CQSE
Center for Quantum
Science & Engineering

QCSA Speaker Event

Spinning Up Semiconductor Quantum Bits

Prof. Jason Petta

Electron spins are excellent candidates for solid state quantum computing due to their exceptionally long quantum coherence times. I will first describe how single electrons can be isolated and detected on a chip. Single spin initialization, readout, and control can then be achieved using all-electrical techniques. Two-qubit quantum gates are based on the exchange interaction, where two electrons are momentarily (~100 ns!) pushed together to increase wavefunction overlap. In the past few years, we have taken semiconductor spin qubit technology from basic demonstrations of quantum control to high fidelity gate operations that may be sufficient to support quantum error correction. I will describe recent experiments where we achieve single spin initialization and readout with errors <1%, single qubit control with a fidelity exceeding 99.95%, and a two-qubit gate with a fidelity of 99.8%. I will conclude by describing upcoming research opportunities in the LA area, including on-campus activities in the UCLA physics department.

11/21 Tue. 4:00pm

Physics and Astronomy Building

Room 4-330

Provided with free food

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