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Multiphoton antiresonance MARK DYKMAN, Michigan State University, MICHAEL FISTUL, Ruhr University Bochum — We show that nonlinear response of a quantum oscillator displays antiresonant dips or resonant peaks with varying frequency of the driving field. The effect accompanies resonant multiphoton mixing of oscillator states, which leads to anticrossing of the quasienergy levels in adiabatic passage of the field frequency through resonance. Usually one would expect anticrossing to be associated with switching from the response in one of the involved states to that in the other. The totally different behavior of the response of a nonlinear oscillator is a consequence of dynamical symmetry which shows that, in the neglect of multiphoton interstate transitions, (i) the response in the resonating states is the same, and (ii) many states are in resonance, pairwise, for the same field frequency. The width and height of the dips (peaks) of the response strongly depend on the field amplitude. We discuss the possibility to observe the antiresonance and the associated multiphoton Rabi oscillations in multilevel Josephson junctions used for quantum measurements.

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