University of Stuttgart
Institute of Electrical and Optical Communications

BA/FA/MA
Narrowband Integrated Optical Filter

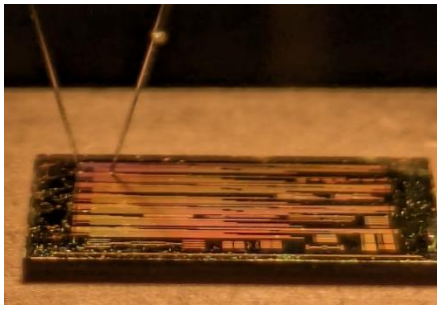
Objective:
Simulation and Design of a Tunable, Narrowband Integrated Optical Filter

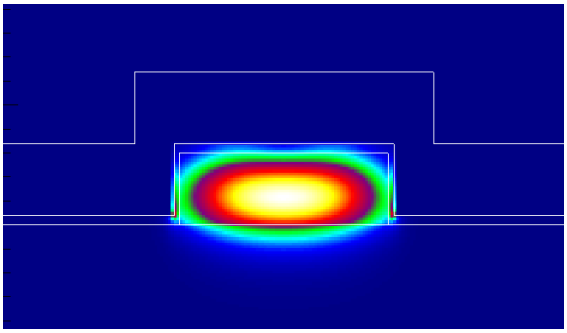
Your Profile:
- Interest in simulation and modeling of photonic devices
- Enjoy optimization and finding efficient solutions
- Initial experience in working with Python

We Offer:
- Individual supervision and support
- Freedom to contribute and implement your own ideas
- Opportunity to work in an innovative field of modern communication technology
- Valuable hands-on experience with photonic simulations (FEM, FDTD) simulation

Background:
Integrated optical filters are key components in modern communication systems, enabling precise wavelength selection and signal processing. Understanding how design parameters and material properties influence the filter's performance is crucial for optimizing these devices and expanding their applications in photonics.

Your Task:
In this project, you will investigate the design and properties of an integrated narrowband optical filter. The filter's resonance frequency is tuned using a micro lithium-ion battery cell. Your main task will be to simulate how a high attenuation coefficient affects the filter's design and performance. Simulations will be carried out using RSoft, FimmWave or Lumerical, and Python skills are advantageous for automating and analyzing the simulation results.





Contact:
Kaps, Robert, robert.kaps@int.uni-stuttgart.de

Related Publications:

- Priyadarshini, Pratyasha, Arnab Goswami, and Bijoy Krishna Das. "Distributed Bragg reflector–based resonance filters for silicon photonics: design and demonstration." *Journal of Optical Microsystems* 4.4 (2024): 041403-041403.
- Saber, Md Ghulam, et al. "Transversely coupled Fabry–Perot resonators with Bragg grating reflectors." *Optics Letters* 43.1 (2017): 13-16.
- Zhao, Yong, et al. "Single Wavelength Resonator Based on $\pi $ Phase-Shifted Antisymmetric Bragg Grating." *IEEE Photonics Technology Letters* 31.16 (2019): 1339-1342.

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