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【527】Coupling spins coherently to microwave photons

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A resonant exchange qubit utilizes two orthogonal (S = 1/2, Sz = 1/2) states composed of three electron spins as the qubit states. We realize such a qubit in a GaAs triple quantum dot with each quantum dot hosting a single electron. We couple the electron spins strongly to individual GHz-photons in a strip-line resonator via a tunable electric dipole coupling. Under optimum conditions, the qubit is found to have a decoherence rate of less than 10 MHz at a qubit-resonator coupling strength of 23 MHz. In a further experiment, we use resonator photons to couple the resonant exchange qubit coherently to a superconducting transmon qubit.

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