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**Temperature Dependence of Rabi Oscillations in Phase Qubits**[1]
ALEXEY USTINOV, JUERGEN LISENFELD, TOBIAS WIRTH, ALEXEY FEOFANOV, ALEXANDER LUKASHENKO, University of Erlangen-Nuremberg, Germany — Using the experimental setup in Erlangen, we compared aluminum-based phase qubits with $SiN_x$ shunting capacitors made at UCSB with similarly designed circuits fabricated at HYPRES foundry using a standard niobium-based fabrication process with $SiO_2$ insulation. Measured decoherence times are about 100 ns and 5 ns, respectively. In both types of circuits, energy relaxation time $T_1$ scales inversely proportional to the area of the qubit junction, which agrees with earlier data. Rabi oscillations remain visible up to the temperature $T$ of about 400 mK (UCSB) and 800 mK (HYPRES), where the energy level separation becomes comparable with $k_{\mathrm{B}}T$. The current pulse readout in the upper temperature range is dominated by thermal escape rather then tunneling. Temperature dependence data for the decoherence time and oscillations contrast will be presented and discussed.

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