

12. Mai 2023

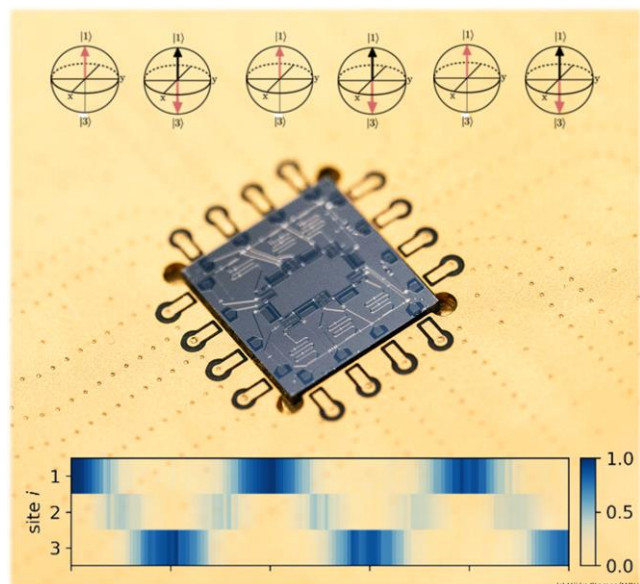
Einladung zum Physikalischen Kolloquium

16.06.2023 **Stefan Filipp, Walther-Meißner-Institut & TU München**

»High-coherence superconducting qubits for enhanced quantum gate operations «

Einführung: A. Ustinov

Recent years have witnessed a rapid development of quantum technologies culminating in the realization of first quantum computer prototypes. Still, to render today's quantum processors practically useful both the coherence time of qubits and the efficient generation of quantum states needs to be enhanced further. Along these lines, we have systematically optimized the parameters for the deposition and structuring of superconducting thin film electrodes that form both harmonic oscillators and qubit structures. With these fabrication improvements we can build resonators with quality factors around 5 million and qubit with coherence times exceeding 300 microseconds. Moreover, we have built tunable couplers between two or more



quantum circuits that mediate simultaneous local interactions. These can be harnessed to generate multi-qubit operations and efficiently create many-body entanglement. As a specific example I will demonstrate a fractional state transfer protocol on a chain of superconducting qubits and discuss its potential use case for quantum simulations and parity readout.

Der Vortrag findet **am Freitag, den 16. Juni 2023 um 15:45 Uhr im Otto-Lehmann-Hörsaal**, Physik-Flachbau (Geb. 30.22), KIT-Campus Süd statt.