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Theory and practice of dressed coherent states in circuit QED[1]
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— In the dispersive regime of qubit-cavity coupling, classical cavity drive populates the cavity, but leaves the qubit state unaffected. However, the dispersive Hamiltonian is derived after both a frame transformation and an approximation. Therefore, to connect to external experimental devices, the inverse frame transformation from the dispersive frame back to the lab frame is necessary. We show that in the lab frame the system is best described by an entangled state known as the dressed coherent state, and thus even in the dispersive regime, entanglement is generated between the qubit and the cavity. Also, we show that further qubit evolution depends on both the amplitude and phase of the dressed coherent state. This provides a limitation to readout in the dispersive regime. We show that only in the limit of infinite measurement time is this protocol QND, as the formation of a dressed coherent state in the qubit-cavity system applies an effective rotation to the qubit state. We show how this rotation can be corrected by a unitary operation, leading to improved qubit initialization by measurement and unitary feedback.] L.C.G. Govia and F.K. Wllhelm Phys. Rev. Applied 4, 054001 (2015) LC.G. Govia and F.K. Wilhelm, arXiv: 1506.04997

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