

Bachelor / Master Thesis:

Design and fabrication of a superconducting modulators

Recent advances in superconducting electronics have made quantum computers operating at cryogenic temperatures a feasible technology.

To minimize heating, fiber optics and an silicon organic hybrid (SOH) electro-optic modulators in the cryogenic chamber are an attractive option for transmitting data to the outside. Currently, SOH modulators employ doped silicon slabs to concentrate the microwave mode onto the optical waveguide.

Carrier freeze out effects at cryogenic temperatures limit the performance of such devices. In order to achieve high conversion efficiency and high bandwidth a very long planar superconducting microwave waveguide without the silicon slabs can be used.

Your tasks:

- Simulation driven design of modulator featuring superconducting electrodes
- Developing and implementing a setup to characterize devices at cryogenic temperatures
- Functionalizing and characterization of in house fabricated superconducting modulators at cryogenic temperatures
- Data transmission experiment at cryogenic temperatures

Interested? Please contact:

Dr. Artem Kuzmin

artem.kuzmin@kit.edu

Tel. 0721 608-42496

Adrian Schwarzenberger, M. Sc.

adrian.schwarzenberger2@kit.edu

Tel. 0721 608-47170

Prof. Dr. Christian Koos

christian.koos@kit.edu

Tel. 0721-608-42786

