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【603】 Nanomagnets for manipulation of spin qubits

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The stray field of micro- and nanomagnets is exploited to manipulate the spin state of electrons confined in semiconductor quantum dots. Current devices use micromagnets that are uniformly magnetized along the direction of an external magnetic field. Here we introduce “U”-shaped Fe nanomagnets, where shape anisotropy sets a non-uniform magnetization pattern. We study the influence of size, shape and external applied magnetic field on such structures by micromagnetic simulations and spin-polarized scanning electron microscopy. We measure surface magnetization patterns for magnets down to 50 nm in width and discuss how nanomagnets are suitable for driving silicon spin qubits.

Theoretical Work

Authors: ALDEGHI, Michele (IBM Research Zurich); Dr ALLENSPACH, Rolf (IBM Research Zurich); Dr VON SALIS, Gian (IBM Research Zurich)

Presenter: ALDEGHI, Michele (IBM Research Zurich)

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