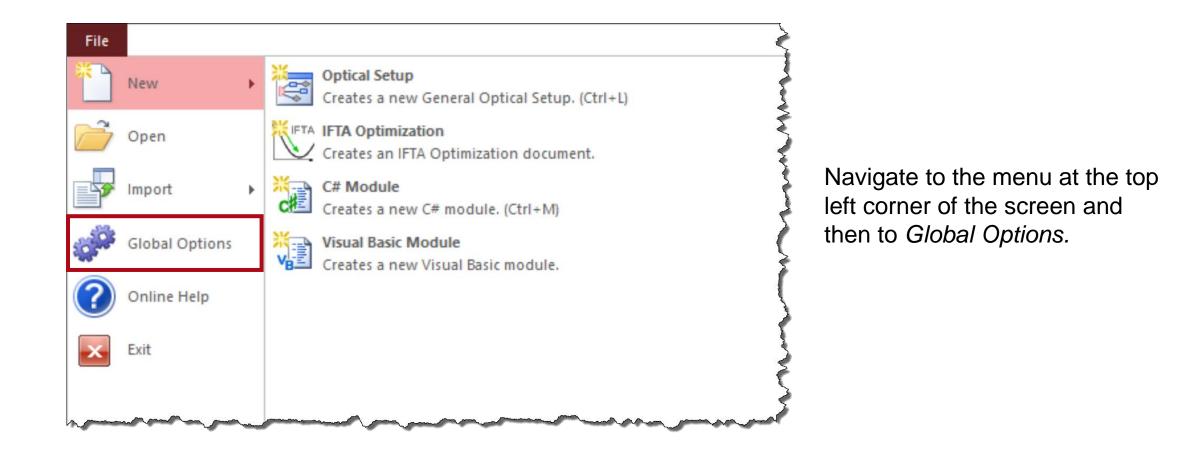


Performance Settings in Global Options of VirtualLab Fusion

| Detectors | Default Precision of Arrays | Double Precision 🗸 |
|--|---|---------------------------|
| Default Simulation Engir 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 | Maximum Number of Sampling Points p Field Size Warnings Warn Before Exceeding Specified L Warn on Maximum Number of Sampling R Maximum Number of Modes Guaranteed Amount of Remaining | imits Points per Field |

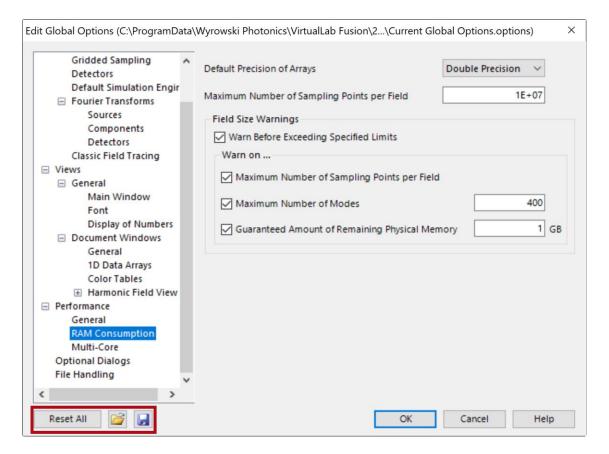
VirtualLab Fusion can be run on very different computers, with different configurations and computational power. Adjusting the internal numerical parameters of the software, like the maximum number of sampling points allowed per field or the number of cores used for computation, can be helpful to optimize 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



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

| Gridded Sampling | Default Precision of Arrays | Double Precision V |
|---|--|--------------------|
| Gridded Sampling A Detectors Default Simulation Engir Fourier Transforms Sources Components Detectors Classic Field Tracing General Main Window Font Display of Numbers Document Windows General | Maximum Number of Sampling Points per Field Field Size Warnings Warn Before Exceeding Specified Limits Warn on Maximum Number of Sampling Points per Field Maximum Number of Modes Guaranteed Amount of Remaining Physical Men | 1E+07 |
| 1D Data Arrays Color Tables Harmonic Field View Performance General RAM Consumption Multi-Core Optional Dialogs File Handling ✓ | | |

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

| Edit Global Options (C:\ProgramData\Wyrowski Photonics\VirtualLab Fusion\2\Current Global Options.options) \times | | | | | × | |
|---|--|--------------------------|-------------------------|--------|------|--|
| | Gridded Sampling A Detectors | Use Multiple Cores | Number of Cores To | Use | 4 🔹 | |
| | Default Simulation Engir Fourier Transforms | Use Multiple Cores for F | Parameter Run Loop | | | |
| | Sources Components Detectors | Optimize Performance f | or Very Fast Iterations | | | |
| | 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 🗸 🗸 🗸 | | | | | |
| | < > | | | | | |
| | Reset All 📔 | | ОК | Cancel | Help | |

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 Engine 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 General RAM Consumption Multi-Core Optional Dialogs File Handling | |
| 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

| Edit Global Options (C:\ProgramData\V | Vyrowski Photonics\VirtualLab Fus | ion\2\Current Glob | oal Options.options) | × |
|--|---|-------------------------------|----------------------|---|
| Gridded Sampling Detectors Default Simulation Engir Fourier Transforms Sources | Error Handling Pop up Warning Messages Pop up Error Messages | | | |
| Components Detectors Classic Field Tracing | Duplication State for Operations 1D Data Arrays | on Data Arrays | | |
| Views General Main Window | Operate on Calling Object 2D Data Arrays | Duplicate | Ask Every Time | |
| Font Display of Numbers Document Windows | Operate on Calling Object | O Duplicate | Ask Every Time | |
| General 1D Data Arrays Color Tables | | | | |
| Harmonic Field View Performance General | | | | |
| RAM Consumption Multi-Core Optional Dialogs | | | | |
| File Handling V | | | | |
| Reset All 📴 🛃 | | OK | Cancel Help | |

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

| Edit Global Options (C:\ProgramData\ | Wyrowski Photonics\VirtualLab Fu | sion\2\Current Global Options.options) | × |
|---|--|---|---|
| Gridded Sampling Detectors Default Simulation Engir Fourier Transforms Sources Components Detectors Classic Field Tracing Views | Import of Zemax OpticStudio® © ZOS-API Import Requires working Zemax Option O Simple and Limited Import Path for 'Zemax OpticStudio®' User Data Path for User Settings | |] |
| General Main Window Font Display of Numbers Document Windows General 1D Data Arrays Color Tables | (User-Defined Catalogs etc.) Path for Temporary Files | C:\ProgramDa\VirtualLab Fusion\ C:\Temp\ 10 mir | |
| Harmonic Field View Performance General RAM Consumption Multi-Core Optional Dialogs File Handling ✓ ✓ ✓ Reset All | | OK Cancel Help | |

Path for User Settings

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

Automatic Saving

 Specified interval for an automatic saving

Optical Setup Defaults

| Edit Global Options (C:\ProgramData\Wy | rowski Photonics\VirtualLab Fusion\2\Current Glo | obal Options.options) × |
|--|--|--|
| Optical Setup Defaults Media & Wavelength Coordinate Systems Gridded Sampling Detectors Default Simulation Engir 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 | hreshold for Semi-Analytical Fourier Transform | 2 |
| General RAM Consumption | Fourier Transform | Inverse Fourier Transform |
| Reset All 📓 🔒 | Semi-Analytical Fourier Transform Pointwise Fourier Transform Use Spherical Phase Only | Semi-Analytical Fourier Transform Pointwise Fourier Transform Use Spherical Phase Or |
| | Enforce Pointwise Fourier Transform | if Numerical Effort is Too High |

Learn more about Fourier transforms.

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:)

| title | Performance Settings in Global Options of VirtualLab Fusion |
|------------------|---|
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| 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 |