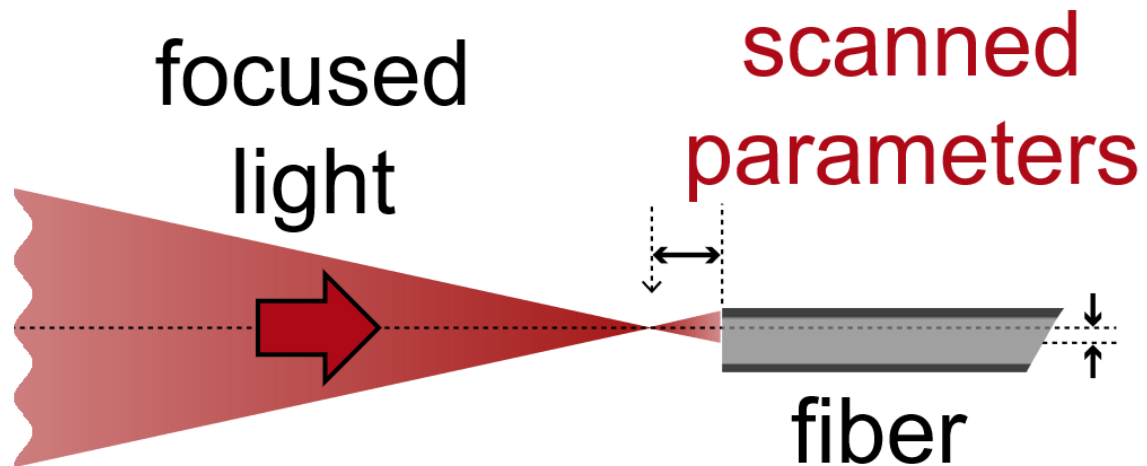


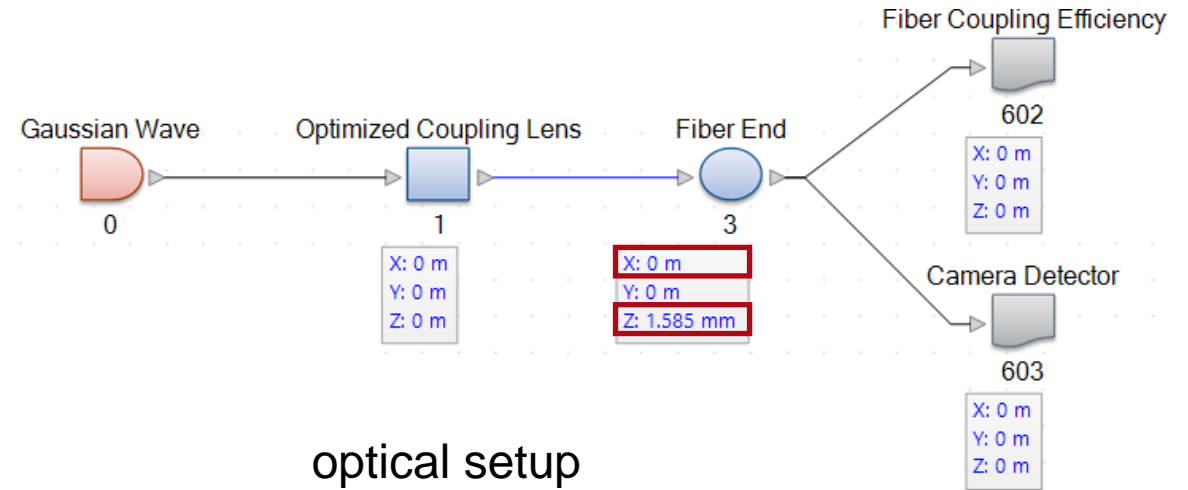
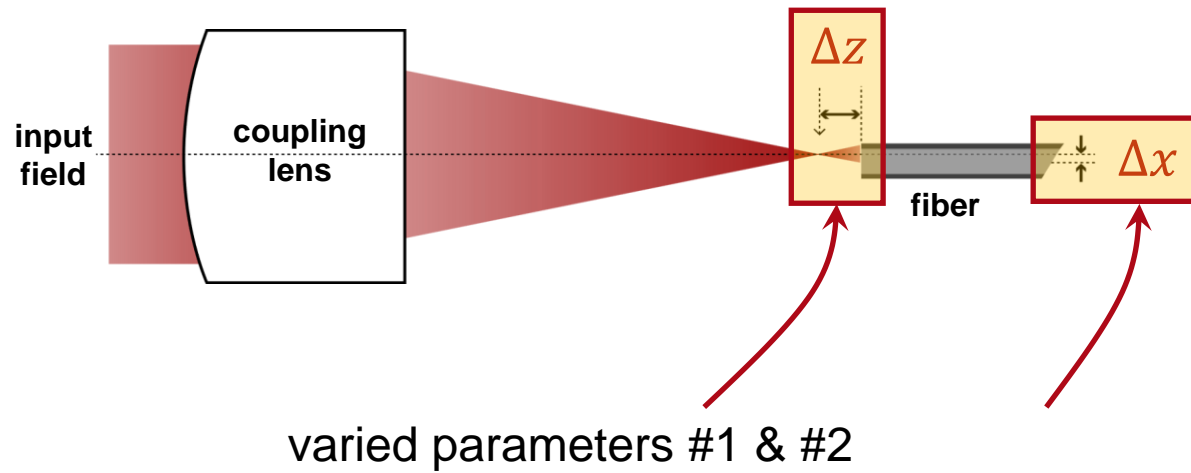
Scanning Mode of Parameter Run

Abstract



The scanning mode of VirtualLab Fusion's Parameter Run allows the user to perform a parameter sweep in which several system parameters are varied simultaneously. This use case demonstrates this feature along the example of a tolerance analysis regarding the efficiency of a fiber coupling setup where the fiber is slightly longitudinally and laterally misaligned. The Parameter Run document also provides specific options for an illustrative display of the corresponding results.

Configuration of Parameter Variation: Parameter Selection



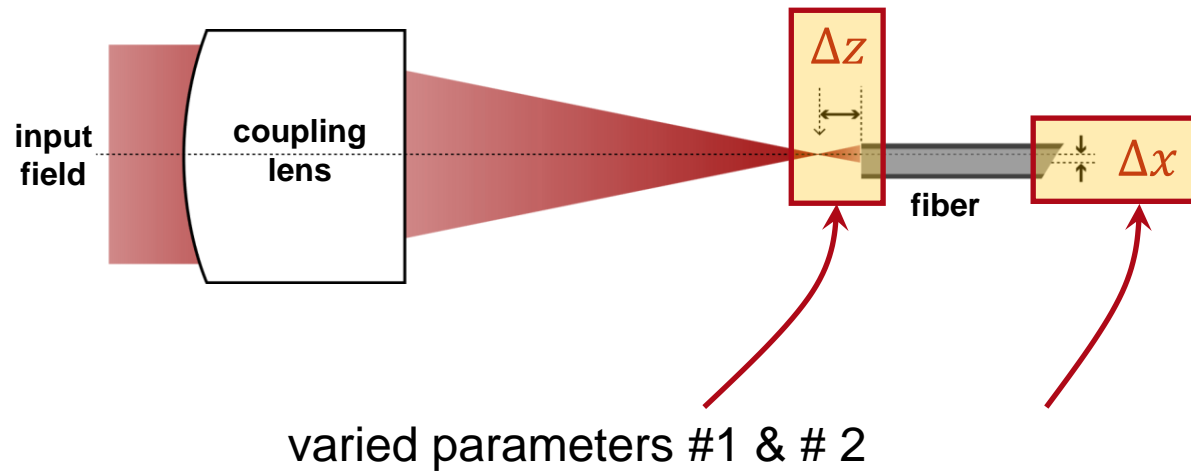
parameter run document

Usage Mode: Scanning Number of Iterations: 1681

Filter by... ☒ Show Only Varied Parameters

1	2	*	Object	Category	Parameter	Vary	From	To	Steps	Step Size	Original Value
			Fiber End #3	Basal Positioning (Relative)	Distance Before	<input checked="" type="checkbox"/>	1.485 mm	1.685 mm	41	5 μ m	1.585 mm
					Lateral Shift X	<input checked="" type="checkbox"/>	-10 μ m	10 μ m	41	500 nm	0 m

Configuration of Parameter Variation: Definition of Steps



The scanning mode performs a series of simulations with all combinations of the i selected parameters (p_i) and their specified number of steps (n_i).

This might result in a large number N of total simulations. E.g.

- for $i = 2 \rightarrow N = n_1 \times n_2$
- for $i = 3 \rightarrow N = n_1 \times n_2 \times n_3$

parameter run document

Usage Mode: Scanning




Number of Iterations: 1681

Filter by...

☒ Show Only Varied Parameters

1	2	*	Object	Category	Parameter	Vary	From	To	Steps	Step Size	Original Value
			Fiber End #3	Basal Positioning (Relative)	Distance Before	<input checked="" type="checkbox"/>	1.485 mm	1.685 mm	41	5 μ m	1.585 mm
					Lateral Shift X	<input checked="" type="checkbox"/>	-10 μ m	10 μ m	41	500 nm	0 m

Selection #1 of Result Display – 2D Type

			Iteration Step							
Detector	Subdetector	Combined Output		1	2	3	4	5	6	7
Varied Parameters	Distance Before (Fiber End...	Data Array		1.485 mm	1.485 mm	1.485 mm	1.485 mm	1.485 mm	1.485 mm	1.485 mm
	Lateral Shift X (Fiber End #...	Data Array		-10 μm	-9.5 μm	-9 μm	-8.5 μm	-8 μm	-7.5 μm	-7 μm
Fiber Coupling Efficiency...	Fiber Coupling Efficiency	Data Array		0.78894 %	0.90613 %	1.0168 %	1.1516 %	1.3274 %	1.4852 %	1.5986 %

parameter run document > result page

Often, for 2 scanned parameters, it makes sense to display the results by creating a 2D plot with one of the two varied parameters as the abscissa (horizontal axis) and the other as the ordinate (vertical axis).

Edit Two-Dimensional Output

☐ Plot All Data on One Axis

☒ Separate Varied Parameters along 2 Dimensions

Data Array Type

2D Gridded

Abscissa

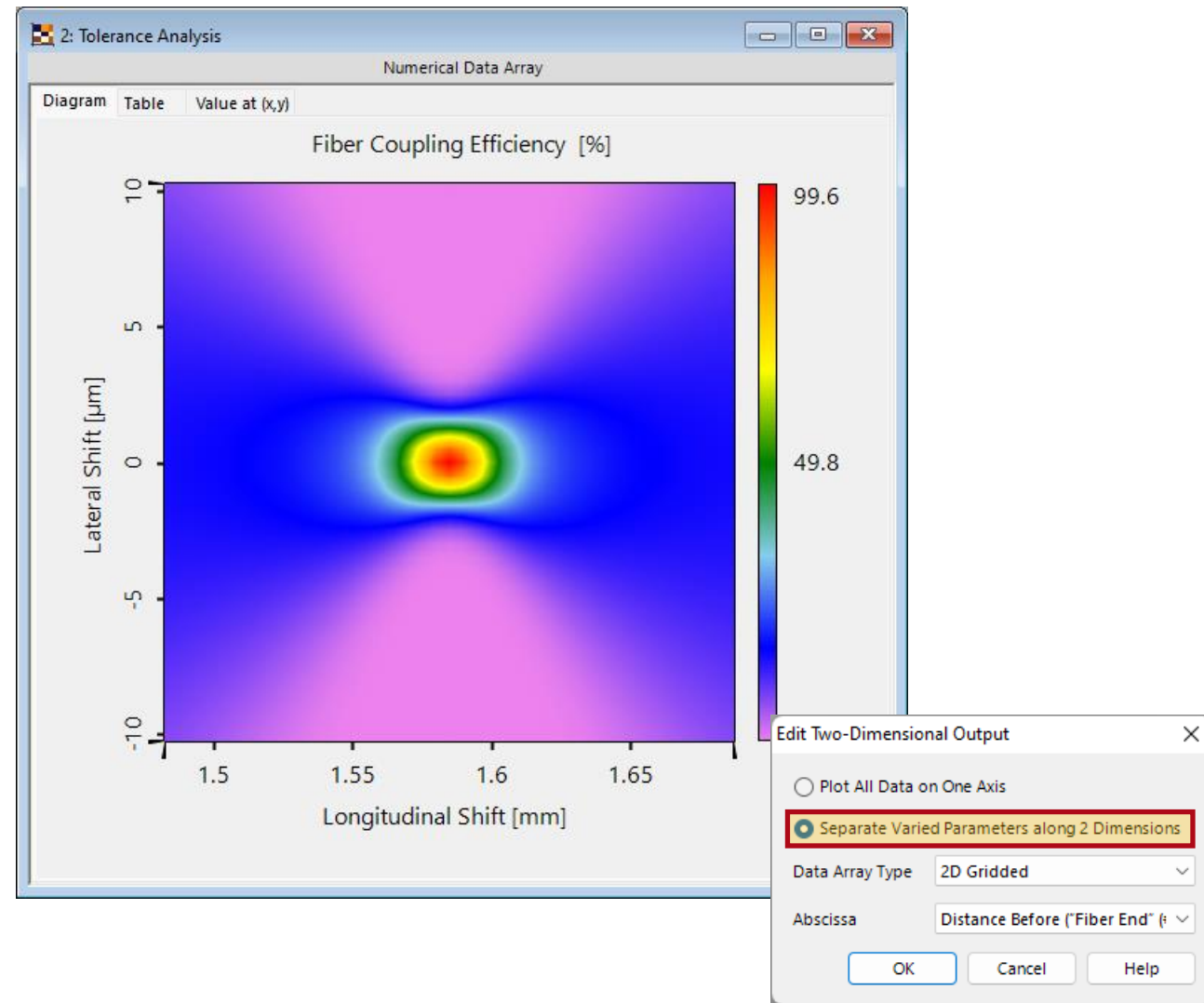
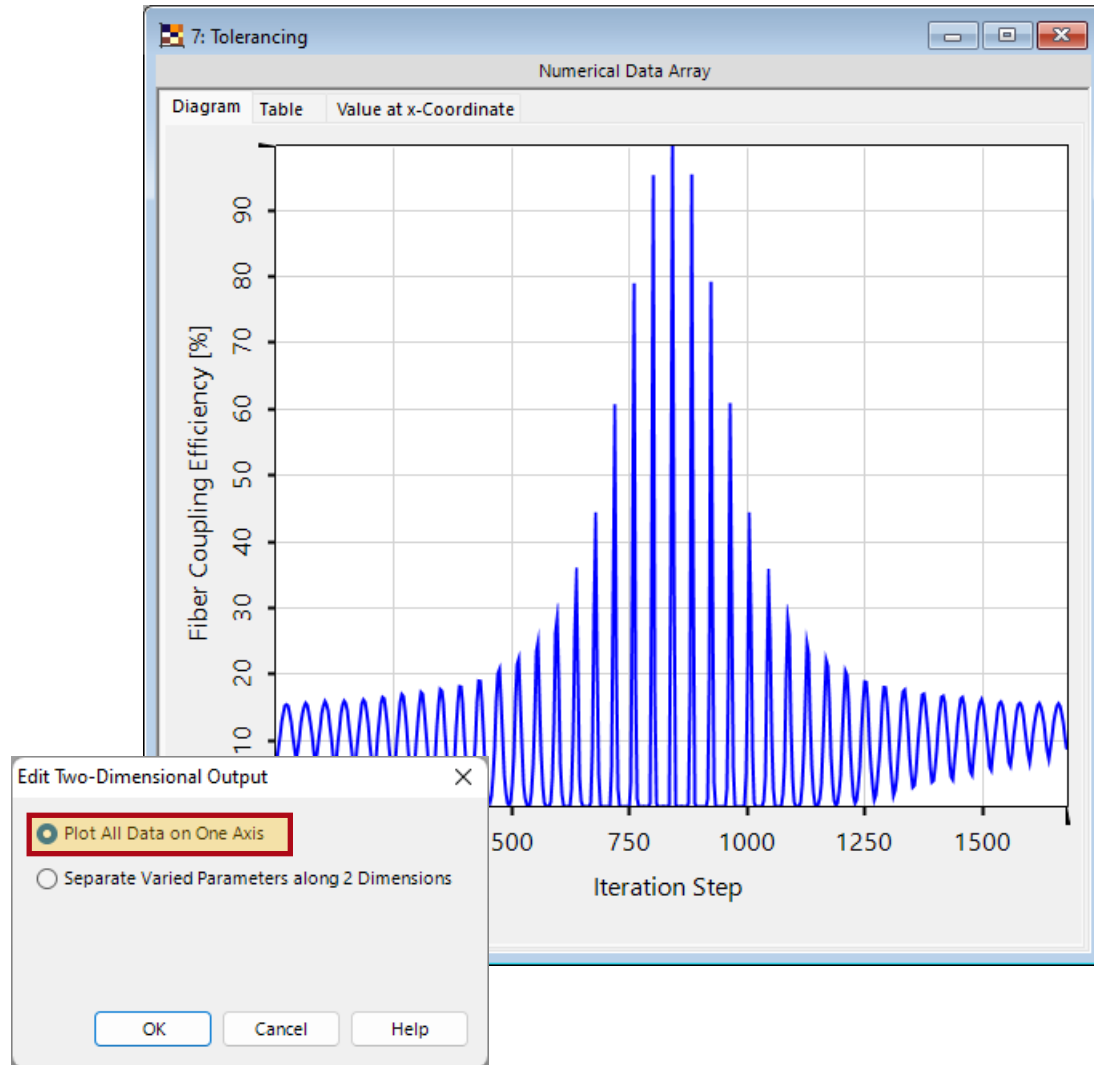
Distance Before ("Fiber End" (i

OK

Cancel

Help

Comparison of Output Formats



Selection #2 of Result Display – 1D Type

		Iteration Step							
Detector	Subdetector	Combined Output	1	2	3	4	5	6	7
Varied Parameters	Distance Before (Fiber End...	Data Array	1.485 mm	1.485 mm	1.485 mm	1.485 mm	1.485 mm	1.485 mm	1.485 mm
	Lateral Shift X (Fiber End #...	Data Array	-10 μm	-9.5 μm	-9 μm	-8.5 μm	-8 μm	-7.5 μm	-7 μm
Fiber Coupling Efficiency...	Fiber Coupling Efficiency	Data Array	0.78894 %	0.90613 %	1.0168 %	1.1516 %	1.3274 %	1.4852 %	1.5986 %

parameter run document > result page

In case one of the two parameter uses fewer iterations than the other, the *1D Multigraph* display might be a handy option. Here we configured the same variations for the x-position as before, but only at 9 different z-planes.

Edit Two-Dimensional Output

☐ Plot All Data on One Axis

☒ Separate Varied Parameters along 2 Dimensions

Data Array Type 1D Multigraph

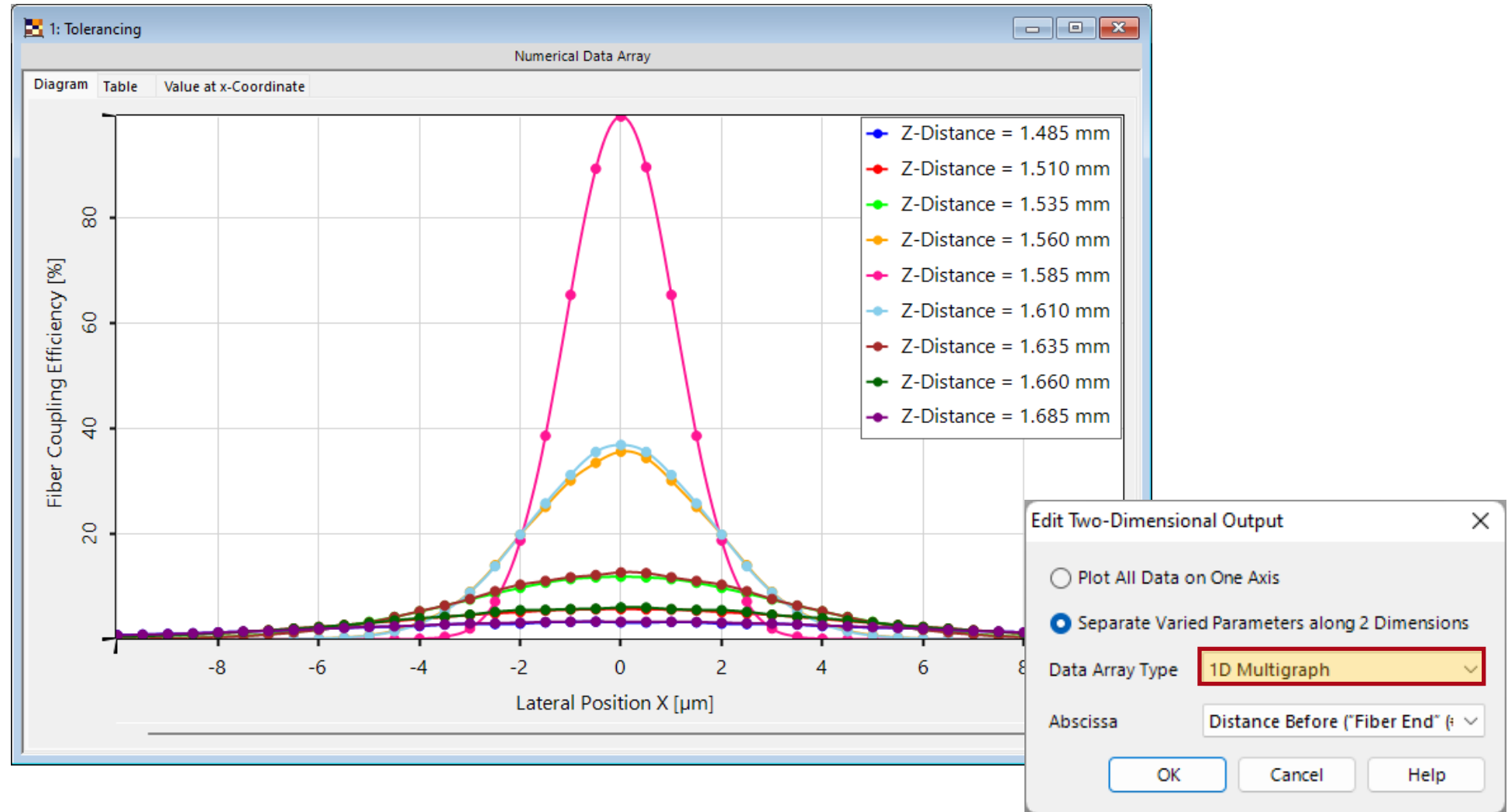
Abscissa Distance Before ("Fiber End" (i

OK

Cancel

Help

Result: 1D Multigraph Display



Document Information

title	Scanning Mode of Parameter Run
document code	MISC.0075
document version	1.1
software edition	VirtualLab Fusion Basic
software version	2021.1 (Build 1.180)
category	Feature Use Case
further reading	<ul style="list-style-type: none">- <u>Usage of the Parameter Run Document</u>- <u>Tolerance Analysis of a Fiber-Coupling Setup</u>- <u>Programming a Scanning Parameter Run</u>- <u>Animation Generation from Chromatic Fields Sets in Parameter Run</u>- <u>Export of Results of a Parameter Run</u>