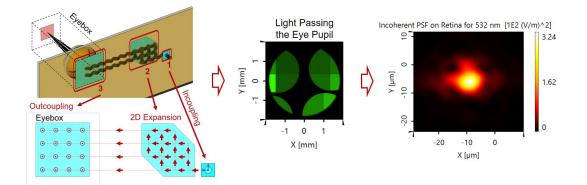# WYROWSKI
VirtualLab FUSION
FAST PHYSICAL OPTICS SOFTWARE

LightTrans' Talks at SPIE Photonics West 2020

Physical-Optics Analysis of Lightguides for Augmented and Mixed Reality Glasses

SPIE AR | VR | MR – Session 4B: Fabrication Processes, Materials, and Design Tools for AR
Sunday, 2 February 2020 | 16:20 – 16:40
Christian Hellmann, Stefan Steiner, Roberto Knoth, Site Zhang, and Frank Wyrowski

Lightguides in combination with gratings seem to be a promising candidate for the development of AR/MR glasses. The research and development of this technique is done in numerous companies and institutes and there is still a lot of room for new ideas and innovations. The design and the modeling of such lightguides is very different to lens design and requires new techniques in modeling. Though ray tracing gives insight also in the case of lightguides, 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 of the in-coupled light, fully vectorial grating analysis, coherence, interference and diffraction effects in the analysis carried out in one software platform, with a fully non-sequential consideration of the lightpaths through the lightguide. In the talk we briefly explain the underlying modeling concepts and demonstrate analysis results for a specific FOV with respect to merit functions like uniformity in the eyebox, uniformity and MTF over the FOV for an example design done in VirtualLab Fusion. We address computation speed and distributed computing.

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