

Fluctuation-induced switching and power spectra of modulated quantum oscillators

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We will show that the rate of metastable decay displays scaling behavior near bifurcation points. This scaling will be discussed for different mechanisms of classical and quantum fluctuations in nonlinear oscillators, which display bistability in response to resonant driving or parametric modulation. The mechanism of quantum activation and the effect of non-Gaussian noise will be considered. We will also describe the distribution of paths followed by the oscillator in switching. The nonanalytic behavior of the effective switching activation energy with varying parameters will be outlined. The power spectra of modulated oscillators will be discussed and the possibility of measuring the effective temperature of a modulated oscillator imposed by quantum fluctuations will be shown. A comparison with the experimental observations on Josephson bifurcation amplifiers and nanomechanical resonators will be made.