University of Stuttgart
Institute of Electrical and Optical Communications

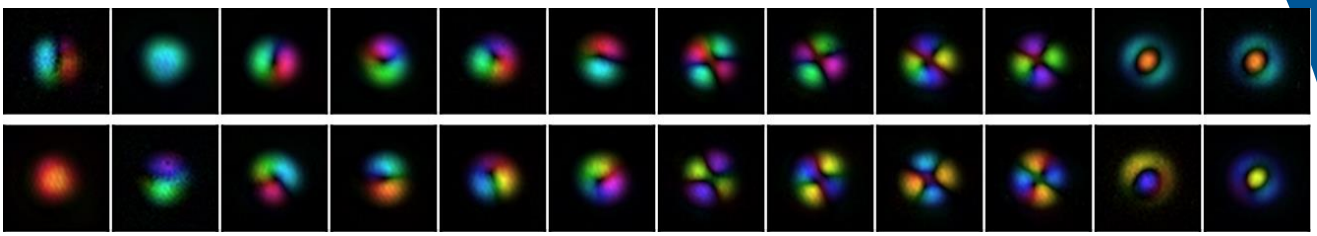
BA/FA/MA

Digital Holography of Fiber and Waveguide Structure Modes

Objective:
Development of optical setup and/or corresponding analysis software for advanced mode imaging

Your profile:
- Studies in engineering (e.g. electrical, photonics, mechanical) or physics
- Curiosity in understanding and solving complex problems for a specified application
- Ability and interest to work with precision mechanics *(beneficial)*
- Basic understanding of Maxwell's equations, wave optics, and/or photonics *(beneficial)*
- Basic programming skills in Python, Matlab, or comparable syntax *(beneficial)*

We offer:
- Development of new skills and knowledge in the field of photonics
- Individual supervision and support
- Opportunity to participate in up-to-date photonic research



Example of optical fields of a MUX device from: S. van der Heide et al., "Optical Field Characterization using Off-axis Digital Holography," Optical Fiber Communication Conference (OFC), 2022, DOI: 10.1364/OFC.2022.M3Z.6.

Background:
Multimode fiber and waveguide systems recently gain importance in telecommunication. For the development of corresponding fibers, as well as MUX/DEMUX systems, the method of their characterization is challenging. One possible solution is the diffraction-limited imaging and analysis of individual mode-fields of fibers and waveguides, in order to evaluate and compare them quantitatively.

Your task:
The overall goal of this topic includes the development and/or optimization of an optical setup for quantitative mode field characterization of fiber and waveguide modes – which is called digital holography. It involves the construction and optimization of a specific optical setup, the test and analysis of photonic devices, and the implementation as well as optimization of corresponding analysis software. The specific area of action of the study thesis can be agreed on individually within this field.

Language:
English or German

Contact:
Louise Hoppe, louise.hoppe@int.uni-stuttgart.de

Institute of Electrical and Optical Communications
Prof. Dr.-Ing. Georg Rademacher
Pfaffenwaldring 47, 70569 Stuttgart