MAR06-2005-005953

Abstract for an Invited Paper
for the MAR06 Meeting of
the American Physical Society

Metastable states in an RF-driven Josephson oscillator

RAJAMANI VIJAYARAGHAVAN, Yale University

A superconducting tunnel (Josephson) junction can be viewed as a non-linear, non-dissipative inductor and can be used to construct an oscillator by shunting it with a capacitor. Under certain driving conditions, the non-linear oscillator can adopt one of two possible modes of oscillation with different amplitude and phase. I'll present experimental results which characterize these metastable states, and the transitions between them in the thermal and quantum regime. The dynamical switching between the metastable states can be used to make sensitive detectors. I'll present data demonstrating the successful implementation of such a detector (Josephson Bifurcation Amplifier) to measure superconducting quantum bits. Other implementations of such non-linear oscillators using superconducting transmission line resonators will also be discussed.