WYROWSKI
VirtualLab FUSION
FAST PHYSICAL OPTICS SOFTWARE

Industry Workshop during SPIE – Photonics West 2019

Modeling and design of diffractive and meta-lenses with VirtualLab Fusion

Date: 6 February 2019
Time: 15:30 – 17:00
Location: Moscone Center, Room 12 (South Exhibit Level), 747 Howard Street, San Francisco, CA 94103, USA
Instructors: Frank Wyrowski – Friedrich Schiller University Jena (Jena, Germany), Site Zhang – LightTrans International UG (Jena, Germany)

Registration: The workshop is open to all Photonics West 2019 attendees (All Conference attendees as well as Exhibit Only attendees). To register please choose the option "Exhibition & Industry Events only" here.

Abstract

The growing importance of diffractive and meta-lenses in modern optical systems makes it vital to investigate and understand their capabilities. Both defined as thin structured layers etched or deposited on a surface, the difference between them lies in the scale of the structures: sub-wavelength range in the case of meta-lenses, wavelength range for diffractive. The underlying surface can be either plane or curved, with the latter case presenting particular challenges in fabrication, when it is at all feasible to manufacture.

The effect sought with the inclusion of such components in an optical system is to produce a change in the incident wavefront; additional electromagnetic phenomena, often detrimental to the overall performance of the element, can and do occur, and must, therefore, be considered. That is precisely one of the highlights of this workshop: we will show you how to include diffractive and meta-lenses in optical lens systems and how to perform a full fast physical optics simulation of the overall system, which accounts for all resulting effects, including higher diffraction orders (e.g. for multiple foci in intra-ocular lenses). The preliminary design of the diffractive and meta-lens elements may be based on an optimization of the wavefront transformation (binary surface) in Zemax®, with the resulting system subsequently imported into VirtualLab.

We will then demonstrate how to design the lens structure of the corresponding diffractive (surface or volume) or meta-lens (nano-fin type). Another route we will illustrate is via the so-called functional design approach, which directly provides the lens structure for a given requested lens functionality. Once the diffractive or meta-lens has been designed (following one of the paths outlined above) the whole system can be analyzed with Fast Physical Optics to gauge its overall performance. The lens structure can eventually be exported as fabrication data for lithography or other manufacturing processes.

LightTrans International UG, Kahlaische Straße 4, 07745 Jena, Germany
Phone +49.3641.53129-0, info@lighttrans.com, www.lighttrans.com

LIGHTTRANS