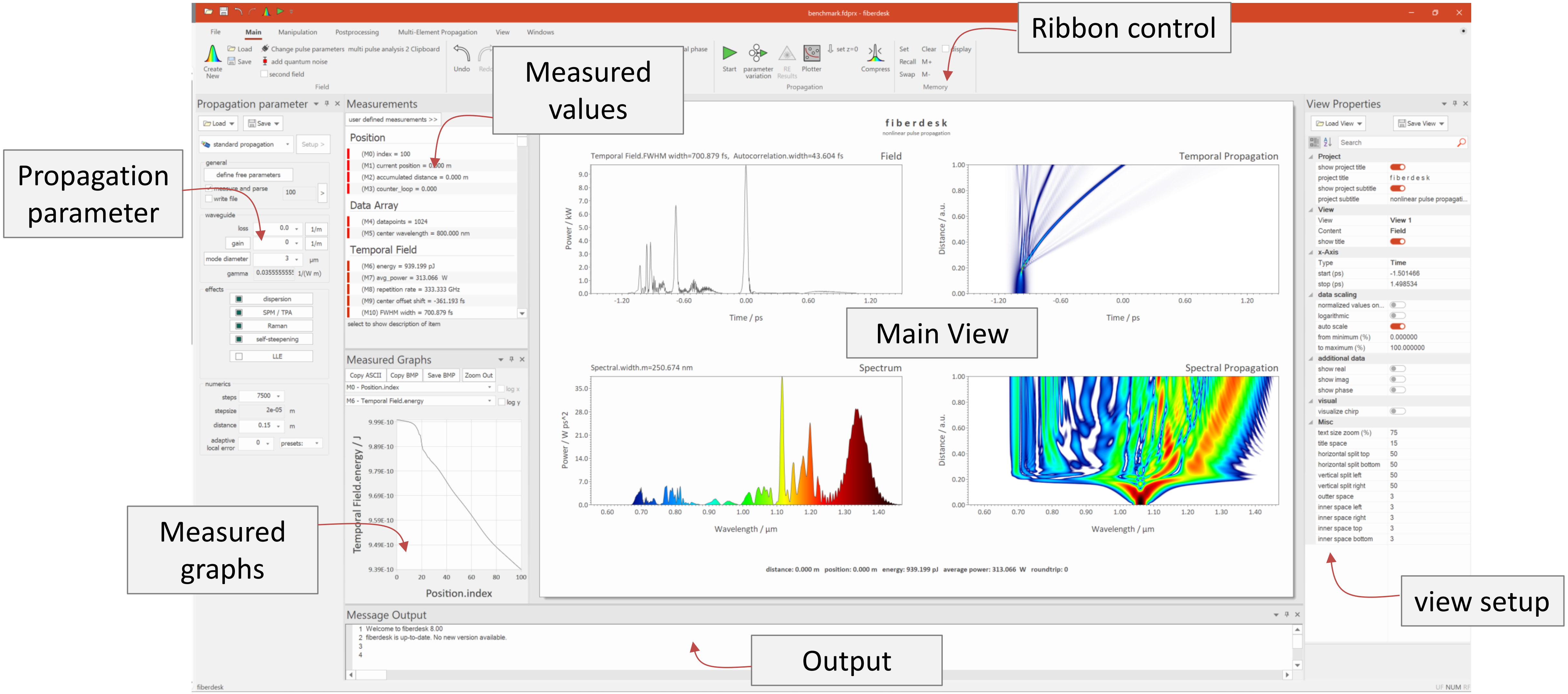
Lecture 1 - Overview

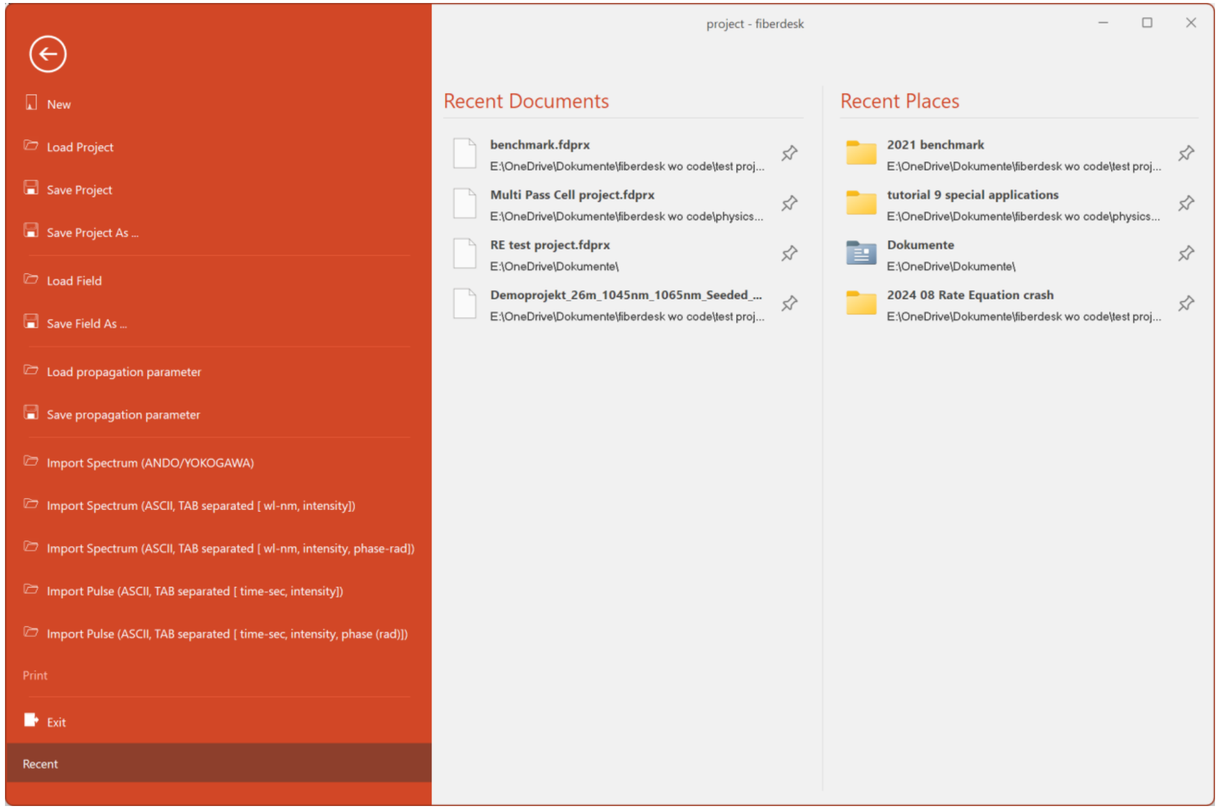
- Graphical User Interface
- Parameter Access
- Setting up a propagation
- Setting up a view
- Loading / Saving field, projects, components

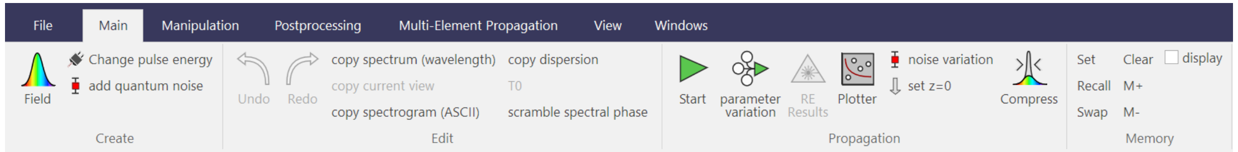
fiberdesk – graphical user interface (GUI)

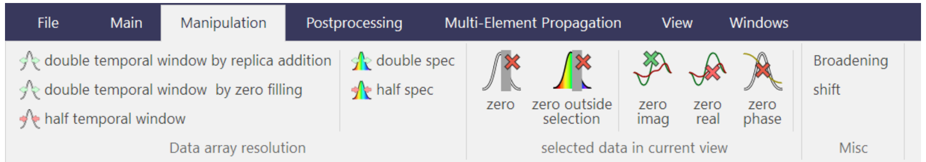


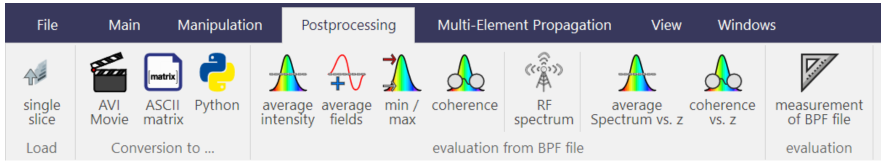
fiberdesk – graphical user interface (GUI)

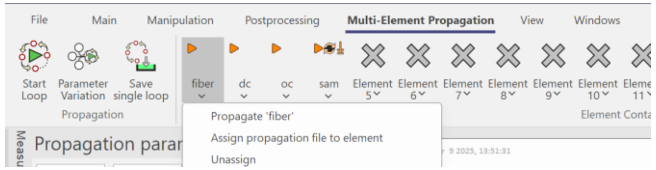
File menu

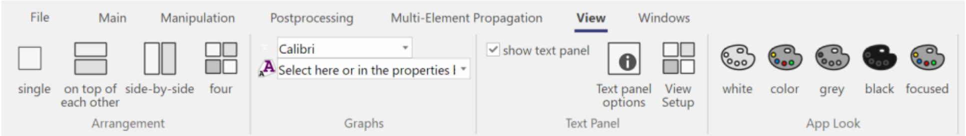


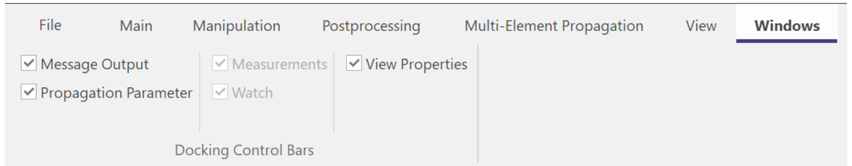












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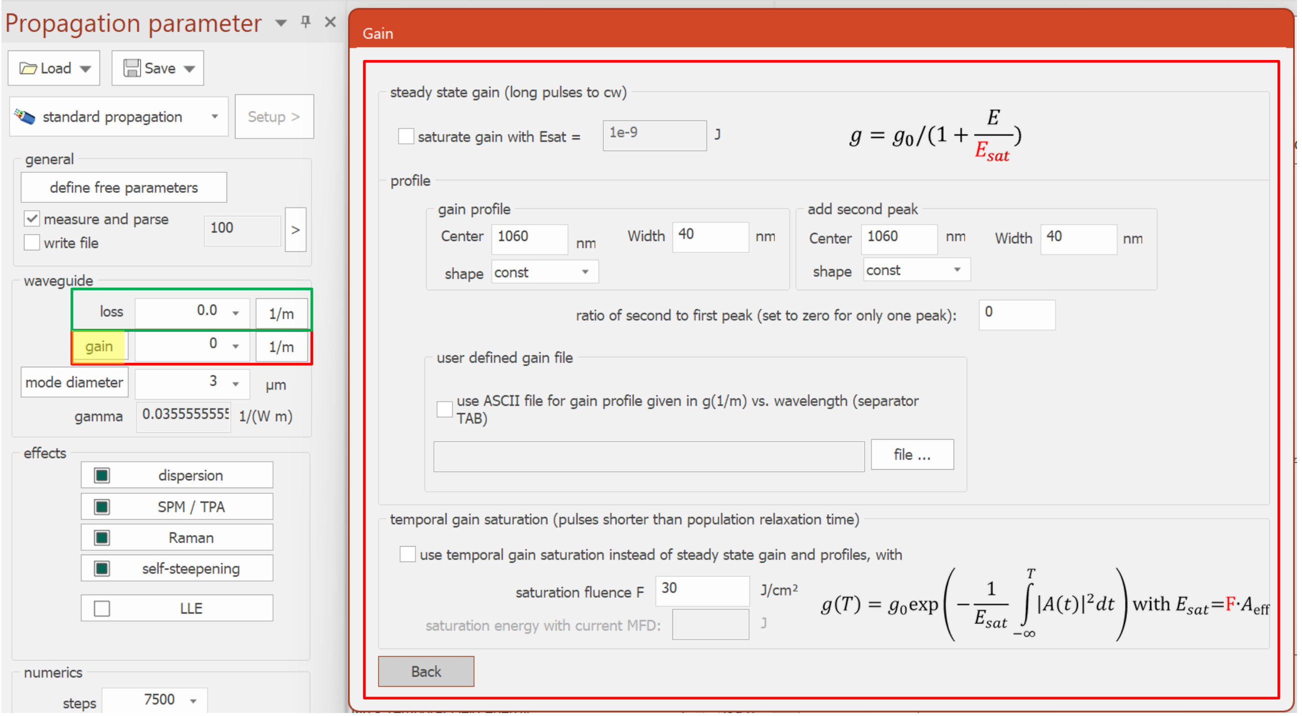
fiberdesk – NLSE parameter setup

Parameter access in detail:

The parameters of the underlying equations are shown for the nonlinear Schrödinger equation as an example:

$$\frac{\partial A}{\partial z} = \boxed{-\frac{\alpha}{2}A} + \boxed{\int_{-\infty}^{\infty} \frac{g(\omega)}{2}\tilde{A}(\omega)e^{-i\omega T}d\omega} + \sum_{n\geq 1}\beta_n \frac{i^{n+1}}{n!}\frac{\partial^n}{\partial T^n}A + i\gamma\cdot\left(1+i\tau_{shock}\frac{\partial}{\partial T}\right)\left(A(T)\int_{-\infty}^{\infty}R(\tau)\left|A(T-\tau)\right|^2 d\tau\right)$$



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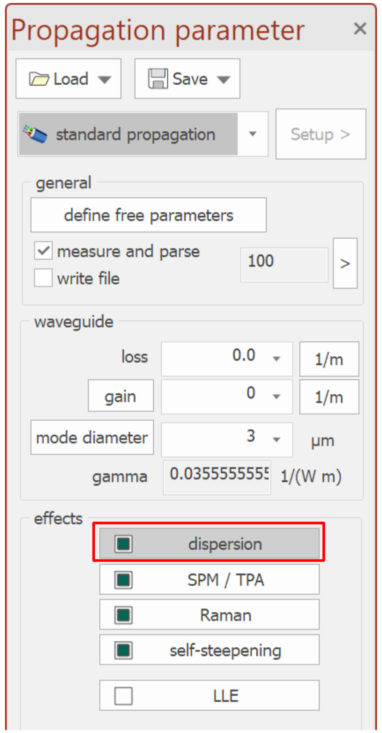

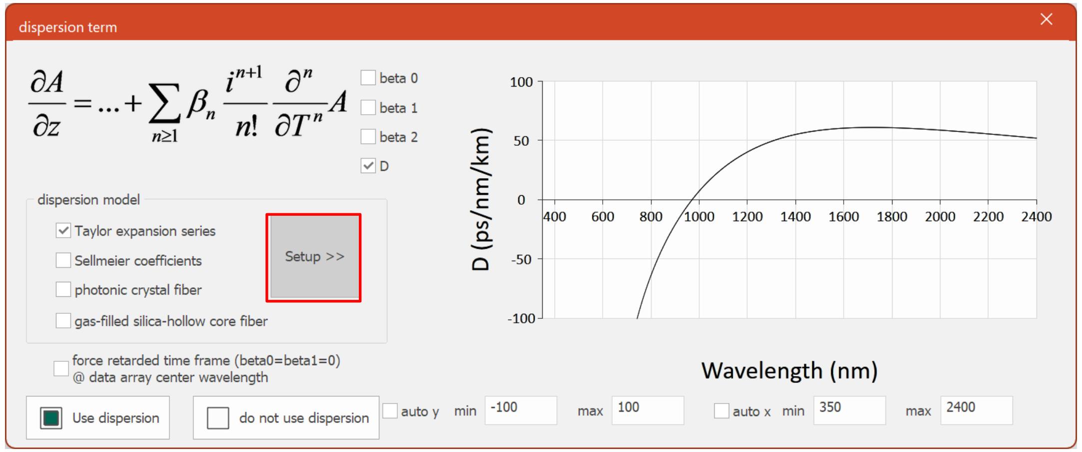

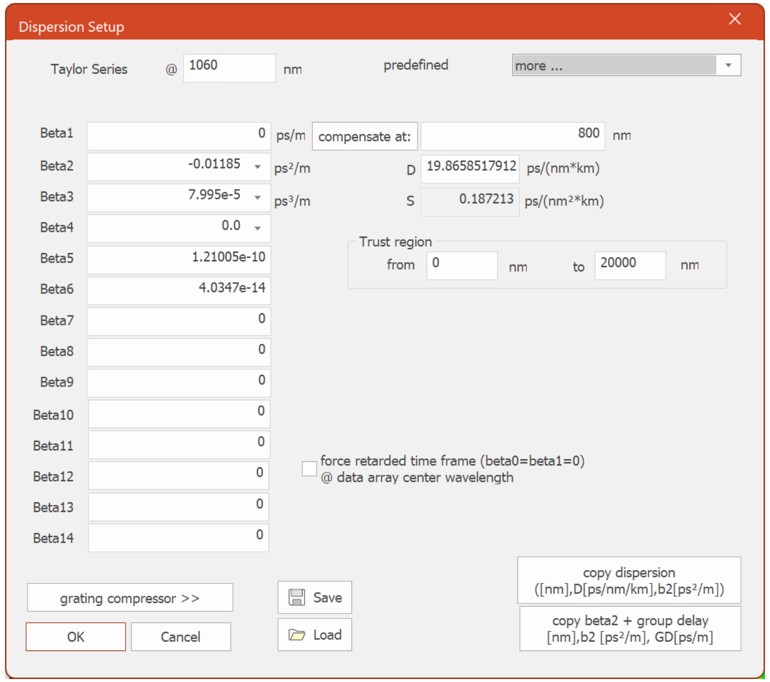

fiberdesk – NLSE parameter setup

Parameter access in detail:

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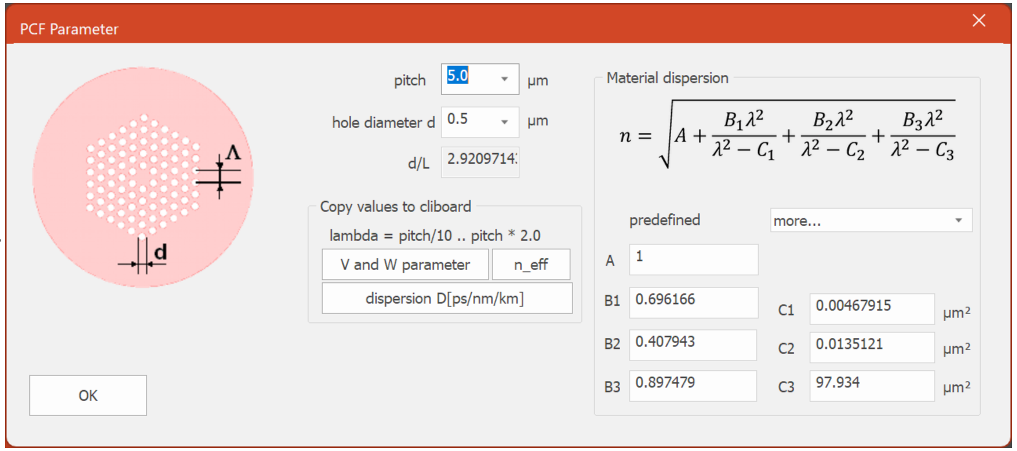

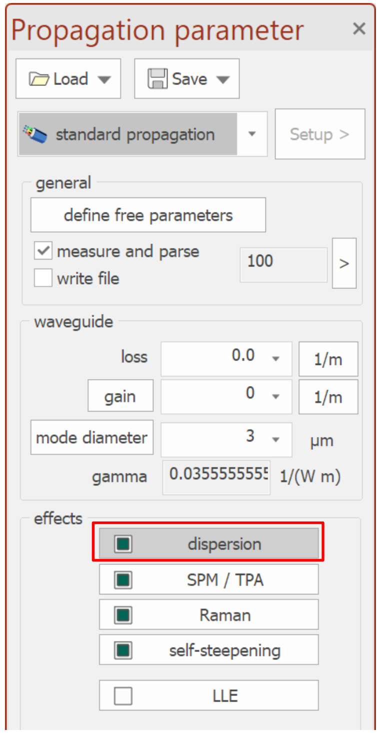

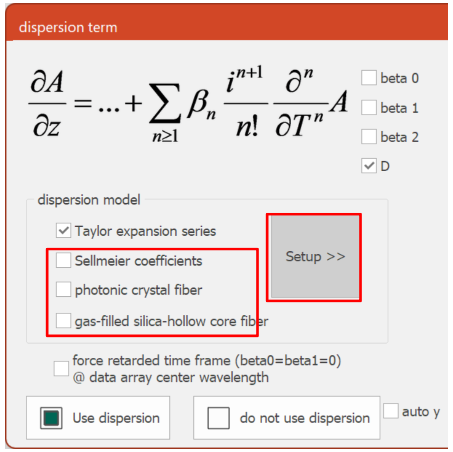

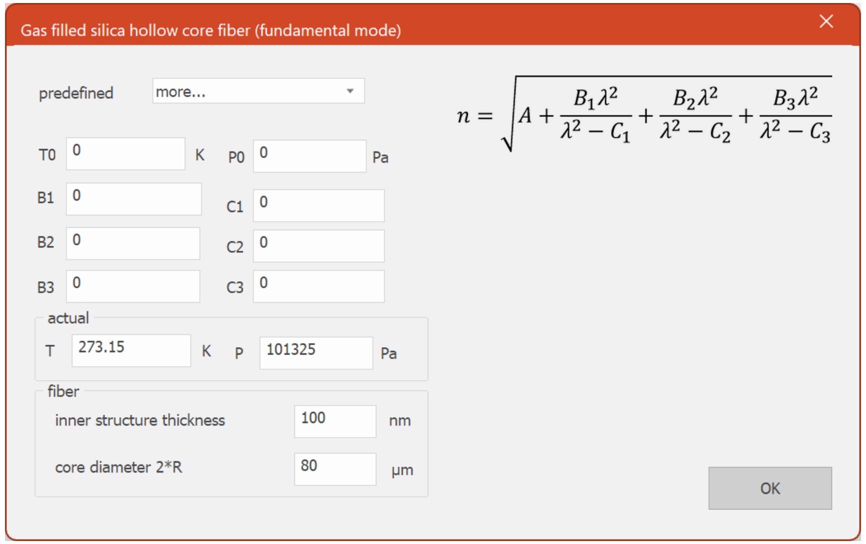

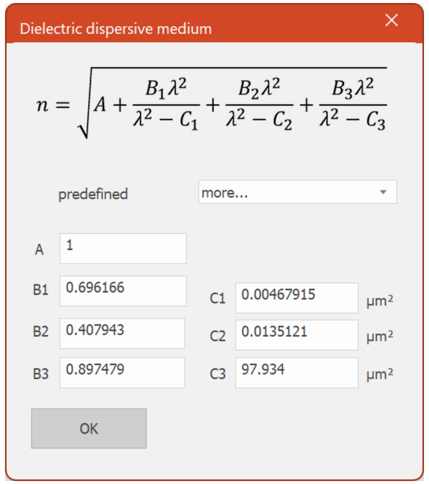

fiberdesk – NLSE parameter setup

Parameter access in detail:

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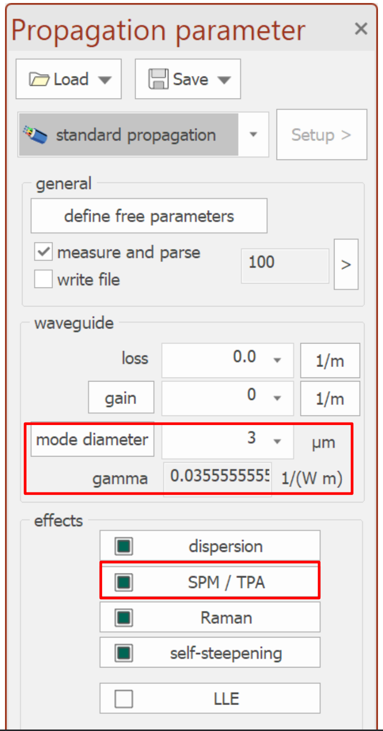

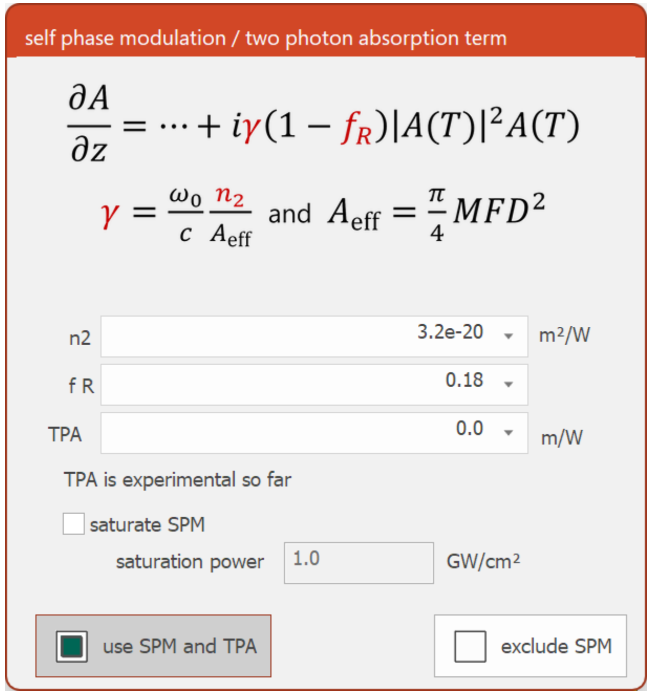

fiberdesk – NLSE parameter setup

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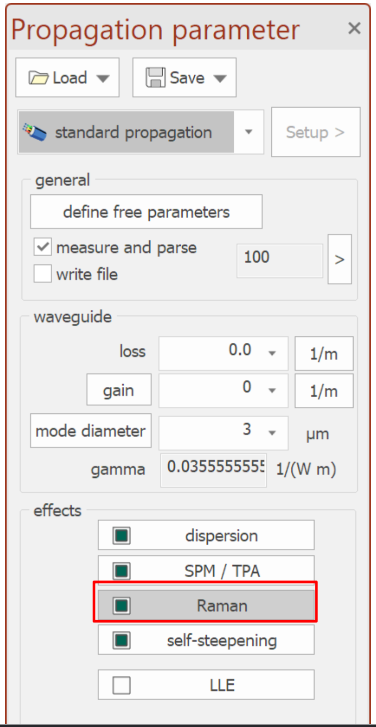

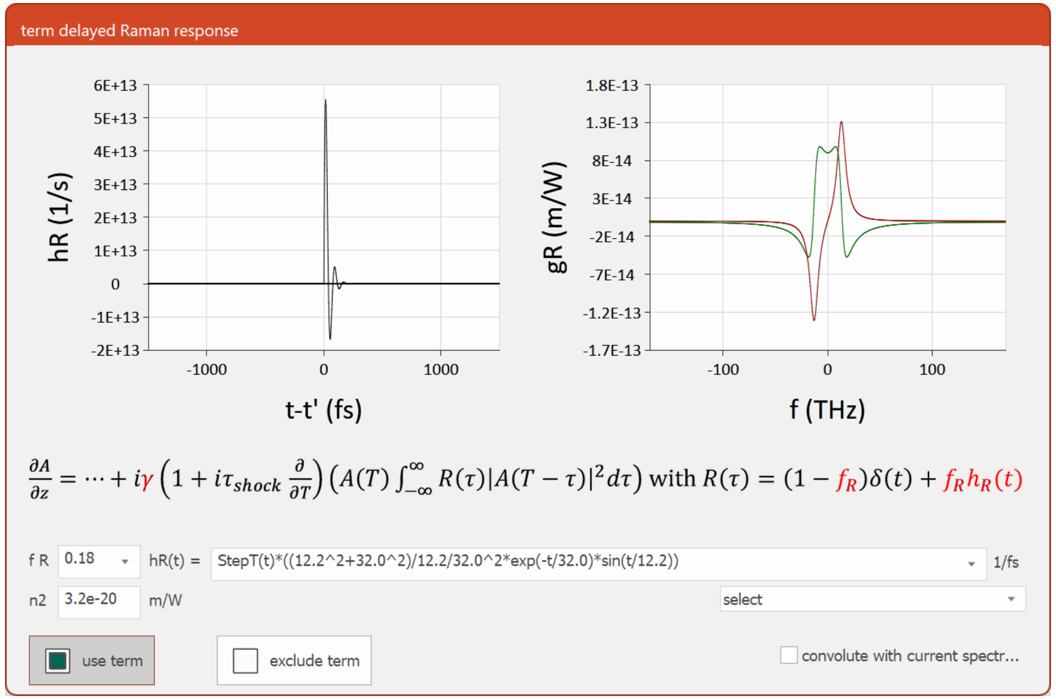

fiberdesk – NLSE parameter setup

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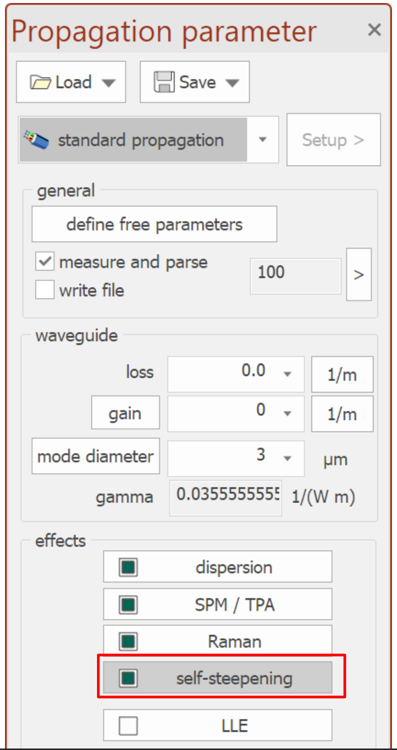
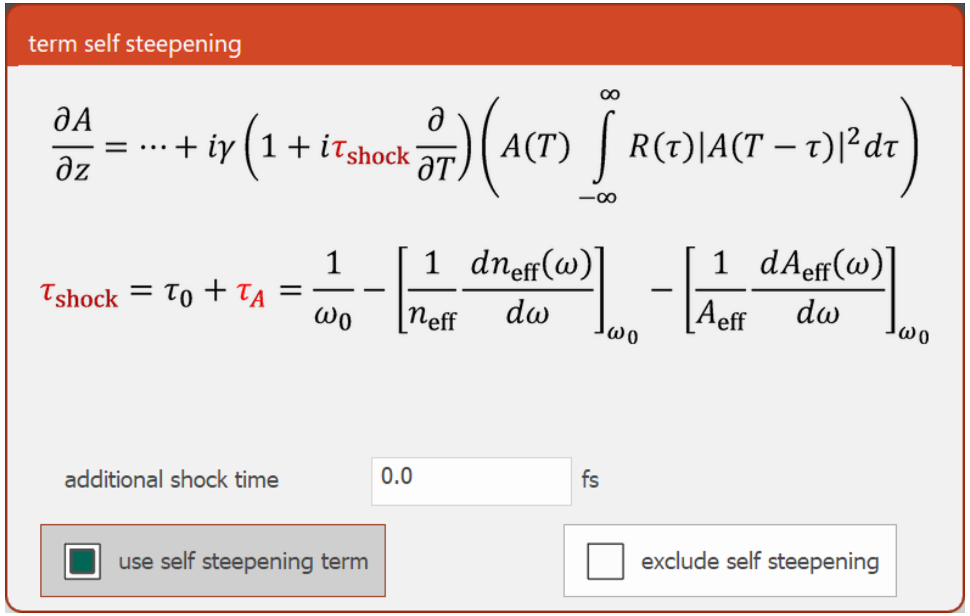
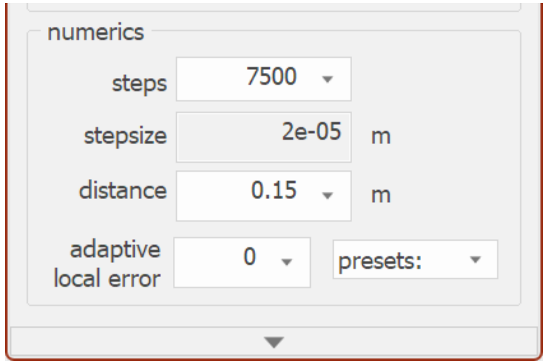


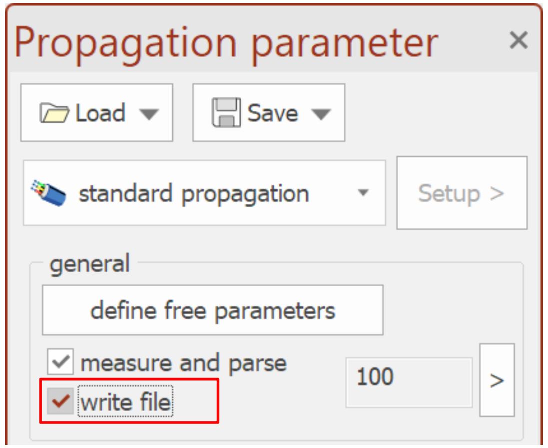


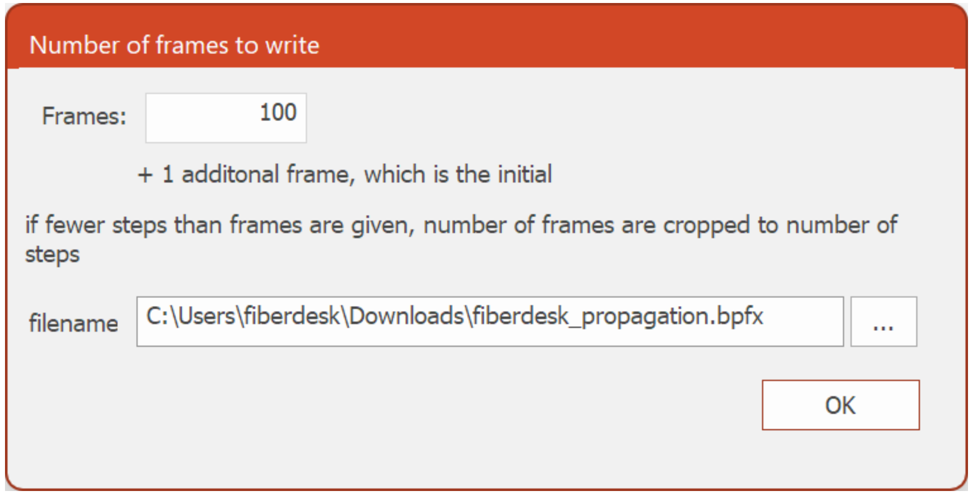
fiberdesk – NLSE parameter setup

Propagation setup:distance, stepsize, numercial accuracy etc.



$$\frac{\partial A}{\partial z} = -\frac{\alpha}{2} A + \int_{-\infty}^{\infty} \frac{g(\omega)}{2} \tilde{A}(\omega) e^{-i\omega T} d\omega + \sum_{n\geq 1} \beta_n \frac{i^{n+1}}{n!} \frac{\partial^n}{\partial T^n} A + i\gamma \cdot \left(1 + i\tau_{shock} \frac{\partial}{\partial T}\right)\left(A(T) \int_{-\infty}^{\infty} R(\tau) \left|A(T-\tau)\right|^2 d\tau\right)$$





file contains the initial field plus 100 fields from the calculated propagation for later analysis

file extension: ***.bpfx**

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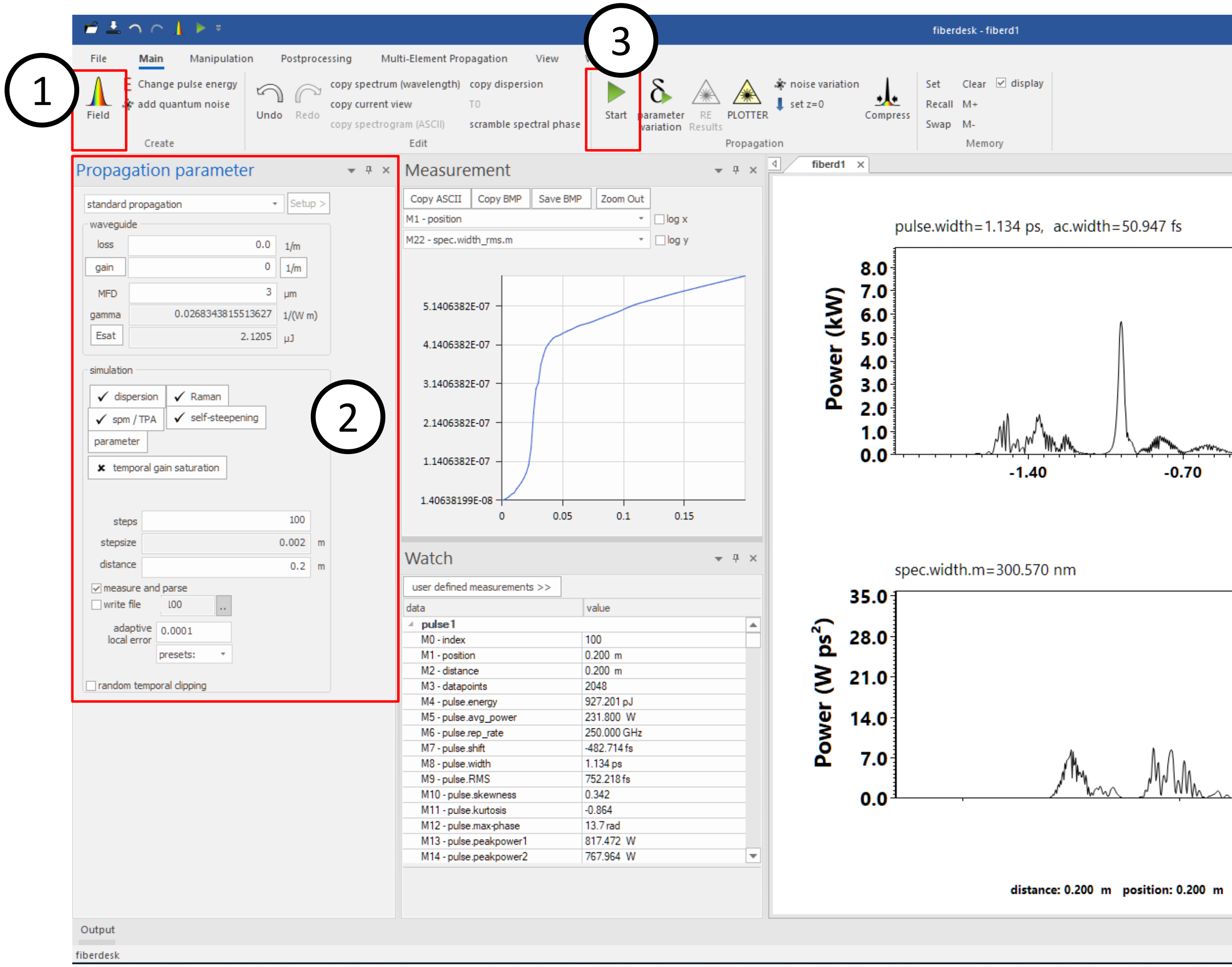
Setting up a propagation

Learn the most simple workflow

(1) Create the inital field

(2) Setup propagation parameter

(3) Start the simulation



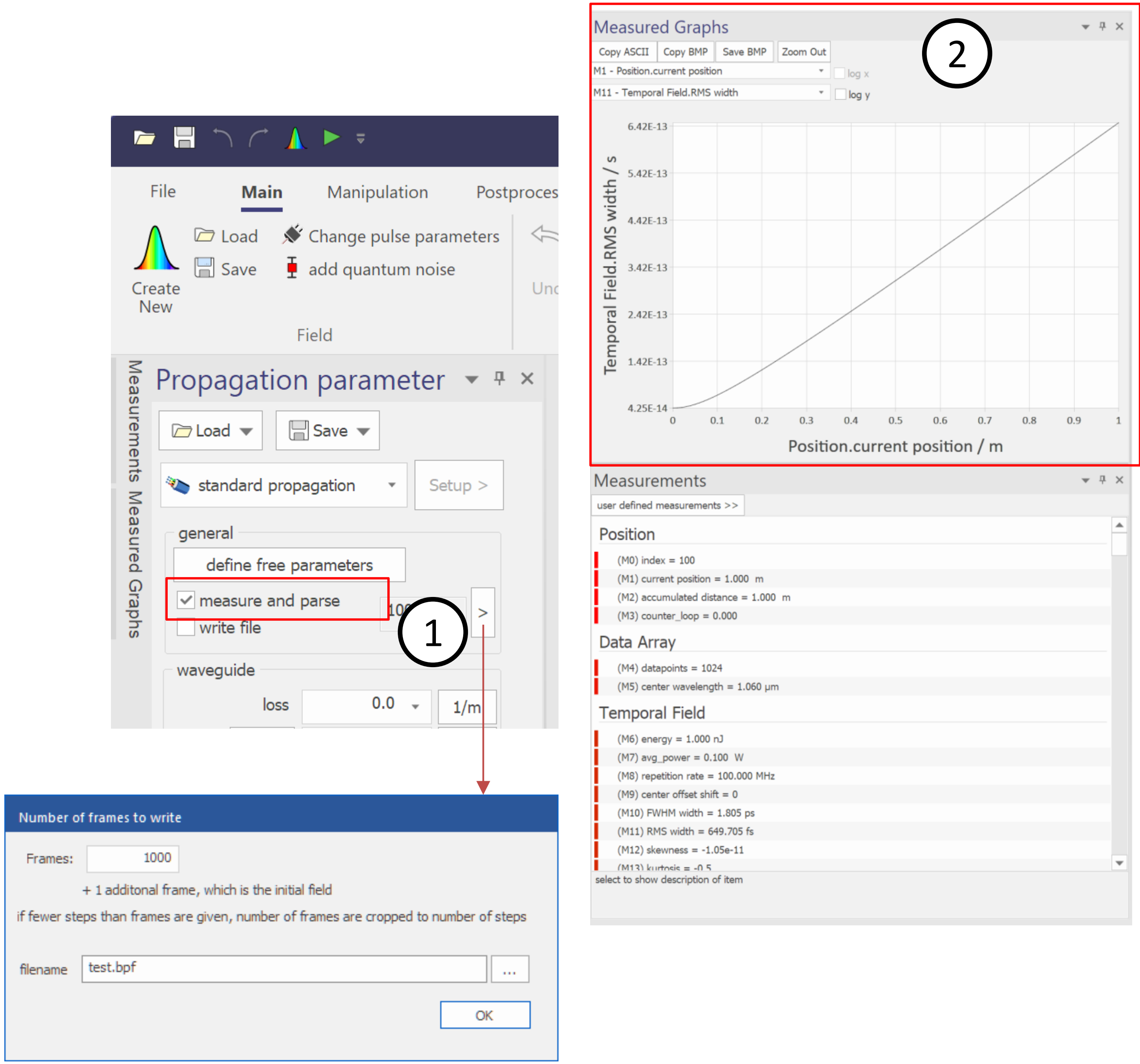
Setting up a propagation

Measure something along z

To measure different values of the numerical field that fiberdesk is propagating:

1. choose „measure and parse“ and setup the number of measurement points along z, which should be equal or less than the number of steps. (change with setup button to access dialog)

2. After propagation, you will see the measured values as instantaneous values or graphs along the propagation.



Setting up a propagation

User defined measures

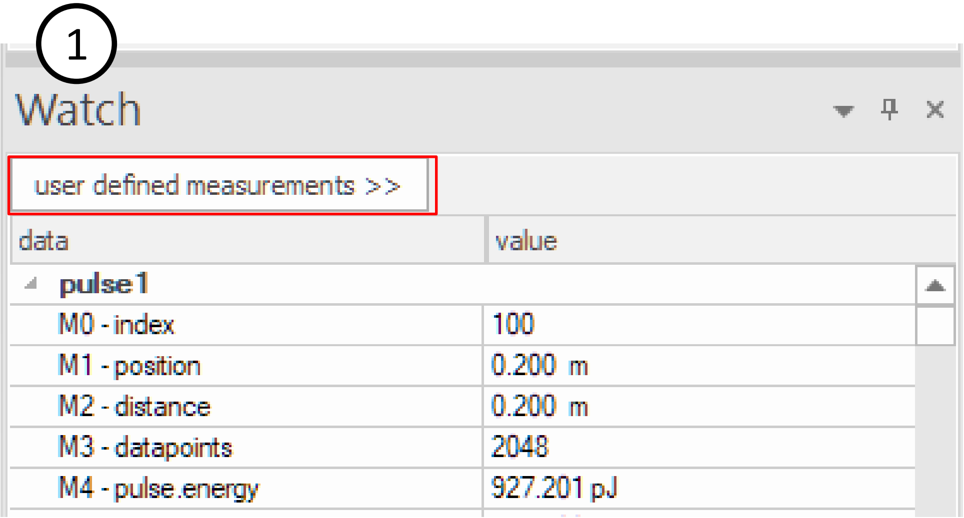
You can also define your own measurement in addition to the pre-defined options.

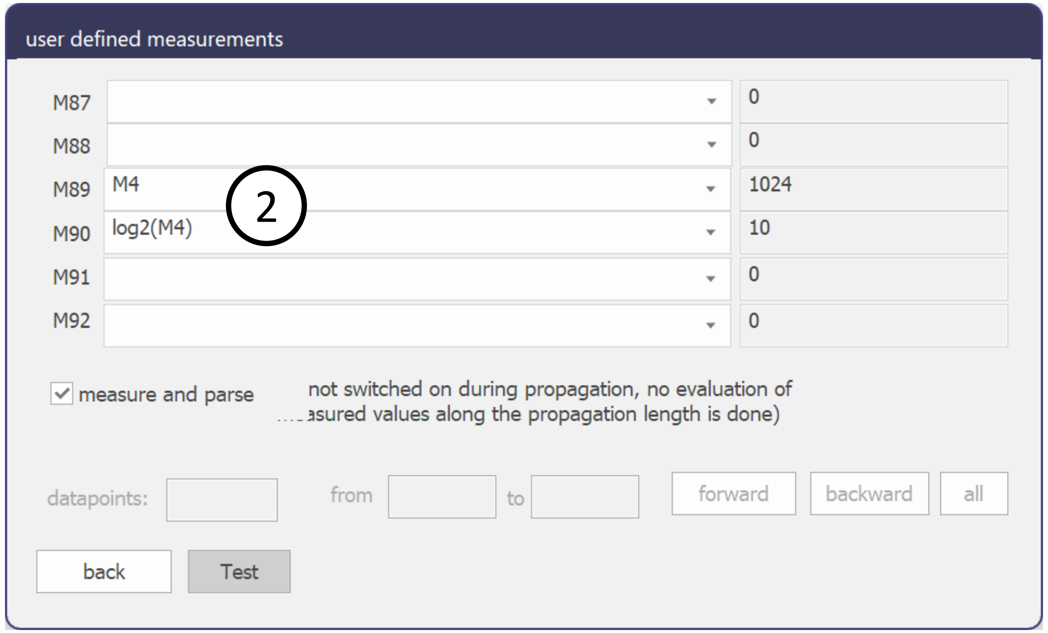
You need to:

1. Open the dialog „user defined measurements >>“

2. Script your own function by either using values measured before or math expressions with variables

M90 = log2(M4) (just an example for M4 = datapoints)

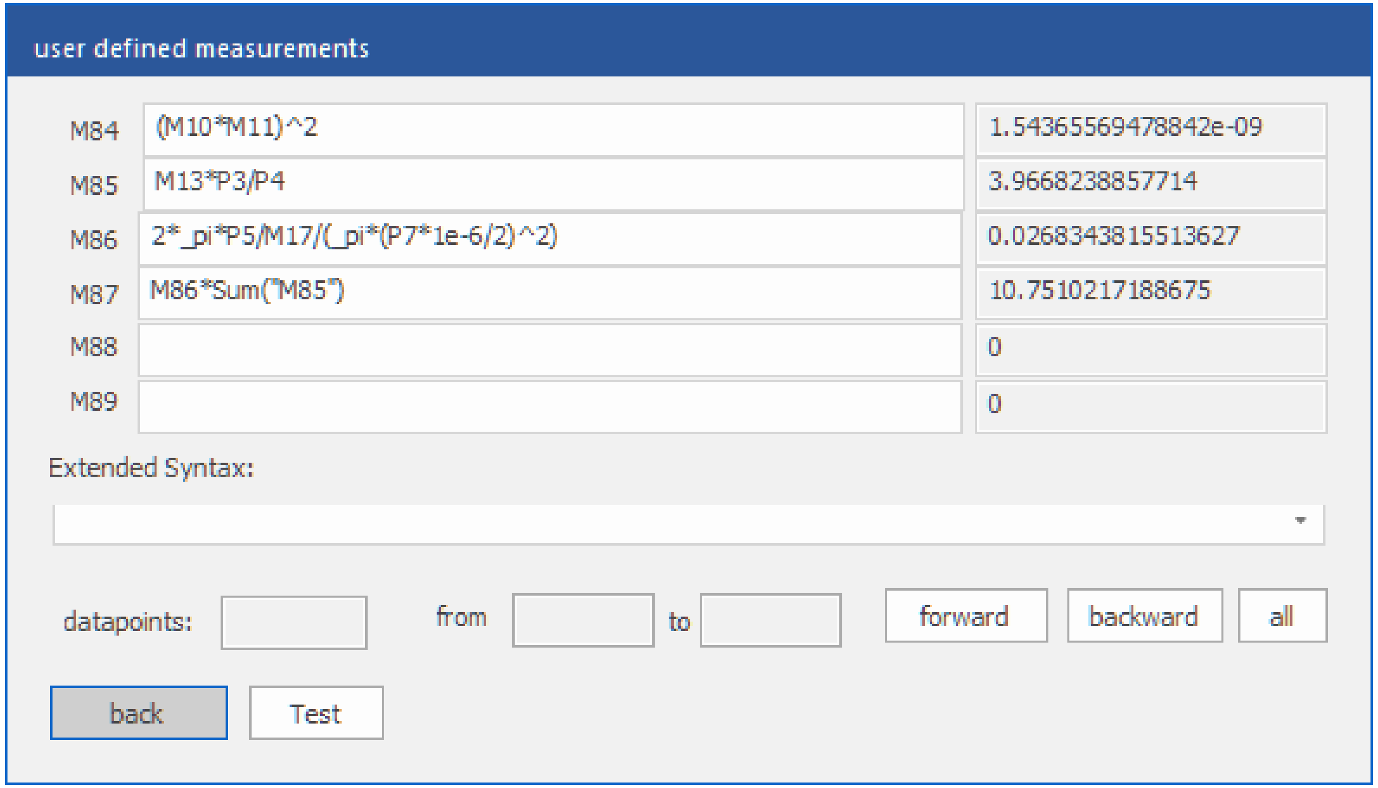




Setting up a propagation

User defined measures

Real example:



How to measure the B-Integral?

(shown by several user defined measurements for educational reasons)

We translate the equation to measured values and a function that integrates (summation) along z.

$$B = \boxed{\gamma \int_0^L \boxed{P_{Peak}(z) \cdot dz}} \text{ with } \boxed{\gamma = \frac{2\pi n_2}{\lambda A_{eff}}}$$

M86 = 2* π *n_2/λ/(π*(MFD_µm*1e-6/2)^2)

M87 = γ * Sum("M85")

M85 = P_{Peak}*L / Steps

Hints:

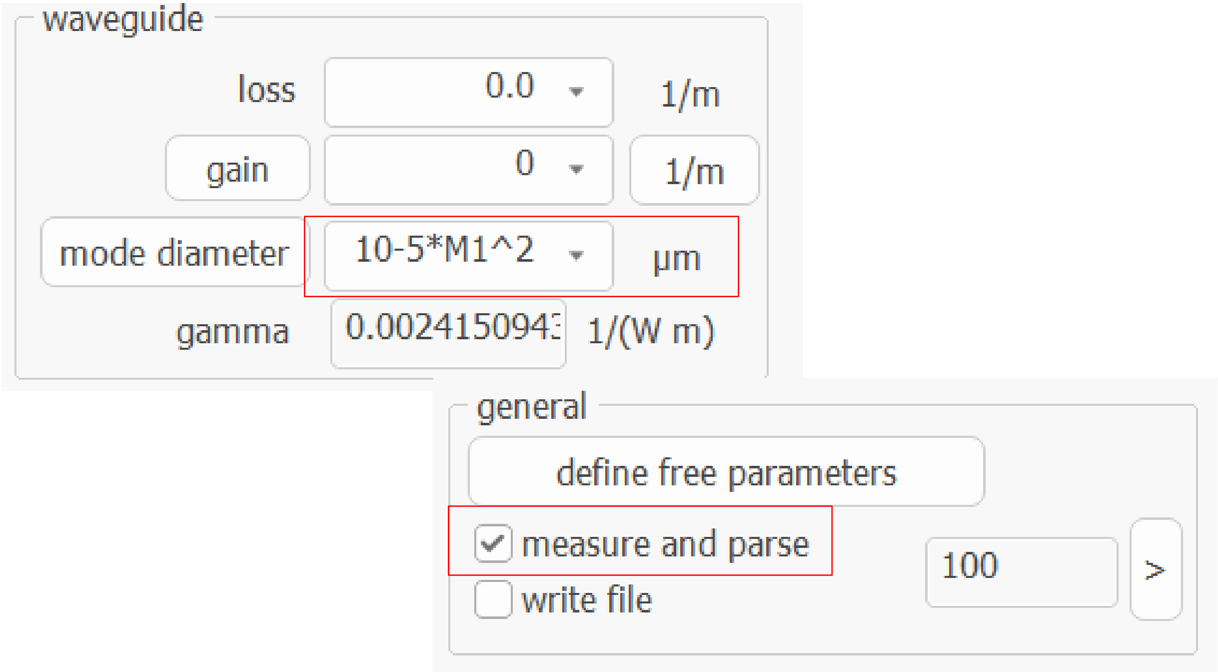
- excecution times are slowed down by complex measurements.
- Please check the meanings of the M values, as they might have changed in their number, depending on the actual version of fiberdesk

Setting up a propagation

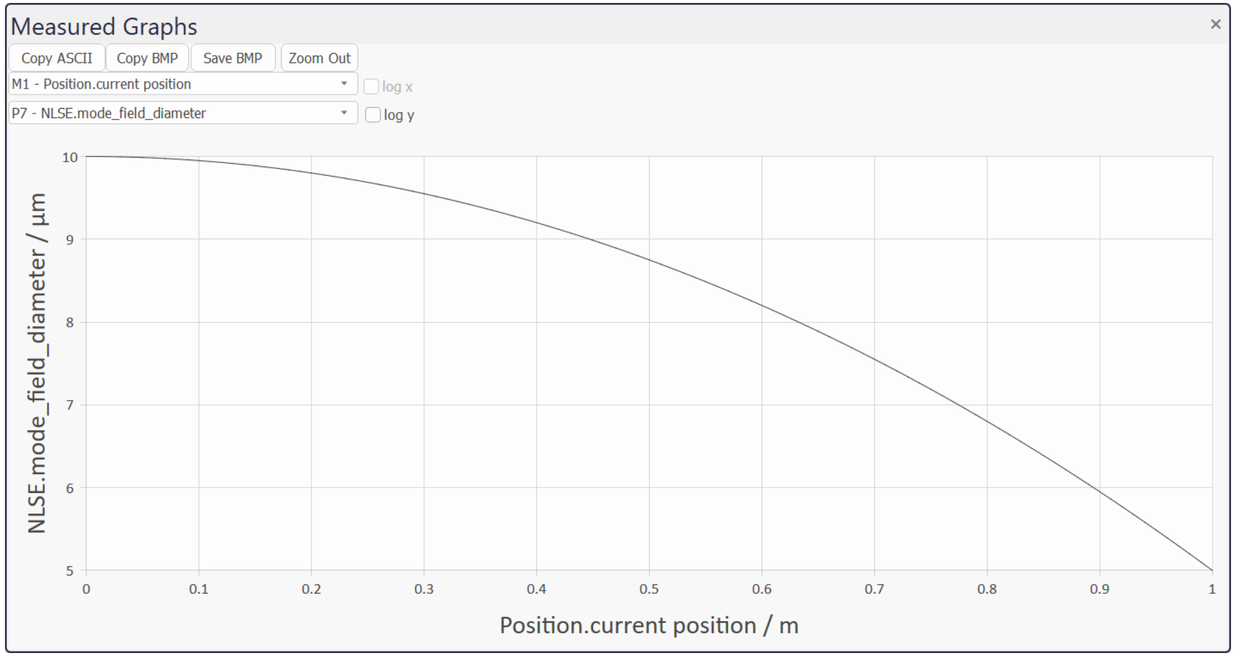
Change parameters during propagation

For example, if you script the mode field diameter (MFD) like this, the MFD will change quadratically with propagation, because M1 is the current position.

You need to have "measure and parse" switched on!



To check the success, the measured parameter is show in the measurement windows:



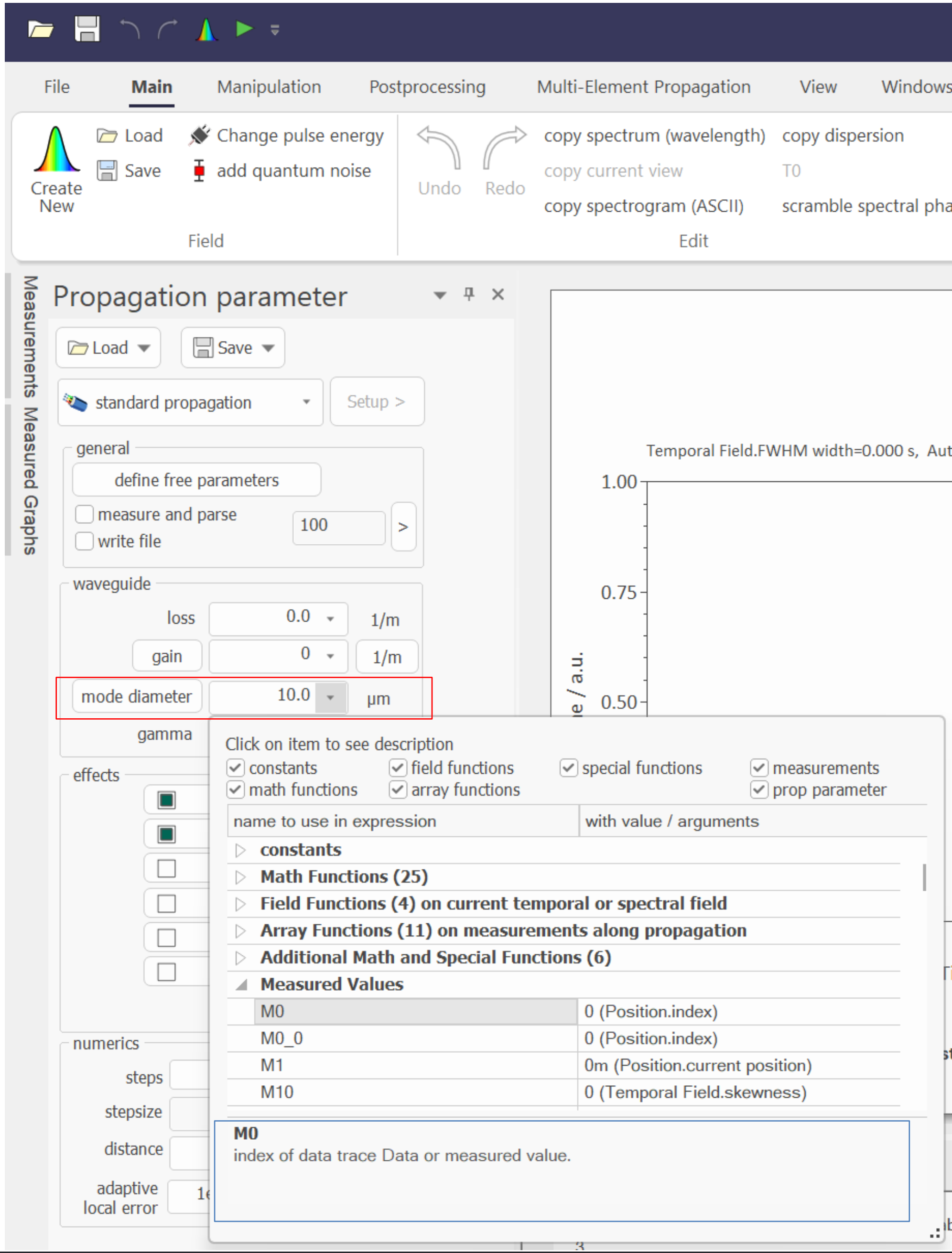
Setting up a propagation

Change parameters during propagation

Changing parameters along the propagation can be made for any parameter, where a symbol (button) appears in the input line, if in focus, see for instance the mode field diameter prompt.

If you click on the symbol, a dialog appear with **all available variables**, functions etc.

Click on any of the entries, and a **short help** will appear in the lower part of the dialog



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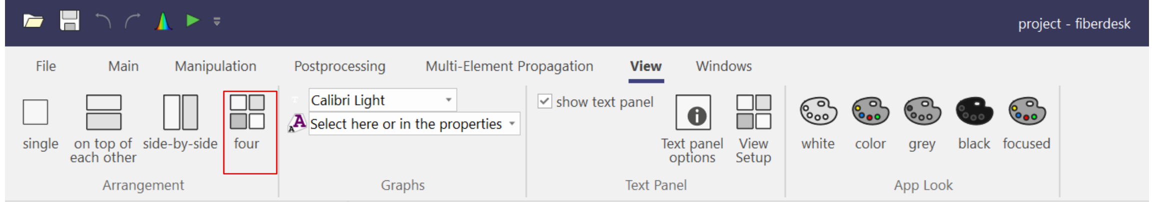

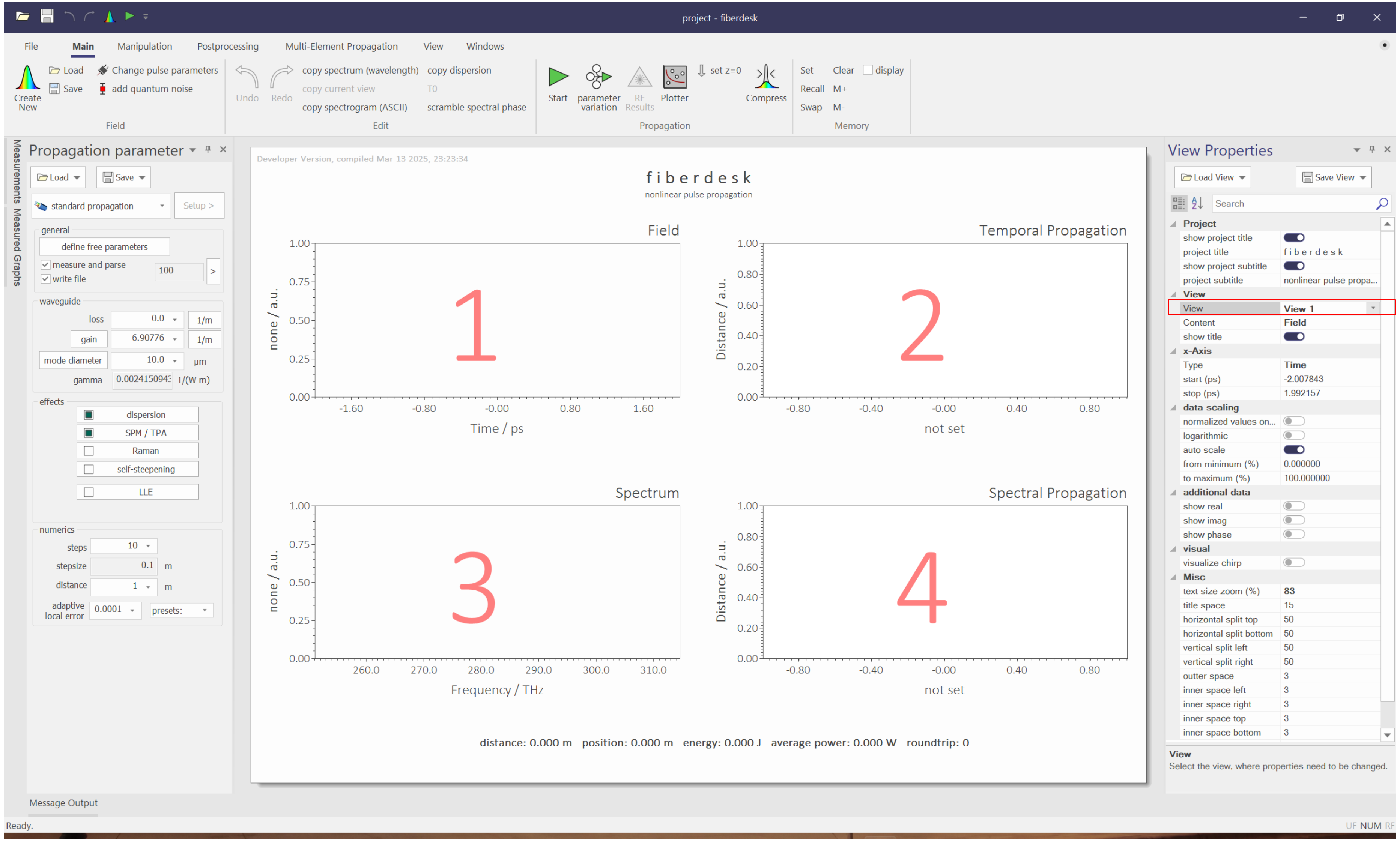

Click here to select the view to set up

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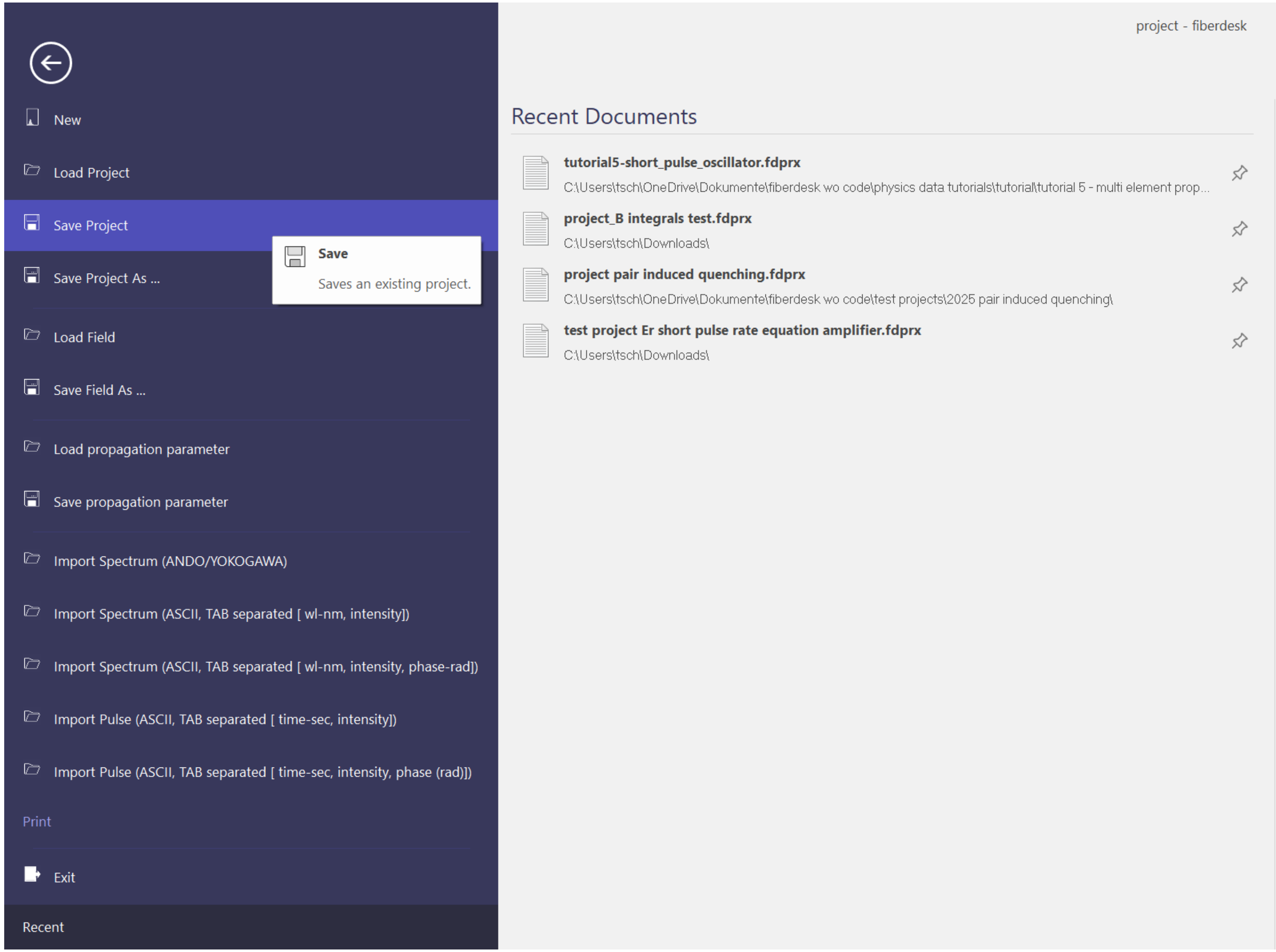

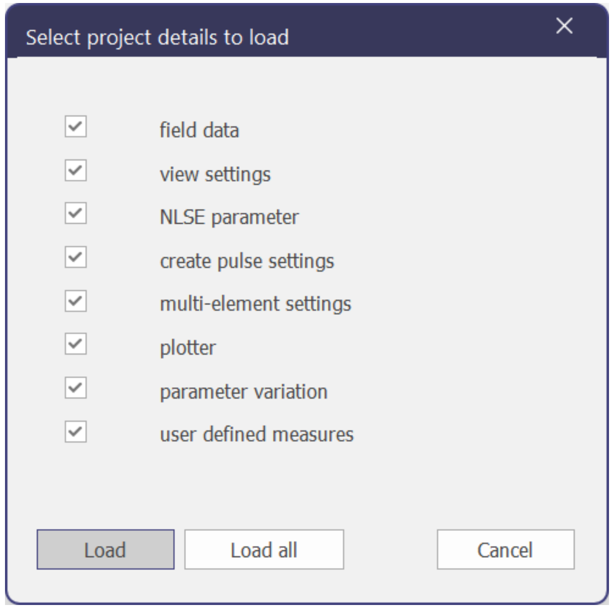

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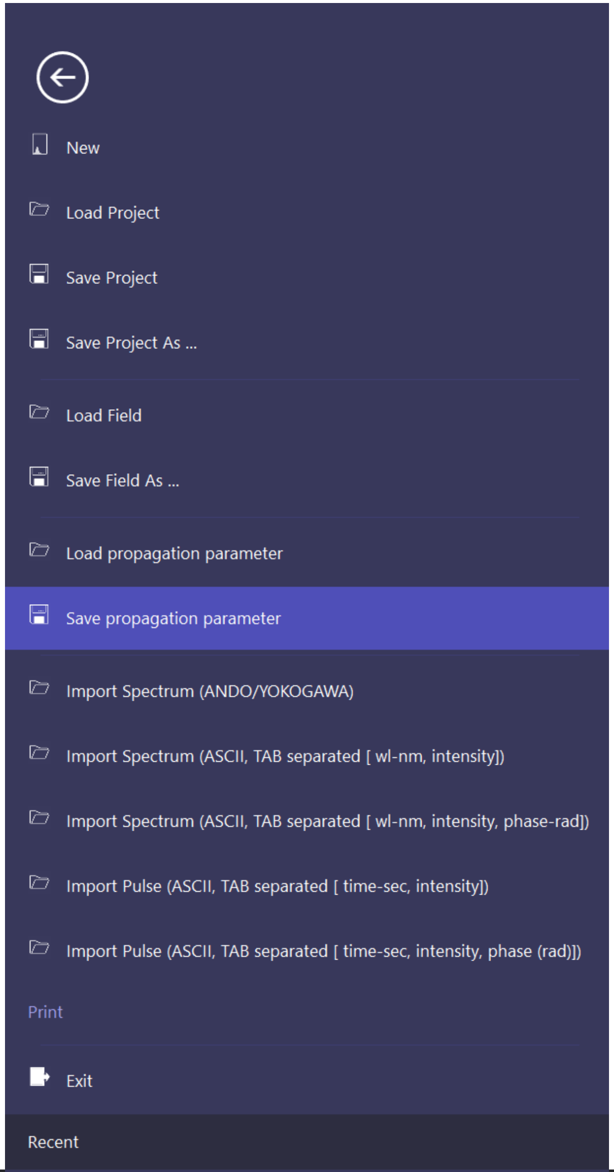
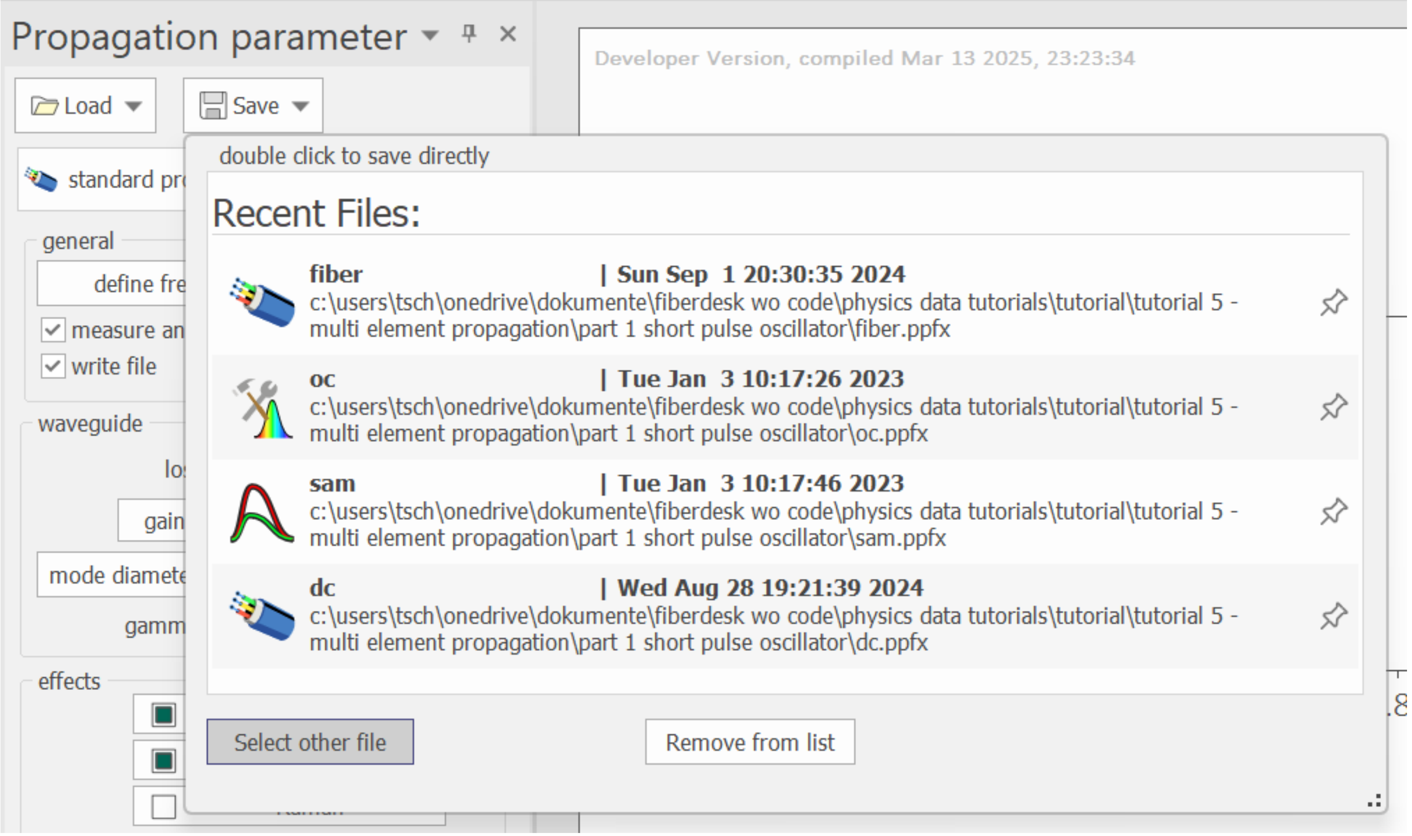
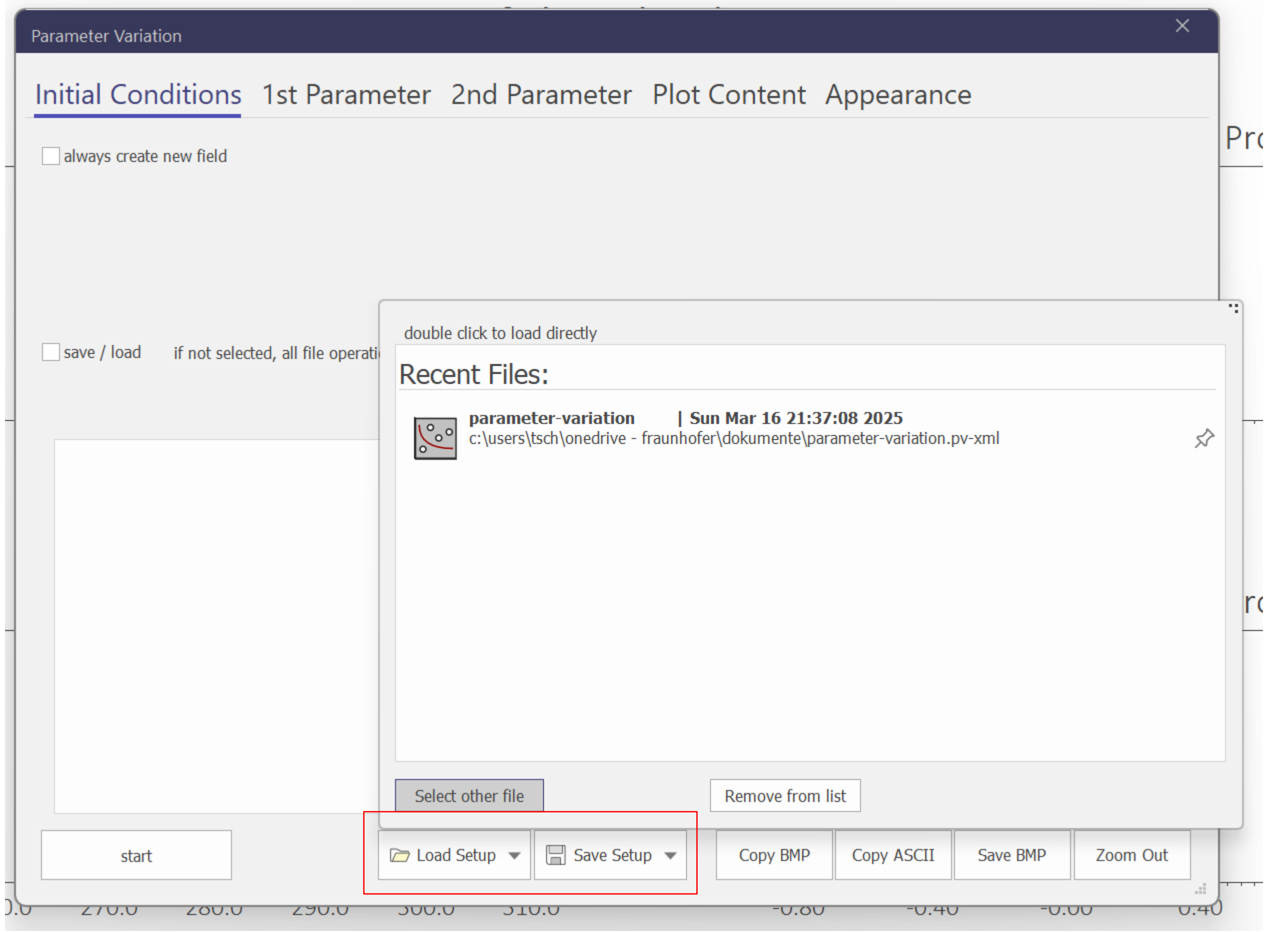




Loading / Saving field, projects, components

Saving dialog content



Saving view content