



Release Notes VirtualLab™ 4.0

The new version 4.0 of VirtualLab™ provides you with a new optics modeling and design software package, which combines the matured technology of versions 3.x with lots of powerful and user-friendly new features. Some of them are:

1. The most amazing new feature is our Light Path Diagram. Instead of using spread sheets to configure an optical system, you specify the light path through an optical system using a flow chart concept. Of course the former spread sheet concept is still supported. Thus, you gain an extremely user-friendly concept without losing what you have worked with before. It's your decision, what you prefer. But we expect you will like the new way that we provide you. It is fast and easy to use and it will save you time and money in your work.
2. With the Light Path Diagram we have introduced ideal and real components in VirtualLab™. Each component is combined with the modeling techniques suitable for it. And we will add more techniques in 2009. That gives you the flexibility, which our concept promises.
3. We have added new propagation techniques. There is a fascinating geometrical optics technique for propagation in free space and through lens systems that is similar to ray tracing software, but we do it in combination with an electromagnetic field representation. Therefore, we combine the power of geometrical optics and access to all parameters of a light field. The technique is equipped, as typical in VirtualLab™, with an automatic sampling feature. You can concentrate on optics instead of numerics. And if you have a better idea than we have at LightTrans, then you can switch over to a manual control and adjust sampling in a way you think is optimal to your problem.
4. Absolutely innovative is our new Automatic Propagation Operator for free space. It compares for you the accuracy of geometrical optics, paraxial Fresnel technique, far field approximation with the rigorous spectrum of plane wave method. The technique which fulfills the accuracy criterion and has the minimum numerical effort is automatically selected. That is a great benefit for you to save time of tests and comparisons. In particular, it helps you to decide if your modeling should be paraxial or non-paraxial.
5. We understand, that you as a user needs to know what your software is doing. Thus, we added a full logging of what VirtualLab™ is doing for you. You can get the information directly or export it as a complete pro-

tocol as an xml document. That is our way to provide transparency to your modeling with VirtualLab™. Our protocols give you a vast amount of modeling information.

6. VirtualLab™ offers now a Parameter Run Document, which allows you to specify and run a series of virtual experiments. It will be the basic starting block for upcoming optimization and tolerancing features in VirtualLab™.
7. Also in source modeling we added some important new features. With VirtualLab™ 4.0, you have a multimode laser source as well as a customized partially coherent planar source model. A combined source allows generation of locally polarized light, like an azimuthally polarized donut mode.
8. We have improved our color representation. Moreover, now you may switch between a photon counting detection and your visual perception of polychromatic light.
9. For the analysis of gratings we added the rigorous Fourier Modal Method (FMM). We combined it with the structure definition of surface and holographic volume gratings. That allows you to analyze diffraction efficiencies, near fields and Rayleigh coefficients. And you can do all that in the framework of your VirtualLab™ platform.
10. We added various wizards, our new Session Editors, to simplify specifying your modeling and design task. In particular you will benefit from that in diffractive optics. We used our outstanding skills in that area to provide you with easy-to-use ways to design beam splitters, diffusers and laser beam shapers.
11. We know, that you often do not need all of the power of VirtualLab™ for solving your modeling and design tasks and making strides in optics innovation. Just some tools may be enough for you. Thus, we offer our technology in toolboxes. VirtualLab™ 4 comes with several toolboxes including Starter, Diffractive Optics and Grating Toolbox along with other toolboxes such as Beam Shaping and Laser Resonator that are under current development. That gives you the choice to concentrate on what you need.

We could give you many more examples of innovative features of VirtualLab™ 4 but maybe it is more important for you to know, that we, the team at LightTrans, are continuously working on serving you better in technical and user-friendly features. Being a customer of VirtualLab™ gives you access to an amazing development in optics software technology. But we also know that something is always missing. Thus, we ask you to send us your ideas and demands for the future development of VirtualLab™.