CHARLES H. BALDWIN

Graduate Research Assistant

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EDUCATION

University of New Mexico
Ph.D., Physics, *Expected:* Summer 2016
- Thesis Topic: *Efficient and Robust Methods for Quantum Tomography*
- Advisor: Prof. Ivan H. Deutsch

Miami University
M.S., Physics, August 2011
- Thesis Topic: *Cavity QED with Center of Mass Tunneling*
- Advisor: Prof. Perry R. Rice

Denison University
B.S., Physics and minor in Mathematics, May 2009

RESEARCH EXPERTISE

- Quantum measurement
- Atomic physics
- Quantum optics
- Quantum tomography
- Quantum control
- Quantum maps
- Quantum information in AMO physics
- Numerical modeling of AMO systems
- Convex optimization
- MATLAB programming

RESEARCH EXPERIENCE

Graduate Research Assistant (May 2012 to present)
Department of Physics and Astronomy,
University of New Mexico
Supervisor: Prof. Ivan H. Deutsch

Graduate Research Assistant (August 2009 to August 2011)
Department of Physics,
Miami University
Supervisor: Prof. Perry R. Rice

Undergraduate Research Assistant (May 2007 to May 2009)
Department of Physics,
Denison University
Supervisor: Prof. Daniel C. Homan

PUBLISHED PAPERS

1. A. Kalev and **C. H. Baldwin**. "The Power of being positive: Robust state estimation made possible by quantum mechanics." Preprint arXiv:1511.01433 (2015).
2. **C. H. Baldwin**, I. H. Deutsch, and A. Kalev, "Informational completeness in bounded-rank quantum-state tomography." Preprint arXiv:1510.0276 (2015).
3. **C. H. Baldwin**, A. Kalev, and I. H. Deutsch. "Quantum process tomography of unitary and near-unitary maps." *Phys. Rev. A*, **90**, 012110 (2014).
4. H. Sosa-Martinez, N. Lysne, **C. H. Baldwin**, A. Kalev, I. H. Deutsch, P. S. Jessen. "Quantum

process tomography for a large Hilbert space qudit." *In preparation*.

5. T. Keating, **C. H. Baldwin**, I. H. Deutsch. "Symmetrically-coupled Rydberg ensembles: A new paradigm for the Jaynes-Cummings model." *In preparation*.
6. H. Sosa-Martinez, N. Lysne, **C. H. Baldwin**, A. Kalev, I. H. Deutsch, P. S. Jessen. "Optimal strategies for quantum state tomography: Efficiency versus robustness." *In preparation*.

ORAL PRESENTATIONS

1. "360-degree tomography of a qudit," Division of Atomic, Molecular, and Optical Physics, Annual meeting, July 2015.
2. "Quantum process estimation via compressed sensing with convex optimization," American Physical Society, March Meeting, March 2014.
3. "Ultra-fast quantum process tomography via continuous measurement and convex optimization," American Physical Society, March Meeting, March 2013.

POSTER PRESENTATIONS

1. "Efficient open system control for near unitary maps," Southwest Quantum Information and Technology, February 2015.
2. "Quantum process tomography of unitary and near-unitary maps," Gordon Research conference, Quantum Science, July 2014.
3. "The role of global phase in optimal control to implement partial isometries," Southwest Quantum Information and Technology, February 2014.
4. "Ultrafast quantum process tomography via continuous measurement and convex optimization," Kavli Institute of Theoretical Physics, February 2013.
5. "Ultrafast quantum process tomography via continuous measurement and convex optimization," Southwest Quantum Information and Technology, February 2013.