University of Stuttgart
Institute of Electrical and Optical Communications

Objective:
Simulation, design and investigation of photonic devices.

BA/FA/MA

Multimodal routing of an integrated photonic circuit

Your profile:

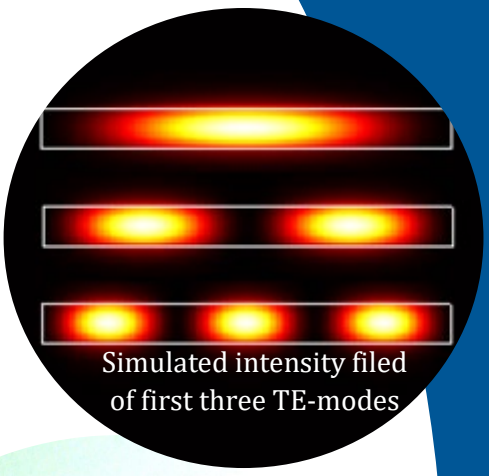
- Studies in electrical engineering, photonics, physics, optotechnology or a related field of study
- Interest in optics, photonics
- Basic knowledge of electromagnetic field theory and numerical simulation methods
- Advantageous experience with simulation software (e.g., Lumerical, COMSOL, Python, MATLAB)
- Independent, analytical, and structured working style

We offer:

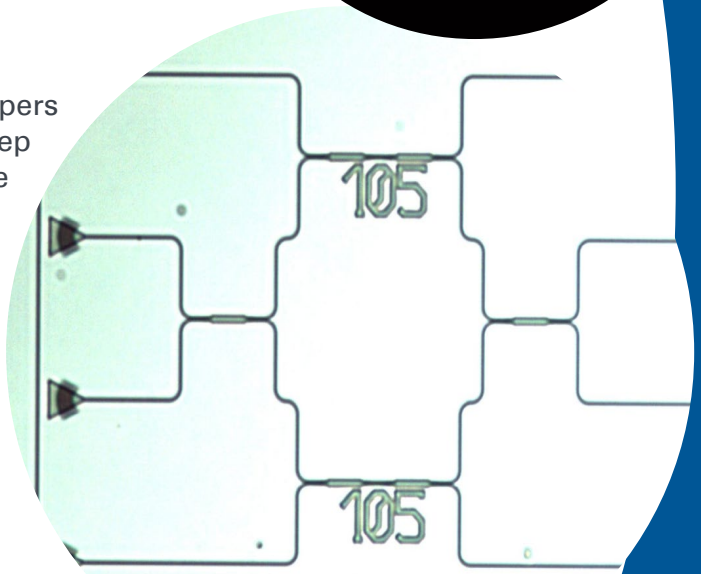
- Individual supervision and support
- Opportunity to participate in exciting photonic research
- Gain experience with current state of the art simulation tools

Background:
Silicon photonics enables the integration of complex optical circuits on a single chip and forms the basis for modern applications in optical communications, sensing, and signal processing. In addition to classic single-mode signal processing, mode-division multiplexing is gaining in importance because it allows multiple modes of a waveguide to be used simultaneously.

The signal on the chip is guided through straight waveguides, bent waveguides, tapers and crossings. All these devices need to be adapted for multi-mode applications.


Simulated intensity filed of first three TE-modes

Your task:
In this work waveguides, bent waveguides and tapers has to be investigated. The focus is a deep understanding of the different devices and the behavior in multimode applications. Therefore, various implementation concepts will be studied for the components and examined with regard to losses, crosstalk, and manufacturing tolerances. A promising routing concept is designed, and a layout is created and can be characterized using metrological methods.



Microscopic picture of a network in SOI

Language:
German or English

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