

We at the Fraunhofer Institute for Electronic Microsystems and Solid State Technologies (Fraunhofer EMFT) are looking for a **master's student (m/f/d)** and offer you an exciting and varied topic:

INVESTIGATION OF SUBSTRATE-INDUCED EFFECTS ON SUPERCONDUCTING NIOBIUM MICROSTRIP RESONATORS ON POLYIMIDE

Fraunhofer EMFT offers students the opportunity to gain practical experience in applied research and development. Exciting tasks provide valuable insights into professional life. As part of MUNICH QUANTUM VALLEY (MQV), EMFT acts as a link between research and industrial application and is dedicated to the development of powerful, scalable quantum computer components.

In the INTERCONNECT SYSTEMS team, we focus on the development of superconducting, flexible cables and interconnections for quantum computers. This includes not only manufacturing, but also the comprehensive electrical, thermal, and mechanical characterization of our products.

This research project aims to explore the influence of flexible polyimide substrates on the performance of superconducting niobium microstrip resonators operated at cryogenic temperatures. The focus lies on understanding how mechanical stress, substrate thickness, and thermal cycling affect the resonator's quality factor and resonance frequency.

The study will involve the design of suitable microstrip resonators. These structures will be characterized in a cryostat environment to evaluate their superconducting behavior under varying mechanical and thermal conditions.

We look forward to your support and to working together on innovative solutions for the future of quantum computers!

These are some of the tasks you can expect:

- Design of superconducting resonators on flexible substrates with varying substrate thicknesses
- Cryogenic S-parameter measurements to extract Q-factor and resonance frequency
- Controlled mechanical bending and thermal cycling to simulate operational stress
- Electromagnetic simulations to support experimental findings

What you should bring with you:

- Enrolled student of physics, electrical engineering, or a comparable field of study
- Experience in the layout design of electronic circuits
- Analytical understanding, scientific thinking, independent and structured way of working
- IT skills; basic programming skills (e.g.: Python, Matlab) are desirable
- Openness, enthusiasm for high-tech, good communication skills for successful collaboration

