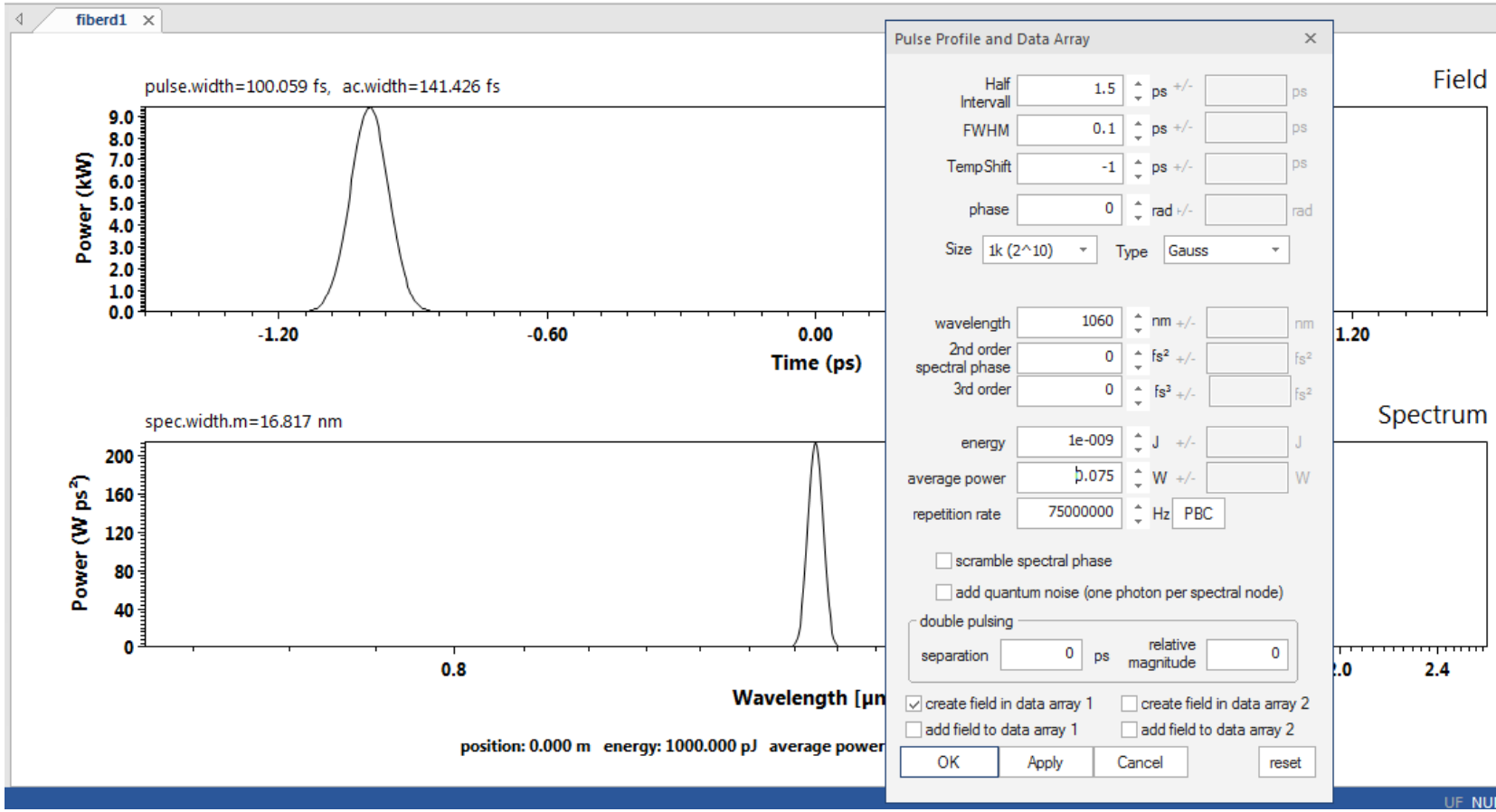
lecture 2

supercontinuum generation, numerical error control and measurements

(1) create a pulse
(2) choose parameters
(3) press start
(4) put result to memory
(5) repeat with higher accuracy
(6) check measurements
(7) noise and coherence

lecture 2

100 fs pulse, temporal windows +/-1.5 ps, 1k datapoints, temporal shift: -1 ps, energy 1 nJ, central wavelength 1060 nm



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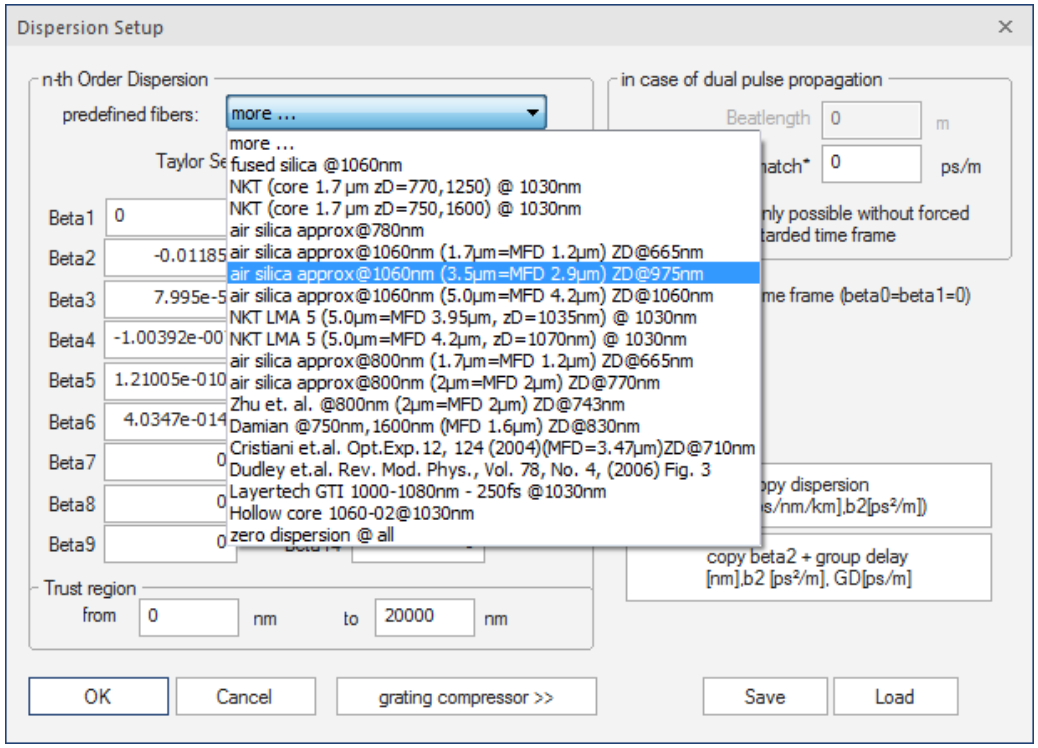
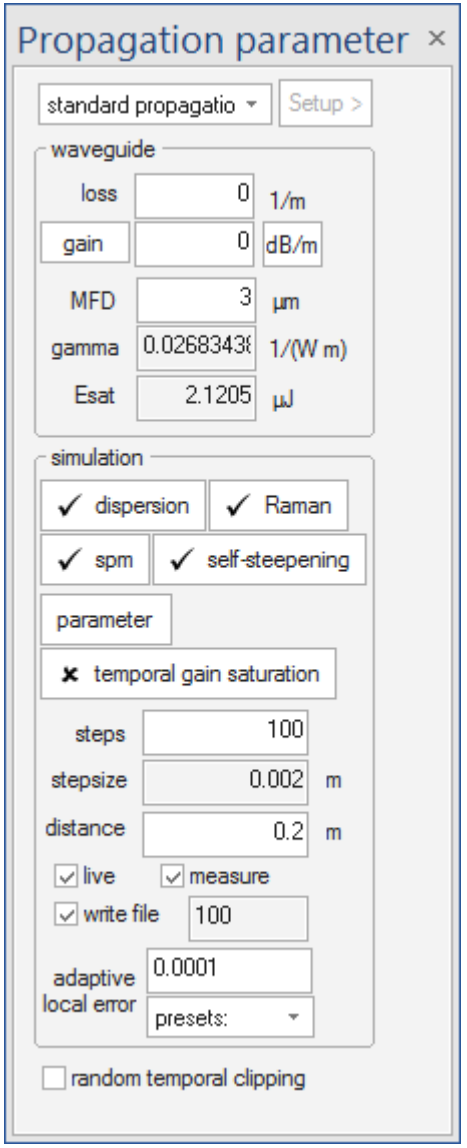
fiber is: NKT-ZD-975 with 2.9 µm MFD, all nonlinear effects considered, Raman response function is simple Lorentz, dispersion preselected.





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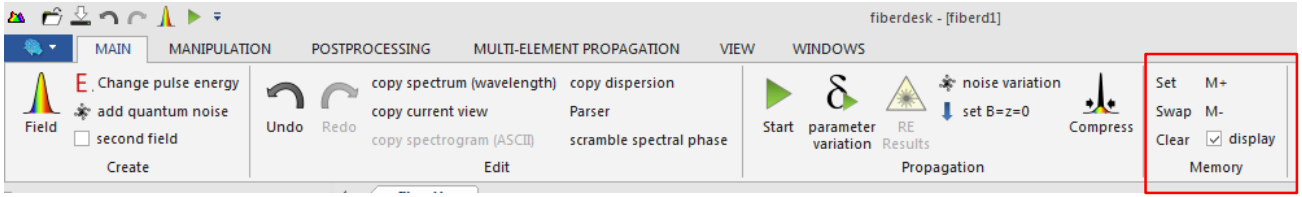
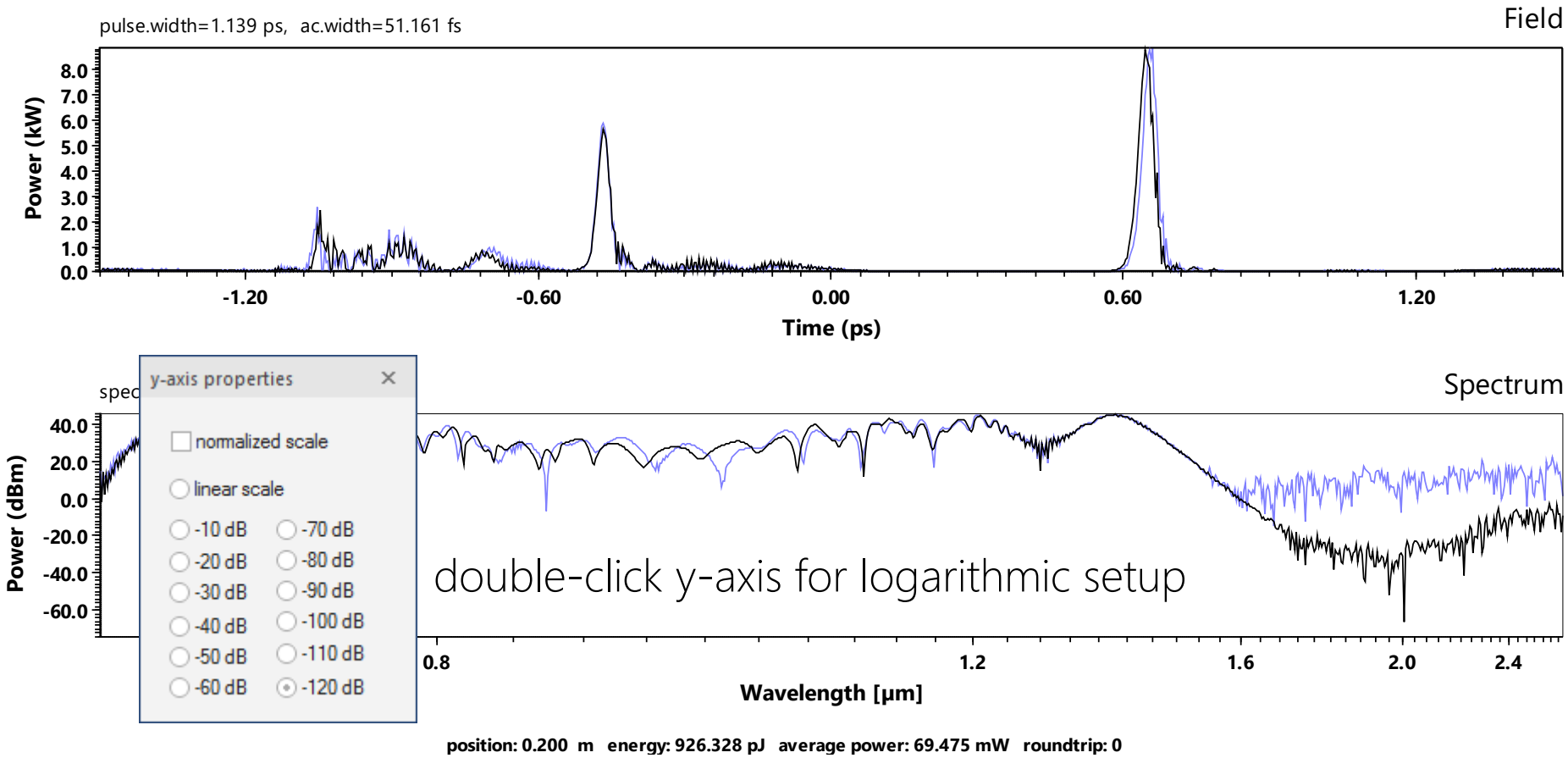


propagate 0.2 m, 100 steps, different accuracy results saved via „memory“ > „set“



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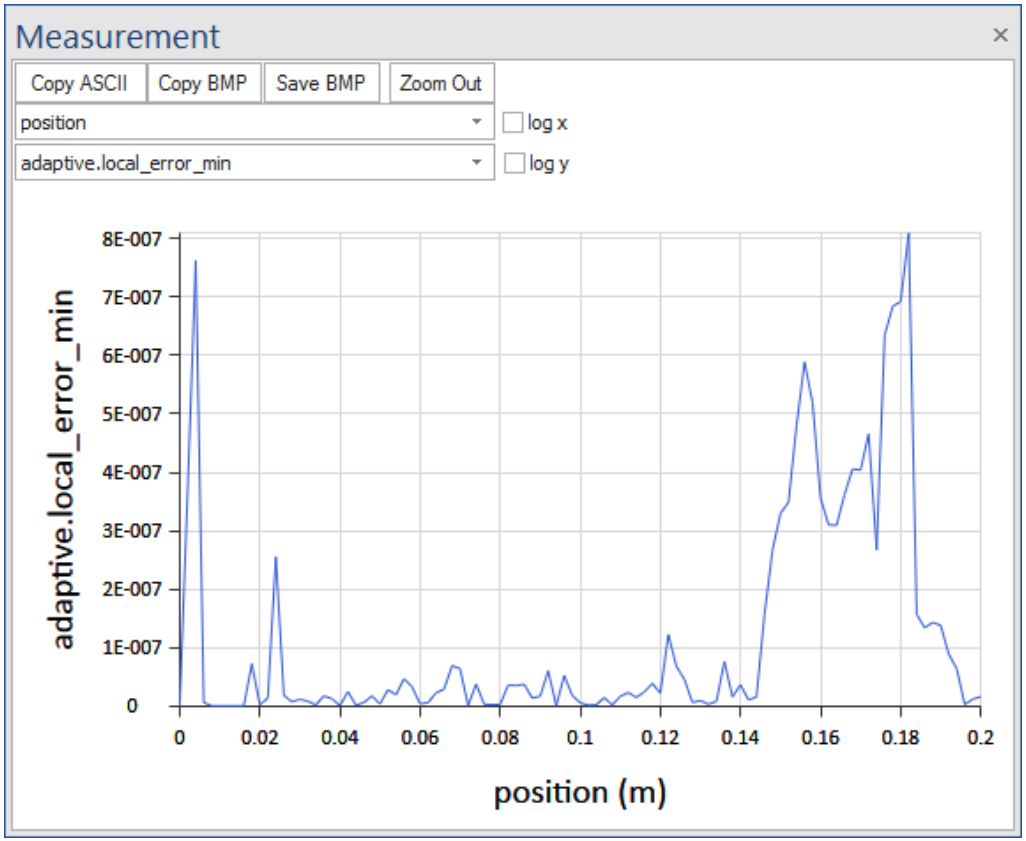
adaptive algorithm is bounded by local error

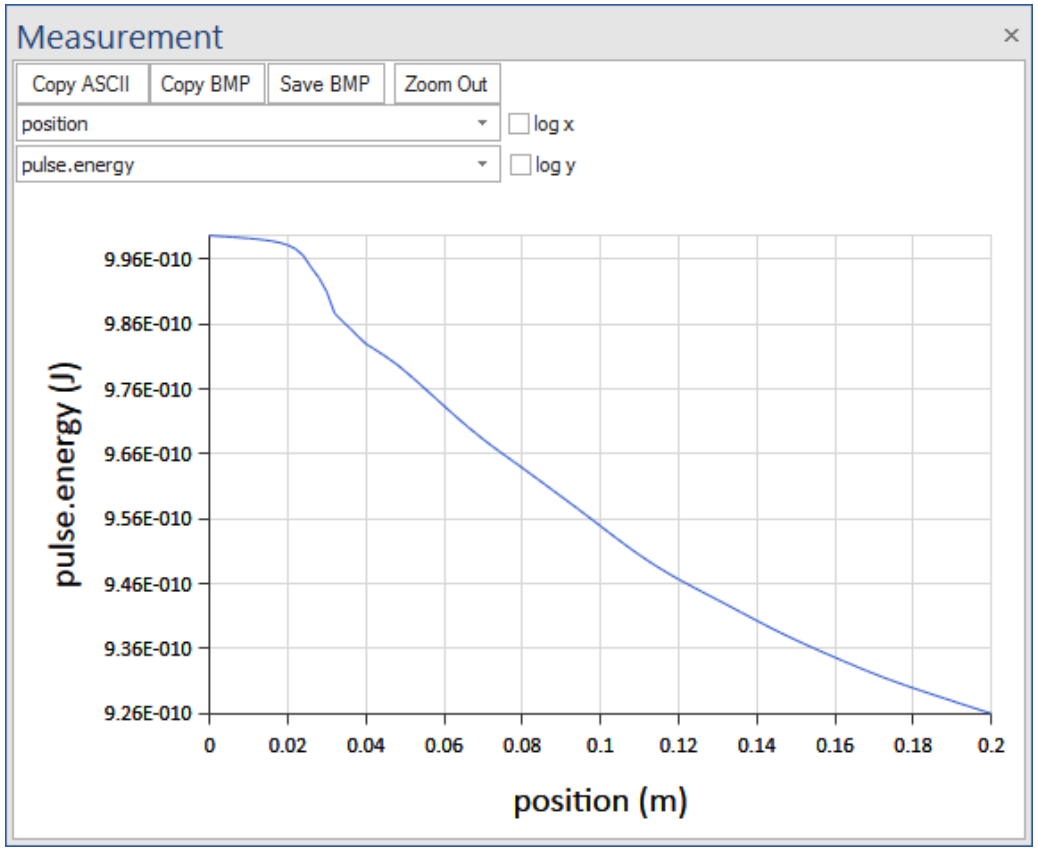
as we measured everything, it can be analysed in the measurement graph



Example: supercontinuum generation with local error <1e-6

lecture 2

Measurements allow for more detailed analysis:



Example: supercontinuum generation energy drop due to intrapulse Raman shift of the soliton, once it is „created"

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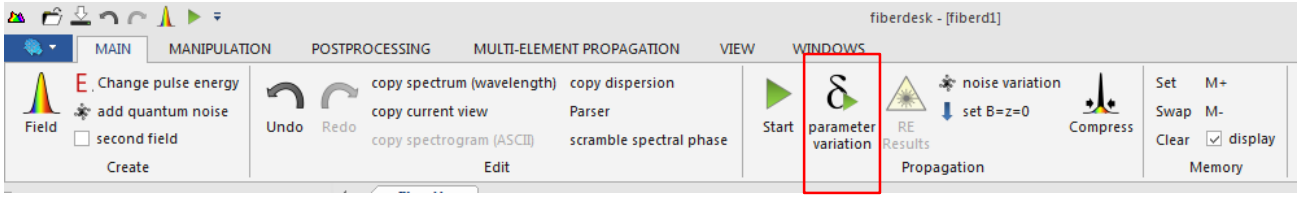
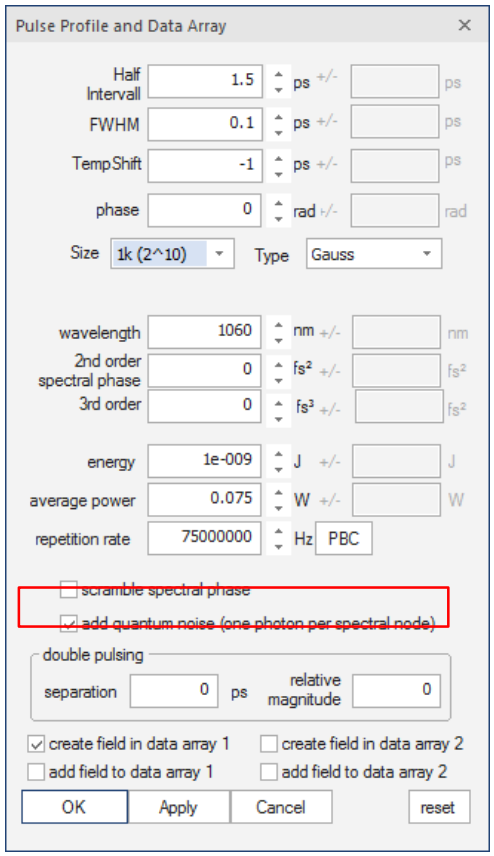
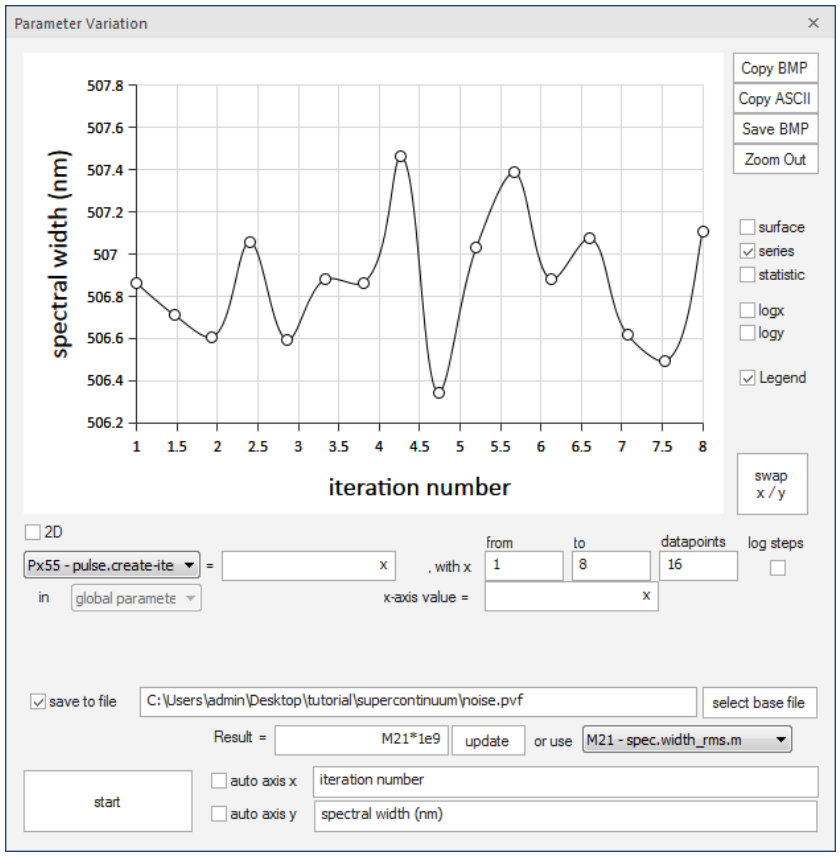


noise and coherence: same starting pulse as before but with quantum noise added, use „propagation“>“parameter variation“ dialog with iterating pulse creation





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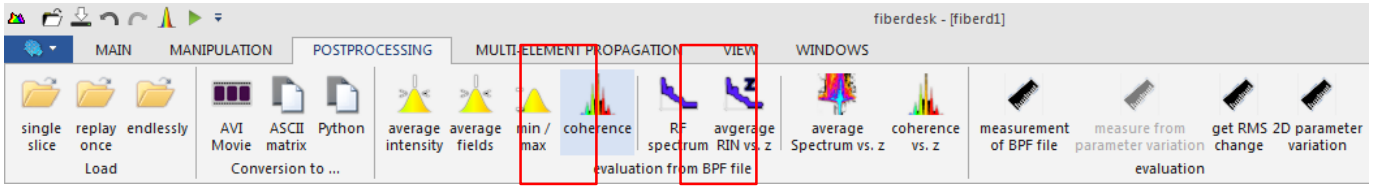

the saved file is now used for average spectrum and coherence calcualation via
Postprocessing > coherence

Postprocessing > average intensity

past both results to clipboard and display in e.g. MS Excel

$$|g_{12}(\lambda)| = \left| \frac{\langle E_1^*(\lambda) E_2(\lambda) \rangle}{\sqrt{\langle |E_1(\lambda)|^2 \rangle \langle |E_2(\lambda)|^2 \rangle}} \right|$$