Justin Dressel ***(February 2, 2026)***

CONTACT INFORMATION

Associate Professor of Physics
Schmid College of Science and Technology
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RESEARCH INTERESTS

Quantum information: quantum control, quantum filtering, quantum computing
Quantum foundations: generalized measurements, contextuality, algebraic methods
Quantum and classical field theory: relativistic fields, gauge-theory gravitation
Mathematical physics: Clifford algebras, von-Neumann algebras, geometric calculus
Computer science: functional programming, Bayesian networks, machine learning

EDUCATION

Ph.D. in Quantum Physics, May 2013
- **University of Rochester**, Rochester, New York USA
- Adviser: Andrew N. Jordan
- Thesis: *Indirect Observable Measurement: an Algebraic Approach*

M.A. in Physics, September 2009
- **University of Rochester**, Rochester, New York USA
- Adviser: Andrew N. Jordan

B.S. in Physics, May 2005
B.S. in Mathematics, May 2005
- **New Mexico Institute of Mining and Technology**, Socorro, New Mexico USA
- *Summa cum Laude*, With Highest Honors in Physics and Mathematics
- Physics Adviser: Kenneth Eack
- Mathematics Adviser: Ivan Avramidi

ACADEMIC APPOINTMENTS

Associate Professor of Physics August 2019 to current
Schmid College of Science and Technology
Institute for Quantum Studies
Chapman University

Contract Researcher June to July 2018
Theoretical Quantum Physics Laboratory (CPR),
RIKEN, Wakoshi, Saitama, Japan

Assistant Professor of Physics August 2015 to July 2019
Schmid College of Science and Technology
Institute for Quantum Studies
Chapman University

Contract Researcher July to August 2016

Interdisciplinary Condensed Matter Physics Team (iTHES),
RIKEN, Wakoshi, Saitama, Japan

Postdoctoral Scholar September 2013 to August 2015
Quantum Computing and Measurement Physics (QCAMP) Group
Department of Electrical and Computer Engineering
University of California, Riverside
- Supervisor: Alexander N. Korotkov
- Focus: Quantum measurement with superconducting qubits and circuit-QED, designing robust experimental tests of quantum information protocols

Visiting Researcher June to August 2013, February 2014, January 2018
Quantum Condensed Matter Research Group (QCMRG)
Center for Emergent Matter Science (CEMS),
RIKEN, Wakoshi, Saitama, Japan

Research Experience

- Since 2009, I have published over 60 journal papers in a variety of high-impact journals (e.g., *Nature*, *PNAS*, *Physical Review Letters*, *Physical Review X*, *Physical Review Research*, *npj Quantum Information*, and others), which have accumulated over 4554 citations (with 634 citations in 2025 alone), yielding an h-index of 33 and i10-index of 49. These papers include 13 with over 100 accumulated citations (including 1 with over 870 citations), a paper highlighted as a cover-feature in *Nature* with over 280 citations, and 3 papers highlighted as "Editors' Suggestions" in Physical Review journals.

My research has spanned a variety of topics, including:
- Experimental uses for sequential quantum measurements in both entangled optical systems and superconducting qubit systems
- Practical studies of ancilla quantum bit and microwave resonator methods for implementing generalized measurements in modern quantum computing implementations, with special focus on superconducting systems
- Practical studies of continuous quantum measurements of superconducting qubits for information processing tasks and quantum error correction.
- Foundational theory for the generalized quantum measurements of observables
- Foundational theory that unifies quantum states and quantum observables into conditional parts of the same operational quantum instruments
- Foundational theory for the quantum weak value, and enhancements of weak value methods for sensitive parameter estimation
- Classical-field and Clifford-algebraic treatments of the the separation of the total angular momentum of light into separately measurable spin and orbital parts
- Acoustic spin and dual-symmetric electromagnetic field theory formulations

Funding Experience

- Awarded: ARO-LPS Grant Award No. W911NF-22-1-0258 (September 2022).
  High-Fidelity, 2D Noise-Resilient Superconducting Quantum Processors
  I. Siddiqi (UCB), A.N. Jordan (CU), J. Dressel (CU).
  Grant Award No. W911NF-22-1-0258.
  Subcontract from UCB: $783,867 over 4 years, 2022 - 2026.
- Awarded: NSF-BSF Grant Proposal No. 1915015 (August 2019).
  NSF-BSF: Efficiently Modeling Continuous Quantum Measurements of High-Dimensional Multi-Qubit Systems.
  J. Dressel (CU), L. Vaidman (Tel Aviv U).
  Grant Award No. 1915015.
  $321,000 over 3 years, September 2019 - August 2022, 1-yr no-cost extension to August 2023.

- Awarded: ARO-LPS Grant Proposal No. W911NF-18-1-0178 (July 2018).
  Implementation of novel benchmarking and error management protocols in planar transmon processors.
  I. Siddiqi (UCB), A.N. Korotkov (UCR), A.N. Jordan (UR), J. Dressel (CU), J. Emerson (UW).
  Grant Award No. W911NF-17-S-0008.
  Subcontract from UCB: $520,000 over 4 years, July 2018 - July 2022, 3 month extension to September 2022.
- Awarded: ARO-LPS Grant Proposal No. 67533-PH-QC (August 2015).
  Continuous Quantum State Tracking and Error Correction (CQSTEC).
  I. Siddiqi (UCB), A.N. Korotkov (UCR), A.N. Jordan (UR), J. Dressel (CU).
  Grant Award No. W911NF-15-1-0496.
  Subcontract from UCB: $400,000 over 4 years, August 2015 - August 2019.

Teaching Experience

Chapman University, Orange, California USA

Associate Professor August 2019 to Present

- PHYS 452: Quantum Mechanics II
  Spring 2025
- PHYS 451: Quantum Mechanics I
  Fall 2024
- PHYS 340: Quantum Information Science
  Fall 2019, Spring 2023, Fall 2025
- PHYS 323: Scientific Computing II
  Fall 2024, Fall 2025
- PHYS 250: Mathematical Methods in Physics
  Spring 2023
- PHYS 220/MATH 220/CHEM 220: Scientific Computing I
  Fall 2019, Fall 2020, Fall 2023, Spring 2024, Spring 2025
- PHYS 101: General Physics I
  Spring 2020, Spring 2021, Spring 2022, Fall 2022
- PHYS 100: What is Physics?
  Fall 2024, Fall 2025
- Summer 2020 Undergraduate Research Fellowship (SURF):
  Mentor for Trevor Kling

Assistant Professor August 2015 to May 2019

- CS 510: Computing for Scientists
  Fall 2015, Fall 2016, Fall 2017
- PHYS 451: Quantum Mechanics (Independent Study)
  Fall 2015
- PHYS 422: Electricity and Magnetism II (Independent Study)
  Spring 2017
- PHYS 340: Quantum Information Science
  Spring 2017
- PHYS 321: Mechanics II
  Spring 2016
- PHYS 320: Mechanics I (Independent Study)
  Fall 2017

- PHYS 220/MATH 220/CPSC 220: Scientific Computing I
  Fall 2016, Fall 2017, Spring 2018, Fall 2018
- PHYS 227: Foundations of Scientific Computing
  Spring 2016
- PHYS 101: General Physics I
  Spring 2017, Spring 2018, Spring 2019
- PHYS 107: General Physics for the Life Sciences I
  Fall 2015
- Summer 2019 Undergraduate Research Fellowship (SURF):
  Mentor for Daniel Briseno
- Summer 2017 Undergraduate Research Fellowship (SURF):
  Mentor for Aaron Grisez

University of Rochester, Rochester, New York USA

Instructor Summer 2009

- PHY 114: General Physics II

Tutor for David T. Kearns Center January 2010 to May 2012

- PHY 113: General Physics I. (Spring 2010)
- PHY 121: Mechanics. (Spring 2012, Fall 2011, Spring 2011)
- PHY 122: Electricity and Magnetism. (Fall 2011, Spring 2011)

Teaching Assistant September 2007 to August 2009

- Workshop Facilitator for PHY 143: Honors Waves and Modern Physics (Spring 2008)
- Workshop Facilitator for PHY 113: General Physics I (Fall 2007)

Service

Chapman University Appointments

- *Math, Philosophy and Physics Doctor of Science (MPP D.Sci.) Program Steering Committee* (Spring 2023 – Present)
- *Faculty Personnel Council (FPC) Chair* (Fall 2023 – Spring 2024)
- *Physics Associate Program Director* (January 2022 – May 2023)
- *Computational and Data Science Graduate Program Steering Committee* (Fall 2018 – Spring 2020)
- *Physics Program Director* (June 2018 – August 2021)
- *Math, Physics, and Computation (MPC) Seminar* (Fall 2016 – Spring 2018)
- *CPSC Search Committee Member* (Fall 2017)

Conference Organizer

- *Southwest Quantum Information and Technology (SQuInT).*
  Steering Committee, 2017–Present.
- *American Physical Society (APS) March Meeting 2018* (March 2018).
  Session Committee for the Division of Quantum Information (DQI).
  Co-organizer of Focus and Invited Sessions for Quantum Foundations.
  Los Angeles Convention Center, Los Angeles CA, March 2018.
- *7th International Conference on Quantum Walks* (March 2018).
  Chapman representative and host.
  Organizer: Y. Shikano (Keio U).
  Conference: March 3-4.
  Chapman University, Orange CA, March 2018.

- *30th Anniversary of the AAV Weak Value* (March 2018).
  Co-organizers: J. Tollaksen (CU), M. Leifer (CU), J. Dressel (CU).
  Conference: March 1-2.
  Chapman University, Orange CA, March 2018.
- *American Physical Society (APS) March Meeting 2017* (March 2017).
  Focus Session: *Continuous Quantum Measurements and Quantum Foundations.*
  Co-organizer: J. Dressel (CU), K. Murch (WU).
  New Orleans Convention Center, New Orleans LA, March 2017.
- *Concepts and Paradoxes in a Quantum Universe* (June 2016).
  Co-organizers: Y. Aharonov (CU), L. Hardy (PI), J. Dressel (CU), J. Tollaksen (CU), M. Leifer (CU).
  Workshop: June 1-19, Conference: June 20-24.
  Perimeter Institute for Theoretical Physics, Waterloo, Ontario, Canada, June 2016.

Journal Referee

- *Science*
- *Nature Communications*
- *Nature Physics*
- *Physical Review Letters*
- *Physical Review X*
- *Physical Review A*
- *Physical Review B*
- *Journal of Physics A: Mathematical and Theoretical*
- *Scientific Reports*
- *New Journal of Physics*
- *Foundations of Physics*
- *Quantum Studies: Mathematics and Foundations*
- *Physics Letters A*
- *Optics Letters*
- *Annals of Physics*
- *Atoms*
- *Quantum*
- *IEEE*

Public Outreach

- Tesla Coil Demonstration for Math/Physics High School Event, Summer 2025
- STEAM for Teens at Orange Public Library, Fall 2017
  Quantum Mechanics with your Laser Pointer
  Orange Public Library
- Academic Minute radio program, Fall 2015
  How quantum physics makes your digital photos grainy
  Chapman University
- Rochester Scholars summer course for volunteer high school students:
  Unexplained Quantum Phenomena Revealed
  Summer 2010, Summer 2011
  Guest lecturer, technical assistant for optical demonstrations
  University of Rochester

Prospective student recruitment

- Tesla Coil Band Performance, Schmid College Open House, Fall 2024
- Preview Day, Chapman University
  Spring 2016, 2017, 2018, 2019, 2020, 2022, 2023, 2024
- Discover Chapman Day, Chapman University
  Fall 2015, 2016, 2017, 2018, 2019, 2022, 2023, 2024
- Mentor for Orange High School STEM Scholars, 2018–2019

- Local high school demonstrations, 2017, 2018, 2019
- Tesla Coil Band Performance, Spring 2017
- Tesla Coil Plasma Speaker: Wireless Energy Demo, Fall 2016
- Graduate student weekend, guest lectures, University of Rochester
  Fall 2008, 2009, 2010, 2011, 2012

Conference photographer March 2012, June 2013

- Coherence and Quantum Optics (CQO) X
  Quantum Information and Measurement (QIM) Conference, 2013
  University of Rochester, Rochester, NY (2013)
- Northeast Modern Language Association (NEMLA) Conference, 2012
  Rochester Conference Center, Rochester, NY (2012)

Professional Experience

National Radio Astronomy Observatory, Socorro, New Mexico USA

Software Engineer June 2005 to August 2007

Atacama Large Millimeter Array (ALMA) project:

- Integration, Test, and Support (ITS) subsystem: reorganized and maintained the CVS repository for the primary codebase; debugged and integrated software written in C, C++, Java, Python, and Bash by seven different subsystems; technical support for software running at five separate international sites
- Systems architect for large distributed diskless network: helped design, install on site, and maintain a distributed network for managing telescopes; implemented automated (linux) software synchronization in Python and Bash, still in production use in six international locations

Software Skills

Programming Languages:

- Fluent: Mathematica, Python, Julia, Haskell, Bash, LaTeX, C
- Familiar: OCaml, Scheme, Lisp, Java, Clojure, R, C++, D, Matlab

Version Control:

- Distributed: Git, Mercurial, Darcs
- Centralized: CVS, SVN, RCS

Awards and Certificates

Chapman University

- Schmid College Unit Faculty Excellence Award, 2023
- Wang-Fradkin Assistant Professorship, 2016–2017

University of Rochester

- David T. Kearns Center, Certificate of Gratitude, 2012
- Agnes M. and George Messersmith Fellowship, 2011–2013
- Certificate in Teaching of College Physics, 2010
- American Association of Physics Teachers (AAPT) Award, 2008
- Department of Education GAANN Fellowship, 2007–2012

National Radio Astronomy Observatory

- Star Award, 2007

New Mexico Institute of Mining and Technology

- Abraham and Esther Brooke Award for Excellence in Physics, 2004

Journal Publications

67. *Quantum Benchmarking of High-Fidelity Noise-Biased Operations on a Detuned-Kerr-Cat Qubit.*
Qing, B., Hajr, A., Wang, K., Koolstra, G., Nguyen, L.B., Hines, J., Huang, I., Bhandari, B., Pedramrazi, Z., Chen, L., Kang, Z, Jünger, C., Goss, N., Jain,

N., Kim, H., Lee, K.-H., Hashim, A., Frattini, N.E., Dressel, J., Jordan, A.N., Santiago, D.I., Siddiqi, I.
Proceedings of the National Academy of Sciences U.S.A. **123**, 2520479123 (2026).

66. *Dynamical Sweet and Sour Regions in Bichromatically Driven Floquet Qubits.*
Briseño-Colunga, D.D., Bhandari, B., Das, D., Nguyen, L.B., Kim, Y., Santiago, D.I., Siddiqi, I., Jordan, A.N., Dressel, J.
Physical Review Applied **25**, 014076 (2026).

65. *Delayed Choice Lorentz Transformations on a Qubit.*
Burns, L., Greenfield, S., Dressel, J.
arXiv:2512.21816 (2025)

64. *Tunable Superconducting Quantum Interference Device Coupler for Fluxonium Qubits.*
Chakraborty, A., Bhandari, B., Briseño-Colunga, D.D., Stevenson, N., Pedramrazi, Z., Liu-C.-H., Santiago, D.I., Siddiqi, I., Dressel, J., Jordan, A.N.
arXiv:2508.16907 (2025)

63. *A unified picture for quantum Zeno and anti-Zeno effects.*
Greenfield, S., Kamal, A., Dressel, J., Levenson-Falk, E.
arXiv:2506.12679 (2025)

62. *Symmetrically Threaded SQUIDs As Next Generation Kerr-cat Qubits.*
Bhandari, B., Huang, I., Hajr, A., Yanik, K., Qing, B., Wang, K., Santiago, D., Dressel, J., Siddiqi, I., Jordan, A.N.
Physical Review X Quantum **6**, 030338 (2025).

61. *Properties and Applications of the Kirkwood-Dirac Distribution.*
Arvidsson-Shukur, D.R.M., Braasch, W.F. Jr., De Bievre, S., Dressel, J., Jordan, A.N., Langrenez, C., Lostaglio, M., Lundeen, J.S., Yunger Halpern, N.
New Journal of Physics **26**, 121201 (2024).

60. *High-Coherence Kerr-cat qubit in 2D architecture.*
Hajr, A., Qing, B., Wang, K., Koolstra, G., Pedramrazi, Z., Kang, Z, Chen, L., Nguyen, L.B., Junger, C., Goss, N., Huang, I., Bhandari, B., Frattini, N.E., Puri, S., Dressel, J., Jordan, A.N., Santiago, D., Siddiqi, I.
Physical Review X **14**, 041049 (2024).

59. *A realist interpretation of unitarity in quantum gravity.*
Sen, I., Alexander, S., and Dressel, J.
Classical and Quantum Gravity **41**, 115005 (2024).

58. *Spacetime geometry of acoustics and electromagnetism.*
Burns, L., Daniel, T., Alexander, S., and Dressel, J.
Quantum Studies: Mathematics and Foundations **11**, 27–67 (2024).

57. *Stabilizing two-qubit entanglement with dynamically decoupled active feedback.*
Greenfield, S., Martin, L., Motzoi, F., Whaley, K.B., Dressel, J., and Levenson-Falk, E.M.
Physical Review Applied **21**, 024022 (2024).

56. *Light that appears to come from a source that does not exist.*
Stern, I., Bloch, Y., Grynszpan, E., Kahn, M., Aharonov, Y., Dressel, J., Cohen, E., and Howell, J.C.
Physical Review A **109**, 012206 (2024).

55. *Comment on "photons can tell 'contradictory' answer about where they have been".*
Reznik, G., Versmold, C., Dziewior, J., Huber, F., Weinfurter, H., Dressel, J., and Vaidman, L.
The European Physical Journal Plus **139**, 181 (2024).

54. *Comment on 'From counterportation to local wormholes'.*
Dressel, J., Reznik, G., and Vaidman, L.
Quantum Science and Technology **9**, 018001 (2024).

53. *Counterfactual communication without a trace in the transmission channel.*
Pan, W.-W., Liu, X., Xu, X.-Y., Wang, Q.-Q., Cheng, Z.-D., Wang, J., Liu, Z.-D., Chen, G., Zhou, Z.-Q., Li, C.-F., Guo, G.-C., Dressel, J., and Vaidman, L.
npj Quantum Information **9**, 87 (2023).

52. *Photons are lying about where they have been, again.*
Reznik, G., Versmold, C., Dziewior, J., Huber, F., Bagchi, S., Weinfurter, H., Dressel, J., and Vaidman, L.
Physics Letters A **470**, 128782 (2023).

51. *Counterportation and the two-state vector formalism.*
Dressel, J., Reznik, G., and Vaidman, L.
arXiv:2303.08962 (2023).

50. *Monitoring fast superconducting qubit dynamics using a neural network.*
Koolstra, G., Stevenson, N., Barzili, S., Burns, L., Siva, K., Greenfield, S., Livingston, W., Hashim, A., Naik, R.K., Kreikebaum, J.M., O'Brien, K.P., Santiago, D.I., Dressel, J., and Siddiqi, I.
Physical Review X **12**, 031017 (2022).

49. *Experimental demonstration of continuous quantum error correction.*
Livingston, W.P., Blok, M.S., Flurin, E., Dressel, J., Jordan, A.N., and Siddiqi, I.
Nature Communications **13**, 2307 (2022).

48. *Diagnosing quantum chaos with out-of-time-ordered-correlator quasiprobability in the kicked-top model.*
Gonzlez Alonso, J. R., Shammah, N., Ahmed, S., Nori, F., and Dressel, J.
arXiv:2201.08175 (2022).

47. *Failed attempt to escape from the quantum pigeon conundrum.*
Aharonov, Y., Bagchi, S., Dressel, J., Reznik, G., Ridley, M., and Vaidman, L.
Physics Letters A **399**, 127287 (2021).

46. *Always-On Quantum Error Tracking with Continuous Parity Measurements.*
Mohseninia, R., Yang, J., Siddiqi, I., Jordan, A.N., and Dressel, J.
Quantum **4**, 358 (2020).

45. *Footprints of quantum pigeons.*
Reznik, G., Bagchi, S., Dressel, J., and Vaidman, L.
Physical Review Research **2**, 023004 (2020) (Editors' Suggestion).

44. *Acoustic field theory: scalar, vector, spinor representations and the emergence of acoustic spin.*
Burns, L., Bliokh, K.Y., Nori, F., and Dressel, J.
New Journal of Physics **22**, 053050 (2020).

43. *Optimizing measurement strengths for qubit quasiprobabilities behind out-of-time-ordered correlators.*
Mohseninia, R., González Alonso, J. R., and Dressel, J.
Physical Review A **100**, 062336 (2019) (Editors' Suggestion).

42. *Benchmarks of Nonclassicality for Qubit Arrays.*
Waegell, M., and Dressel, J.
npj Quantum Information **5**, 66 (2019).

41. *Out-of-time-ordered-correlator quasiprobabilities robustly witness scrambling.*
González Alonso, J. R., Yunger Halpern, N., and Dressel, J.
Physical Review Letters **122**, 040404 (2019).

40. *Strengthening weak measurements of qubit out-of-time-ordered correlators.*
Dressel, J., González Alonso, J. R., Waegell, M. and Yunger Halpern, N.
Physical Review A **98**, 0120132 (2018).

39. *Weak values from strong interactions in neutron interferometry.*
Denkmayr, T., Dressel, J., Geppert-Kleinrath, H., Hasegawa, Y., and Sponar, S.
Physica B: Condensed Matter **04**, 014 (2018).

38. *The quasiprobability behind the out-of-time-ordered correlator.*
Halpern, N.Y., Swingle, B., and Dressel, J.
Physical Review A **97**, 042105 (2018).

37. *Incoherent qubit control using the quantum Zeno effect.*
Hacohen-Gourgy, S., Martin, L., García-Pintos, L.P., Dressel, J., and Siddiqi, I.
Physical Review Letters **120**, 020505 (2018).

36. *Past observable dynamics of a continuously monitored quantum bit.*
García-Pintos, L.P., Dressel, J.
Physical Review A **96**, 062110 (2017) (Editor's Suggestion).

35. *Arrow of Time for Continuous Quantum Measurements.*
Dressel, J., Chantasri, A., Jordan, A.N., and Korotkov, A.N.
Physical Review Letters **119**, 220507 (2017).

34. *Confined Contextuality in Neutron Interferometry: Observing the Quantum Pigeonhole Effect.*
Waegell, M., Denkmayr, T., Geppert, H., Ebner, D., Jenke, T., Hasegawa, Y., Sponar, S., Dressel, J., and Tollaksen, J.
Physical Review A **96**, 052131 (2017).

33. *Janus sequences of quantum measurements and the arrow of time .*
Jordan, A.N., Chantasri, A., Murch, K., Dressel, J., and Korotkov, A.N.
AIP Conference Proceedings **1841**, 020003 (2017).

32. *Linear feedback stabilization of a dispersively monitored qubit.*
Patti, T.L., Chantasri, A., García-Pintos, L.P., Jordan, A.N., and Dressel, J.
Physical Review A **96**, 022311 (2017).

31. *Rapid Estimation of drifting parameters in continuously measured quantum systems.*
Cortez, L., Chantasri, A., García-Pintos, L.P., Dressel, J., and Jordan, A.N.
Physical Review A **95**, 012314 (2017).

30. *Experimental demonstration of direct path state characterization by strongly measuring weak values in a matter-wave interferometer.*
Denkmayr, T., Geppert, H., Lemmel, H., Waegell, M., Dressel, J., Hasegawa, Y. and Sponar, S.
Physical Review Letters **118**, 010402 (2017).

29. *Probing quantumness with joint continuous measurements of non-commuting qubit observables.*
García-Pintos, L.P., and Dressel, J.
Physical Review A **94**, 062119 (2016).

28. *Measuring a transmon qubit in circuit QED: dressed squeezed states.*
Khezri, M., Dressel, J., and Korotkov, A.N.
Physical Review A **94**, 012347 (2016).

27. *Preserving entanglement during weak measurement demonstrated with a violation of the Bell-Leggett-Garg inequality.*
White, T.C., Mutus, J.Y., Dressel, J., Kelly, J., Barends, R., Jeffrey, E., Sank, D., Megrant, A., Campbell, B., Chen, Y., Chen, Z., Chiaro, B., Dunsworth, A., Hoi, I.-C., Neill, C., O'Malley, P.J.J., Roushan, P., Vainsencher, A., Wenner, J., Korotkov, A.N., and Martinis, J.M.
Nature Partner Journals: Quantum Information **2**, 15022 (2016).

26. *Qubit measurement error from coupling with a detuned neighbor in circuit QED.*
Khezri, M., Dressel, J., and Korotkov, A.N.
Physical Review A **92**, 052306 (2015).

25. *Spacetime algebra as a powerful tool for electromagnetism.*
Dressel, J., Bliokh, K.Y., and Nori, F.
Physics Reports **589**, 1–71 (2015).

24. *Power-Recycled Weak-Value-Based Metrology.*
Lyons, K., Dressel, J., Jordan, A.N., Howell, J.C., and Kwiat, P.G.
Physical Review Letters **114**, 170801 (2015).

23. *Weak Values as Interference Phenomena.*
Dressel, J.
Physical Review A **91**, 032116 (2015).

22. *Violating the Modified Helstrom Bound with Nonprojective Measurements.*
Dressel, J., Brun, T.A., and Korotkov, A.N.
Physical Review A **91**, 040301(R) (2015).

21. *Heisenberg scaling with weak measurement: A quantum state discrimination point of view.*
Jordan, A.N., Tollaksen, J., Troupe, J.E., Dressel, J., and Aharonov, Y.
Quantum Studies: Mathematics and Foundations **2**, 5–15 (2015).

20. *Conservation of the spin and orbital angular momenta in electromagnetism.*
Bliokh, K.Y., Dressel, J., and Nori, F.
New Journal of Physics **16**, 093037 (2014).

19. *Implementing generalized measurements with superconducting qubits.*
Dressel, J., Brun, T.A., and Korotkov, A.N.
Physical Review A **90**, 032302 (2014).

18. *Mapping the optimal route between two quantum states.*
Weber, S.J., Chantasri, A., Dressel, J., Jordan, A.N, Murch, K.W, and Siddiqi, I.
Nature **511**, 570–573 (2014).

17. *Entanglement-assisted weak value amplification.*
Pang, S., Dressel, J., and Brun, T.A.
Physical Review Letters **113**, 030401 (2014).

16. *Colloquium: Understanding Quantum Weak Values: Basics and Applications.*
Dressel, J., Malik, M., Miatto, F.M., Jordan, A.N., and Boyd, R.W.
Reviews of Modern Physics **86**, 307 (2014).

15. *Avoiding Loopholes with Hybrid Bell-Leggett-Garg Inequalities.*
Dressel, J., and Korotkov, A.N.
Physical Review A **89**, 012125 (2014).

14. *Classical Field Approach to Quantum Weak Measurements.*
Dressel, J., Bliokh, K.Y., and Nori, F.
Physical Review Letters **112**, 110407 (2014).

13. *Certainty in Heisenberg's uncertainty principle: Revisiting definitions for estimation errors and disturbance.*
Dressel, J., and Nori, F.
Physical Review A **89**, 022106 (2014).

12. *Action principle for continuous quantum measurement.*
Chantrasi, A., Dressel, J., and Jordan, A.N.
Physical Review A **88**, 042110 (2013).

11. *Strengthening weak value amplification with recycled photons.*
Dressel, J., Lyons, K., Graham, T.M., Kwiat, P.G., and Jordan, A.N.
Physical Review A **88**, 023821 (2013).

10. *Quantum instruments as a foundation for both states and observables.*
Dressel, J., and Jordan, A.N.
Physical Review A **88**, 022107 (2013).

9. *Corrigendum: Sufficient conditions for uniqueness of the weak value.*
Dressel, J., and Jordan, A.N.
Journal of Physics A: Mathematical and Theoretical **46**, 029501 (2012).

8. *Weak Values are Universal in Von Neumann Measurements.*
Dressel, J., and Jordan, A.N.
Physical Review Letters **109**, 230402 (2012).

7. *Contextual-value approach to the generalized measurement of observables.*
Dressel, J., and Jordan, A.N.
Physical Review A **85**, 022123 (2012).

6. *Measuring which-path information with coupled electronic Mach-Zehnder interferometers.*
Dressel, J., Choi, Y., and Jordan, A.N.
Physical Review B **85**, 045320 (2012).

5. *Significance of the imaginary part of the weak value.*
Dressel, J., and Jordan, A.N.
Physical Review A **85**, 012107 (2012).

4. *Sufficient conditions for uniqueness of the weak value.*
Dressel, J., and Jordan, A.N.
Journal of Physics A: Mathematical and Theoretical **45**, 015304 (2012).

3. *Experimental Violation of Two-Party Leggett-Garg Inequalities with Semi-weak Measurements.*
Dressel, J., Broadbent, C.J., Howell, J.C., and Jordan, A.N.
Physical Review Letters **106**, 040402 (2011).

2. *Contextual Values of Observables in Quantum Measurements.*
Dressel, J., Agarwal, S., and Jordan, A.N.
Physical Review Letters **104**, 240401 (2010).

1. *Gravitational Redshift and Deflection of Slow Light.*
Dressel, J., Howell, J.C., Rajeev, S., and Jordan, A.N.
Physical Review A **79**, 013834 (2009).

Conference Presentations

103. *Non-Hermitian Evolution from Continuous Monitoring.*
Invited Speaker: Institute for Quantum Studies Seminar, Chapman University, Orange CA, November 2025.

102. *Understanding the 2025 Nobel Prize in Physics.*
Public Talk: Chapman University, Orange CA, November 2025.

101. *Non-Hermitian Evolution from Continuous Monitoring.*
Invited Speaker: QuiDiQua III, Quasiprobability Distributions in Quantum Mechanics, Optics and Information, Institut Henri Poincaré, Paris, France, November 2025.

100. *Continuous Quantum Measurements and Feedback Control of Superconducting Qubits.*
Invited Speaker: Celebrating 100 Years of Quantum Science
University of Ottawa, Ottawa, Canada, May 2025.

99. *Continuous Quantum Measurements and Feedback Control of Superconducting Qubits.*
Invited Speaker: Physics Department Colloquium
University of Texas, Arlington, March 2025.

98. *Benchmarking Single-Qubit Gates on a Noise-Biased Qubit: Kerr cat qubit.*
American Physical Society (APS): Summit Meeting 2025.
Anaheim Convention Center, Anaheim CA, March 2025.

97. *Strong light-matter coupling to protect quantum information with Schrodinger cat states.*
American Physical Society (APS): Summit Meeting 2025.
Anaheim Convention Center, Anaheim CA, March 2025.

96. *Decoherence in dynamically protected qubits.*
American Physical Society (APS): Summit Meeting 2025.
Anaheim Convention Center, Anaheim CA, March 2025.

95. *Control-Z two-qubit gate on 2D Kerr cats.*
American Physical Society (APS): Summit Meeting 2025.
Anaheim Convention Center, Anaheim CA, March 2025.

94. *Planar Fluxonium Qubits Design with 4-way Coupling.*
American Physical Society (APS): Summit Meeting 2025.
Anaheim Convention Center, Anaheim CA, March 2025.

93. *Dynamical Sweet Spot Manifolds of Bichromatically Driven Floquet Qubits.*
American Physical Society (APS): Summit Meeting 2025.
Anaheim Convention Center, Anaheim CA, March 2025.

92. *A unified picture for quantum Zeno and anti-Zeno effects.*
American Physical Society (APS): Summit Meeting 2025.
Anaheim Convention Center, Anaheim CA, March 2025.

91. *Delayed Choice Lorentz Transformations on a Qubit.*
American Physical Society (APS): Summit Meeting 2025.
Anaheim Convention Center, Anaheim CA, March 2025.

90. *Design of fluxonium coupling and readout via SQUID couplers.*
American Physical Society (APS): Summit Meeting 2025.
Anaheim Convention Center, Anaheim CA, March 2025.

89. *Two-qubit gates for fluxonium using a tunable coupler.*
American Physical Society (APS): Summit Meeting 2025.
Anaheim Convention Center, Anaheim CA, March 2025.

88. *Continuous Quantum Measurements and Feedback Control of Superconducting Qubits.*
Invited Speaker: Hitachi Lab Seminar
Cambridge University, United Kingdom, February 2025.

87. *Operator Techniques for Continuous Quantum Measurements in Circuit Quantum Electrodynamics.*
Invited Speaker: Advances in Operator Theory with Applications to Mathematical Physics
Chapman University, November 2024.

86. *Continuous Quantum Measurements using Machine Learning on Superconducting Qubits.*
Invited Speaker: Cavendish Quantum Information Seminar
Cambridge University, United Kingdom, June 2024.

85. *Optical Ventriloquism and Local Streamlines.*
Invited Speaker: Superoscillations - Theoretical Aspects and Applications III
Grand Hotel San Michele, Cetraro Italy, June 2024.

84. *Optical Ventriloquism (and other Super-subjects).*
Invited Speaker: Super-resolution Workshop
Chapman University, April 2024.

83. *Compact 2D Fluxonium Qubits Design with Inductive Coupling for Measurement and Control.*
American Physical Society (APS): March Meeting 2024.
Minneapolis Convention Center, Minneapolis MN, March 2024.

82. *Flux-Pumped Double-SQUID Josephson Parametric Amplifier.*
American Physical Society (APS): March Meeting 2024.
Minneapolis Convention Center, Minneapolis MN, March 2024.

81. *High coherence 2D Kerr-cat qubit: Experimental realization and technical challenges (2/2).*
American Physical Society (APS): March Meeting 2024.
Minneapolis Convention Center, Minneapolis MN, March 2024.

80. *SQUID-Based Kerr Cat Qubit: Theory and Lifetime Analysis.*
American Physical Society (APS): March Meeting 2024.
Minneapolis Convention Center, Minneapolis MN, March 2024.

79. *Globally stabilizing two-qubit entanglement with dynamically decoupled active feedback.*
American Physical Society (APS): March Meeting 2024.
Minneapolis Convention Center, Minneapolis MN, March 2024.

78. *Bichromatic Driving in Floquet Qubits.*
American Physical Society (APS): March Meeting 2024.
Minneapolis Convention Center, Minneapolis MN, March 2024.

77. *High-Fidelity Two-Qubit Gates Between Fluxonium Qubits Using a Tunable Coupler.*
American Physical Society (APS): March Meeting 2024.
Minneapolis Convention Center, Minneapolis MN, March 2024.

76. *Geometric Gates via Parametric Control of a SQUID Coupler.*
American Physical Society (APS): March Meeting 2024.
Minneapolis Convention Center, Minneapolis MN, March 2024.

75. *Design of fluxonium coupling and readout via SQUID couplers.*
American Physical Society (APS): March Meeting 2024.
Minneapolis Convention Center, Minneapolis MN, March 2024.

74. *How to communicate a QR code without a trace.*
Invited Outreach Speaker: Physics Fun!
Chapman University, February 2024.

73. *Quantum Measurements with Quasiprobabilities.*
Invited Speaker: QuiDiQua : Quasiprobability Distributions in Quantum Mechanics and Quantum Information. Kirkwood-Dirac-Wigner.
Villeneuve d'Ascq, Lille, France, November 2023.

72. *How to communicate a QR code without a trace.*
Invited Speaker: 30th Anniversary of Interaction-free Measurements.
Chapman University, April 2023.

71. *Weak measurement feedback and Zeno pinning for remote entanglement generation and stabilization in superconducting qubits.*
American Physical Society (APS): March Meeting 2023.
Las Vegas Convention Center, Las Vegas NV, March 2023.

70. *High coherence 2D Kerr-cat qubit: Experimental realization and technical challenges.*
American Physical Society (APS): March Meeting 2023.
Las Vegas Convention Center, Las Vegas NV, March 2023.

69. *Optimal control for reduced leakage in superconducting qubits using bichromatic driving.*
American Physical Society (APS): March Meeting 2023.
Las Vegas Convention Center, Las Vegas NV, March 2023.

68. *Tunable coupler for high-fidelity two-qubit gates in fluxonium.*
American Physical Society (APS): March Meeting 2023.
Las Vegas Convention Center, Las Vegas NV, March 2023.

67. *Continuous Quantum Error Correction.*
Invited Speaker: Cavendish Quantum Information Seminar, Cambridge University
Online seminar, February 2023.

66. *Continuous Quantum Measurements using Machine Learning on Superconducting Qubits.*
Invited Speaker: Institute for Quantum Studies Seminar
Chapman University, February 2023.

65. *Tracking the State Dynamics of Superconducting Transmon Qubits.*
Invited Speaker: Applied Superconductivity Conference 2022.
Honolulu Convention Center, HI, October 2022.

64. *Retrocausal paradoxes in circuit quantum electrodynamics.*
Discussion Seminar: Quantum Time Machines: Workshop on the role of time in quantum mechanics 2022.
University of San Diego, July 2022.

63. *Continuous Quantum Measurements and Machine Learning on Superconducting Qubits.*
Invited Talk: Quantum Seminar, Stevens Institute of Technology.
Online seminar, April 2022.

62. *Learning Temporal Correlations in Continuous Quantum Measurements.*
Invited Talk: CQuIC Seminar, UNM 2021.
Online seminar, April 2021.

61. *Reconstructing Transmon State Trajectories Outside the Bad-Cavity Regime using a Neural Network Filter.*
American Physical Society (APS): March Meeting 2021.
Online meeting, March 2021.

60. *Continuous Error Correction with Parity Measurements.*
American Physical Society (APS): March Meeting 2021.
Online meeting, March 2021.

59. *Contextuality in non-interacting measurement.*
American Physical Society (APS): March Meeting 2020.
Denver Convention Center, Denver CO, March 2020.
(canceled due to COVID-19: moved online)

58. *High-fidelity quantum state estimation via autoencoder tomography.*
American Physical Society (APS): March Meeting 2020.
Denver Convention Center, Denver CO, March 2020.
(canceled due to COVID-19: moved online)

57. *Spin Angular Momentum in Acoustic Field Theory.*
American Physical Society (APS): March Meeting 2020.
Denver Convention Center, Denver CO, March 2020.
(canceled due to COVID-19: moved online)

56. *Measuring qubit quasiprobability distributions behind out-of-time-ordered correlators.*
American Physical Society (APS): March Meeting 2019.
Boston Convention Center, Boston MA, March 2019.

55. *Continuous parity measurement and error correction.*
American Physical Society (APS): March Meeting 2019.
Boston Convention Center, Boston MA, March 2019.

54. *Out-of-time-ordered-correlator quasiprobabilities for the quantum kicked top.*
American Physical Society (APS): March Meeting 2019.
Boston Convention Center, Boston MA, March 2019.

53. *Minimal quantum state representations from denoising autoencoders.*
American Physical Society (APS): March Meeting 2019.
Boston Convention Center, Boston MA, March 2019.

52. *Tracking non-Markovian quantum dynamics of a superconducting qubit with a recurrent neural network filter.*
American Physical Society (APS): March Meeting 2019.
Boston Convention Center, Boston MA, March 2019.

51. *Strengthening weak measurements for qubit multitime correlators.*
PIMan 2019 Workshop
Chapman University, Orange CA, March 2019.

50. *Strengthening weak measurements for qubit tomography and multitime correlators.*
Invited Talk: CEMS, RIKEN 2019.
CEMS, RIKEN, Wako-shi, Saitama, Japan, January 2019.

49. *Watching Superconducting Qubits with Microwaves.*
Invited Talk: Keio University.
Keio University, Japan, July 2018.

48. *Strengthening weak measurements for qubit tomography and multitime correlators.*
Invited Talk: Chapman University Math, Physics, and Computation (MPC) Seminar.
Chapman University, Orange CA, October 2018.

47. *Quantum Computing: State of Play.*
Invited Talk: Orange County Association of Computing Machinery (ACM) Chapter.
Knobbe Martin's Irvine Office, Irvine CA, May 2018.

46. *Watching Superconducting Qubits with Microwaves.*
Invited Talk: International Conference on Quantum Communication, Measurement and Computing (QCMC) 2018.
Louisiana State University, Baton Rouge LA, March 2018.

45. *Quantization from Clifford Algebra.*
American Physical Society (APS): March Meeting 2018.
Los Angeles Convention Center, Los Angeles CA, March 2018.

44. *Tracking calibration drifts in a continuous quantum measurement.*
American Physical Society (APS): March Meeting 2018.
Los Angeles Convention Center, Los Angeles CA, March 2018.

43. *Weak Values in the Wild.*
Invited Talk: 30th Anniversary of the Weak Value.
Chapman University, Orange CA, March 2018.

42. *Continuous Measurements of Superconducting Qubits: Many-Worlds to Master Equations.*
Invited Talk: International Conference on Quantum Foundations (ICQF) 2017.
National Institute of Technology, Patna, Bihar, India, December 2017.

41. *Watching a Quantum System: How to Continuously Measure a Superconducting Qubit.*
Invited Talk: Chapman University Math, Physics, and Computation (MPC) Seminar.
Chapman University, Orange CA, September 2017.

40. *Watching a Quantum System: How to Continuously Measure a Superconducting Qubit.*
Invited Talk: USC Physics and Astronomy Colloquium.
USC, Los Angeles CA, September 2017.

39. *Continuous measurement of transmon qubits: state-dragging and stabilization using the quantum Zeno effect.*
Invited Talk: USC Electrical Engineering Quantum Group.
USC, Los Angeles CA, June 2017.

38. *What does a continuously monitored qubit readout really show?.*
American Physical Society (APS): March Meeting 2017.
New Orleans Center, New Orleans LA, March 2017.

37. *State dragging using the quantum Zeno effect.*
American Physical Society (APS): March Meeting 2017.
New Orleans Center, New Orleans LA, March 2017.

36. *Probing quantumness with joint continuous measurements of non-commuting qubit observables.*
American Physical Society (APS): March Meeting 2017.
New Orleans Center, New Orleans LA, March 2017.

35. *Linear feedback stabilization of a continuously monitored qubit.*
American Physical Society (APS): March Meeting 2017.
New Orleans Center, New Orleans LA, March 2017.

34. *Arrow of time for repeated and continuous quantum measurement.*
American Physical Society (APS): March Meeting 2017.
New Orleans Center, New Orleans LA, March 2017.

33. *Weak and continuous measurements with superconducting qubits.*
Invited Talk: CEMS, RIKEN 2016.
CEMS, RIKEN, Wako-shi, Saitama, Japan, July 2016.

32. *Experimental violation of a Bell-Leggett-Garg inequality using weak measurements.*
Invited Talk: CEMS, RIKEN 2016.
CEMS, RIKEN, Wako-shi, Saitama, Japan, July 2016.

31. *Weak and continuous measurements with superconducting qubits.*
Concepts and Paradoxes in a Quantum Universe, Conference.
Perimeter Institute of Theoretical Physics, Waterloo, Ontario, Canada, June 2016.

30. *Delayed Choice Lorentz Rotations.*
Concepts and Paradoxes in a Quantum Universe, Workshop.
Perimeter Institute of Theoretical Physics, Waterloo, Ontario, Canada, June 2016.

29. *Continuous Transmon Measurements: Filtering and Parameter Determination.*
Army Research Office (ARO) On-site Grant Review Meeting.
University of California, Berkeley, Berkeley CA, May 2016.

28. *Sagnac Sensing Weak Value Amplification: Technical feasibility analysis.*
DRS Technical Review Meeting.
Teleconference with slides, April 2016.

27. *How zero-intensity light can exert a non-zero force on a charged particle.*
American Physical Society (APS): March Meeting 2016.
Baltimore Convention Center, Baltimore MD, March 2016.

26. *Experimental violation of a Bell-Leggett-Garg inequality using weak measurements.*
Invited Talk: Math, Physics, and Computation (MPC) Seminar.
Chapman University, Orange, CA, December 2015.

25. *Experimental violation of a Bell-Leggett-Garg inequality using weak measurements.*
Invited Talk: International Conference on Quantum Foundations (ICQF) 2015.
National Institute of Technology, Patna, Bihar, India, December 2015.

24. *Entanglement-assisted weak measurement.*
American Physical Society (APS): March Meeting 2015.
San Antonio Convention Center, San Antonio TX, March 2015.

23. *Entanglement-assisted weak measurement.*
American Physical Society (APS): March Meeting 2015.
San Antonio Convention Center, San Antonio TX, March 2015.

22. *Violating the Modified Helstrom Bound with Nonprojective Measurements.*
American Physical Society (APS): March Meeting 2015.
San Antonio Convention Center, San Antonio TX, March 2015.

21. *Experimental violation of a Bell-Leggett-Garg inequality using weak measurements, Part II: The Violation.*
American Physical Society (APS): March Meeting 2015.
San Antonio Convention Center, San Antonio TX, March 2015.

20. *Experimental violation of a Bell-Leggett-Garg inequality using weak measurements, Part I: Avoiding loopholes.*
American Physical Society (APS): March Meeting 2015.
San Antonio Convention Center, San Antonio TX, March 2015.

19. *Mapping the Optimal Route Between Two Quantum States.*
Riverside Postdoctoral Association, Inaugural Symposium 2014.
University of California, Riverside, Riverside CA, September 2014.

18. *Violating the modified Helstrom bound.*
Workshop Talk: UCSB Meeting 2014.
University of California: Santa Barbara, Santa Barbara CA, September 2014.

17. *Implementing generalized measurements.*
Workshop Talk: UCSB Meeting 2014.
University of California: Santa Barbara, Santa Barbara CA, September 2014.

16. *Optimal routes through quantum phase space.*
Workshop Talk: UCSB Meeting 2014.
University of California: Santa Barbara, Santa Barbara CA, September 2014.

15. *Avoiding Loopholes with Hybrid Bell-Leggett-Garg Inequalities.*
American Physical Society (APS): March Meeting 2014.
Denver Convention Center, Denver CO, March 2014.

14. *Enhancing Weak Value Amplification.*
Invited Talk: UCB 2014.
University of California, Berkeley CA, January 2014.

13. *An Action Principle for Continuous Quantum Measurements.*
Invited Talk: USC 2013.
University of Southern California, Los Angeles CA, November 2013.

12. *Weak Measurements, Weak Values, and Bell-Leggett-Garg Inequalities.*
Workshop Talk: UCSB Meeting 2013.
University of California: Santa Barbara, Santa Barbara CA, September 2013.

11. *Weakly Measuring Observables with Generalized Eigenvalues.*
    Invited Talk: CEMS, RIKEN 2013.
    CEMS, RIKEN, Wako-shi, Saitama Japan, July 2013.

10. *Weak Values are Universal in von Neumann Measurements.*
    American Physical Society (APS): March Meeting 2013.
    Baltimore Convention Center, Baltimore MD, March 2013.

9. *Grounding generalized measurements in the laboratory.*
   Optical Society of America (OSA): Frontiers in Optics (FiO) 2012.
   Rochester Convention Center, Rochester NY, October 2012.

8. *Weak values need not be weak.*
   Cross Borders Workshop (XBW) XIV.
   McGill University, Montreal Quebec, Canada, June 2012.

7. *Contextual Values: Going beyond the eigenvalues of an observable.*
   Cross Borders Workshop (XBW) XIII.
   University of Rochester, Rochester NY, June 2011.

6. *Experimental Violation of Two-Party Leggett-Garg Inequalities with Semi-weak Measurements.*
   American Physical Society (APS): March Meeting 2011.
   Dallas Convention Center, Dallas TX, March 2011.

5. *Quantum measurement with Mach-Zehnder Interferometers.*
   American Physical Society (APS): March Meeting 2011.
   Dallas Convention Center, Dallas TX, March 2011.

4. *Quantum Strangeness: or, How I learned to stop worrying and* love *Weak Values.*
   University of Rochester Prospective Physics Weekend.
   University of Rochester, Rochester NY, February 2011.

3. *Experimental Violation of Two-Party Leggett-Garg Inequalities with Semi-weak Measurements.*
   Optical Society of America (OSA): Frontiers in Optics (FiO) 2010.
   Rochester Convention Center, Rochester NY, October 2010.

2. *Weak Value Inequalities as a Test of Hidden Variable Theories.*
   Symposium on Quantum Control and Quantum Entanglement.
   University of Rochester, Rochester NY, October 2009.

1. *Gravitational Redshift and Deflection of Slow Light.*
   American Physical Society (APS): March Meeting 2009.
   Pittsburgh Convention Center, Pittsburgh PA, March 2009.