LEIGH S. MARTIN

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Education

University of California at Berkeley
Enrolled in the Physics PhD program
University of Colorado at Boulder, B.A., Physics
Graduated May 2012, Summa Cum Laude with Distinction.
Science and Mathematics GPA: 4.0; Cumulative GPA: 3.99

Honors and Awards

National Science Foundation Graduate Fellowship (2013, three years over five year period)

Berkeley Fellowship for Graduate Study (2013, two years)

National Defense Science and Engineering Fellowship (declined for NSF fellowship)

Physics Outstanding Graduate (spring 2012, University of Colorado at Boulder)

Jacob Van Ek award (spring 2011, University of Colorado at Boulder)

Dean's Scholar Award (2009, 2010, 2011, University of Colorado at Boulder)

Dean's List Honoree (2008 – 2012, University of Colorado at Boulder)

High School Valedictorian and Mathematics Award (2008)

Publications

1. E. Flurin, **L. Martin**, S. Hacohen-Gourgy, I. Siddiqi, "Using a Recurrent Neural Network to Reconstruct Quantum Dynamics of a Superconducting Qubit from Physical Observations," arXiv 1811.12420 (2018).
2. **L. Martin**, W. Livingstong, S. Hacohen-Gourgy, H. Wiseman, I. Siddiqi, "Implementation of a Canonical Phase Measurement With Quantum Feedback," *submitted*.
3. S. Zhang, **L. Martin**, K. B. Whaley, "Locally Optimal Measurement-Based Quantum Feedback With Application to Multi-Qubit Entanglement Generation," arXiv 1807.02029 (2018).
4. **L. Martin**, R. Y. Bello, C. W. Hogle, A. Palacios, X. M. Tong, J. L. Sanz-Vicario, T. Jahnke, M. Schöffler, R. Dörner, Th. Weber, F. Martín, H. C. Kapteyn, M. M. Murnane, and P. Ranitovic, "Revealing the Role of Electron-Electron Correlations by Mapping Dissociation of Highly Excited D_2^+ using Ultrashort XUV Pulses," Phys Rev. A **97**, 062508 (2018).
5. J. Atalaya, S. Hacohen-Gourgy, **L. Martin**, I. Siddiqi, A. Korotkov, "Multitime correlators in continuous measurement of qubit observables," Phys. Rev. A **97** 020104(R) (2018).
6. A. Eddins, S. Schreppler, D. Toyli, **L. Martin**, S. Hacohen-Gourgy, L. Govia, H. Ribeiro, A. Clerk, I. Siddiqi, "Stroboscopic Qubit Measurement with Squeezed Illumination," Phys. Rev. Lett. **120** 040505 (2018).
7. S. Hacohen-Gourgy, L. García-Pintos, **L. Martin**, J. Dressel, I. Siddiqi, "Incoherent Qubit Control Using the Quantum Zeno Effect," Phys. Rev. Lett. **120** 020505 (2018).
8. A. Chantasri, J. Atalaya, S. Hacohen-Gourgy, **L. Martin**, I. Siddiqi, A. Jordan, "Simultaneous continuous measurement of noncommuting observables: Quantum state correlations," Phys. Rev. A **97** 012118 (2018).
9. **L. Martin**, M. Sayrafi, K. B. Whaley, "What is the fastest way to prepare a Bell state using measurement and feedback?" Quantum Sci. Technol. **3** 4 (2017).
10. J. Atalaya, S. Hacohen-Gourgy, **L. Martin**, I. Siddiqi, A. N. Korotkov, "Correlators in simultaneous measurement of non-commuting qubit observables," arXiv: 1702.08077 (2017).
11. S. Hacohen-Gourgy, **L. Martin** ***(co-first author)***, E. Flurin, V. V. Ramasesh, K. B. Whaley, I. Siddiqi, "Dynamics of Simultaneously Measured Non-Commuting Observables," Nature **538** 7626 (2016).
12. E. Flurin, V. V. Ramasesh, S. Hacohen-Gourgy, **L. Martin**, N. Y. Yao, I. Siddiqi, "Observing Topological Invariants Using Quantum Walks in Superconducting Circuits," Phys. Rev. X. **7** 031023 (2017).

13. M. Kimchi-Schwartz, **L. Martin**, E. Flurin, C. Aron, M. Kulkarni, H. Tureci, I. Siddiqi, "Stabilizing Entanglement via Symmetry-Selective Bath Engineering in Superconducting Qubits," Phys. Rev. Lett. **116** 240503 (2016).
14. **L. Martin**, F. Motzoi, H. Li, M. Sarovar, K. B. Whaley, "Deterministic Generation of Remote Entanglement with Active Quantum Feedback," Phys. Rev. A. **92** 062321 (2015).
15. C. Hogle, X. Tong, **L. Martin**, M. Murnane, H. Kapteyn, P. Ranitovic, "Attosecond Coherent Control of Single and Double Photoionization in Argon," Phys. Rev. Lett. **115** 173004 (2015).
16. P. Ranitovic, C. Hogle, P. Riviere, A. Palacio, X. Tong, N. Toshima , A. Gonzalez-Castrillo, **L. Martin**, F. Martín, M. Murnane, H. Kapteyn, "Attosecond VUV Coherent Control of Molecular Dynamics," PNAS **111** 3 912-17 (2014).
17. **L. Martin**, C. Chen, J. Miao, "Multi-Shell Ankylography," arXiv: 1311.4517 (2013). - arxiv.org/abs/1311.4517
18. D. Adams, **L. Martin (*co-first author*)**, M. Seaberg, D. Gardner, H. Kapteyn, M. Murnane, "A Generalization for Optimized Phase Retrieval Algorithms," Optics Express **20** 24778-90 (2012).
19. D. Gardner, B. Zhang, M. Seaberg, **L. Martin**, D. Adams, F. Salmassi, E. Gullikson, H. Kapteyn, M. Murnane, "High Numerical Aperture Reflection Mode Tabletop Optical Diffraction Microscopy Using Off-Axis Apertured Illumination," Optics Express **20** 19050-9 (2012).
20. J. Miao, C. Chen, Y. Mao, **L. Martin**, H. Kapteyn, "Potential and Challenge of Ankylography," arxiv.org/abs/1112.4459 (2011).

Presentations

1. ***Invited Talk:*** L. Martin, W. Livingstong, S. Zhang, S. Hacohen-Gourgy, H. Wiseman, K. B. Whaley, I. Siddiqi, "Quantum Feedback for Measurement and Control," PRAQSYS 2018.
2. **L. Martin**, W. Livingston, S. Hacohen-Gourgy, H. Wiseman, I. Siddiqi, "Implementation of an Ideal Phase Measurement With Continuous, Adaptive Feedback," APS March Meeting 2018.
3. **L. Martin**, M. Sayrafi, K. B. Whaley, "Optimal Protocols for Remote Entanglement Generation," Quantum Information and Measurement IV: Quantum Technologies, Université Pierre et Marie Curie, April 2017.
4. ***Invited Talk*: L. Martin**, M. Sayrafi, S. Zhang, S. Hacohen-Gourgy, I. Siddiqi, K. B. Whaley, "Measurement-based feedback for superconducting circuits," Quantum Control Theory: Mathematical Aspects and Physical Applications, Technical University of Munich, Institute for Advanced Study, April 2017.
5. **L. Martin**, W. Livingston, S. Hacohen-Gourgy, E. Flurin, P. Bhattacharyya, H. Wiseman, I. Siddiqi, "Measuring the phase of a single photon with adaptive measurement," APS March Meeting 2017.
6. ***Invited Talk:* L. Martin,** I. Siddiqi, K. B. Whaley, "Quantum Control in Superconducting Circuits," IMA Conference on Nano and Quantum Control, April 2016.
7. **L. Martin,** S. Hacohen-Gourgy, E. Flurin, V. Ramasesh, "Simultaneous Measurement of Non-Commuting Observables: Part I," APS March Meeting, 2016.
8. **L. Martin**, F. Motzoi, H. Li, M. Sarovar, K. B. Whaley, "Optimal Feedback for Remote Entanglement," APS March Meeting, 2015.
9. ***Seminar:* L. Martin**, C. Hogle, P. Ranitovic, M. Murnane, H. Kapteyn, "Applications of High Harmonic Generation," Stanford Linear Accelerator Photon Science Seminar, September 2012.
10. C. Hogle, P. Ranitovic, **L. Martin**, M. Murnane, H. Kapteyn, W. Peters. A. P Spencer, D. Jonas, X Tong, N Toshima, "Ultrafast Dynamics of Ozone Exposed to Ionizing Radiation," DAMOP, June 2012.
11. P. Ranitovic, C. Hogle, **L. Martin**, W. Peters, A. Spencer, D. Jones, X. Tong, M. Murnane, H. Kapteyn, "Ultrafast Dynamics of Ozone Exposed to Ionizing Radiation," CLEO, May 2012.
12. **L. Martin**, C. Chen, M. Seaberg, D. Adams, J. Miao, "Multiple Shell Ankylography," CLEO, May 2012.
13. B. Zhang, D. Gardner, **L. Martin,** M. Seaberg, D. Adams, M. Murnane, H. Kapteyn, "Coherent Diffraction Imaging with an Apertured Illumination Support," CLEO, May 2012.
14. C. Hogle, P. Ranitovic, X. Tong, **L. Martin**, M. Murnane, H. Kapteyn, "Visualization of D2 Nuclear Wave Packets with High Harmonic Radiation," Gordon Research Conference, February 2012.

15. **L. Martin**, C. Chen, M. Seaberg, D. Adams, J. Miao, "Multiple Shell Ankylography," CUR, October 2011.

Research Experience

Siddiqi and Whaley groups, UC Berkeley: *February 2013 – present*
- Design and implementation of superconducting circuit experiments
- Theoretical development of continuous measurement and quantum feedback

Quantum Optics Group of Tilman Esslinger - ETH Zurich: *October 2012 – July 2013*
- High power supply for magneto-optical trapping
- Construction of a cavity QED/BEC experiment

Kapteyn-Murnane Research Group - JILA, University of Colorado at Boulder: *January 2010 - September 2012*
- Ultrafast three-dimensional ion momentum spectroscopy (COLTRIMS), data acquisition and analysis
- Coherent diffraction imaging
- Computational and mathematical development of new phase retrieval algorithm
- High-speed electronic FPGA and computer-based laser stabilization
- Numerous analog and digital electronics projects
- Spectral broadening of ultrafast pulses via self-phase modulation

Miao Group - Department of Physics and Astronomy, University of California, Los Angeles *June - August 2012*
- Development of mathematical description of the capabilities of three-dimensional diffraction imaging (ankylography)
- Experimental implementation of ankylography
- Simulation and theoretical study of ankylography

Skills
- Programming languages: Python , MATLAB, LabVIEW, C++, Verilog Hardware Description Language (low level, FPGA), Mathematica, OpenGL, PIC (programmable integrated circuit) Basic, Latex
- GHz microwave circuitry
- One semester of assistant teaching (3rd year electricity and magnetism) - Learning Assistant Program at the University of Colorado at Boulder
- Ultrafast and nonlinear optics
- Ultrahigh Vacuum Equipment
- Analog, digital and high power electronics
- Metal machining and CAD design
- Atom trapping and cooling
- Conversant in Spanish
- Beginner in German, French and Mandarin Chinese

Volunteer Activities
- Exploratorium volunteer – (Spring 2015-Spring 2017)
- UC Berkeley Compass Project – Undergraduate Research Project Supervisor (Fall 2013), public science demonstrations
- Science Discovery Workshop (summer 2010, summer 2011)
- JILA Wizard's Show (Spring 2010)
- Weekly math and science tutoring at Boulder High (2008 - 2010)
- Traveled to Mexico, Costa Rica, Nicaragua and Guatemala for various service projects (2007 - 2010)
- Mentoring and tutoring at Johnson elementary, Denver CO (2008 - 2009)