

# lecture 8

## Nonlinear Optical Loop Mirror



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The loop shall be a single nonlinear element without dispersion.

Save this element as  
testNOLM.ppf

**Propagation paramet...**

standard propagation

waveguide

loss  1/m

gain  dB/m

MFD  μm

gamma  1/(W m)

Esat  μJ

simulation

dispersion  Raman

spm  self-steepening

parameter

temporal gain saturation

steps

stepsize  m

distance  m

measure and parse

write file

adaptive local error  presets:

random temporal clipping

**Watch**

user defined measurements >>

data	value
▲ pulse1	
M0 - index	0
M1 - position	0.000 m
M2 - distance	0.000 m
M3 - datapoints	1024
M4 - pulse.energy	1.600 pJ

self phase modulation term

$$\frac{\partial A}{\partial z} = \dots + i\gamma(1 - f_R)A(T)$$

$$\gamma = \frac{\omega_0}{c} \frac{n_2}{A_{\text{eff}}} \text{ and } A_{\text{eff}} = \frac{\pi}{4} MFD^2$$

n2  m<sup>2</sup>/W

fR

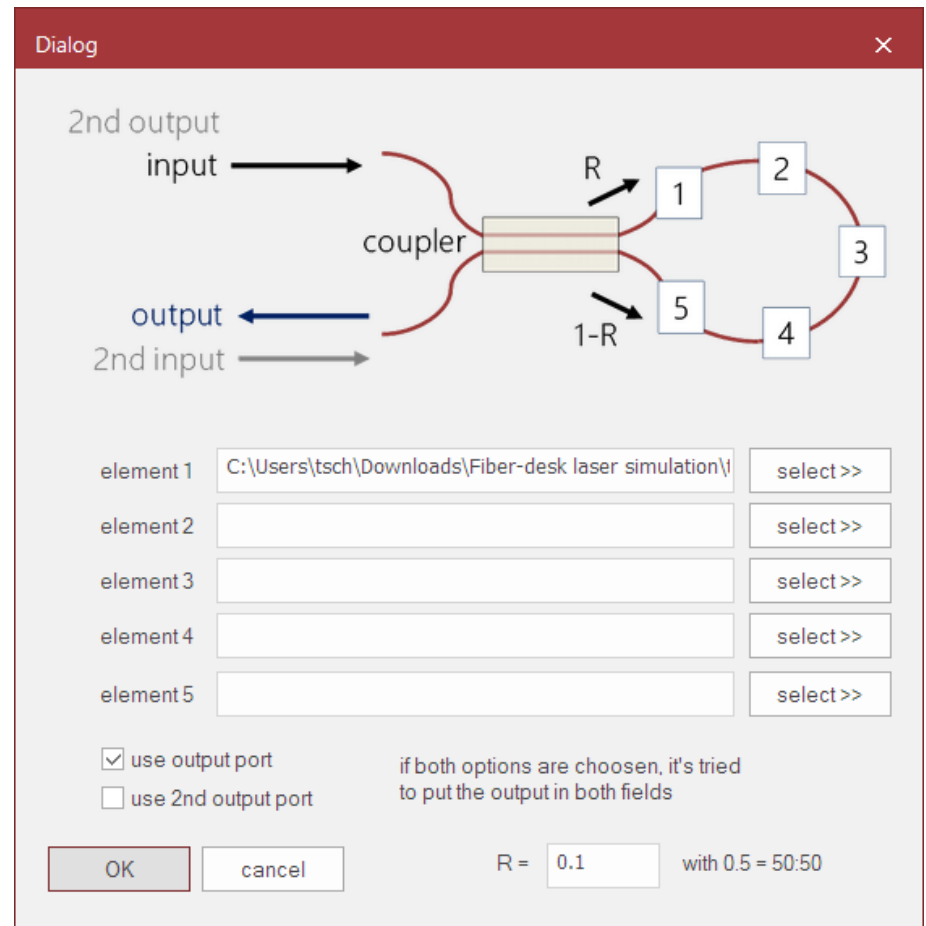
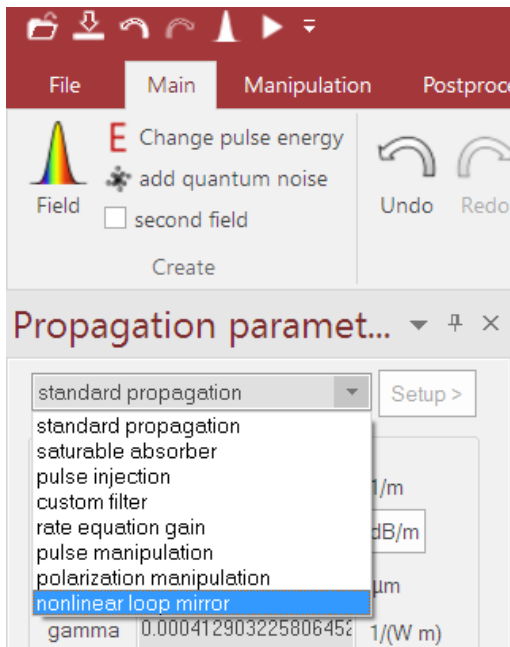
saturate SPM saturation power  GW/cm<sup>2</sup>

use SPM  exclude SPM

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## Nonlinear Optical Loop Mirror

Choose the NOLM element and start the setup dialog



Select the previously saved file for the first element. The output will be the result.

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In order to see the effect of the nonlinearity in the loop, please define a new pulse as „cw“ according to the settings here.

Pulse Profile and Data Array

Half Intervall: 8 ps +/-

**FWHM: 10000000 ps +/-**

TempShi: 0 ps +/-

phase: 0 rad +/-

Size: 1k (2^10) Type: Gauss

wavelength: 1060 nm +/-

2nd order spectral: 0 fs<sup>2</sup> +/-

3rd order: 0 fs<sup>3</sup> +/-

energy: 1.6e-12 J +/-

average: 0.1 W +/-

repetition rate: 6.25e+10 Hz  cw

scramble spectral pha...

add quantum noise (one photon per spectral no...

double pulsing

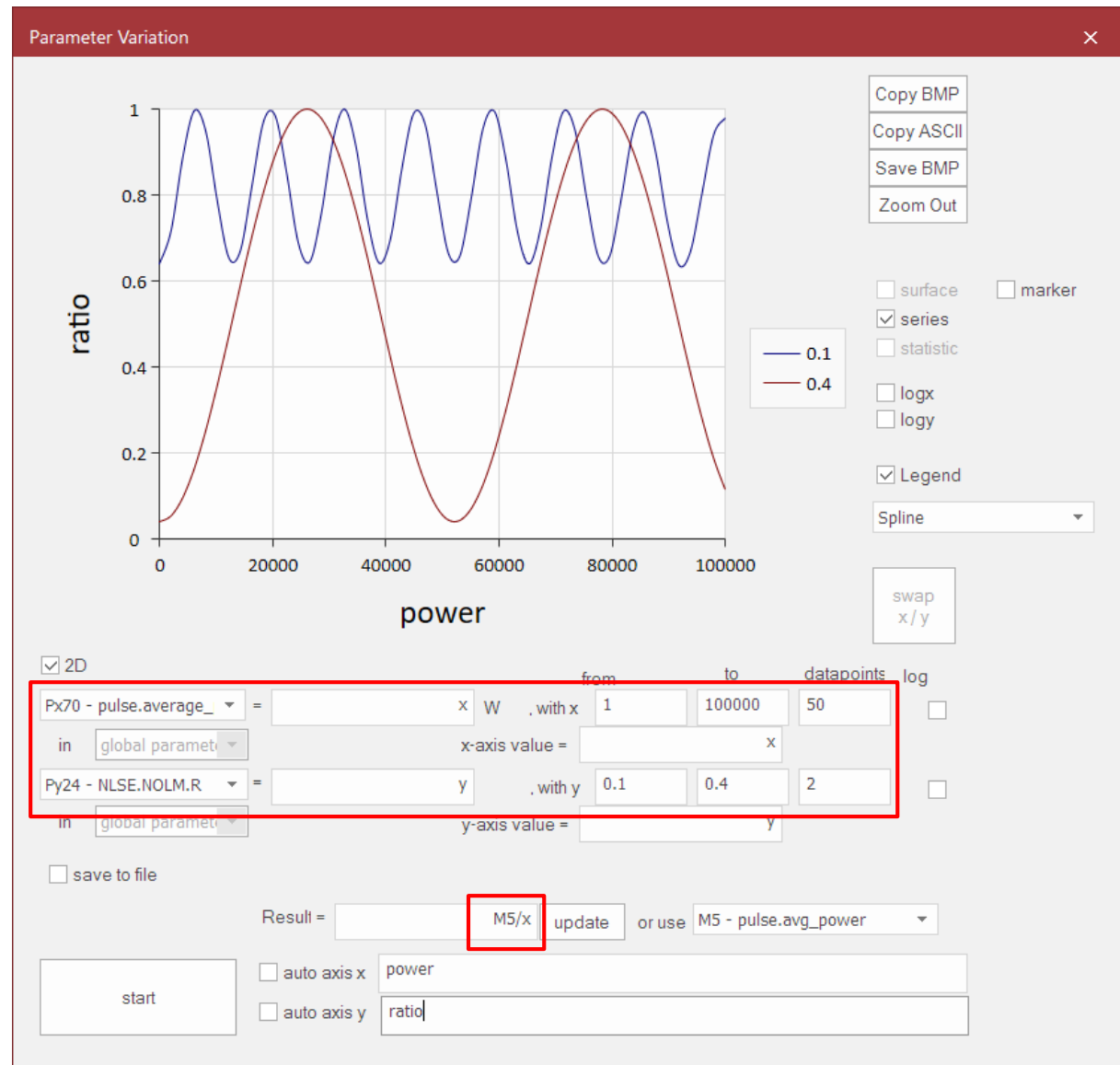
separator: 0 ps relative magnitude: 0

create field in data array 1  create field in data array 2

add field to data array 1  add field to data array 2

OK Apply Cancel reset

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Now the power is varied in the parameter variation dialog as well as the splitting ratio. The displayed results is the output power over the input power.