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Simple quantum feedback of a solid-state qubit¹ ALEXANDER KO-ROTKOV, University of California, Riverside — We propose an experiment on quantum feedback control of a solid-state qubit, which seems to be within the reach of the present-day technology. Similar to the earlier proposal, the feedback loop is used to maintain the coherent oscillations in a qubit for an arbitrary long time; however, this is done in a much simpler way, which eases significantly the bandwidth problem. The main idea is to use the quadrature components of the noisy detector current to monitor approximately the phase of qubit oscillations. The price for simplicity is a less-than-ideal operation: the fidelity is limited by about 95%. The feedback loop operation can be experimentally verified by appearance of a positive in-phase component of the detector current relative to an external oscillating signal used for synchronization.

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