

Dephasing of Ge spin qubits: random telegraph and 1/f noise

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Hole spin qubits in Ge, investigated for all-electrical spin manipulation because of its large spin-orbit coupling, are exposed to charge noise leading to decoherence. I will discuss a model we recently proposed to describe 1/f noise from individual fluctuators and determine the dephasing time T_2^* as a function of qubit properties. T_2^* decreases with increasing magnetic field and is an order of magnitude longer for out-of-plane than for in-plane fields for the same Zeeman energy. T_2^* shows little variation as a function of the top gate field and is a complex function of the dot radius. Our results should help experiments to enhance coherence in hole qubit architectures [1].

- [1] Zhanning Wang, Sina Gholizadeh, Xuedong Hu, S. Das Sarma, Dimitrie Culcer.
“Dephasing of planar Ge hole spin qubits due to 1/f charge noise”. *arXiv:2408.10302*.