Tutorial 33.01: Overview of Ultrashort Pulse Modeling with VirtualLab

Abstract
VirtualLab enables modeling the propagation of ultrashort pulses through optical systems. This tutorial introduces you to basic techniques.

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Keywords:	fs pulses, material dispersion, pulse propagation, ultrafast optics, ultrashort pulses
Requirements:	VirtualLab version 4.5.0 or higher – **Starter Toolbox**
Tutorial Version:	1.1
Sample Files:	Corresponding files can be found here.
Related Tutorials:	41.01

VirtualLab 4.5 and higher enables ultrashort pulse modeling. Pulses are represented by sets of harmonic fields which are propagated through optical systems using the powerful vectorial field tracing technique of VirtualLab. By a quasi-analytical treatment of material dispersion the sampling effort in the frequency domain can be kept small. Transformation into the time domain is always possible.

The tutorial deals with the following topics:

- Theoretical concepts
- Pulse propagation through homogeneous media
- Consideration of time shift and material dispersion
- Tools to handle pulse data
- Specification of pulse sources

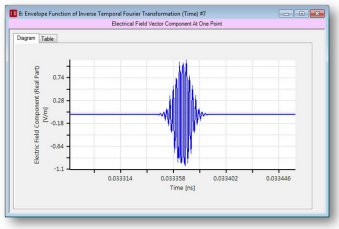

Figure 1. *Field of 10 fs pulse in one lateral location.*

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.