

HiWi / Research Internship (ETIT Forschungspraktikum): Multi-Plane Light Conversion for Mode Multiplexing

The data rates in modern fiber-optic communication systems approach the limits imposed by the maximum transmission capacity of conventional single-mode fibers. Increasing the achievable data rates beyond today's limits requires exploiting yet unused degrees of freedom because of the limited bandwidth of the optical fiber channel. Deploying new fiber types enables propagating multiple signals over the same wavelength and polarization channel using separate spatial transmission paths, so-called fiber modes. The central challenge of this technique is the mapping of the parallel data signals onto the fiber modes and vice versa. This process requires a multiplexer that can be realized (among others) with the help of multi-plane light conversion (MPLC). The basic idea in MPLC is the application of a series of phase masks to the propagating light. This way, unitary transforms between arbitrary modal bases become possible, as shown in the figure below.

Your tasks:

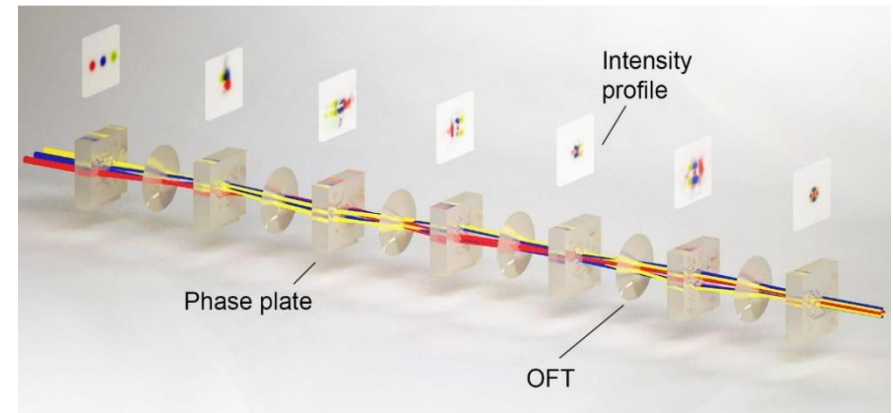
- Develop design rules for the phase plates enabling transforms between modal bases
- Investigation of MPLC on microstructure level

Position:

- HiWi: 40h/month
- Research internship: ~3 months

For detailed information contact:

M. Sc. Jonas Krimmer Prof. Dr. Sebastian Randel
jonas.krimmer@kit.edu sebastian.randel@kit.edu
Tel. 0721-608-42487 Tel. 0721-608-42490



Multiple phase plates realize the transform of three adjacent Gaussian mode profiles into the desired fiber mode.

Source: Labroille et al. Optical Fiber Technology 35. 2017.