University of Stuttgart
Institute of Electrical and Optical Communications

BA/FA/MA

Design and Optimization of Subwavelength Metamaterials for Silicon-on-Insulator Photonic Integrated Circuits

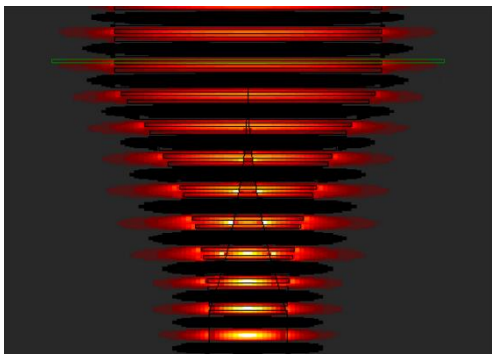
Objective:
- Simulation
- Optimization

Your profile:
- Experience in working with Python
- Knowledge in integrated photonics
- You have the ability to work independently and solve problems on your own
- Previous knowledge in electromagnetic simulation is beneficial

We offer:
- Individual supervision and support
- Freedom to contribute and implement your own ideas
- Access to state-of-the-art facilities and advanced simulation tools

Background:
Photonic Integrated Circuits (PICs) have become a key component of modern communication technologies in recent years. They are used in a variety of commercial products, enabling complex optical functions such as pre-filtering and multiplexing. These PICs are typically fabricated on silicon platforms, similar to electronic circuits. To further increase the performance of these devices, the integration of advanced materials, such as subwavelength metamaterials, is essential. Metamaterials offer unique optical properties that are not found in naturally occurring materials, allowing for unique control over light propagation, refraction, and reflection. This enables the realization of highly compact and efficient photonic components, improving the functionality of PICs in applications like optical filtering, beam shaping, and enhanced light-matter interaction.

Your task:
Your work will include electromagnetic simulations to analyze the properties of silicon-on-insulator (SIO) metamaterials and the use of optimization techniques to improve the device performance, with a particular focus on minimizing optical losses, reducing the device footprint, and improving the broadband behavior. The amount of work can be tailored to the type of thesis.



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