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ASC-PhD-Colloquium

Dr. Markus Storcz

LMU Munich

Optimal Control of Superconducting Nanocircuits and Quantum Optics Experiments on a Chip

Solid-state quantum bits (qubits) are promising candidates for the realization of quantum computing. They are potentially scalable to a quantum processor, the building block of a quantum computer. Characteristic solid-state qubits are realized as superconducting nano-circuits or semiconductor quantum dot systems.
This talk will outline how quantum optimal control theory can be applied to coupled superconducting qubits. It is shown that by using shaped pulses a controlled-not gate can be obtained with a gate fidelity $F > 0.99999$.
In the second part of the talk, novel designs for solid-state circuits analogous to quantum optics are proposed. Very appealing basic questions are elucidated, like the generation and detection of deeply nonclassical states of the electromagnetic field, i.e., single microwave photon Fock states, in the solid-state.

Wednesday, 22nd February 06, 11.15 h , Room 348 / 349, Theresienstr. 37 / III

Prof. V. Mukhanov