

## FREE VirtualLab Fusion Seminar

VirtualLab Fusion Technology and Applications:

# Interferometry, Microscopy and Fiber Coupling

**Date:** 10 May 2019

**Time:** 09:00 – 13:00

**Location:** San Jose Convention Center, Room 214

**Requirements:** No laptop needed

**Registration:** [www.lighttrans.com/seminarregistration](http://www.lighttrans.com/seminarregistration)

Modern optical technology has so branched out from traditionally understood lens systems that ray optics often falls short when it comes to simulating and designing cutting-edge optical systems while providing all optical quantities and measures of concern with acceptable accuracy. A software package that yields fast physical optics simulation results alongside ray tracing then becomes, not a choice, but a necessity. Discover the Fast Physical Optics concept with VirtualLab Fusion by means of seminar modules on technology and different applications. Join a specific module that you are interested in or stay for the lot, according to your preferences.

### Learning Outcomes

- Overview:**
- Understanding the limitations of ray optics modeling for innovative optical systems and the necessity of physical optics in typical cases of modern optics.
  - Discovering how field tracing technology overcomes common challenges of numerical complexity in physical optics computations.
- Interferometry:**
- Configuring various interferometric setups in VirtualLab Fusion, including Mach-Zehnder and Michelson interferometers.
  - Usage of non-sequential field tracing to simulate interference patterns including coherence and polarization.
- Microscopy:**
- Setting up different types of microscopes in VirtualLab Fusion including different source models.
  - Physical optics modeling of vectorial PSF, MTF and image simulations for microstructured samples.
- Fiber Coupling:**
- Design of lens systems for high-NA fiber coupling by parametric optimization.
  - Physical optics analysis of coupling efficiency and investigation of the influence of tolerances on the efficiency.

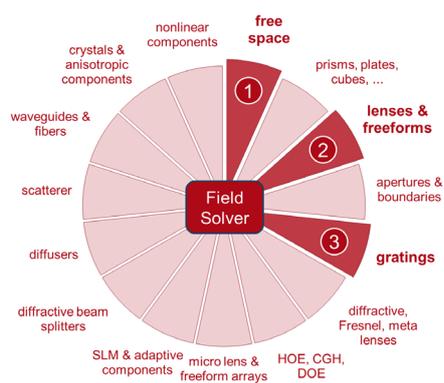
## Seminar modules

### Theory: VirtualLab Fusion Technology 9:00 – 10:00

Often physical-optics modeling is understood to be too slow and not user-friendly in practice. Various mathematical concepts enable Fast Physical Optics by field tracing in a user-friendly way in VirtualLab Fusion. We give a brief insight into the theory and the different electromagnetic modeling techniques which are provided in an interconnected way by the VirtualLab solver platform.

### Application II: Microscopy 11:00 – 11:45

Accurate evaluation of the imaging quality of microscopy setups requires physical optics modeling for inclusion of the polarization, coherence, and lateral structure of the beam which illuminates the sample under investigation. In VirtualLab Fusion, the interaction of the incident field with the sample can be performed by an electromagnetic field solver which enables a complete simulation of the microscopy imaging process.



### Application I: Interferometry 10:00 – 10:45

In interferometry a variety of different setups and sources are used to realize powerful concepts in optical metrology. With the unique non-sequential field tracing technique, VirtualLab Fusion enables the fast modeling of interferometer setups with high accuracy, including coherence and polarization effects.

### Application III: Fiber Coupling 12:00 – 12:45

For single-mode fibers with relatively small core diameters, coupling light in requires higher-NA lens systems to obtain the required focus size so as to obtain a high coupling efficiency. Such lens coupling systems can be designed by VirtualLab Fusion or imported from Zemax OpticStudio®. VirtualLab Fusion enables then a thorough physical optics analysis of the coupling efficiency and a flexible tolerancing of this quantity.

