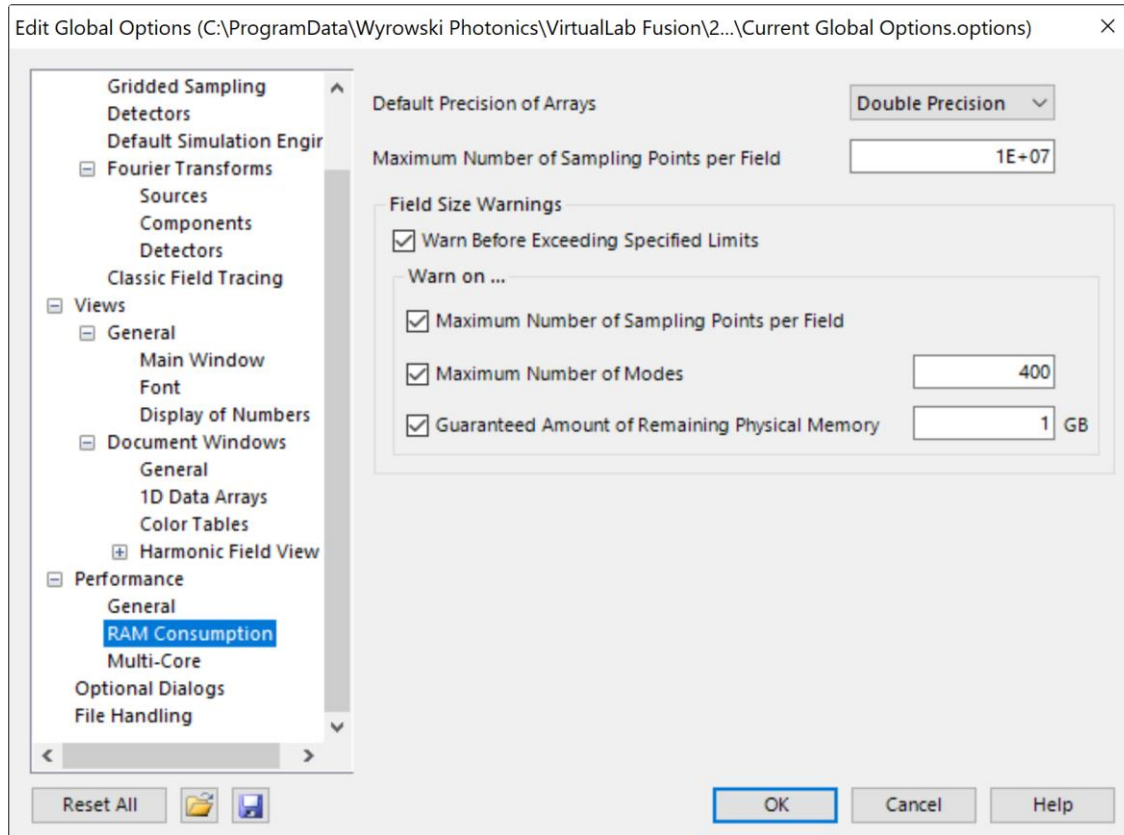# Performance Settings in Global Options of VirtualLab Fusion

Abstract

VirtualLab Fusion can be run on very different computers, with different configurations and computational power. Adjusting the internal numerical parameters of the software, like the maximum number of sampling points allowed per field or the number of cores used for computation, can be helpful to optimize the numerical load with regards to the available processor power and memory. In this document we discuss the performance-related options which can be configured in the Global Options of VirtualLab Fusion.

How to access Global Options
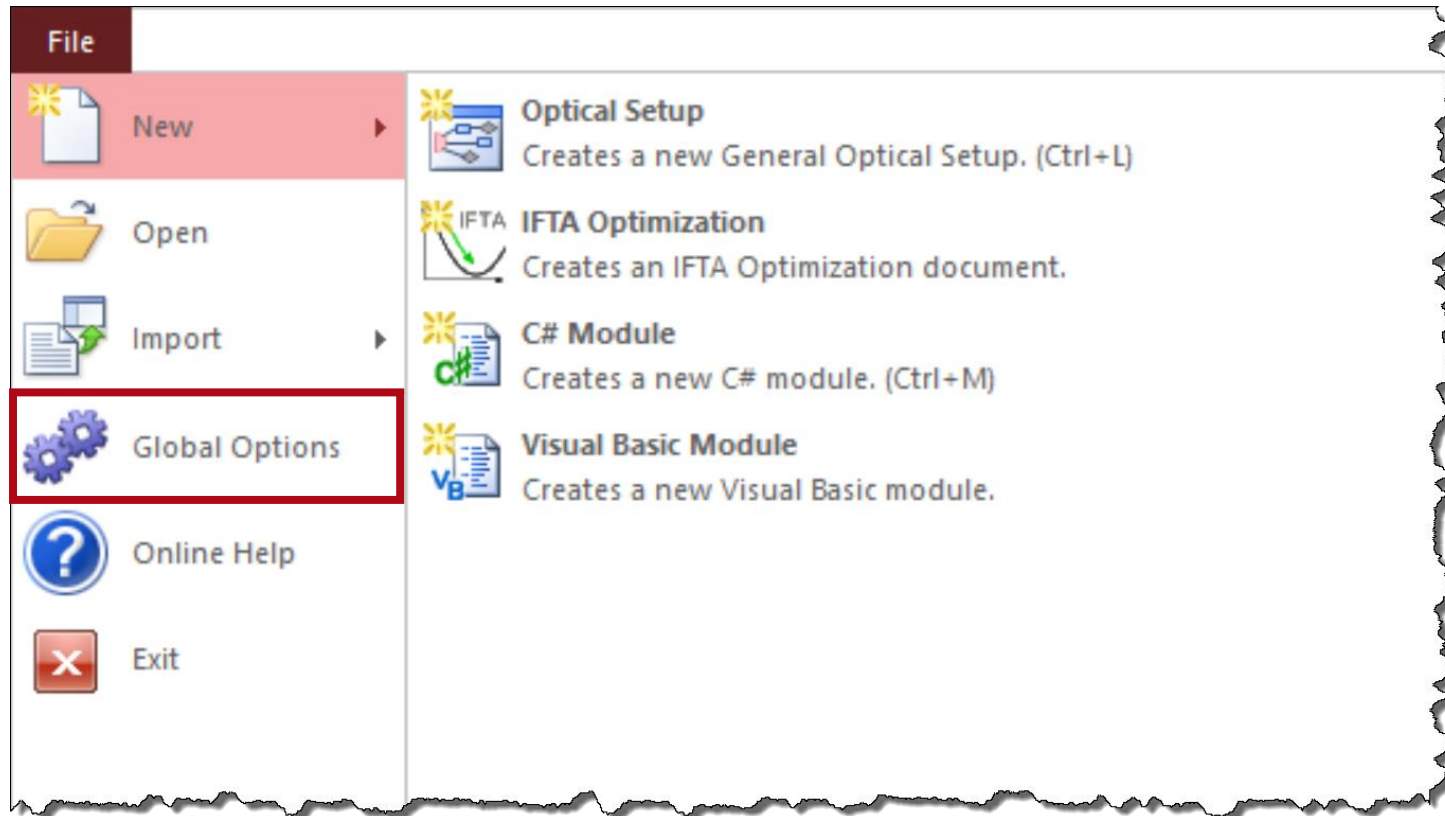
Navigate to the menu at the top left corner of the screen and then to *Global Options.*

Loading & Saving the Global Options

After configuring all settings, except for the file paths in the *Saving* category, the global options can be reset, loaded, and saved with the following controls:

| Item	Description
Reset All	Resets all global program options to their initial values.
Load Global Options	With this button you can load the Global Options from a file saved with the 💾 button.
Save Global Options	With this button you can save the Global Options into a .options file, either as backup or to transfer them to another computer.
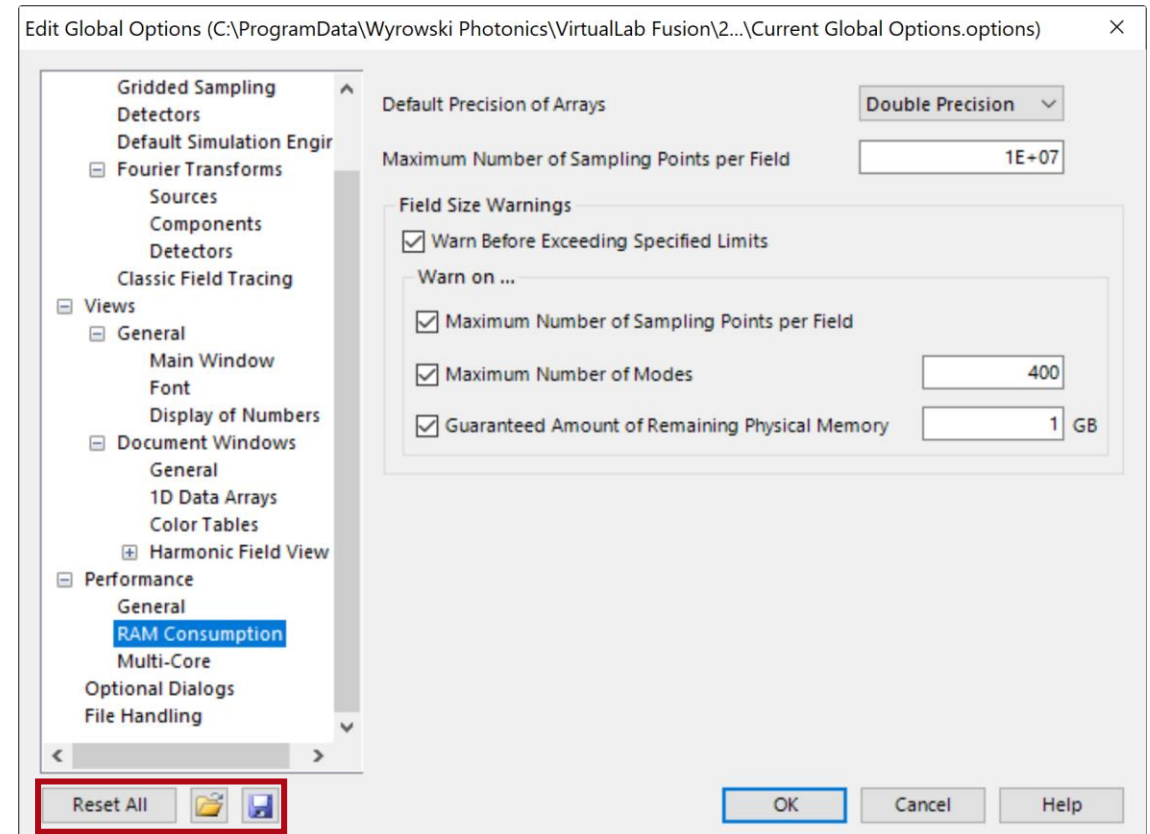
Performance
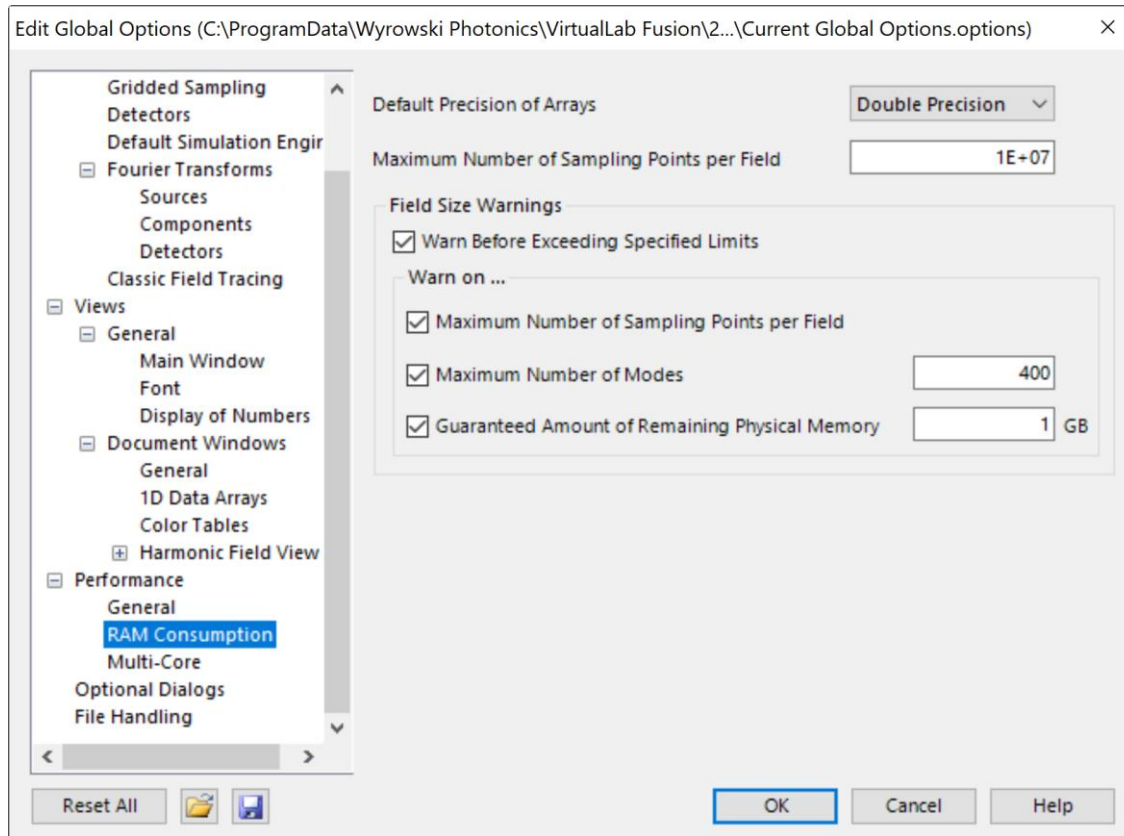
RAM Consumption

- Change maximum number of sampling points per field to adjust limit of usage of physical memory

- Activate and deactivate warnings for memory-demanding simulations. Please note that issued warnings require user input and therefore interrupt the simulation procedure.
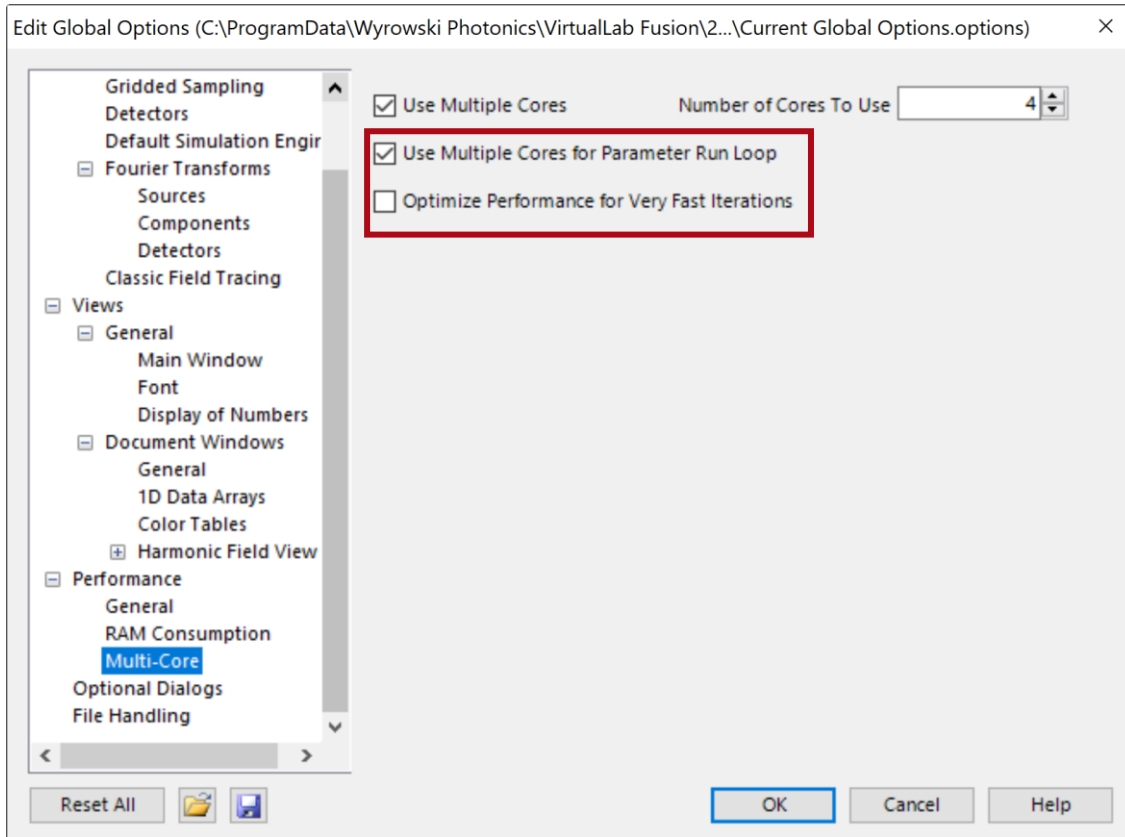
Performance
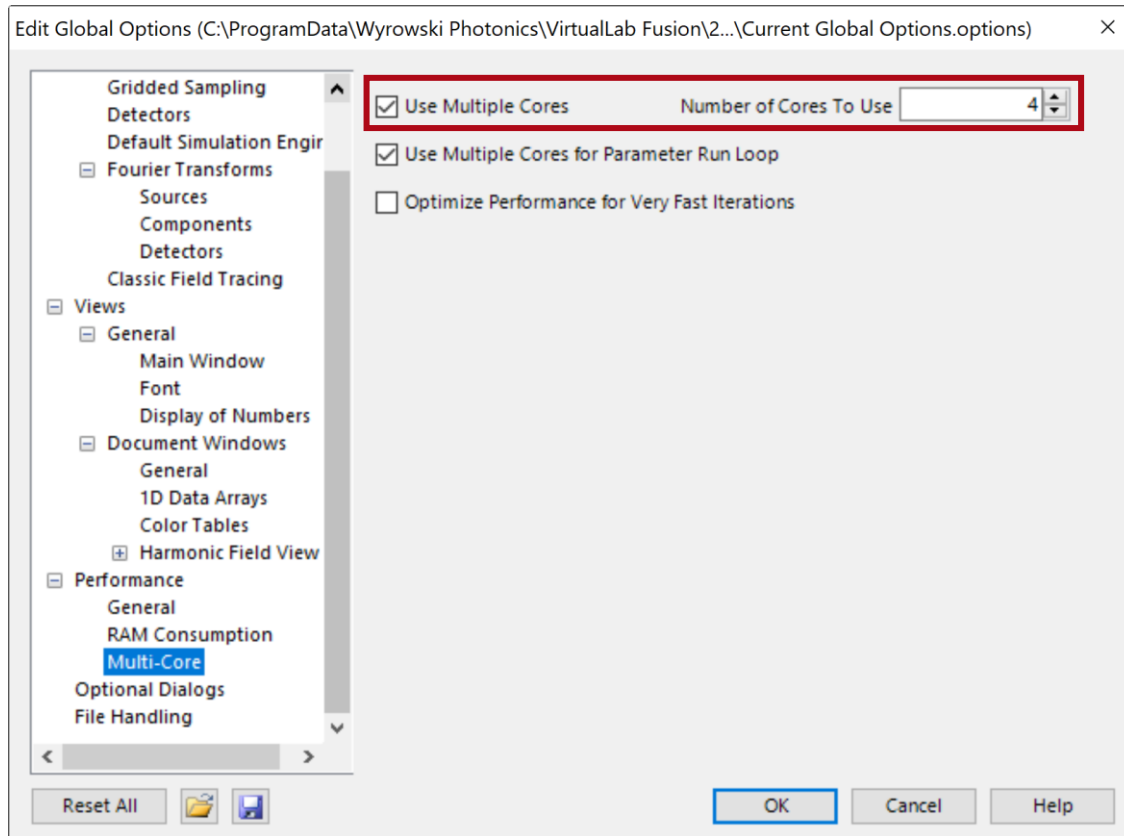
Multi-Core

- VirtualLab Fusion utilizes parallelization of simulation processes in order to improve computational time
- For the Parameter Run parallelization is used to simulate multiple systems at the same time, the "Number of Cores To Use" determine how many systems can be simulated parallel

Performance

Edit Global Options (C:\ProgramData\Wyrowski Photonics\VirtualLab Fusion\2...\Current Global Options.options)

- Gridded Sampling
- Detectors
- Default Simulation Engin
- Fourier Transforms
  - Sources
  - Components
  - Detectors
- Classic Field Tracing
- Views
  - General
    - Main Window
    - Font
    - Display of Numbers
  - Document Windows
    - General
    - 1D Data Arrays
    - Color Tables
    - Harmonic Field View
- Performance
  - General
  - RAM Consumption
  - **Multi-Core**
- Optional Dialogs
- File Handling

☑ Use Multiple Cores   Number of Cores To Use   4

☑ Use Multiple Cores for Parameter Run Loop

☐ Optimize Performance for Very Fast Iterations

Reset All   OK   Cancel   Help

Multi-Core for Parameter Run

- If performing a Parameter Run for a system that requires much RAM it may be useful to deactivate this functionality to avoid out-of-memory errors

Optimize Performance for Very Fast Iterations

- Changes internal parallelization processes to improve calculation time for Parameter Run with quickly calculated iterations

Optional Dialogs
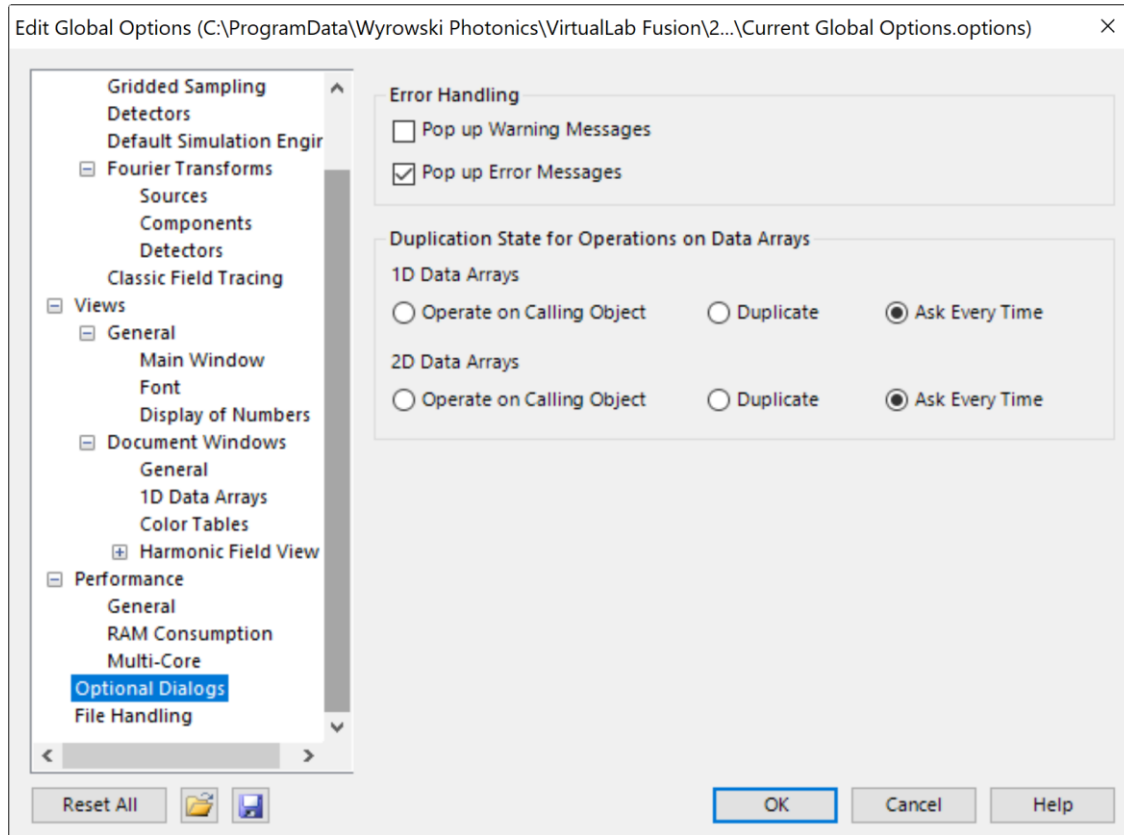
Error Handling

- Pop up Messages for Warnings and Errors can be de- and reactivated

Duplication State for Operators on Data Arrays

- As default, if performing operations on a Data Array, VirtualLab Fusion will ask if a new window shall be generated, or the old result shall be overwritten. It is possible to setup the system so that one option is automatically chosen.
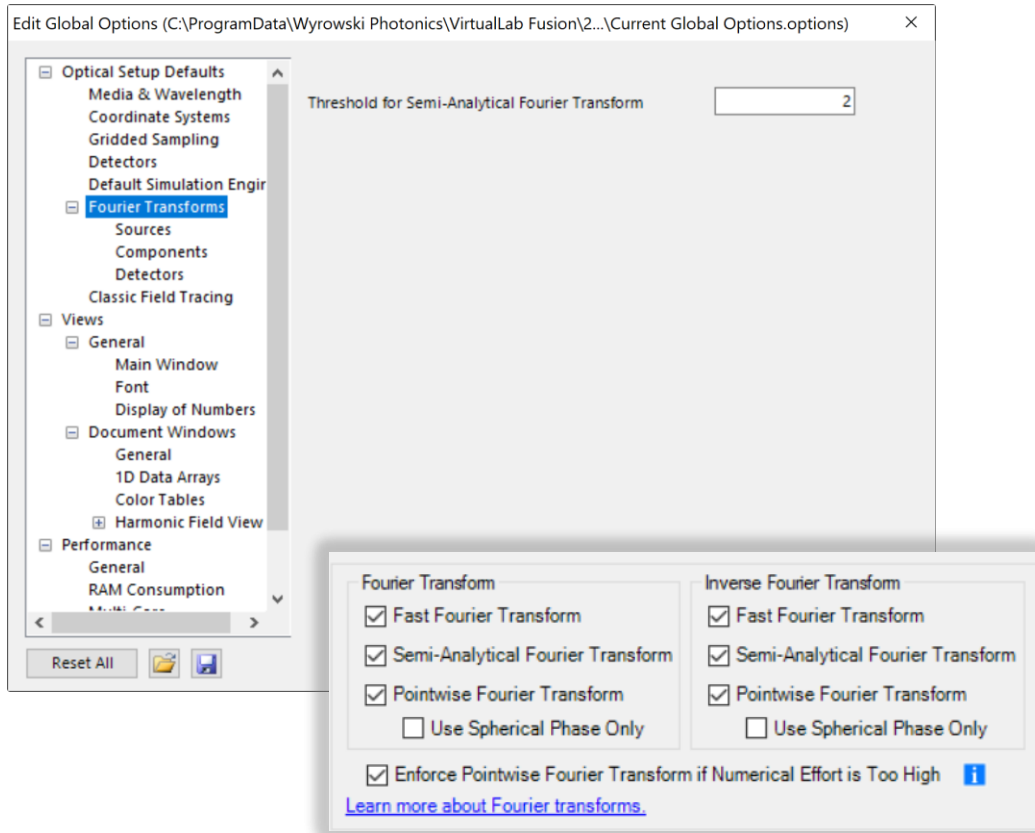
File Handling
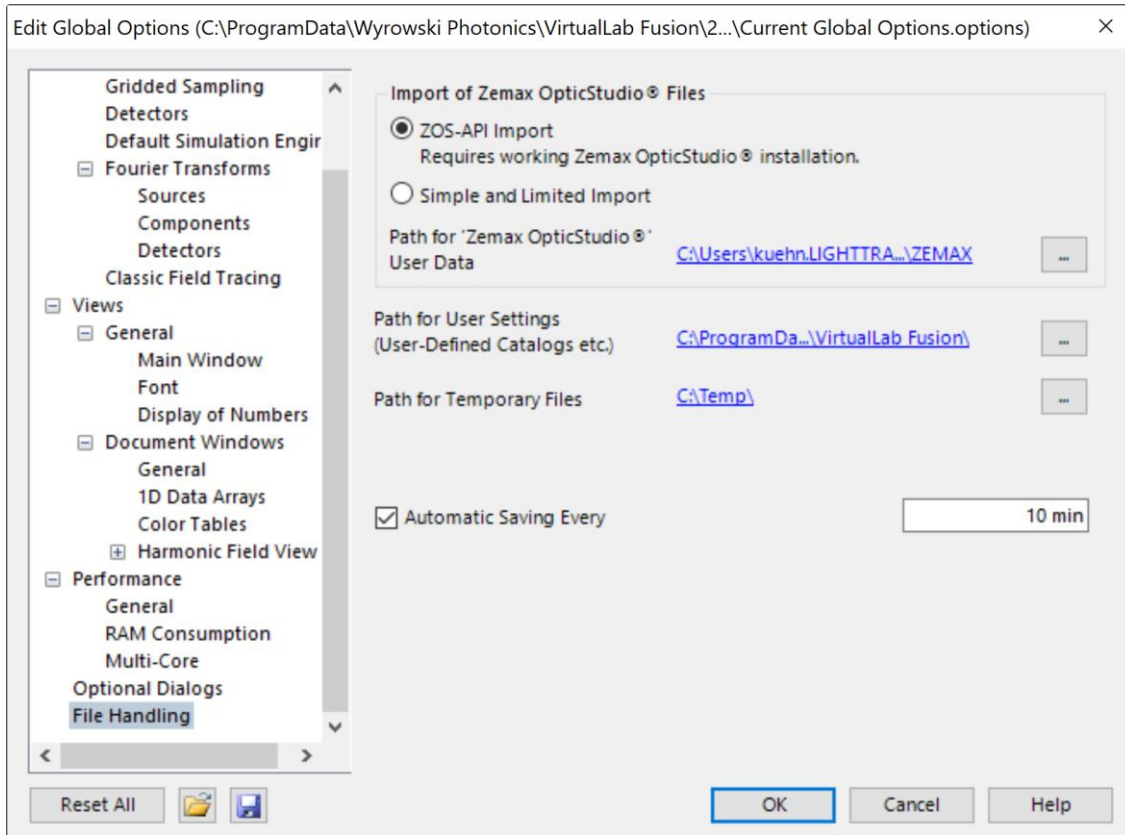
Path for User Settings

- This directory is used to save various software specific files like error logs, GUI-Settings and user-defined catalogs
- It also serves as initial directory for e.g. export functions

Automatic Saving

- Specified interval for an automatic saving

Optical Setup Defaults

Threshold for Semi-Analytical Fourier Transform

- This threshold defines when the Semi-Analytical Fourier Transform (SFT) is used instead of the regular Fast Fourier Transform (FFT). SFT is only used when FFT requires the defined value times higher sampling.

Fourier Transform Settings

- Fourier Transforms setting for the Source, Components, Detectors can be overwritten per Optical Setup in the Simulation Settings dialog and per component in the Fourier Transforms tab of the component's edit dialog. (see more details:)

Document Information

title	Performance Settings in Global Options of VirtualLab Fusion
document code	USP.0006
version	1.0
edition	VirtualLab Fusion Basic
software version	2021.1 (Build 1.142)
category	Feature Use Case
further reading	- Personalization Settings for Visualization in VirtualLab Fusion