

Séminaire du SPEC
Mercredi 11 octobre 2006, 11h00

Bt. 774 - Salle Claude ITZYKSON
Centre d'Etudes de Saclay, Orme des Merisiers
91191 Gif-sur-Yvette

Accueil café 15 minutes auparavant
**Quantum non-demolition measurement
of a superconducting two-level system**

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Superconducting qubits are artificial two-level systems that are based on the nonlinearity of the Josephson effect and the large single electron charging energy in nanofabricated circuits. In recent years, these systems have received a lot of attention in the context of quantum computing. Coherent control of single qubits has been achieved and entangled states of two qubits have been created.

We present recent experiments that address the issue of measurement of superconducting qubits. We investigate a superconducting flux qubit, measured by probing the state of a hysteretic coupled resonator. This setup allows for very efficient detection of the state of our qubit, with a measured contrast of 85 %. We also perform consecutive measurements of the qubit state. The large correlations between two measurements demonstrate the QND nature of this readout scheme. This result establishes the validity of a QND strategy for projective measurement of superconducting qubits and has implications for quantum information processing.

Finally, we present experiments in which we tune the measurement strength by changing the amplitude of the driving of the resonator used for readout. For a measurement strength which is either lower or higher than the setting which leads to projective measurement, we find that the measurement is only partly projective.

Invitant :

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