Abstract Submitted
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Measurement errors for phase qubits[1] QIN ZHANG, ABRAHAM KOFMAN, ALEXANDER KOROTKOV, University of California, Riverside — We analyze error mechanisms in measurement of superconducting phase qubits, including measurement cross-talk for two coupled phase qubits and effect of nonadiabaticity during the measurement pulse. Each qubit is represented by a fictitious particle moving in an asymmetric double-well potential. A measurement, e.g., of the state $|10\rangle$ perturbs the second qubit which may result in a wrong measurement result $|11\rangle$. In the study of this cross-talk the first qubit is described classically, since it is highly excited, whereas the second qubit can be treated either classically or quantum- mechanically. We obtain conditions for minimizing the cross- talk. We also study the nonadiabatic errors for different shapes and durations of the measurement pulse and discuss optimal conditions for fast and reliable measurements.

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