University of Stuttgart
Institute of Electrical and Optical Communications

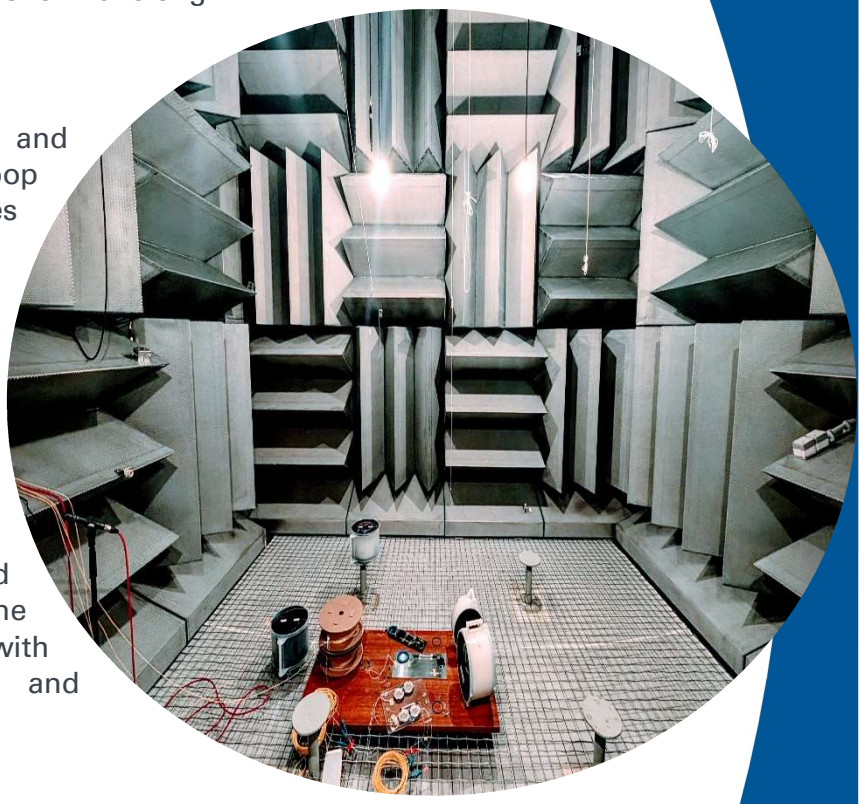
BA/FA/MA
High speed polarization tracker

Objective:
Software development,
Measurement technology (photonic)

Your profile:
- experience in microcontroller and FPGA programming
- experience in PCB layout
- interest in photonic devices

We offer:
- Individual supervision and support
- Freedom to contribute and implement your own ideas
- The opportunity to work on exciting photonic measurement setups and familiarize yourself with new technologies

Background:
Ever increasing data rates require new and exciting optical fiber technologies such as few mode fibers and multicore Fibers. For polarization diverse characterization of those specialty fibers and their corresponding couplers, a precise and wavelength independent linear polarized source is needed. Due to birefringence in optical fibers this polarization is wavelength dependent, and has to be tuned over wavelength.



Your task:
This project involves the design and implementation of a high-speed, closed-loop polarization tracking system that integrates analog polarization state measurement with real-time piezoelectric-based control for dynamic stabilization. The technical scope encompasses three primary domains: (1) a high-bandwidth analog sensing subsystem for low-latency polarization detection, (2) custom PCB design for piezoelectric actuator control including high-voltage amplification, signal conditioning, and thermal management, and (3) embedded control system architecture featuring real-time feedback across the full Poincaré sphere with sub-millisecond response characteristics and complete 360° rotation capability.

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