WYROWSKI
VirtualLab FUSION
FAST PHYSICAL OPTICS SOFTWARE

LightTrans talk at OPIE 2019

Modeling of Optical Systems with VCSEL Sources by Innovative Fast Physical Optics

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Paper authors:	Christian Hellmann[1], Stefan Steiner[2], Roberto Knoth[2], Site Zhang[2], and Frank Wyrowski[3]
	[1] Wyrowski Photonics GmbH | Jena, Germany
	[2] LightTrans International UG
	[3] Applied Computational Optics Group, Friedrich Schiller University | Jena, Germany,
Presenting author:	Stefan Steiner

Abstract

For numerous applications for instance in the fields of optical fibers, sensors and detection vertical-cavity surface-emitting laser diodes (VCSELs) are applied. The reason for the suitability in this wide range of applications is due to their specific characteristics when it comes to adequate beam quality and cheap manufacture. Moreover, because of the used fabrication techniques, arrays with arbitrary shapes of VCSELs can be fabricated in a cheap and feasible way. In order to model optical systems either with light emitted by a single VCSEL or an array of VCSELs usually ray tracing techniques are applied. Though ray tracing gives insight into the basic properties of the light propagation, an analysis which includes all relevant effects must be based on a physical-optics approach which is fast and user-friendly. With the Fast-Physical Optics technique in our software VirtualLab Fusion we provide such a modeling approach. We include the polarization, coherence, interference and diffraction effects in the analysis carried out in one software platform, with a fully non-sequential consideration of the simulation. In the seminar it will be shown how VCSEL source can be modeled in VirtualLab Fusion illustrated by an example. Further, we will show how specific beam profiles of the real VCSEL source can be imported and used for the simulation and the analysis of complex optical systems. In addition, the modeling of rectangular, hexagonal and random pattern arrays of VCSELs is discussed. In the seminar, the advantages of the applied Fast Physical Optics approach and the capabilities of the Field Tracing Technology are presented.

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