage of the Parameter Run Document](#)

[Introduction to the Parametric Optimization Document](#)

# Tools



# Document Information

title	Configuring Your Simulation in VirtualLab Fusion
document code	SWF.0009
document version	1.0
software edition	VirtualLab Fusion Basic
software version	2023.1 (Build 1.548)
category	Feature Use Case
further reading	<ul style="list-style-type: none"><li>• <a href="#">Profile Editor</a></li><li>• <a href="#">System Modeling Analyzer</a></li><li>• <a href="#">Free Space Prpagation Settings</a></li><li>• <a href="#">Profile Editing Tool: Speed vs Accuracy</a></li><li>• <a href="#">Usage of the Parameter Run Document</a></li><li>• <a href="#">Introduction to the Parametric Optimization Document</a></li><li>• <a href="#">3D Visualization of the Optical System</a></li></ul>