

Holes spin qubits in Silicon and Germanium

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Semiconductor spin qubits are leading candidates for full-scale quantum computation due to their compatibility with industrial nanofabrication and their advantageous quantum properties. Holes spins can be coherently manipulated with all-electrical control due to the spin-orbit interaction (SOI) without requiring micromagnets, but this also opens the door for decoherence by charge noise. In this talk, I will present recent progress on building spin-orbit qubits with holes in Ge/Si core/shell nanowires and Si fin FETs, touching upon hole spin driving mechanisms, anisotropic exchange, autonomous tuning, maximizing qubit speed and coherence at the same time at a sweet-spot, and finally, presenting a compact semiconductor gyrator with self-impedance matching.