

Abstract

Ultrashort pulse modeling with VirtualLab™ allows the investigation of fs pulses in focal regions. The tutorial explains the techniques to do that along an example with a high NA focussing lens.

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Keywords:	fs pulses, material dispersion, pulse propagation, ultrafast optics, ultrashort pulses, focusing
Requirements:	VirtualLab™ version 4.5.0 or higher – Starter Toolbox
Tutorial Version:	1.0
Sample Files:	Corresponding files can be found here .
Related Scenarios:	98.01
Related Tutorials:	33.01 (we recommend to study 33.01 before 41.01)

VirtualLab™ is based on field tracing for unified optical modeling. That allows for instance the use of geometrical optics to propagate harmonic fields through lenses in combination with the application of wave optics to propagate into the focus in order to investigate vectorial harmonic fields in focal regions (see Scenario_98.01). This technique also enables the investigation of ultrashort pulses, which are represented by sets of harmonic fields, in focal regions.

The tutorial deals with the following topics:

- Discussion of setup and the modeling (NA=0.68)
- Pulse specification (5 fs at 800 nm)
- Specification of frequency sampling by two simulation steps
- Application of smart inclusion of material dispersion
- Calculation of pulse along the x-axis in the focal region
- Simulation of x- and z-component of pulse envelope

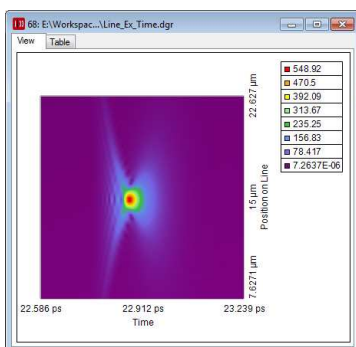


Figure 1. x-component of pulse envelope along the x-axis in focal region. The horizontal axis of the diagram indicates the time axis and the vertical one the lateral position on the x-axis.

Technical Support

If you have any questions, remarks or problems concerning this tutorial, or in using VirtualLab™ in general, please do not hesitate to contact us by E-Mail support@lighttrans.com.

Please use the update service to install the current version of VirtualLab™. Alternatively you can use the latest **Trial Version** of VirtualLab™ which is available at our [download site](#). If you have been registered already for an older trial version, just contact us by [E-Mail](#).

To ensure that this tutorial gives the same results as described, set the global settings to the default values. In VirtualLab™ this can be done in the **Extras** > **Global Options** dialog with the *Reset All* button.