SFB 631

Festkörperbasierte Quanteninformationsverarbeitung

Seminar Announcement

Location University of Regensburg, Dept. of Physics
Room PHY 5.0.21

Time Thursday, 29th May 2008
3:15 p.m.

Speaker **Dr. Sigmund Kohler**,
Physics Department, University of Augsburg

Title Landau-Zener transitions of a qubit: From state preparation to monitoring dynamics

Abstract
The coupling of a qubit to a circuit-QED mode can induce Landau-Zener transitions of the qubit upon switching the magnetic flux that penetrates the superconducting loop. The adiabatic energies of this system are characterized by multiple exact and avoided level crossings, so that the usual two-level Landau-Zener formula is no longer applicable. We derive selection rules for the multi-level transitions and present an exact expression for the corresponding transition probabilities. Applications include quantum state preparations like single-photon generation and the controllable creation of qubit-oscillator entanglement. If the circuit is driven by a rf signal, the phase of the reflected signal depends on the state of the qubit. We discuss the possibility and the limitations of monitoring the qubit dynamics in that way.

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