

2017 Silicon Quantum Electronics Workshop

List of Posters

1. Simultaneous conduction and valence band quantization in Si:P δ -layers
F. Mazzola [1], J. W. Wells [1], A. C. Pakpour-Tabrizi [2], R. B. Jackman [2], B. Thiagarajan [3], Ph. Hofmann [4], J. A. Miwa [4]
2. Negatively charged state on phosphorus atom in the silicon quantum computer architecture
Tatiana V. Pavlova
3. Si(001)-AsH₃ : Arsine as Precursor for STM Patterned 2D Arsenic in Silicon
Taylor J.Z. Stock [1], Oliver Warschkow [2], Emily V.S. Hofmann [1], Eleanor Crane [1], Alexander Koelker [1], Steven R. Schofield [1], David R. McKenzie [2], Nigel A. Marks [3], Neil J. Curson [1]
4. Fabrication of Acceptor Transport Devices in Silicon
Alejandro Marquez Seco [1], Sergey V. Amitonov [1], Bram van de Ven [1], Wilfred G. van der Wiel [1], Floris A. Zwanenburg [1]
5. Si:P Chains and the Hubbard model
Amintor Dusko [1,2], Andre Saraiva [1], Alain Delgado [2], and Belita Koiller [1]
6. Spin qubit manipulation of acceptor bound states in group IV quantum wells
MARIA J. CALDERON AND J.C. ABADILLO-URIEL (INSTITUTO DE CIENCIA DE MATERIALES DE MADRID, CSIC)
7. Low magnetic field anomalies of spin relaxation in silicon in the low temperature limit
Stefanie Tenberg [1], Serwan Asaad [1], Mark Johnson [1], Arne Laucht [1], Fay Hudson [1], Kohei Itoh [2], David Jamieson [3], Andrew Dzurak [1], Andrea Morello [1]
8. Spin-orbit interaction and g-factor isotropy of holes in Si and Ge rectangular nanowires and nanowire quantum dots
Marko J. Rancic [1], Christoph Kloeffel [1], Daniel Loss [1]
9. A 7-K noise temperature cryogenic CMOS LNA for scalable RF readout of spin qubits
Rosario M. Incandela [1], Edoardo Charbon [1-2-3], Fabio Sebastiano [1]
10. Multi-electron multi-valley effective mass theory: Numerical considerations and applications
Andrew D. Baczewski [1], John King Gamble [1], N. Tobias Jacobson [1], Richard P. Muller [1], Erik Nielsen [1]
11. Heavy holes in shallow undoped Ge/SiGe quantum wells and nanostructures
M. Lodari [1], A. Sammak [1], D. Sabbagh [1], L.Yeoh [1], N. Shamarkadze [1], M.Virgilio [2], P. Zaumseil [3], G.Capellini[3,4], and G. Scappucci [1]

12. Next steps towards a fault-tolerant qubit in silicon
N. Kalhor, S. G. J. Philips and L. M. K. Vandersypen
13. Cryomultiplexing magnetotransport in silicon two-dimensional electron gases at milli-Kelvin temperatures and high magnetic fields.
L. A. Yeoh [1], R. N. Schouten [1], D. Sabbagh [1], A. Sammak [1], G. Scappucci [1]
14. Hyperfine-assisted fast electric control of dopant nuclear spins in semiconductors
Peter Boross [1], Gabor Szechenyi [1], Andras Palyi [2]
15. Long-distance Spin Qubit Coupling Through High Kinetic Inductance Superconducting Nanowire Resonators
N. Samkharadze [1], G. Zheng [1], N. Kalhor [1], P. Scarlino [1], A. Sammak [1], G. Scappucci [1], D. P. DiVincenzo [2], L. DiCarlo [1] and L. M. K. Vandersypen [1]
16. Decoherence of a two-qubit gate system in silicon
Peihao Huang^{1,2}, Neil M. Zimmerman^{2}, Garnett W. Bryant^{1,2}
17. Withdrawn
18. A crossbar network for silicon spin qubits
R. Li [1], L. Petit [1], D.P. Franke [1], J.P. Dehollain [1], J. Helsen [1], M. Steudtner [1], N.K. Thomas [2], Z.R. Yoscovits[2], K.J. Singh [2], S. Wehner [1], L.M.K. Vandersypen [1], J.S. Clarke [2], and M.Veldhorst[1]
19. Kondo effect in a self-assembled SiGe quantum dot
R. Shikishima [1], H. Kiyama [1], K. Kawaguchi [1], M. Bamesreiter [2], D. Bougeard [2], A. Oiwa [1]
20. Impact of valley phase and splitting on readout of silicon spin qubit
M.L.V. Tagliaferri[1], L. Bavdaz[1], W. Huang[2], A.S. Dzurak[2], D. Culcer[3], M. Veldhorst[1]
21. Towards hot spin qubits with silicon quantum dots
L. Petit [1], J. Boter [1], G. Eenink [1], G. Droulers [1], M. Tagliaferri [1], R. Li [1], N. Thomas [2], J. Roberts [2], R. Pillarisetty [2], P. Amin [2], H. C. George [2], K. J. Singh [2], J. S. Clarke [2], L. M. K. Vandersypen [1] and M. Veldhorst [1]
22. Depletion-mode Quantum Dots in Intrinsic Silicon
Sergey V. Amitonov, Paul C. Spruijtenburg, Max W.S. Vervoort, Wilfred G. van der Wiel, and Floris A. Zwanenburg
23. Magnetic coupling and control of electron spins in silicon
D.P. Franke, R. Li, L. Petit, J.P. Dehollain, L.M.K. Vandersypen, M. Veldhorst
24. Cobalt micro-magnet integration on silicon MOS quantum dots
Julien Camirand Lemyre (1), Sophie Rochette (1), John Anderson (2), Ronald P. Manginell (2), Tammy Pluym (2), Dan Ward (2), Malcolm S. Carroll (2) and Michel Pioro-Ladrière (1,4)

25. Spin relaxation of a donor electron coupled to interface states
Peihao Huang and Garnett W. Bryant
26. Further investigation of the deep double donor interstitial magnesium in silicon.
Rohan J. S. Abraham [1], Adam DeAbreu [1], Kevin J. Morse [1], Nikolay V. Abrosimov [2], Sergey Pavlov [3], Yuri A. Astrov [4], Stephanie Simmons [1] and Michael L. W. Thewalt [1]
27. Effective mass theory simulations of exchange coupled donors in silicon
Benjamin Joecker [1], John King Gamble [2], Andrew D. Baczewski [2], Jarryd Pla [3], Andrea Morello [1]
28. Ion-implanted ³¹P donor devices for 2-qubit logic gates
Mateusz Madzik [1], Arne Laucht [1], Vincent Mourik [1], Fay E. Hudson [1], Kohei M. Itoh [2], David N. Jamieson [3], Andrew S. Dzurak [1], Andrea Morello [1]
29. Principal Investigations of Acceptor Qubits in Silicon
T. Kobayashi[1,2], J. van der Heijden[1], J. Salfi[1], C. Chua[1], M. G. House[1], B. C. Johnson[3], J. C. McCallum[3], S. Barraud[4], R. Lavieville[4], H. Riemann[5], N. Abrosimov[5], P. Becker[6], H.-J. Pohl[7], M. Y. Simmons[1] and S. Rogge[1]
30. Cryogenic DRAM-based voltage controller integrated with a Si/SiGe quantum dot
Miki Trifunovic, Andrea Corna, Nodar Samkharadze, Lieven Vandersypen, Ryoichi Ishihara
31. High-Q lumped-element resonators for gate-based dispersive readout
Imtiaz Ahmed [1], James Haigh [2], Sylvain Barraud [3] and M. Fernando Gonzalez-Zalba [2]
32. Impact of Zeeman splitting electrical tunability on Rabi frequency of Si hole qubits
Alessandro Crippa [1,2], Romain Maurand [1,2], Léo Bourdet [2,3], Dharmraj Kotekar-Patil [1,2], Xavier Jehl [1,2], Marc Sanquer [1,2], Romain Laviéville [2,4], Heorhii Bohuslavskiy [1,2,4], Sylvain Barraud [2,4], Maud Vinet, [2,4], Yann-Michel Niquet [2,3], and Silvano de Franceschi [1,2]
33. An extended Hubbard model for mesoscopic transport in donor arrays in silicon
Nguyen H. Le [1], Andrew J. Fisher [2], Eran Ginossar [1]
34. Electrical Transport Measurements with Atomically Precise Probes
Markus Maier, Juergen Koeble, Roland Thiel, Mathias Fenner, Alexandre Pirou, Dirk Stahl, Thomas Roth
35. Enhancement-mode two-channel triple quantum dot from an undoped Si/Si_{0.8}Ge_{0.2} quantum well hetero-structure
L. Gaudreau[1], D. G. Austing[1], S. A. Studenikin[1], T. M. Lu[2], D. R. Luhman[2], D. Bethke[2], M. C. Wanke[2], M. P. Lilly[2], M. S. Carroll[2], and A. S. Sachrajda[1]
36. Achieving High Fidelity Single Qubit Gates in Strongly Driven Silicon Quantum Dot Qubits
Yuan-Chi Yang, S. N. Coppersmith, and Mark Friesen
37. Double quantum dots in Ge hut wires
Hannes Watzinger [1], Lada Vukušić [1], Josip Kukučka [1], Matthias Brauns [1], Daniel Jirovec [1], Jason

Jung [1], Georgios Katsaros [1]

38. Single Shot Spin to Charge Conversion in Si/SiGe Quantum Dots Using Latched Readout and Cryogenic Amplification

Matthew T. Rakher

39. Triple-Quantum-Dots with Overlapping Gates for Si/SiGe Qubits

J.P. Dodson[1], T. J. Knapp[1], Nathan Holman[1], Ryan H. Foote[1], T. McJunkin[1], Brandur Thorgrimsson[1], M. F. Gyure[2], L. Edge[2], R. F. McDermott[1], Mark Friesen[1], S. N. Coppersmith[1], M. A. Eriksson[1]

40. Optical characterization of Si:Se+ for future integration into photonic cavity-QED structures

Adam DeAbreu[1], Rohan J. S. Abraham[1], Kevin J. Morse[1], Helge Riemann[2], Nikolay V. Abrosimov[2], Peter Becker[3], Hans-Joachim Pohl[4], Robert G. Elliman[5], Michael L. W. Thewalt[1], Stephanie Simmons[1]

41. A hybrid spin quantum memory in silicon

M. Savytskyi [1], S. Probst [2], P. Bertet [2], J.J.L. Morton [3], A. Morello [1], J. J. Pla [1]

42. Quantum Computing using Spin Qubits in Ge Phononic Crystals

Jacob Boschee[1], Vadim Smelyanskiy[2], Fedir Vasko[3], Vasyl Hafiychuk[3], and Andre Petukhov[1]

43. Dispersive readout of accumulation-mode SiMOS quantum dots

A. Rossi [1], R. Zhao [2], A. West [2], B. Hensen [2], T. Tanttu [2], M. F. Gonzalez-Zalba [3], A. S. Dzurak [2]

44. Dynamics of a nuclear spin bath in enriched silicon

Matthew D. Grace, Wayne M. Witzel, Malcolm S Carroll

45. Microwave induced frequency shift and its quadrature compensation for Si/SiGe spin qubits

K. Takeda[1], J. Yoneda[1], T. Otsuka[1], T. Nakajima[1], M. R. Delbecq[1], G. Allison[1], J.Kamioka[2], T. Honda[2], T. Kodera[2], S. Oda[2], Y. Hoshi[3], N. Usami[4], K. M. Itoh[5], S. Tarucha[1]

46. Designs for electrically driven spin qubits based on silicon-MOS quantum dots

R.C.C. Leon [1], J.C. Lemyre [2,3], J.C.C. Hwang [1], M. Pioro-Ladrière [2,3,4], F.E. Hudson [1], A. Morello [1] and A.S. Dzurak [1]

47. Withdrawn

48. Atomic-precision spatial metrology of phosphorous donors in silicon by STM imaging of wave functions

M. Usman [1], J. Bocquel [2], J. Salfi [2], B. Voisin [2], A. Tankasala [3], R. Rahman [3], M.Y. Simmons [2], S. Rogge [2], L.C.L. Hollenberg [1]

49. A Phosphorus in Silicon Adiabatic Quantum Computer

C. D. Hill[1], M. Usman[1], S. Rogge[2], M. Y. Simmons[2], and L. C. L. Hollenberg[1]

50. A 3x3 array of ²⁸Si quantum dots.

G. Droulers [1], J. M. Boter [1], K. J. Singh [2], N. K. Thomas [2], D. Frank [1], M. Veldhorst [1], J. S. Clarke [2] and L. M. K. Vandersypen [1,2]

51. Reflectometry readout of Ge quantum dots

Josip Kukučka[1], Lada Vukušić[1], Hannes Watzinger[1], Matthias Brauns[1], Daniel Jirovec[1], Jason Jung[1] and Georgios Katsaros[1]

52. Isotopically enriched Si-28/SiGe heterostructures with nearly atomic-scale roughness

Satoru Miyamoto [1], Yusuke Hoshi [2,3], Noritaka Usami [2], Kohei M. Itoh [1]

53. Cryo-CMOS circulators for spin and superconducting qubits

Andrea Ruffino [1], Masoud Babaie [2], Fabio Sebastiano [2], Edoardo Charbon [1,2]

54. Impact of gate-induced strain on silicon MOS quantum dot tunnel barriers

Ryan Stein[1], Josh Pomeroy[2], Neil M. Zimmerman[2] and M. D. Stewart, Jr.[2]

55. Reducing charge offset drift in Si/SiO₂ based single-layer single electron devices using a poly-Si top gate

Binhui Hu [1], Neil M. Zimmerman [2], M. D. Stewart, Jr. [2]

56. AC Signal Characterization for Optimization of a CMOS Single Electron Pump

Roy Murray [1,2], Justin K. Perron [3], M.D. Stewart Jr. [1], Neil M. Zimmerman [1]

57. Implications of the spin-orbit effect for singlet-triplet qubit operation

Patrick Harvey-Collard,^{1,2} N. Tobias Jacobson,² Ryan M. Jock,² Andrew M. Mounce,² Vanita Srinivasa,² Dan R. Ward,² Joel R. Wendt,² Martin Rudolph,² Tammy Pluym,² John King Gamble,² Wayne M. Witzel,² and Malcolm S. Carroll²

58. Measurement-free implementations of small-scale surface codes for quantum dot qubits

H. Ekmel Ercan [1], Joydip Ghosh [1], Daniel Crow [1]*, Vickram N. Premakumar [1], Robert Joynt [1], Mark Friesen [1], S. N. Coppersmith [1]

59. Noise spectroscopy and randomized benchmarking of a silicon quantum dot qubit

Kok Wai Chan [1], Wister Huang [1], Henry Yang [1], Jason Hwang [1], Bas Hensen [1], Tuomo Tantt [1], Fay Hudson [1], Kohei Itoh [2], Arne Laucht [1], Andrea Morello [1], and Andrew Dzurak [1]

60. Alternative method for interconnecting STM written quantum electronic devices

Generation and annealing of electron traps in high-mobility MOSFETs

Jin-Sung Kim, Alexei M. Tyryshkin, Stephen A. Lyon

61. Significance of Accurate Electronic Structure Calculation Methods in Designing Silicon Donor Qubits

Fahd A. Mohiyaddin [1], Jacek Jakowski [1], Jingsong Huang [1], Yousif W. Almulla [1], Milton N. Ericson, Charles Britton, Franklin G. Curtis, Eugene F. Dumitrescu, Bobby G. Sumpter [1] and Travis S. Humble [1]

62. Why tunnel gates are better than tilting gates in quantum dot quantum computing

Yun-Pil Shim [1], Charles Tahan [1]

63. Hysteresis Correction and its Relationship to Creep and Drift in Scanning Tunneling Microscope Tip Positioning

James H. G. Owen, Udi Fuchs, Joshua B. Ballard, John N. Randall

64. Evaluation and reduction of impurity contributions during deposition of isotopically enriched ^{28}Si thin films

Ke Tang [1,3], Kevin Dwyer [4,5], Hyun-Soo Kim [1,4], A. N. Ramanayaka [1,2], and J. M. Pomeroy [1]

65. Hall measurements and STM analysis of Al delta layer heterostructures in silicon

Hyun soo Kim [1], A. N. Ramanayaka [2,4], Ke Tang [3], J. Haggmann [4], C. A. Richter [4], M. D. Stewart, Jr. [4], J. M. Pomeroy [4]

66. Extending the coherence of a quantum dot hybrid qubit

Brandur Thorgrimsson [1], J. Corrigan [1], Dohun Kim [2], Yuan-Chi Yang [1], L. W. Smith [1], C. B. Simmons [1], Daniel R. Ward [1], Ryan H. Foote [1], D. E. Savage [1], M. G. Lagally [1], Mark Friesen [1], S. N. Coppersmith [1], M. A. Eriksson [1]

67. High Bandwidth Electron Spin Readout with the Radio Frequency Single Electron Transistor

D. Keith [1], M. G. House [1], M. B. Donnelly [1], T. F. Watson 1 [1], B. Weber 2 [1], M. Y. Simmons [1]

68. Theory of spin-orbit coupling at the silicon MOS interface

N. Tobias Jacobson [1], Vanita Srinivasa [1], John King Gamble [1], Andrew D. Baczewski [1], Wayne M. Witzel [1], Ryan M. Jock [1], Patrick Harvey-Collard [1,2], Andrew M. Mounce [1], Martin Rudolph [1], and Malcolm S. Carroll [1]

69. Localized implantation of phosphorus atoms into Si/SiGe heterostructure for donor-dot qubits

Thomas McJunkin, Ryan H. Foote, Brandur Thorgrimsson, Samuel F. Neyens, J.P. Dodson, T. J. Knapp, Joelle Corrigan, D. E. Savage, M. G. Lagally, Mark Friesen, S. N. Coppersmith, M. A. Eriksson

70. Design and characterization of a device for hosting singlet-triplet qubits with atomic precision donors in silicon

P. Pakkiam, M.G. House, M. Koch, and M.Y. Simmons

71. High-fidelity gate control of silicon quantum dot qubits using shape-optimized microwave pulses

Chih-Hwan Henry Yang [1], Kok Wai Chan [1], Wister Huang [1], Jason C. C. Hwang [1], Bas Hensen [1], Arne Laucht [1], Robin Harper [2], Fay E. Hudson [1], Stephen Bartlett [2], Kohei M. Itoh [3], Andrea Morello [1], Andrew S. Dzurak [1]

72. Adiabatically-controlled two-qubit gates using quantum dot hybrid qubits

Adam Frees [1], John King Gamble [2], Mark Friesen [1], S. N. Coppersmith [1]

73. Interface induced spin-orbit interaction in silicon quantum dots and anisotropic dephasing time

Rifat Ferdous [1], Kok W. Chan [2], Menno Veldhorst [3], J.C.C. Hwang [2], C. H. Yang [2], Gerhard

Klimeck [1], Andrea Morello [2], Andrew S. Dzurak [2], Rajib Rahman [1]

74. Design Considerations of Cryo-RFICs for Superconducting Qubits Readout

M. Mehrpoo [1][2], F. Sebastiano [1], E. Charbon [1][2][3][4], M. Babaie [1]

75. Quantum-limited measurement and gates on spin qubits via curvature coupling to a cavity

Rusko Ruskov, Charles Tahan

76. Investigating CMOS Based Local Bias Voltage Generation for Solid-State Qubit Potential Well Creation

Patrick Vliex (1), Carsten Degenhardt (1), Lotte Geck (1), Andre Kruth (1), Dennis Nielinger (1), Stefan van Waasen (1,2), Stefan Heinen (3)

77. Atomically-precise fabrication on silicon: Optimization of dangling bond properties and incorporation of acceptor dopants

Peter Scherpelz [1], Pam Pena Martin [2], Joe Lyding [2] and Giulia Galli [1, 3]

78. Single-shot Readout of Spin states in a FDSOI Split-Gate Device with Built-in Charge Detector

T. Meunier¹, M. Urdampilleta^{1*}, L. Hutin^{2*}, B. Jadot¹, B. Bertrand², H. Bohuslavskyi^{2,3}, R. Maurand³, S. Barraud², M. Sanquer³, X. Jehl³, S. De Franceschi³, M. Vinet²

79. Phonon-induced relaxation and dephasing in a charge quadrupole qubit

Viktoriia Kornich, Maxim G. Vavilov, Mark Friesen, Susan N. Coppersmith

80. Exchange coupling in silicon quantum dots from atomistic configuration interaction

Chin-Yi, Chen, Archana Tankasala, Rifat Ferdous, Rajib Rahman

81. Quantum dot devices with an overlapping palladium-aluminium oxide gate stack

Jelmer M. Boter [1], Gabriel Droulers [1], Kanwal Singh [2], Gertjan Eenink [1], Elfi van Zeijl [3], James S. Clarke [2], Menno Veldhorst [1], Lieven M.K. Vandersypen [1]

82. Lifting of Spin Blockade by Charged Impurities in Si-MOS Double Quantum Dot Devices

Cameron King [1], Joshua Schoenfield [2], M. J. Calderón [3], Belita Koiller [4], André Saraiva [4], Xuedong Hu [5], Hong-Wen Jiang [2], Mark Friesen [1], S. N. Coppersmith [1]

83. Strain Mapping of Integrated Device Structures to Aid in Understanding QD Localization

Payam Amin, Nicole K. Thomas, Hubert C. George, Jessica M. Torres, James S. Clarke

84. Capacitive coupling of hybrid dot-donor singlet-triplet qubits in silicon

Vanita Srinivasa [1], N. Tobias Jacobson [1], Andrew D. Baczewski [1], John King Gamble [1], Wayne M. Witzel [1], Ryan M. Jock [2], Patrick Harvey-Collard [2,3], Martin Rudolph [2], and Malcolm S. Carroll [2]

85. Single Shot Pauli-Blockade in Lithographically Formed Few Electron MOS Double-Quantum-Dot Using a Single Layer Design

M. Rudolph [1], T. England [1], R. M. Jock [1], P. A. Sharma [1], A. Mounce [1], T. Jacobson [1,2], D. R. Ward [1], T. Pluym [1], B. Silva [1], J. Anderson [1], J. Wendt [1], M. P. Lilly [1,3], M. S. Carroll [1]

86. Automated characterization of silicon photonic devices in the mid-infrared

Camille Bowness [1] , Kevin J. Morse [1] , Timothy S. Richards[1] , Yun Wang [3] , Lukas Chrostowski [2] , Michael L.W. Thewalt [1] , and Stephanie Simmons [1]

87. Coupling Si-based quantum dot qubits using microwave-frequency co-planar waveguide resonators

Nathan Holman¹, Cameron King¹, J. P. Dodson¹, Ryan H. Foote¹, M. F. Gyure², P. W. Deelman², L. F. Edge², R. F. McDermott¹, Mark Friesen¹, S. N. Coppersmith¹, M. A. Eriksson¹

88. All-electrical control of donor-bound electron spin qubits in silicon

Yu Wang¹, Chinyi Chen¹, Michelle Y. Simmons², Rajib Rahman¹

89. Low-disorder gate-defined quantum dots in silicon

M. Brauns [1,2], S. V. Amitonov [1], P.-C. Spruijtenburg [1], F.A. Zwanenburg [1]