

4th Annual Workshop on Silicon Science & Technology for Quantum Computing

August 23-24, 2010
Albuquerque Marriott
Albuquerque, NM, USA



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DAY ONE

8:00 am	Opening remarks & orientation	Carroll/ Tarman
8:10	Single-shot readout and microwave control of an electron spin in silicon	Morello
8:35	Transport and electrically detected magnetic resonance measurements of few donor semiconductor nanostructures	Lo
9:00	Excited states and valley effects in a negatively charged impurity in a silicon FinFET	Rahman
9:25	Quantum interference & many-body effects in a double donor system	Verduijn
9:50	Break	
10:20	Transport and charge sensing in donor-based qubit architectures realized by STM lithography	Mahapatra
10:45	Quantum transport in ultra-scaled phosphorus delta-doped silicon nanowires	Ryu
11:10	Spectroscopy and capacitance measurements of tunneling resonances in an Sb-implanted point contact	Bishop
11:35	Heterointerface effects on the charging energy of negatively charged shallow donors in silicon: the role of dielectric mismatch	Koiller
12:00 pm	Lunch	
1:30	Electron spin coherence of phosphorus donors in high-purity ²⁸ Si silicon	Tyryshkin
1:55	Decoherence of Donor Electron Spins in Isotopically Enriched Silicon	Witzel
2:20	Electron spin coherence and electron nuclear double resonance of Bi donors in natural Si	Morton
2:45	Hyperfine structure and nuclear hyperpolarization observed in the bound exciton luminescence of Bi donors in natural Si	Thewalt
3:10	Break	
3:40	On-Chip Avalanche Detectors for Deterministic Doping of Silicon Nano-Devices with sub-10 keV single ion implantation	Yang
4:05	Using pulse sequences to characterize and robustly mitigate qubit noise	Young
4:30	Channel-optimized quantum error correction and control	Kosut
4:55	Robustness of optimally controlled unitary quantum gates	Brif
5:20	Overflow time	

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DAY ONE continued

6:00 **Dinner**
7:00 **Poster Session**

Posters

Microwave control of a single electron spin in silicon	Pla
Low Temperature Analog CMOS Electronics	Lyon
Atomistic simulations of coherent tunneling adiabatic passage in an imperfect donor chain	Muller
Focused Ion Beam Development for Single Ion Implantation	Bielejec
Combining Dynamical Decoupling with Robust Optimal Control for Improved Quantum Information Processing	Grace
Thermal Modeling of Circuits with Temperature Dependent Thermal Conductivities for Cryogenic CMOS	Hamlet
A Comparison of Electrostatic Simulations to Measurements of Quantum Dot Structures	Young
Charge Sensing in Laterally Coupled Doubled-Top-Gated MOS Structures using Capacitance Modeling and simulation	Stalford
Low noise qubit gates in DQD systems	Nielsen
Valley Degeneracy and Valley Drag on Silicon {111} Surfaces	McFarland
Cryogenic CMOS circuits for single charge digital readout	Gurrieri
Characterization of a lateral double quantum dot in a silicon MOS device	House
Defect studies in Si-based MOS structures for the development of spin-dependent transport devices	Johnson
Intervalley coupling for silicon electronic spin qubits: Insights from an effective mass study	Saraiva

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DAY TWO

8:00 am	Reorientation	Tarman
8:10	Spin coherence and relaxation of disorder-confined electrons at interfaces in silicon	Malissa
8:35	Spin filling and valley splitting in a few-electron silicon quantum dot	Lim
9:00	Measurements of valley splitting in few-electron Si/SiGe quantum dots	Borselli
9:25	Charge sensing spectroscopy in Si/SiGe quantum dots	Thalakulam
9:50	Break (Poster Session)	
10:20	Valley polarization and interface quality in SiO ₂ /(100)Si/SiO ₂ quantum well	Niida
10:45	Absence of Valley Degeneracy in Si/SiO ₂ Interfaces	Saraiva
11:10	Valley-related challenges for SiGe quantum dot structures	Kiselev
11:35	Aspects of Si quantum computation	Das Sarma
12:00 pm	Lunch (Poster Session)	
1:30	Unintentional dots in silicon nanowires	Thorbeck
1:55	Double quantum dot with tunable coupling in an enhancement-mode silicon metal-oxide-semiconductor device with lateral geometry	Tracy
2:20	A novel spin-flip co-tunneling process in the effective three-electron regime of a Si/SiGe double dot	Koh
2:45	Highly-Tunable Few-Electron Silicon MOS Double Quantum Dot	Lai
3:10	Break (Poster Session)	
3:40	Coupling an electron spin to a cavity	Hu
4:05	A circuit QED structure comprised of a silicon quantum dot charge qubit and a lumped-element microwave resonator	Last
4:30	Modeling and low temperature operation of silicon-based CMOS processes	Akturk
4:55	Extremely efficient clocked electron transport on helium using a silicon IC	Takita
5:20	Overflow time	
6:00	Concluding remarks	Carroll