



Sonderseminar

Mittwoch, 25. Juli 2018

12:15 Uhr

WSI, Seminarraum S 101

“Benchmarking of 2-qubit fidelities in silicon”

Universal quantum computation requires qubit technology with excellent one- and two-qubit gate fidelities. Here, for qubits encoded on the electron spin states of gate-defined quantum dots, we demonstrate Bell state tomography with fidelities ranging from 80 % to 89 %, and two-qubit randomized benchmarking with an average Clifford gate fidelity of 94.7 % and average Controlled-ROT (CROT) fidelity of 98.0 %. These fidelities are found to be limited by the relatively slow gate times employed here compared with the decoherence times T_2^* of the qubits. Silicon qubit designs employing fast gate operations based on high Rabi frequencies, together with advanced pulsing techniques, should therefore enable significantly higher fidelities in the near future.

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