SFB 631

Festkörperbasierte Quanteninformationsverarbeitung

TECHNISCHE UNIVERSITÄT MÜNCHEN

Seminar Announcement

Location Walther-Meissner-Institut

Seminarraum 143

Time Thursday, 08.07.2004

11:00 Uhr st

Speaker Andreas Wallraff

Departments of Physics and Applied Physics, Yale University, New Haven, CT 06520, USA

Title Circuit Quantum Electrodynamics: Doing Quantum Optics on a Chip

Abstract We have realized an experiment in which a superconducting qubit (a Cooper pair box) is strongly coupled to a single microwave photon stored in a high quality on-chip cavity. The large electric dipole moment of the Cooper pair box interacts strongly with the vacuum electric field of the quasi one-dimensional superconducting transmission line cavity. The coherent exchange of a single excitation between the qubit and the cavity is observed spectroscopically as the vacuum Rabi frequency exceeds the damping rates of both the cavity and the qubit. Our experiments constitute the first observation of strong coupling cavity quantum electrodynamics (CQED) in a solid state system. This new regime of matter light interaction in a circuit can be exploited for quantum information processing and quantum communication.

gez. A. Marx