Press Release

VirtualLab Fusion 2020.1: Fast Physical Optics, Brought to the Next Level

Latest release of physical-optics software VirtualLab Fusion opens the door to a wider range of applications.

Jena, Germany | August 2020

The strategy followed by LightTrans International in the development of the physical-optics design software VirtualLab Fusion can be summarized in two words: **connecting solvers**. The latest version, 2020.1, released this summer, brings this strategy to a whole new level.

Connecting field solvers is the basis of **fast physical optics**: using a single solver for the simulation of a complex system is not an option – either important effects are missed, or the simulation becomes too heavy. VirtualLab Fusion acts as a one-stop simulation platform where different solvers can be applied for the different components in the system, and the results are combined seamlessly in a non-sequential way to provide the vec**torial solution** for the whole system. In the latest version, those **solvers can be defined in the space or in the spatial frequency (k) domain**, depending on which is more convenient on a case-by-case basis. This freedom an asset: the simulations are faster and, in many cases, physical effects in the system are considered in an even more exact way.

This domain freedom puts the spotlight on the Fourier transform (FT). Another reason for the widespread assumption that physical optics is slow and heavy is the tradition of using the rigid Nyquist-Shannon equidistant sampling, a prerequisite of the well-known Fast Fourier Transform. But VirtualLab Fusion 2020.1, with its catalog of **Fourier transform algorithms** and the accompanying **hybrid data handling**, provides a workaround to sidestep such stringent sampling conditions: the result is, simply, **faster physical-optics**.

So, there it is: New solvers. The freedom to move between domains to apply them. A catalog of FT algorithms with automatic decision making for a comfortable and seamless experience.

In other words: new fields of application now open to you with VirtualLab Fusion 2020.1, and faster than ever before.

Cascaded apertures, 4f setups, laser systems

Considering diffraction throughout an optical system, as opposed to working under the assumption that diffraction will not appear until the exit pupil, is vital to model a series of well-known scenarios: 4f setups, cascaded apertures, paraxial Gaussian systems. "*In VirtualLab Fusion 2020.1 we implement a collection of innovative Fourier transform algorithms with a unique hybrid data handling to keep computational effort in*

Press contact:

LightTrans International UG
Irene Kopp

Kahlaische Straße 4
07745 Jena, Germany

Phone +49.3641.53129-54
Fax +49.3641.53129-01

irene.kopp@lighttrans.com
www.lighttrans.com

check, plus a fully automatic, but customizable, decision-making process," explains Frank Wyrowski, president of LightTrans. All of which, together, ensure diffraction effects are taken into account throughout the system in a faster and more user-friendly way.

Gratings & stratified media

Agility in the computation of Fourier transforms not only has repercussions in the simulation of diffraction effects: a quick back-and-forth between the space and k domains is a necessity to model systems which combine components with different natural domains, as is the case e.g. for lenses or other curved surfaces (space domain), and gratings (k domain). CTO Site Zhang emphasizes, "*The new components in version 2020.1 for gratings, plane interfaces, and stratified media take full advantage of a rigorous k-domain treatment. With the new medium which facilitates the definition of pillars with varying parameters, we now support a user-friendly configuration and simulation of metagratings.*" For example, non-intuitive effects, like the angular/spectrum dispersion and polarization dependency, are automatically taken into account.

Diffractive lenses & holographic optical elements (HOEs)

The new components for diffractive lenses and HOEs tackle the local variation of parameters in the structure with the use of the local linear grating approximation (LLGA), with both the rigorous Fourier modal method (FMM) and the thin-element approximation (TEA) available as local algorithms to model the interaction of light with the structure.

Augmented and mixed reality

AR & MR have been common in science fiction for decades. We are now bearing witness to the growth of this technology in real life; however, tackling the challenges which remain yet to be overcome – specifically those related to the optics – demands dedication and ingenuity. To the modeling and design tools dedicated to this topic already previously available, version 2020.1 adds a visualization of the beam footprints superimposed onto the segmented grating regions. LightTrans International has also partnered with Dynardo to offer optiSLang®'s evolutionary algorithm embedded in VirtualLab Fusion's user interface (sold separately).

4.747 characters (incl. space)

Press contact:

LightTrans International UG
Irene Kopp

Kahlaische Straße 4
07745 Jena, Germany

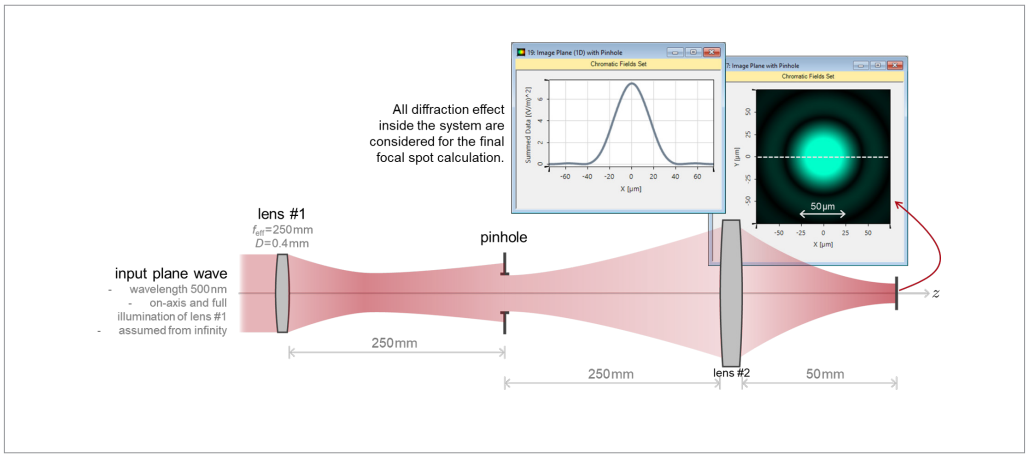
Phone +49.3641.53129-54
Fax +49.3641.53129-01

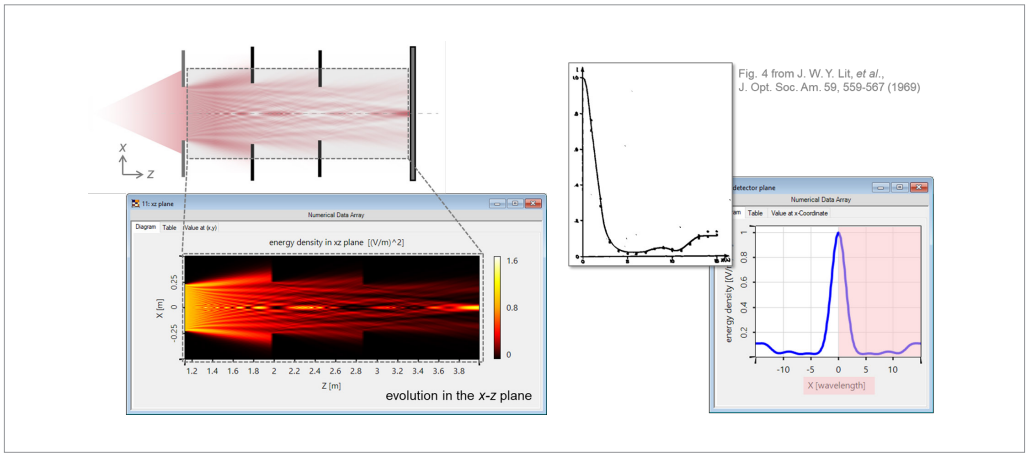
irene.kopp@lighttrans.com
www.lighttrans.com

LightTrans International UG

LightTrans offers solutions for the entire development cycle of optical components. Our products and services include optical design software, optical engineering, training and consulting. All the products and services of LightTrans are based on the physical-optics design software VirtualLab Fusion developed and produced by Wyrowski Photonics, which provides ray tracing and fast physical optics methods.
More information at www.lighttrans.com

Image material





Press contact:

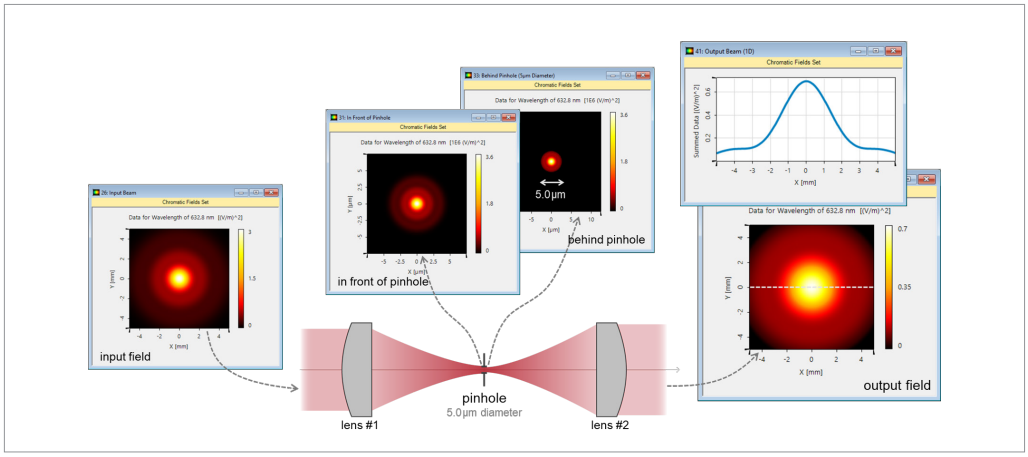
LightTrans International UG
Irene Kopp

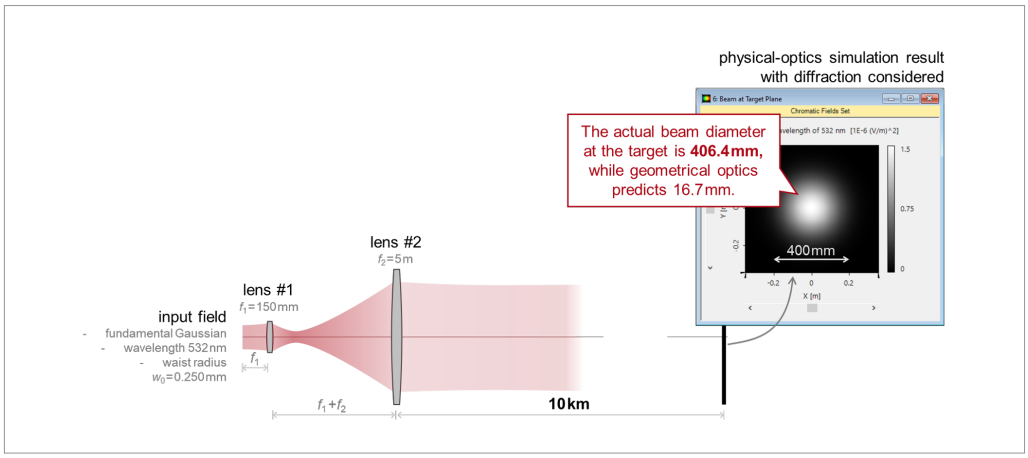
Kahlaische Straße 4
07745 Jena, Germany

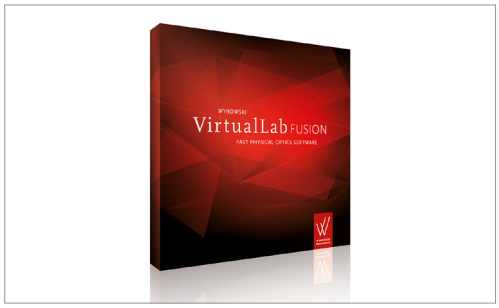
Phone +49.3641.53129-54
Fax +49.3641.53129-01

irene.kopp@lighttrans.com
www.lighttrans.com

Image material







Download the image material via scan:

Press contact:

LightTrans International UG
Irene Kopp

Kahlaische Straße 4
07745 Jena, Germany

Phone +49.3641.53129-54
Fax +49.3641.53129-01

irene.kopp@lighttrans.com
www.lighttrans.com