Abstract Submitted
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A dc-SQUID phase qubit[1] EMILE HOSKINSON, AURELIEN FAY, WIEBKE GUICHARD, LAURENT LEVY, ALEX ZAZUNOV, NICOLAS DIDIER, FRANK HEKKING, OLIVIER BUISSON, CRTBT-LPMMC-LCMI, CNRS and Universite Joseph Fourier, BP 166, 38042 Grenoble-Cedex 9, France — A current and flux biased dc-SQUID behaves as a quantum particle trapped in a cubic-quadratic potential well. Resonant transitions between the ground and first excited states are induced by the application of microwave current or flux pulses. Measurement is performed by an adiabatic nanosecond flux pulse which projects the excited levels of the quantum particle onto the voltage state of the SQUID. Rabi-like coherent oscillations have been observed with a decay time $\tau \simeq 20$ ns [PRL 93, 187003]. The dominant source of this decoherence was thermal current fluctuations [PRB 73, 180502]. We propose operation of this circuit as a qubit at an optimal point where it is insensitive to these current fluctuations to first order. Preliminary measurements show an increase in τ by a factor of 5.

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