

LightTrans talk at DGaO 2019

# Challenges and Solutions in the Design of Lightguides for XR Glasses

**Deutsche Gesellschaft für angewandte Optik - Jahrestagung 2019**

**Session time: 13 June 2019 | 12:15 – 12:30**

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## Abstract

Glasses for AR, MR, and VR, also referred to as XR glasses, seem to be one of the next big technical innovations to come. Though several companies provide first products already, we are just in the initial stage of the development of high quality XR glasses. Several technical challenges are to be tackled and it is not clear yet what kind of concept will finally become convincing. The application of a lightguide in combination with grating regions is definitely a good candidate and we will discuss the concept, challenges and our current strategies to deal with them. In order to include all relevant effects in the modeling and design a physical-optics approach is mandatory. In the design we proceed in two steps: first we generate designs for each field-of-view (FOV) and then select one from an array of strategies for how to combine them. As in lens design, the inclusion of a large FOV is challenging. In the case of XR glasses we discuss the FOV challenge for coupling into the lightguide, as well as for the further processing in the lightguide in order to achieve the required design criteria. We present our design approach and our outlook on next developments.