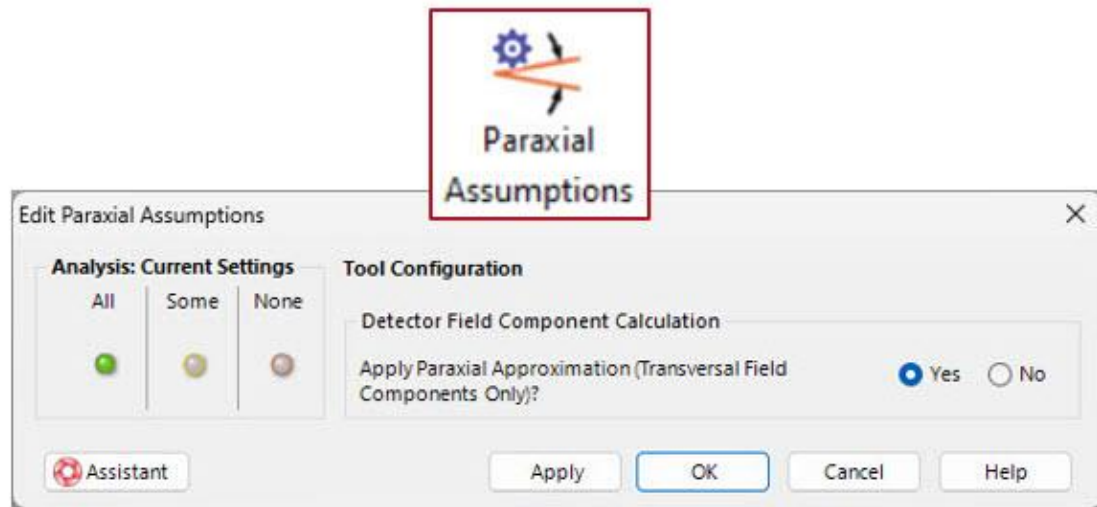


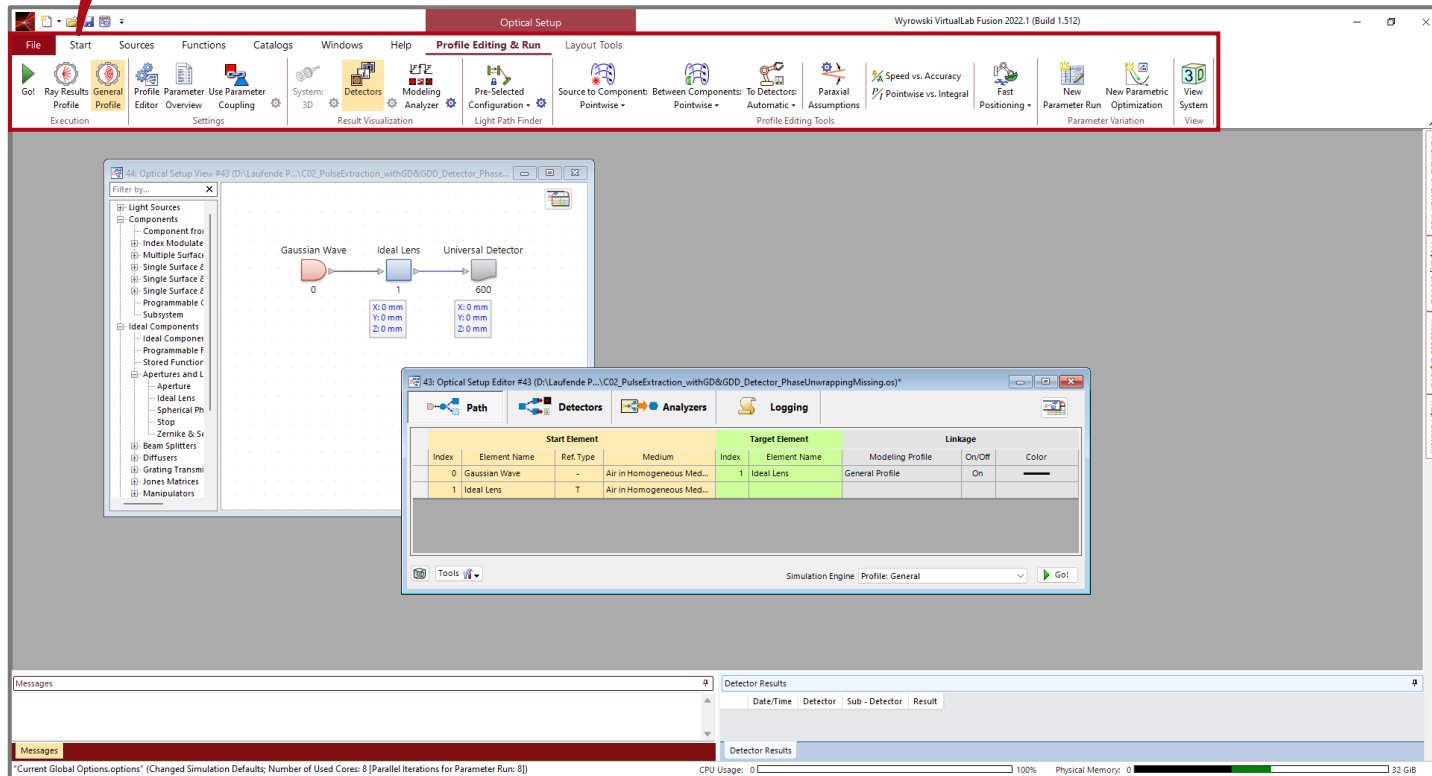
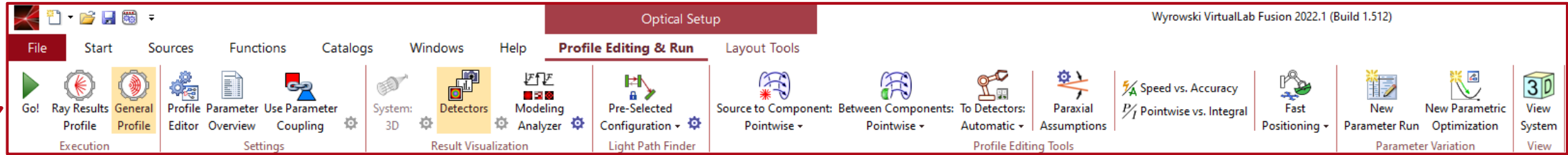
# Paraxial Assumptions Tool

# Abstract



Both because of the practical role that paraxial behavior plays in countless optical systems, and due to the drastic simplification of the mathematics and numerics involved that an assumption of paraxiality often entails, it makes sense to offer users of physical optics software the possibility of benefiting from these advantages. That is precisely what VirtualLab Fusion does: in a control panel specifically designed for this purpose, the user can have a general overview of the current system configuration regarding the paraxial assumption as well as the ability to modify that configuration for the whole system in a convenient, easy-to-use tool.

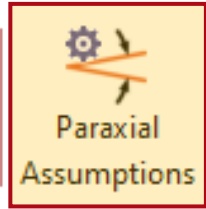
# The Profile Editing & Run Tab



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

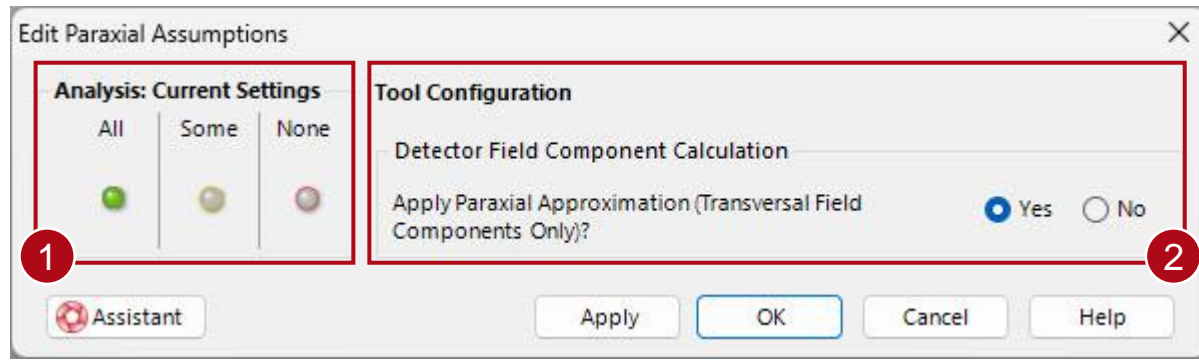
In this use case we want to focus on the control of the application of paraxial assumptions in your simulation.

# Paraxial Assumptions



⚡/A Speed vs. Accuracy  
P/I Pointwise vs. Integral

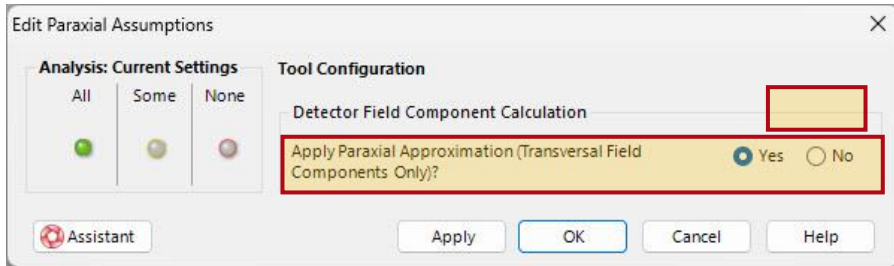
The tool *Paraxial Assumptions* provides an overview and allows users to control whether the longitudinal component of the electromagnetic field will be assumed negligible for all *Universal Detectors*.



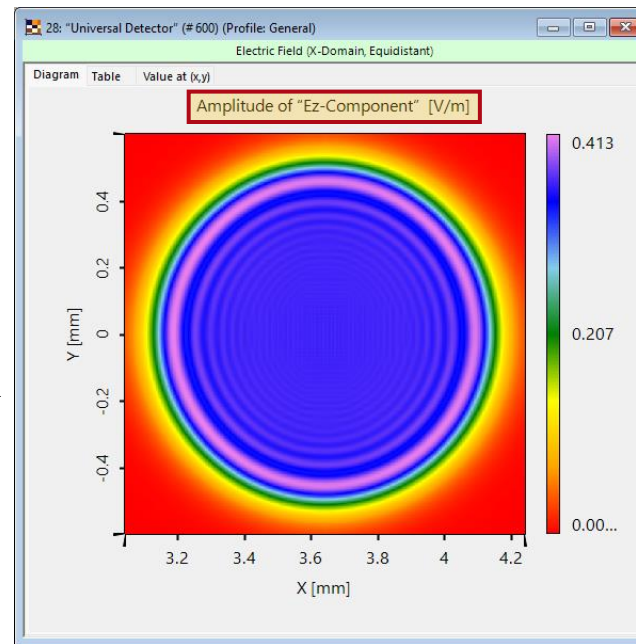
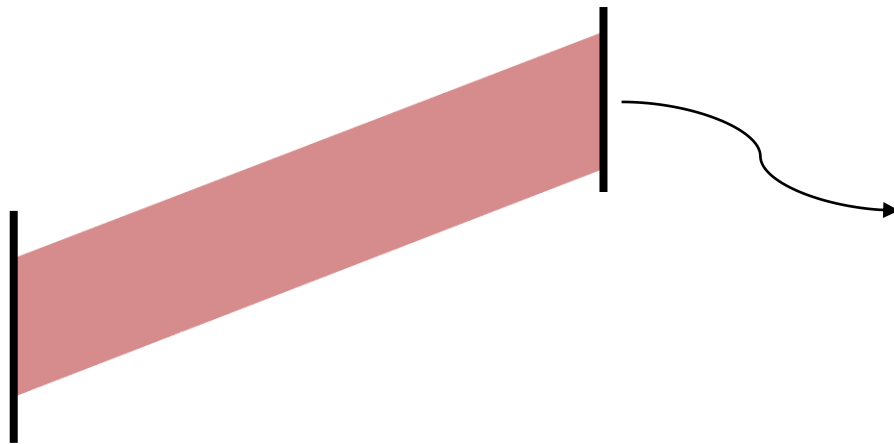
② The fast configuration part can overwrite all settings in the entire system for a given approximation (which can be edited in detector settings, the *Profile Editor*, ...). The two buttons (*Yes/No*) **do not** necessarily indicate the current status of said approximation, that is done by the analysis (①) part on the left.

① The panel on the left provides condensed information about all current system settings related to those two approximations and reports its findings in the form of a traffic light system. Here, red (*None*) means that there is no *Universal Detector* in the system for which the corresponding approximation is active, green (*All*) means that for all *Universal Detectors* the corresponding approximation is active, and yellow (*Some*) stands for the cases where the approximation is active for some of the *Universal Detectors* in the system but not others.

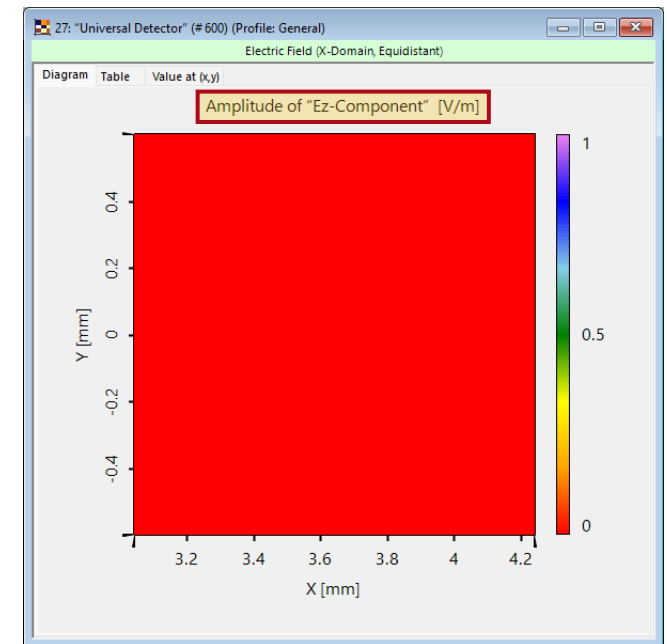
# Physical Definition – Paraxial Approximation



The option to assume *Paraxial Approximation* is only given for *Universal Detectors*. If active, the  $E_z$  and  $H_z$  component of the field will be neglected and  $H_x$  and  $H_y$  calculated by using paraxial formulas. In cases where other types of the detectors are introduced into the optical setup, a warning will be shown to alert the user that the setting in the *Paraxial Assumption* tool does not affect them.



Without Paraxial Approximation



With Paraxial Approximation

# Document Information

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title	Paraxial Assumption Tool
document code	SWF.0013
document version	1.1
software edition	VirtualLab Fusion Basic
software version	2023.2 (Build 1.242)
category	Feature Use Case
further reading	

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