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Optical Design and Measurement

Bachelor/Master thesis at IOIP:

Systematic wave-optical simulation of polymer optical waveguides

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Motivation:

Our research group (ODEM) does work in cooperation with various other Institutes all over Germany. Especially close work is done with the ITA in Hannover, IAVT in Dresden and FAPS in Erlangen-Nürnberg. With the aim to research processes and technologies for three-dimensional printed waveguides, the research group OPTAVER was founded by the mentioned Institutes. For the ODEM group special interest is in the optical simulation of the system. For simulations of optical systems different approaches have been established in recent years. Under usage of geometrical optics, raytracing is a widely used algorithm. But for precise simulations, wave propagation methods are the preferred choice.

Aim:

The aim of this thesis is to take a systematic look at polymer optical waveguides simulated with the Wave Propagation Method (WPM). The WPM is implemented in the inhouse software WaveSim and has only be adjusted for the polymer optical waveguides. Special interest is in the damping of the waveguide, since it defines it quality and further usage. Further, influences of bends of the waveguide, waviness and roughness of the waveguide and many more interesting characteristics are subject of study. In the end the thesis will give a deeper insight into the behaviour of light in a 3D-printed waveguide and will be an important document for engineers which are performing the printing process.

Requirements:

- Good knowledge in optics
- Know how in matlab or C/C++

Further information: **https://www.optik.nat.fau.de/forschung/odem/**

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