

Christopher R Monroe

March 2017

Joint Quantum Institute and Department of Physics
University of Maryland
College Park, MD 20742
www.iontrap.umd.edu

Office: 301-405-8631
Labs: 301-405-4494/7617/7618/7619
Fax: 301-314-0207
monroe@umd.edu

Education

- 1992 Ph.D., Physics, University of Colorado, Boulder, CO (Advisor: Carl Wieman)
- 1987 S.B., Physics, Massachusetts Institute of Technology, Cambridge MA (Advisor: Michael Feld)
- 1983 Detroit Catholic Central High School, Redford MI

Positions

- 2015– Distinguished University Professor, University of Maryland, College Park
- 2014– Fellow, Center for Quantum Information and Computer Science (QuICS), Univ. Maryland, College Park
- 2007– Bice Zorn Professor of Physics, University of Maryland, College Park
- 2007– Fellow, Joint Quantum Institute (JQI), NIST and University of Maryland, College Park
- 2006–2007 Director, FOCUS (NSF Physics Frontier Center on Ultrafast Science), University of Michigan, Ann Arbor
- 2006–2007 Professor, Electrical Engineering and Computer Science Dept., University of Michigan, Ann Arbor
- 2003–2007 Professor, Physics Dept., University of Michigan, Ann Arbor
- 2000–2003 Associate Professor, Physics Dept., University of Michigan, Ann Arbor
- 1995–2000 Adjunct Lecturer, Physics Dept., University of Colorado, Boulder
- 1994–2000 Staff Physicist, National Institute of Standards and Technology (NIST), Boulder
- 1992–1994 NRC Postdoctoral Researcher, NIST, Boulder CO (Mentor: David Wineland)

Fellowships and Awards

- Member, National Academy of Sciences (2016)
- American Physical Society Arthur Schawlow Prize for Laser Science (2015)
- University of Maryland College of Science Distinguished Faculty Award (2014)
- Fellow, American Association for the Advancement of Science (2012)
- Scientific American “50” Research Award (2006)
- University of Michigan Faculty Distinguished Research Award (2005-2006)
- Fellow, American Physical Society (2005)
- Fellow, UK Institute of Physics (2002)
- Distinguished Traveling Lecturer, American Physical Society Division of Laser Science (2002–)
- American Physical Society I.I. Rabi Award (2001)
- International Quantum Communication Award, Tamagawa University, Japan (2000)
- US Presidential Early Career Award for Scientists and Engineers (1997)
- National Research Council Postdoctoral Fellowship (1992-1994)
- University of Colorado Feldkamp Award for Graduate Research (1990)

Service

Committees, Boards

- National Academies of Sciences Intelligence Science and Technology Experts Group (ISTEG) (2015–)
- DoD Advisory Board for Quantum Sciences and Engineering at ARL, AFRL, and NRL (2015–).
- American Physical Society Div. AMO Physics (DAMOP): **Chair** (2010), Chair-Elect (2009), Vice-Chair (2008).
- American Physical Society Topical Group on Quantum Information: Executive Committee (2008-2010).
- American Physical Society Committee on Meetings: **Chair** (2005), Member (2003-2004).
- National Academy of Sciences Committee on AMO science (CAMOS): **Chair** (2012-2015), Member (2009-2011).
- National Academy of Sciences Committee on AMO science (AMO2010 decadal report, 2005-2006).
- National Science Foundation Physics Frontier Center, JILA and Univ. of Colorado: External Advisory Board (2014–).
- Center for Quantum Information, Tsinghua University, Beijing, China: International Advisory Board (2012–).
- Institute for Quantum Computing, University of Waterloo, Canada: Scientific Advisory Committee (2010–).
- Physics and Engineering Physics Department, Stevens Institute of Technology: External Advisory Board (2009–).

Organization and Outreach

Founding co-organizer, biennial Michigan Summer School on Quantum Physics (2008–2014).
Gordon Research Conference on Atomic Physics: **Chair** (2007), Vice-Chair (2005).
Enrico Fermi International School of Physics on “Quantum Information Science”: Co-Director (2001).

Editorial

Nature: Quantum Information: Editorial Board (2015–).
Journal of Optics B: Editorial Board (2003-2007), Advisory Board (2008-2012).
Journal of Quantum Information (Rinton Press): Editorial Advisory Board (2000–)

Research Interests

I am an experimentalist in the areas of quantum computing, quantum communication, atomic, molecular, and optical physics, and quantum optics. My research interests include:

Quantum Information and Entanglement. Quantum information science exploits the properties of quantum superposition and quantum entanglement to store and process information in ways that are not possible classically. I have a longstanding interest in the fabrication of quantum hardware using atoms and photons, natural carriers of quantum information. This includes the design and realization of elementary entangling quantum logic gates between nearby atoms, the quantum networking of remotely-located atoms with photons, and the scaling to much larger numbers of atomic quantum bits with advanced microfabricated atom trap array and photonic structures.

Cold Atomic Physics. Atoms can be localized to nanometer precision with electromagnetic fields and laser cooling techniques. My interest in this area involves the use of laser radiation to prepare, characterize, and exploit nearly-pure quantum states of internal (electronic) and external (motional) degrees of freedom of cold atoms and ions in order to generate controllable interactions and quantum entanglement for studies of quantum many-body systems.

The Interface between Atomic and Condensed Matter Physics. My group has led the development of atomic quantum simulators that can emulate intractable Hamiltonians that are found in contexts such as quantum magnetism and strongly-correlated condensed matter. We have also developed the use of microfabricated semiconductor structures for confining individual atomic ions in free space, while also characterizing the electrical noise processes of semiconductor and other electrode materials using single atoms as sensitive probes. More generally, I am interested in juxtaposing atomic systems with mesoscopic condensed-matter systems, including photonic couplings between atomic ions and quantum dots and electro-mechanical couplings between mesoscopic oscillators and atoms.

Ultrafast Control of Cold Atoms. I am actively pursuing the use of ultrafast ($\sim 10^{-12}$ s) optical techniques for the manipulation and control of cold atomic systems and the generation of multi-atom entangled quantum states. Ultrafast control eliminates sensitivity to slower decoherence processes, and represents a new regime of ultracold atomic physics.

Foundations of quantum mechanics. I have a longstanding interest in foundational aspects of quantum mechanics, from quantum measurement, quantum decoherence, and alternative interpretations of quantum mechanics, to the general phenomenon of quantum entanglement and various forms of Bell’s Inequalities. I am interested in quantum metrology and the border between quantum and classical physics as system complexity grows. I enjoy conveying quantum tenets to younger students and the public, with heavy reliance on analogies from the visual and musical arts.

Grants

- 2016-2021, MURI – Army Research Office (\$5,000,000; \$1,250,000 to UMD), “Modular Quantum Circuits”
- 2016-2021, IARPA – (\$32,000,000; \$12,000,000 to UMD) “Error-Correction Universal Ion Trap Quantum Computer, co-PI with 8 others
- 2015-2020, ARL – (\$1,000,000) “Quantum Networks,” co-PI with 12 others
- 2015-2017, LPS – (\$580,000) “Ultrafast Quantum Gates with Trapped Ions,” PI
- 2014-2018, ARO – (\$800,000) “Quantum Dynamics with Trapped Ion Spin Chains,” PI.
- 2014-2016, Lockheed, Inc – (\$1,800,000) “LM/UMD Quantum Engineering Center,” PI and Director.
- 2014-2019, MURI – Air Force Office of Scientific Research (\$5,000,000; \$1,250,000 to UMD), “Wiring Quantum Networks with Mechanical Transducers”
- 2014-2019, MURI – Air Force Office of Scientific Research (\$6,250,000; \$1,750,000 to UMD), “Optimal Measurements for Scalable Quantum Technologies”
- 2014-2019, NSF Physics Frontier Center (\$12,000,000) “JQI: Processing Quantum Coherence,” co-PI at the Joint Quantum Institute and the University of Maryland.
- 2012-2015, DARPA Defense Science Office (\$3,920,000; \$670,000 to UMD), “Scalable Platform for Agile extended-Reach Quantum Communication (SPARQC),” co-PI with 8 others at 6 institutions.

- 2011-2013, AFOSR/STTR (\$850,000, \$270,000 to UMD) “Monolithic quartz ion trap chip” with Translume, Inc.
- 2010-2015, IARPA/ARO (\$15,100,000; \$3,450,000 to UMD) “Modular Universal Scalable ion Trap Quantum Computer (MUSIQC),” co-PI with 6 others at 6 institutions.
- 2010-2012, European Commission AQUITE Network (\$280,000) “Quantum Technology with Atoms”
- 2010-2011, DURIP – Army Research Office (\$138,000) “Modelocked Laser for Ultrafast Quantum Gates.”
- 2009-2012, NSF Physics at the Information Frontier (\$450,000) “Photonic Networking of Trapped Ion Qubits.”
- 2009-2014, MURI – Army Research Office (\$6,250,000; \$1,125,000 to UMD), “Quantum-Optical Circuits of Hybrid Quantum Memories,” Lead PI, with 11 co-PIs at 7 institutes.
- 2008-2011, Intelligence Community Postdoctoral Fellowship – National Geospatial Agency (\$350,000).
- 2008-2013, NSF Physics Frontier Center (\$12,500,000) “JQI: Processing Quantum Coherence,” co-PI at the Joint Quantum Institute and the University of Maryland.
- 2008-2009, Army Research Office and IARPA (\$500,000), “Trapped Ion Quantum Networks,” PI with co-PI L.-M. Duan.
- 2007-2013, DARPA Defense Science Office (\$13,000,000; \$1,575,000 to UMD), “Quantum Simulation of Magnetic Spin Phases with Atoms and Ions in Optical Lattices,” Lead PI, with 13 co-PIs at 9 institutes.
- 2006-2009, NSF Physics at the Information Frontier (\$450,000) “Photonic Networking of Trapped Ion Qubits.”
- 2005-2006, DURIP – Army Research Office (\$115,000) “Ultrafast Photoionization Loading of Ion Traps.”
- 2005-2006, DARPA and MEMS Exchange (\$205,000), “MEMS fabrication of silicon ion traps.”
- 2004-2008, Army Research Office and DTO (\$2,200,000) “Trapped Ion Quantum Information Processing”
- 2003-2004, NIST SBIR and Aerophysics, Inc. (\$120,000) “Microscale Mass Spectrometer Arrays,” co-PI with PIs L. B. King (Michigan Tech) and S. Satyuk (Aerophysics, Inc.)
- 2003-2006, NSF Information Tech. Research (\$2,300,000) “Trapped Ion Cavity-QED,” co-PI with M. Chapman (Georgia Tech)
- 2001-2008, NSF Physics Frontier Centers (\$21,000,000) “FOCUS: Frontiers of Optical Coherent and Ultrafast Science,” PI and Director (2006-2007); co-PI with 26 others at Univ. Michigan and Univ. Texas (2001-2005).
- 2001-2004, Army Research Office and ARDA (\$1,600,000) “Trapped Ion Quantum Computing.”
- 2001-2002, DURIP -- Army Research Office (\$120,000) “High-fidelity Optical Processes in Trapped Atoms.”
- 2001-2004, NSF Information Technology Research (\$500,000) “Entanglement of Atomic Cadmium Ions.”
- 1995-2000, National Security Agency (\$2,500,000), “Ion Trap Quantum Computing,” co-PI with PI D. Wineland (NIST).

Journal Publications (>29,000 citations, h=67)

134. “*Multi-Species Trapped Ion Node for Quantum Networking*,” I. V. Inlek, C. Crocker, M. Lichtman, K. Sosnova, and C. Monroe, arXiv: 1702.01062 (2017).
133. “*Ultrafast Creation of Large Schrödinger Cat States of an Atom*,” K. G. Johnson, J. D. Wong-Campos, B. Neyenhuis, J. Mizrahi, C. Monroe, arXiv: 1612.05854v2 (2017).
132. “*Experimental Demonstration of Quantum Fault Tolerance*,” N. M. Linke, M. Gutierrez, K. A. Landsman, C. Figgatt, S. Debnath, K. R. Brown, C. Monroe, arXiv: 1609.06946 (2016).
131. “*Observation of Prethermalization in Long-Range Interacting Spin Chains*,” B. Neyenhuis, J. Smith, A. Lee, P. Richerme, P. Hess, J. Zhang, Z. Gong, A. Gorshkov, and C. Monroe, arXiv 160800681 (2016).
130. “*Experimental Comparison of Two Quantum Computing Architectures*,” N. M. Linke, D. Maslov, M. Roetteler, S. Debnath, C. Figgatt, K. A. Landsman, K. Wright, C. Monroe, **Proc. Nat’l Acad. Sci.** (to appear); arXiv: 1702.01852 (2017).
129. “*Observation of a Discrete Time Crystal*,” J. Zhang, P.W. Hess, A. Kyprianidis, P. Becker, A. Lee, J. Smith, G. Pagano, I.-D. Potirniche, A.C. Potter, A. Vishwanath, N.Y. Yao, C. Monroe, **Nature** **543**, 217–220 (2017).
128. “*Engineering Large Stark Shifts for Control of Individual Clock-State Qubits*,” A. C. Lee, J. Smith, P. Richerme, B. Neyenhuis, P. W. Hess, J. Zhang, and C. Monroe, **Phys. Rev. A** **94**, 042308 (2016).
127. “*Co-Designing a Scalable Quantum Computer with Trapped Atomic Ions*,” K. R. Brown, J. Kim, and C. Monroe, **Nature Quantum Information** **2**, 16034 (2016).
126. “*Demonstration of a programmable general purpose quantum computer*,” S. Debnath, N. M. Linke, C. Figgatt, K. A. Landsman, K. Wright, and C. Monroe, **Nature** **536**, 63 (2016).
125. “*Many-body localization in a quantum simulator with programmable random disorder*,” J. Smith, A. Lee, P. Richerme, B. Neyenhuis, P. W. Hess, P. Hauke, M. Heyl, D. A. Huse, and C. Monroe, **Nature Physics** doi:10.1038/nphys3783 (2016)..
124. “*High resolution adaptive imaging of a single atom*,” J. D. Wong-Campos, K. Johnson, B. Neyenhuis, J. Mizrahi, and C. Monroe, **Nature Photonics** doi:10.1038/nphoton.2016.136 (2016).

123. “*Quantum Connections*,” C. Monroe, M. Lukin, and R. Schoelkopf, *Scientific American* (May, 2016), p50.
122. “*Active Stabilization of Ion Trap Radiofrequency Potentials*,” K. G. Johnson, J. D. Wong-Campos, B. Neyenhuis, J. Mizrahi, and C. Monroe, *Rev. Sci. Instrum.* **87**, 053110 (2016).
121. “*Simulating the Haldane Phase in Trapped Ion Spins Using Optical Fields*,” I. Cohen, P. Richerme, Z.-X. Gong, C. Monroe, A. Retzker, *Phys. Rev. A* **92**, 012334 (2015)..
120. “*Sensing Atomic Motion from the Zero Point to Room Temperature with Ultrafast Atom Interferometry*,” K. G. Johnson, B. Neyenhuis, J. Mizrahi, J. D. Wong-Campos, C. Monroe, *Phys. Rev. Lett.* **115**, 213001 (2015).
119. “*Realization of a Quantum Integer-Spin Chain with Controllable Interactions*,” C. Senko, P. Richerme, J. Smith, A. Lee, I. Cohen, A. Retzker, and C. Monroe, *Phys. Rev. X* **5**, 021026 (2015).
118. “*Modular Entanglement of Atomic Qubits using both Photons and Phonons*,” D. Hucul, I. V. Inlek, G. Vittorini, C. Crocker, S. Debnath, S. M. Clark, and C. Monroe, *Nature Physics*, **11**, 37 (2015).
117. “*Entanglement of distinguishable quantum memories*,” G. Vittorini, D. Hucul, I.V. Inlek, C. Crocker, and C. Monroe, *Phys. Rev. A* **90**, 040302(R) (2014).
116. “*Quantum gates with phase stability over space and time*,” I.V. Inlek, G. Vittorini, D. Hucul, C. Crocker, and C. Monroe, *Phys. Rev. A* **90**, 042316 (2014).
115. “*Coherent Imaging Spectroscopy of a Quantum Many-Body Spin System*,” C. Senko, J. Smith, P. Richerme, A. Lee, W.C. Campbell, and C. Monroe, *Science* **345**, 430 (2014).
114. “*Non-local propagation of correlations in long-range interacting quantum systems*,” P. Richerme, Z.-X. Gong, A. Lee, C. Senko, J. Smith, M. Foss-Feig, S. Michalakis, A. V. Gorshkov, and C. Monroe, *Nature* **511**, 198 (2014).
113. “*Large Scale Modular Quantum Computer Architecture with Atomic Memory and Photonic Interconnects*,” C. Monroe, R. Raussendorf, A. Ruthven, K. R. Brown, P. Maunz, L.-M. Duan, J. Kim, *Phys. Rev. A* **89**, 022317 (2014).
112. “*Optimal quantum control of multi-mode couplings between trapped ion qubits for scalable entanglement*,” T. Choi, S. Debnath, T. A. Manning, C. Figgatt, Z.-X. Gong, L.-M. Duan, and C. Monroe, *Phys. Rev. Lett.* **112**, 19502 (2014).
111. “*Beat note stabilization of mode-locked lasers for quantum information processing*,” R. Islam, W. C. Campbell, T. Choi, S. M. Clark, S. Debnath, E. E. Edwards, B. Fields, D. Hayes, D. Hucul, I. V. Inlek, K. G. Johnson, S. Korenblit, A. Lee, K. W. Lee, T. A. Manning, D. N. Matsukevich, J. Mizrahi, Q. Quraishi, C. Senko, J. Smith, and C. Monroe, *Optics Letters* **39**, 3238 (2013).
110. “*Quantum Catalysis of Magnetic Phase Transitions in a Quantum Simulator*,” P. Richerme, C. Senko, S. Korenblit, J. Smith, A. Lee, R. Islam, W. C. Campbell, and C. Monroe, *Phys. Rev. Lett.* **111**, 100506 (2013).
109. “*Quantum Control of Qubits and Atomic Motion Using Ultrafast Laser Pulses*,” J. Mizrahi, B. Neyenhuis, K. G. Johnson, W. C. Campbell, C. Senko, D. Hayes, D. Hucul, and C. Monroe, submitted to *Appl. Phys. B* (2013).
108. “*Experimental Performance of a Quantum Simulator: Optimizing Adiabatic Evolution and Identifying Many-body Ground States*,” P. Richerme, C. Senko, J. Smith, A. Lee, S. Korenblit, and C. Monroe, *Phys. Rev. A* **88**, 012334 (2013).
107. “*Emergence and Frustration of Magnetism with Variable-Range Interactions in a Quantum Simulator*” R. Islam, C. Senko, W. C. Campbell, S. Korenblit, J. Smith, A. Lee, E. E. Edwards, C.-C. Wang, J. K. Freericks and C. Monroe, *Science* **340**, 583 (2013).
106. “*Scaling the Ion Trap Quantum Processor*” C. Monroe and J. Kim, *Science* **339**, 1164 (2013).
105. “*Ultrafast Spin-Motion Entanglement and Interferometry with a Single Atom*,” J. Mizrahi, C. Senko, W. C. Campbell, K. G. Johnson, C. W. S. Conover, C. Monroe, *Phys. Rev. Lett.* **203001** (2013).
104. “*Quantum Simulation of Spin Models on an Arbitrary Lattice with Trapped Ions*,” S. Korenblit, W. C. Campbell, R. Islam, E. E. Edwards, Z. Gong, G.-D. Lin, L.-M. Duan, J. Kim, K. Kim, and C. Monroe, *New J. Phys.* **14**, 095024 (2012).
103. “*Coherent Error Suppression in Spin-Dependent Force Quantum Gates*,” D. Hayes, S. M. Clark, S. Debnath, D. Hucul, Q. Quraishi, and C. Monroe, *Phys. Rev. Lett.* **109**, 020503 (2012).
102. “*Photon collection from a trapped ion + cavity system*,” J. D. Sterk, L. Luo, T. A. Manning, P. Maunz, and C. Monroe, arXiv 1112.4489, *Phys. Rev. A* **85**, 062308 (2012).

101. “Quantum simulation of the transverse Ising model with trapped ions,” K. Kim, S. Korenblit, R. Islam, E. E. Edwards, M-S Chang, C. Noh, H. Carmichael, G-D Lin, L-M Duan, C. C. Joseph Wang, J. K. Freericks and C. Monroe, *New J. Phys.* **13**, 1050031 (2011).
100. “Onset of a Quantum Phase Transition with a Trapped Ion Quantum Simulator,” R. Islam, E. E. Edwards, K. Kim, S. Korenblit, C. Noh, H. Carmichael, G.-D.Lin, L.-M. Duan, C.-C. Joseph Wang, J. K. Freericks, C. Monroe, *Nature Communications* **2**, 377 (2011).
99. “Sharp Phase Transitions in a Small Frustrated Network of Trapped Ion Spins,” G.-D. Lin, C. Monroe, and L.-M. Duan, *Phys. Rev. Lett.* **106**, 230402 (2011).
98. “Demolishing Quantum Nondemolition,” C. Monroe, *Physics Today*, 8 (Jan 2011).
97. “Quantum Simulation and Phase Diagram of the Transverse Field Ising Model with Three Atomic Spins,” E. E. Edwards, S. Korenblit, K. Kim, R. Islam, M. Chang, J. Freericks, G. Lin, L.-M. Duan, C. Monroe, *Phys. Rev. B* **82**, 060412 (2010).
96. “Ultrafast Gates for Single Atomic Qubits,” W. C. Campbell, J. Mizrahi, Q. Quraishi, C. Senko, D. Hayes, D. Hucul, D. N. Matsukevich, P. Maunz, C. Monroe, *Phys. Rev. Lett.* **105**, 090502 (2010).
95. “Quantum Logic between Distant Trapped Ions,” S. Olmschenk, D. Hayes, D. N. Matsukevich, P. Maunz, D. L. Moehring, and C. Monroe, *Int. Jour. Quant. Info.* **8**, 337 (2010).
94. “Quantum Simulation of Frustrated Ising Spins with Trapped Ions,” K. Kim, M.-S. Chang, S. Korenblit, R. Islam, E. E. Edwards, J. K. Freericks, G.-D. Lin, L.-M. Duan, and C. Monroe *Nature* **465**, 590 (2010).
93. “Quantum Networks with Trapped Ions,” C. Monroe and L.-M. Duan, *Rev. Mod. Phys.* **82**, 1209 (2010).
92. “Random Numbers Certified by Bell’s Theorem,” S. Pironio, A. Acín, S. Massar, A. Boyer de la Giroday, D. N. Matsukevich, P. Maunz, S. Olmschenk, D. Hayes, L. Luo, T. A. Manning, and C. Monroe, *Nature* **464**, 1021 (2010).
91. “Quantum Computers,” T. D. Ladd, F. Jelezko, R. Laflamme, Y. Nakamura, C. Monroe, and J. L. O’Brien, *Nature* **464**, 45 (2010).
90. “Entanglement of Atomic Qubits using an Optical Frequency Comb,” D. Hayes, D. N. Matsukevich, P. Maunz, D. Hucul, Q. Quraishi, S. Olmschenk, W. Campbell, J. Mizrahi, C. Senko, and C. Monroe *Phys. Rev. Lett.*, **104**, 140501 (2010).
89. “Phonon-mediated entanglement for trapped ion quantum computing,” K.-A. Brickman and C. Monroe, *Rep. Prog. Phys.* **73** 036401 (2010).
88. “Protocol for Hybrid Entanglement Between a Trapped Atom and a Semiconductor Quantum Dot,” E. Waks and C. Monroe, *Phys. Rev. A* **80**, 062330 (2009).
87. “Protocols and Techniques for a Scalable Atom–Photon Quantum Network,” L. Luo, D. Hayes, T.A. Manning, D.N. Matsukevich, P. Maunz, S. Olmschenk, J.D. Sterk, and C. Monroe, *Fortschritte der Physik* **57**, 1133-1152 (2009).
86. “Demonstration of a scalable, multiplexed ion trap for quantum information processing,” D. Leibbrandt, J. Labaziewicz, R. Clark, I. Chuang, R. Epstein, C. Ospelkaus, J. Wesenberg, J. Bollinger, D Leibfried, D Wineland, D Stick, J Sterk, C. Monroe, C-S Pai, Y Low, R Frahm, and R Slusher, *Quantum Inf. Comp.* **9**, 899 (2009).
85. “Entanglement and Tunable Spin-Spin Couplings Between Trapped Ions Using Multiple Transverse Modes,” K. Kim, M.-S. Chang, R. Islam, S. Korenblit, L.-M. Duan, and C. Monroe, *Phys. Rev. Lett.* **102**, 250502 (2009).
84. “Precision measurement of the lifetime of the $6p^2P_{1/2}$ level of Yb^+ ,” S. Olmschenk, D. Hayes, D. N. Matsukevich, P. Maunz, D. L. Moehring, K. C. Younge, C. Monroe, *Phys. Rev. A* **80**, 022502 (2009).
83. “Large Scale Quantum Computation in an Anharmonic Linear Ion Trap,” G.-D. Lin, S.-L. Zhu, R. Islam, K. Kim, M.-S. Chang, S. Korenblit, C. Monroe, and L.-M. Duan, *Europhysics Letters* **86**, 60004 (2009).
82. “A heralded quantum gate between remote atoms,” P. Maunz, S. Olmschenk, D. Hayes, D. N. Matsukevich, L.-M. Duan, and C. Monroe, *Phys. Rev. Lett.* **102**, 250502 (2009).
81. “Quantum Teleportation between Distant Matter Qubits,” S. Olmschenk, D. N. Matsukevich, P. Maunz, D. Hayes, L.-M. Duan, and C. Monroe, *Science* **323**, 486 (2009).
80. “Remapping the Quantum Frontier,” C. Monroe and M. Lukin, *Physics World* (August, 2008), pp. 32-39.
79. “Quantum Computing with Ions,” C. Monroe and D. J. Wineland, *Scientific American* (August, 2008), 64.

78. "On the Transport of Atomic Ions in Multidimensional Ion Trap Arrays," D. Hucul, M. Yeo, S. Olmschenk, W. K. Hensinger, J. A. Rabchuk, and C. Monroe, **Quant. Inf. Comp.** **8**, 501-578 (2008); *quant-ph/0702175*.
77. "Bell inequality violation with two remote atomic qubits," D. Matsukevich, P. Maunz, D. L. Moehring, S. Olmschenk, and C. Monroe, **Phys. Rev. Lett.** **100**, 150404 (2008).
76. "Robust Quantum Information Processing with Atoms, Photons, and Atomic Ensembles," L.-M. Duan and C. Monroe, **Advances in Atomic, Molecular, and Optical Physics**, vol. 55, E. Arimondo, P.R. Berman and C.C. Lin, eds. (Elsevier, 2007), pp. 419-464.
75. "Manipulation and detection of a trapped Yb⁺ hyperfine qubit," S. Olmschenk, K. C. Younge, D. L. Moehring, D. Matsukevich, P. Maunz, and C. Monroe, **Phys. Rev. A** **76**, 052314.
74. "Magneto-optical trapping of cadmium," K.-A. Brickman, M.-S. Chang, M. Acton, A. Chew, D. Matsukevich, P. C. Haljan, V. S. Bagnato, and C. Monroe, **Phys. Rev. A** **76**, 043411 (2007).
73. "Entanglement of single-atom quantum bits at a distance," D. L. Moehring, P. Maunz, S. Olmschenk, K. C. Younge, D. N. Matsukevich, L.-M. Duan, and C. Monroe, **Nature** **449**, 68 (2007).
72. "Quantum interference of photon pairs from two remote trapped atomic (Yb) ions," P. Maunz, D. L. Moehring, S. Olmschenk, K. C. Younge, D. N. Matsukevich and C. Monroe, **Nature Physics** **3**, 538 (2007).
71. "The Trap Technique: Toward a Chip-Based Quantum Computer," D. Stick, J. D. Sterk, and C. Monroe, **IEEE Spectrum** (August, 2007), p. 5378.
70. "Quantum Networking with Photons and Trapped Atoms," D. L. Moehring, M. J. Madsen, K. Younge, R. N. Kohn, Jr., P. Maunz, L.-M. Duan, and C. Monroe, **J. Opt. Soc. Amer.** **24**, 300 (2007).
69. "Quantum Interference of Photon Pairs from Two Trapped Atomic (Cd) Ions," P. Maunz, D. L. Moehring, M. J. Madsen, R. N. Kohn, Jr., K. Younge, and C. Monroe, **quant-ph/0608047**.
68. "Efficient Photoionization-Loading of Trapped Ions with Ultrafast Pulses," L. Deslauriers, M. Acton, B. B. Blinov, K.-A. Brickman, P. C. Haljan, W. K. Hensinger, D. Hucul, S. Katnik, R. N. Kohn, P. J. Lee, M. A. Madsen, P. Maunz, D. L. Moehring, S. Olmschenk, D. Stick, and C. Monroe, **Phys. Rev. A** **74**, 063421 (2006).
67. "Scaling and Suppression of Anomalous Quantum Decoherence in Ion Traps," L. Deslauriers, S. Olmschenk, D. Stick, and C. Monroe, **Phys. Rev. Lett.** **97**, 103007 (2006).
66. "Trapped ion quantum computation with transverse phonon modes," Shi-Liang Zhu, C. Monroe, and L.-M. Duan **Phys. Rev. Lett.** **97**, 050505 (2006).
65. "Semiconductor Traps for Laser-Cooled Atomic Ions and Scalable Quantum Computing," D. Stick, W. K. Hensinger, S. Olmschenk, and C. Monroe, **IEEE Lasers and Electro-Optic Society Newsletter** **20** (3), 13 (June, 2006)
64. "Probabilistic Quantum Gates between Remote Atoms through Interference of Optical Frequency Qubits," L.-M. Duan, M. J. Madsen, D. L. Moehring, P. Maunz, R. N. Kohn, and C. Monroe, **Phys. Rev. A** **73**, 062324 (2006).
63. "Ultrafast Coherent Coupling of Atomic Hyperfine and Photon Frequency Qubits," M. J. Madsen, D. L. Moehring, P. Maunz, R. N. Kohn, L.-M. Duan, and C. Monroe, **Phys. Rev. Lett.** **97**, 040505 (2006).
62. "Near-Perfect Simultaneous Detection of a Qubit Register," M. Acton, L. Deslauriers, K.-A. Brickman, P. C. Haljan, P. J. Lee, S. Olmschenk, and C. Monroe, **Quant. Inf. Comp.** **6**, 465 (2006); *quant-ph/0511257*.
61. "Precision Lifetime Measurement of a Single Trapped Ion with Ultrafast Laser Pulses," D. L. Moehring, B. B. Blinov, D. W. Gidley, R. N. Kohn, M. J. Madsen, T. B. Sanderson, R. S. Vallery, and C. Monroe, **Phys. Rev. A** **73**, 023413 (2006).
60. "T-junction ion trap array for two dimensional ion shuttling, storage and manipulation" W. K. Hensinger, S. Olmschenk, D. Stick, D. Hucul, M. Yeo, M. Acton, L. Deslauriers, J. Rabchuk, and C. Monroe, **Appl. Phys. Lett.** **88**, 034101 (2006).
59. "Arbitrary-speed quantum gates within large ion crystals through minimum control of laser beams," Shi-Liang Zhu, C. Monroe, L.-M. Duan, **Europhys. Lett.** **73** (4), 1 (2006); *quant-ph/0508037*.
58. "Ion Trap in a Semiconductor Chip," D. Stick, W. K. Hensinger, S. Olmschenk, M. J. Madsen, K. Schwab, and C. Monroe, **Nature Physics** **2**, 36 (2006).
57. "Broadband Laser Cooling of Trapped Atoms with Ultrafast Laser Pulses," B. B. Blinov, R. N. Kohn, M. J. Madsen, D. L. Moehring, and C. Monroe, **J. Opt. Soc. Am. B** **23**, 1170 (2006); *quant-ph/0505111*.

56. "Entanglement of Trapped-Ion Clock States," P. C. Haljan, P. J. Lee, K.-A. Brickman, M. Acton, L. Deslauriers, and C. Monroe, **Phys. Rev. A** **72**, 062316 (2005).
55. "Implementation of Grover's Quantum Search Algorithm in a Scalable System," K.-A. Brickman, P. C. Haljan, P. J. Lee, M. Acton, L. Deslauriers, and C. Monroe, **Phys. Rev. A** **72**, 050306 (2005).
54. "Phase Control of Trapped Ion Quantum Gates," P. J. Lee, K.-A. Brickman, L. Deslauriers, P. C. Haljan, L.-M. Duan, and C. Monroe, **Journal of Optics B** **7**, S371 (2005).
53. "Ion trap transducers for quantum electromechanical oscillators", W. K. Hensinger, D. W. Utami, H.-S. Goan, K. Schwab, C. Monroe, and G. J. Milburn, **Phys. Rev. A** (2005).
52. "Spin-dependent Forces on Trapped Ions for Phase-Stable Quantum Gates and Motional Schrödinger Cat States," P. C. Haljan, K.-A. Brickman, L. Deslauriers, P. J. Lee, and C. Monroe, **Phys. Rev. Lett.** **94**, 153602 (2005).
51. "Experimental measurement of a Bell inequality violation between an atom and a photon," D.L. Moehring, M.J. Madsen, B.B. Blinov, and C. Monroe, **Phys. Rev. Lett.** **93**, 090410 (2004).
50. "Zero-point cooling and heating of Trapped Cd^+ ions," L. Deslauriers, P. Haljan, P. Lee, K.-A. Brickman, M. Madsen, B. B. Blinov, and C. Monroe, **Phys. Rev. A** **70**, 043408 (2004).
49. "Quantum computing with trapped ion hyperfine qubits," B. B. Blinov, D. Leibfried, C. Monroe, and D. J. Wineland, **Quantum Inf. Proc.** **3**, 45 (2004).
48. "Control of trapped-ion quantum states with optical pulses," C. Rangan, A.M. Bloch, C. Monroe, P.H. Bucksbaum, **Phys. Rev. Lett.** **92**, 113004 (2004).
47. "Scalable trapped ion quantum computation with a probabilistic ion-photon mapping," L.-M. Duan, B. B. Blinov, D. L. Moehring, and C. Monroe, **Quantum Inf. Comp.**, **4**, 165 (2004); *quant-ph/0401185*.
46. "Observation of entanglement between a single trapped atom and a single photon," B. B. Blinov, D. L. Moehring, L.-M. Duan, and C. Monroe, **Nature** **428**, 153 (2004).
45. "Planar ion trap geometry for microfabrication," M.J. Madsen, W. Hensinger, D. Stick, J. Rabchuk, and C. Monroe, **Applied Physics B: Laser and Optics** **78**, 639 (2004); *quant-ph/0401047*.
44. "Atomic qubit manipulations with an electro-optic modulator," P.J. Lee, B.B. Blinov, K. Brickman, L. Deslauriers, M.J. Madsen, R. Miller, D.L. Moehring, D. Stick, and C. Monroe, **Optics Letters** **28**, 1582 (2003).
43. "Quantum dynamics of single trapped ions," D. Leibfried, R. Blatt, C. Monroe, and D. Wineland, **Rev. Mod. Phys.** **75**, 281 (2003).
42. "Decoherence of motional superpositions of a trapped ion," C. A. Sackett, C. Monroe, and D. J. Wineland, **Chaos, Solitons, and Fractals** **16**, 431 (2003).
41. "Sympathetic cooling of trapped Cd^+ isotopes," B. Blinov, L. Deslauriers, M. P. Lee, M. Madsen, R. Miller, and C. Monroe, **Phys. Rev. A**, 040304 (2002).
40. "Quantum information processing with atoms and photons," C. Monroe, **Nature** **416**, 238 (2002).
39. "Architecture for a large scale ion-trap quantum computer," D. Kielpinski, C. Monroe, and D. Wineland, **Nature** **417**, 709 (2002).
38. "Experimental demonstration of entanglement-enhanced rotation angle estimation using trapped ions," V. Meyer, M. Rowe, D. Kielpinski, C. Sackett, W. Itano, C. Monroe, and D. Wineland, **Phys. Rev. Lett.** **86**, 5870 (2001).
37. "A Decoherence-Free Quantum Memory Using Trapped Ions," D. Kielpinski, V. Meyer, M. A. Rowe, C. A. Sackett, W. Itano, C. Monroe, and D. Wineland, **Science** **291**, 1013 (2001).
36. "Experimental Violation of a Bell's Inequality with Efficient Detection," M. A. Rowe, D. Kielpinski, V. Meyer, C. A. Sackett, W. Itano, C. Monroe, and D. Wineland, **Nature** **409**, 791 (2001).
35. "Computing with atoms and molecules?" C. Monroe and D. Wineland, **Science Spectra**, Issue 23, 17 (2000).
34. "Experimental Entanglement of Four Particles," C. Sackett, D. Kielpinski, Q. Turchette, V. Meyer, M. Rowe, C. Langer, C. Myatt, B. King, W. Itano, D. Wineland, and C. Monroe, **Nature** **404**, 256 (2000).
33. "Decoherence and Decay of Motional Quantum States of a Trapped Atom Coupled to Engineered Reservoirs," Q. Turchette, C. Myatt, D. Kielpinski, B. King, C. Sackett, W. Itano, C. Monroe, and D. Wineland, **Phys. Rev. A** **62**, 053807 (2000).

32. "Heating of Trapped Ions From the Quantum Ground State," Q. Turchette, D. Kielpinski, B. King, C. Myatt, C. Sackett, W. Itano, C. Monroe, and D. Wineland, **Phys. Rev. A** **61**, 063418 (2000).
31. "Decoherence of Quantum Superpositions Coupled to Engineered Reservoirs," C. Myatt, D. Kielpinski, B. King, C. Sackett, Q. Turchette, W. Itano, C. Monroe, and D. Wineland, **Nature** **403**, 269 (2000).
30. "Quantum Logic Using Sympathetically Cooled Ions," D. Kielpinski, B. King, Q. Turchette, C. Myatt, C. Sackett, D. Kielpinski, W. Itano, C. Monroe, D. Wineland, and W. Zurek, **Phys. Rev. A** **61**, 032310 (2000).
29. "Superposition and quantum measurement of trapped atoms," D.J. Wineland, C.R. Monroe, C. Sackett, D. Kielpinski, M. Rowe, V. Meyer, and W. Itano, **Ann. der Physik** **9**, 851 (2000).
28. "Deterministic Entanglement of Two Trapped Ions," Q. Turchette, C. Wood, C. Myatt, B. King, D. Leibfried, W. Itano, C. Monroe, and D. Wineland, **Phys. Rev. Lett.** **81**, 17 (1998).
27. "Initializing the Collective Motion of Trapped Ions for Quantum Logic," B. King, C. Wood, C. Myatt, Q. Turchette, D. Leibfried, W. Itano, C. Monroe, and D. Wineland, **Phys. Rev. Lett.** **81**, 1525 (1998).
26. "Trapped-Ion Quantum Simulator," D. Wineland, C. Monroe, W. Itano, B. King, D. Leibfried, C. Myatt, and C. Wood, **Physica Scripta** **T76**, 147 (1998).
25. "Shadows and Mirrors: Reconstructing the Quantum State of Atom Motion," D. Leibfried, T. Pfau, and C. Monroe, **Physics Today** **51**, 22 (April, 1998).
24. "Experimental Primer on the Trapped Ion Quantum Computer," D. Wineland, C. Monroe, W. Itano, B. King, D. Leibfried, D. Meekhof, C. Myatt, and C. Wood, **Fortschritte der Physik** **46**, 363 (1998).
23. "Quantum Computing," G. Brassard, I. Chuang, S. Lloyd, and C. Monroe, **Proc. Nat. Acad. Science** **95**, 11032 (1998).
22. "Quantum State Manipulation of Trapped Atomic Ions," D. Wineland, C. Monroe, D. Meekhof, B. King, D. Leibfried, W. Itano, J. Bergquist, D. Berkeland, J. Bollinger, and J. Miller, **Proc. R. Soc. A** **454**, 411 (1998).
21. "Coherent Quantum State Manipulation of Trapped Ions," D. Wineland, C. Monroe, D. Meekhof, B. King, D. Leibfried, W. Itano, J. Bergquist, D. Berkeland, J. Bollinger, J. Miller, **Adv. in Quantum Chemistry** **30**, 41 (1998).
20. "Issues in Coherent Quantum Manipulation of Trapped Atomic Ions," D. Wineland, C. Monroe, W. Itano, D. Leibfried, B. King, and D. Meekhof, **NIST Journal of Research** **103**, 259 (1998).
19. "Experimental Creation and Measurement of Motional Quantum States of a Trapped Ion," D. Meekhof, D. Leibfried, C. Monroe, B. King, W. Itano, and D. Wineland, **Brazilian Journal of Physics** **27**, 178 (1997).
18. "Atomic Physics in Ion Traps," C. Monroe and J. Bollinger, **Physics World** **10**, 37 (March 1997).
17. "News and Views: Shaping Atoms in Optical Lattices," C. Monroe, **Nature** **338**, 719 (1997).
16. "Experimental Preparation and Measurement of the State of Motion of a Trapped Atom," D. Leibfried, D. Meekhof, B. King, C. Monroe, W. Itano, and D. Wineland, **Journal of Modern Optics** **44**, 2485 (1997).
15. "Simplified Quantum Logic with Trapped Ions," C. Monroe, D. Leibfried, B. King, D. Meekhof, W. Itano, and D. Wineland, **Phys. Rev. A** **55**, R2489 (1997).
14. "Experimental Determination of the Motional Quantum State of a Trapped Atom," D. Leibfried, D. Meekhof, B. King, C. Monroe, W. Itano, and D. Wineland, **Phys. Rev. Lett.** **77**, 4281 (1996).
13. "A Schrödinger Cat Superposition State of an Atom," C. Monroe, D. Meekhof, B. King, D. Wineland, **Science** **272**, 1131 (1996).
12. "Manipulating the Motion of a Single Trapped Atom," C. Monroe, D. Meekhof, B. King, D. Leibfried, W. Itano, and D. Wineland, **Accounts of Chemical Research** **29**, 585 (1996).
11. "Generation of nonclassical motional states of a trapped atom," D. Meekhof, C. Monroe, B. King, W. Itano, and D. Wineland, **Phys. Rev. Lett.** **76**, 1796 (1996).
10. "Demonstration of a Universal Quantum Logic Gate," C. Monroe, D. Meekhof, B. King, W. Itano, and D. Wineland, **Phys. Rev. Lett.** **75**, 4714 (1995).
9. "Resolved-Sideband Raman Cooling of a Bound Atom to the 3D Zero-Point Energy," C. Monroe, D. Meekhof, B. King, S. Jefferts, W. Itano, D. Wineland, and P. Gould, **Phys. Rev. Lett.** **75**, 4011 (1995).

8. "Paul Trap for Optical Frequency Standards," S. Jefferts, C. Monroe, A. Barton, and D. Wineland, *IEEE Trans. on Instrum. and Measur.* **44**, 148 (1995).
7. "A Coaxial-Resonator Driven rf (Paul) Ion Trap for Strong Confinement," S. Jefferts, C. Monroe, E. Bell, D. Wineland, *Phys. Rev. A* **51**, 1235 (1995).
6. "A New Magnetic Suspension System for Atoms and Bar Magnets," C. Sackett, E. Cornell, C. Monroe and C. Wieman, *Amer. Jour. Phys.* **61**, 304 (1993).
5. "Measurement of Cs-Cs Elastic Scattering at $T=30 \mu\text{Kelvin}$," C. Monroe, E. Cornell, C. Sackett, C. Myatt, and C. Wieman, *Phys. Rev. Lett.* **70**, 414 (1993).
4. "Multiply Loaded, AC Magnetic Trap for Neutral Atoms," E. Cornell, C. Monroe and C. Wieman, *Phys. Rev. Lett.* **67**, 2439 (1991).
3. "Observation of the Cesium Clock Transition using Laser-Cooled Atoms in a Vapor Cell," C. Monroe, H. Robinson and C. Wieman, *Opt. Lett.* **16**, 50 (1991).
2. "Very Cold Trapped Atoms in a Vapor Cell," C. Monroe, W. Swann, H. Robinson and C. Wieman, *Phys. Rev. Lett.* **65**, 1571 (1990).
1. "Collisional Losses from a Light Force Atom Trap," D. Sesko, T. Walker, C. Monroe, A. Gallagher and C. Wieman, *Phys. Rev. Lett.* **63**, 961 (1989).

Book Chapters, Conference Proceedings

20. "Quantum Simulation of Spin Models with Trapped Ions," C. Monroe, W. C. Campbell, E. E. Edwards, R. Islam, D. Kafri, S. Korenblit, A. Lee, P. Richerme, C. Senko, and J. Smith, Proceedings of the International School of Physics 'Enrico Fermi,' Course 189, Varenna, 2013, edited by M. Knoop, I. Marzoli, and G. Morigi (2014).
19. "Quantum Networks with Atoms and Photons," C. Monroe, W. Campbell, C. Cao, T. Choi, S. Clark, S. Debnath, C. Figgatt, D. Hayes, D. Hucul, V. Inlek, R. Islam, S. Korenblit, K. Johnson, A. Manning, J. Mizrahi, B. Neyenhuis, A. Lee, P. Richerme, C. Senko, J. Smith and K. Wright, *J. Phys. Conf. Ser.* **467**, 012008 (2013).
18. "Mode-locked laser driven gates for trapped ion quantum information processing" W. C. Campbell, C. Conover, D. Hayes, D. Hucul, D. N. Matsukevich, P. Maunz, J. Mizrahi, S. Olmschenk, Q. Quraishi, C. Senko, and C. Monroe, *Laser Spectroscopy XX*, W. Ertmer, ed. (World Scientific, 2011).
17. "Ion Trap Networking: Cold, Fast, and Small," D. L. Moehring, M. Acton, B. B. Blinov, K.-A. Brickman, L. Deslauriers, P. C. Haljan, W. K. Hensinger, D. Hucul, R. N. Kohn, P. J. Lee, M. J. Madsen, P. Maunz, S. Olmschenk, D. Stick, M. Yeo, and C. Monroe, *Laser Spectroscopy XVII*, E. Hinds, A. Ferguson, and E. Riis, eds. (World Scientific, 2005) pg. 421.
16. "What Quantum Computers Tell Us About Quantum Mechanics," Chapter 17 of *Science and Ultimate Reality: Quantum Theory, Cosmology, and Complexity* (Cambridge University Press, 2003).
15. *Experimental Quantum Computation and Information, Proceedings of the International School of Physics Enrico Fermi*, F. DeMartini and C. Monroe, eds. (North Holland, Amsterdam, 2002).
14. "Scalable Entanglement of Trapped Ions," C. Monroe, C. Sackett, D. Kielpinski, B. King, C. Langer, V. Meyer, C. Myatt, M. Rowe, Q. Turchette, W. Itano, and D. Wineland, in *Atomic Physics 17* (AIP, N.Y., 2001), pg 173.
13. "From Microscopic Towards Mesoscopic: Quantum State Engineering with Cold Trapped Ions," B. King, Q. Turchette, C. Myatt, C. Wood, D. Leibfried, D. Kielpinski, W. Itano, C. Monroe, and D. Wineland, in *Mesoscopic and Macroscopic Quantum Phenomena*, ed. by J.R. Friedman and S. Han (Nova, New York, 2000).
12. "Searches for anomalous interactions using trapped ions," D. J. Wineland, J. J. Bollinger, W. M. Itano, J. C. Bergquist, and C. Monroe, in *CPT and Lorentz Symmetry*, proc. of the First Meeting, Indiana University, Bloomington, November 1998, edited by V. A. Kostelecky (World Scientific, Singapore, 1999), p. 87-93.
11. "Quantum Logic with a Few Trapped Ions," C. Monroe, W. Itano, D. Kielpinski, B. King, D. Leibfried, C. Myatt, Q. Turchette, D. Wineland, and C. Wood, *Trapped Charged Particles and Fundamental Physics*, eds. D. Dubin and D. Schneider (American Inst. Phys., 1999), p. 378.
10. "Trapped ions, Entanglement, and Quantum Computing," C. Myatt, B. King, D. Kielpinski, D. Leibfried, Q. Turchette, C. Wood, W. Itano, C. Monroe, and D. Wineland, in *Methods of Ultrasensitive Detection*, SPIE conf. proc. 3270, p. 131 (1998).
9. "Entangled States of Atomic Ions for Quantum Metrology and Computation," D. Wineland, C. Monroe, D. Meekhof, B. King,

D. Leibfried, W. Itano, J. Bergquist, D. Berkeland, J. Bollinger, J. Miller, in *Atomic Physics XV* (World Scientific, Singapore, 1997), pg 31.

8. “Quantum Harmonic Oscillator State Synthesis and Analysis,” W. Itano, C. Monroe, D. Meekhof, D. Leibfried, B. King, and D. Wineland, in *Atom Optics*, SPIE vol. 2995 (1997).

7. “Experiments at NIST with Trapped Ions: 3-D Zero-Point Cooling, Quantum Gates, Bragg Scattering, and Atomic Clocks,” C. Monroe, A. Barton, J. Bergquist, D. Berkeland, J. Bollinger, F. Cruz, W. Itano, S. Jefferts, B. Jelenkovic, B. King, D. Meekhof, J. Miller, M. Poitzsch, J. Tan, and D. Wineland, in *Laser Spectroscopy XII* (World Scientific, 1996), pg. 179.

6. “Quantum-Mechanically Correlated States and Atomic Clocks,” C. Monroe, D. Meekhof, B. King, W. Itano, J. Bollinger, and D. Wineland, in *Dark Matter, Clocks, and Tests of Fundamental Laws*, (Editions Frontières, Gif-sur-Yvette, 1995), pg. 391.

5. “The Low Temperature Road toward Bose-Einstein Condensation in Optically and Magnetically Trapped Cesium Atoms,” C. Monroe, E. Cornell and C. Wieman, in *Laser Manipulation of Atoms and Ions, Proceedings of the International School of Physics Enrico Fermi* (North Holland, Amsterdam, 1992), pg. 361.

4. “Fundamental Physics with Optically Trapped Atoms,” C. Wieman, C. Monroe and E. Cornell, in *Laser Spectroscopy X* (World Scientific, Singapore, 1992), pg. 37.

3. “Curious Behavior of Optically Trapped Atoms,” C. Wieman, T. Walker, D. Sesko and C. Monroe, in *Atomic Physics XII* (Am. Instit. Phys., N.Y., 1991), pg 58.

2. “Collisional Loss Mechanisms in Light-Force Atom Traps,” T. Walker, D. Sesko, C. Monroe and C. Wieman, in *The Physics of Electronic and Atomic Collisions XVI* (Am. Instit. Phys., N.Y., 1990), pg. 593.

1. “Enhanced and Suppressed Visible Spontaneous Emission by Atoms in a Concentric Optical Resonator,” D. Heinzen, J. Childs, C. Monroe, and M.S. Feld, in *Laser Spectroscopy VIII* (Springer, Heidelberg, 1987), pg. 36.

Popular accounts of research covered by *Associated Press, Byte, CBS Evening News, CNN, the Christian Science Monitor, Tom Clancy, Discover, the Economist, FOX News, IEEE Spectrum, MSNBC, National Public Radio, Nature, New Scientist, New York Times, NOVA, Optics and Photonics News, Photonics Spectra, Physics Today, Physical Review Focus, Physics World, Popular Mechanics, Popular Science, Public Broadcasting System, Reuters, Science, Science News, Scientific American, Scientific Computing World, Scripps-Howard, Technology Review, Time, and Wired.*

(see www.iontrap.umd.edu/popular_press)

Colloquia and Seminars

Mar-17, “Quantum Simulations of Magnetism,” Penn State Univ., State College PA

Mar-17, “Quantum Computing with Atoms,” Penn State Univ., State College PA

Mar-17, “Quantum Computing,” Abilene Christian University, Abilene TX

Mar-17, “Building a Quantum Computer, Atom by Atom,” MIT, Cambridge, MA

Feb-17, “Building a Quantum Computer, Atom by Atom,” Indiana University, Bloomington, IN

Feb-17, “Quantum Computing with Atoms and Photons,” Indiana University Purdue Univ, Indianapolis, IN

Dec-16, “Quantum Computing with Atoms” Princeton University, Princeton, NJ

Nov-16, “Quantum Computing with Atoms,” Univ. Maryland, College Park, MD

Nov-16, “Quantum Computing with Atoms,” Colorado State Univ., Ft. Collins, CO

Oct-16, “Quantum Networks with Atoms” University of Delft, Netherlands

Oct-16, “Quantum Networks with Atoms” AFRL, Rome, NY

June-16, “Quantum Networks with Atoms” University of Ulm, Germany

Feb-16, “Quantum Computing and Simulation” Gunnar Källen Lecture, Lund University, Lund, Sweden

Feb-16, “Quantum Information with Trapped Ions,” University of Chicago, Hyde Park, IL

Feb-16, “Quantum Networks of Atoms,” Neils Bohr Institute, Copenhagen, Denmark

Jan-16, “Quantum Networks,” Ohio State University, Columbus, OH

Feb-16, “Quantum Networks of Atoms,” Duke University, Durham, NC

Sept-15, “Building A Quantum Computer With Trapped Ions,” Quantum Seminar, MIT, Cambridge, MA

Aug-15, “Quantum Information Science with Atoms,” Duke Univ., Durham, NC

Jun-15, “Building a Quantum Computer with Atoms,” IARPA Seminar, Arlington, VA

- May-15 “The Ion Trap Quantum Architecture,” Google, Inc., Los Angeles, CA
- Mar-15 “Quantum Networks with Ions,” University of Calgary (Calgary, Alberta)
- Jan-15 “Quantum Networks with Ions,” University of Wisconsin (Madison, WI)
- Dec-14 “Quantum Networks with Atoms,” University of Saarland (Saarbrücken, Germany)
- Nov-14 “Quantum Networks with Atoms,” Rice University (Houston, TX)
- Nov-14 “Quantum Networks with Atoms,” University of California at Santa Barbara (Santa Barbara, CA)
- Nov-14 “Quantum Networks with Atoms,” University of Southern California (Los Angeles, CA)
- Oct-14 “Synthesis of $(Yb^+)_{20}$ for Quantum Computing,” Univ. Maryland Chemistry Dept. (College Park, MD)
- June-14 “Quantum Information Science with Atoms,” Army Research Laboratory (Adelphi, MD)
- Feb-14 “Quantum Computing with Trapped Ions,” New York University (New York, NY)
- Feb-14 “Quantum Computing with Trapped Ions,” New York University (New York, NY)
- Feb-14 “Quantum Computing with Trapped Ions,” New York University (New York, NY)
- Jan-14 “Quantum Magnetism from the Bottom Up,” CQuIC Seminar, University of New Mexico (Albuquerque, NM)
- Jan-14 “Breaking Quantum Badness,” University of New Mexico (Albuquerque, NM)
- Jan-14 “Breaking Bad Ion Traps,” Sandia National Laboratory (Albuquerque, NM)
- Nov-13 “Quantum Networks of Atoms,” Syracuse University (Syracuse, NY)
- Oct-13 “Magnetism from the Bottom Up,” Harvard CUA Seminar (Cambridge, MA)
- May-13 “Magnetism from the Bottom Up,” ETH - Swiss Federal Inst. of Technology (Zurich, Switzerland)
- Mar-13 “Magnetism from the Bottom Up,” University of Pittsburgh (Pittsburgh, PA)
- Sept-12 “Quantum Simulation of Interacting Spins,” Yale University (New Haven, CT)
- Apr-12 “Quantum Networks with Trapped Ions,” SUNY (Stony Brook, NY)
- Mar-12 “Quantum Networks with Atoms,” Weizmann Institute (Rehovot, Israel)
- Mar-12 “Quantum Simulations of Magnetism,” UCLA (Los Angeles, CA)
- Mar-12 “Quantum Information Science,” Pomona College (Claremont, CA)
- Feb-12 “Quantum Simulations of Magnetism with Trapped Ions,” Univ. Colorado (Boulder, CO)
- Jan-12 “Quantum Networks with Atomic Memories,” CalTech (Pasadena, CA)
- Nov-11 “Quantum Information Science,” Washington-Virginia IEEE Optics Section (College Park, MD)
- Oct-11 “Quantum Networks with Trapped Atomic Ions,” TU Delft (Delft, Netherlands)
- Oct-11 “Quantum Simulation of Magnetism with Atoms,” Univ. Utrecht (Utrecht, Netherlands)
- Sept-11 “Quantum Simulation of Magnetism with Atoms,” Stevens Institute of Technology (Hoboken, NJ)
- Mar-11 “Quantum Control of Atoms,” Harvard University (Cambridge, MA)
- Jan-11 “Quantum Information Science,” Gettysburg College (Gettysburg, PA)
- Jan-11 “Quantum Networks,” University of British Columbia (Vancouver, BC)
- Jan-11 “Quantum Networks,” Simon Fraser University (Burnaby, BC)
- Jan-11 “Quantum Networks with Atoms and Photons,” Ohio State University (Columbus, OH)
- Oct-10 “Quantum Computation and Communication,” Naval War College (Newport, RI)
- May-10 “Quantum Networks of Atoms, Phonons, and Photons,” University of Washington (Seattle, WA)
- Mar-10 “Quantum Computing with Atoms,” George Washington University (Washington, DC)
- Mar-10 “Quantum Networks of Atoms, Phonons, and Photons,” Duke University (Durham, NC)
- Feb-10 “Quantum Networks of Atoms, Phonons, and Photons,” Notre Dame University (South Bend, IN)
- Nov-09 “Quantum Networks with Atoms, Phonons, and Photons,” MIT-Harvard Center for Ultracold Atoms (Cambridge, MA)
- Sept-09 “Quantum Networks with Atoms, Phonons, and Photons,” Univ. Maryland Baltimore County (Catonsville, MD)
- Jul-09 “Quantum Information with Individual Atoms,” Northrup-Grumman (Linthicum, MD)
- Apr-09 “Atomic Teleportation and Quantum Networks,” Univ. Illinois (Champaign, IL)
- Mar-09 “Trapped Ion Quantum Networks,” Inst. for Quant. Comp, Univ. Waterloo (Waterloo, Ont.)
- Mar-09 “Trapped Ion Quantum Networks,” York University (York, Ont.)
- Feb-08 “Quantum Networks with Atoms and Photons,” Univ. California (Berkeley, CA)
- Feb-08 “Trapped Ion Quantum Networks,” LANL Quantum Seminar (Los Alamos, NM)
- Oct-08 “Trapped Ion Quantum Networks,” University of Delaware (Newark, DE)

- Oct-08 “Quantum Information,” NSF Distinguished Lecture Series (Arlington, VA)
- Sept-08 “Trapped Ion Quantum Networks,” Army Research Laboratory (Adelphi, MD)
- Sept-08 “Quantum Computing with Trapped Ions,” Stevens Inst. of Tech. (Hoboken, NJ)
- July-08 “Trapped Ion Quantum Networks,” Max Planck Inst. for Quantum Optics (Garching, Germany)
- July-08 “Trapped Ion Quantum Networks,” University of Innsbruck and IQOQI (Innsbruck, Austria)
- Apr-08 “Quantum Networks and Atomic action-at-a-distance,” Michigan Tech. Univ. (Houghton, MI)
- Mar-08 “Quantum Computing with Atoms and Photons,” Univ. Central Florida (Orlando, FL)
- Feb-08 “Quantum Networks with Atoms,” Purdue Univ. (Lafayette, IN)
- Feb-08 “Integrated Atomic Quantum Networks,” Sandia National Laboratory (Albuquerque, NM)
- Feb-08 “Quantum Networks with Atoms,” Univ. New Mexico (Albuquerque, NM)
- Dec-07 “Quantum Networks and Atomic action-at-a-distance,” Univ. Maryland (College Park, MD)
- Dec-07 “Quantum Networks and Atomic action-at-a-distance,” Penn. State Univ. (State College, PA)
- Mar-07 “Quantum Information and Quantum Control,” Princeton University (Princeton, NJ)
- Feb-07 “Quantum Computing with Atoms and Photons,” Drexel University (Philadelphia, PA)
- Feb-07 “Quantum Computing with Atoms and Photons,” Miami University (Miami, OH)
- Dec-06 “Quantum Computing with Atoms and Photons,” Kansas State University (Manhattan, KA)
- Nov-06 “Quantum Computing with Atoms and Photons,” Iowa State University (Ames, IA)
- Nov-06 “Quantum Computers,” Albion College (Albion, MI)
- Sept-06 “Quantum Information Networking with Atoms and Photons,” Williams College (Williamstown, MA)
- Sept-06 “Quantum Computing” Hamilton College (Clinton, NY)
- Sept-06 “Quantum Information Networking with Atoms and Photons,” SUNY-Stonybrook (Stonybrook, NY)
- June-06, “Quantum Computing with Atoms,” University of Chicago (Chicago, IL)
- May-06, “Quantum Networking with Trapped Atomic Qubits,” Stanford University (Palo Alto, CA)
- Feb-06, “Quantum Networking with Trapped Ions,” Michigan State University (East Lansing, MI)
- Jan-06, “Quantum Networking with Trapped Ions,” MPQ Director’s Seminar (Garching, Germany).
- Dec-05, “The 2nd Quantum Revolution: Einstein in the 21st Century,” Univ. Michigan (Ann Arbor, MI)
- Nov-05, “Advanced Ion Traps and Ultrafast Quantum Gates” Harvard/MIT CUA (Cambridge, MA)
- Sept-05, “Quantum Computing with Individual Atoms,” Grinnell College (Grinnell, IA)
- Apr-05, “Quantum Computing with Atoms & Photons,” Univ. Maryland (College Park, MD)
- Apr-05, “Quantum Networks with Atoms and Photons,” Univ. Windsor (Windsor, Ont, Canada)
- Feb-05, “Microscale Ion Traps for Quantum Information,” Sandia Nat’l Lab. (Albuquerque, NM)
- Oct-04, “Quantum Computing and Communication with Atoms& Photons,” Washington Univ. (St. Louis, MO)
- Apr-04, “Atom-photon entanglement: the best of both quantum worlds,” Univ. Michigan (Ann Arbor, MI)
- Nov-03, “Entanglement between a single atom and photon,” University of Illinois (Champaign, IL)
- Nov-03, “Quantum Computing with Individual Atoms,” University of Buffalo (Buffalo, NY)
- Oct-03, “Quantum Computing and Schrodinger’s Cat,” St. Cloud State (St. Cloud, MN)
- Apr-03, “Quantum Computing with Trapped Ions,” University of Connecticut (Storrs, CT)
- Apr-03, “Quantum Computation and Schrodinger’s Cat,” University of North Carolina (Wilmington, NC)
- Dec-02, “Quantum Information and the Individual Atom,” University of Michigan (Ann Arbor, MI)
- Nov-02, “Quantum Computation and Schrodinger’s Cat,” Georgia Tech (Atlanta, GA)
- Nov-02, “Quantum Computing with individual atoms,” Rhodes College (Memphis, TN)
- Sept-02, “Quantum Computing with individual atoms,” Wayne State University (Detroit, MI)
- May-02, “Control of Trapped Ions for Quantum Information Science,” MIT (Cambridge, MA)
- May-02, “Quantum Computers,” St. Olaf College Annual Science Symposium (Northfield, MN)
- Apr-02, “Quantum Computing with individual atoms,” Western Illinois University (Macomb, IL)
- Mar-02, “Storing quantum information in individual atoms,” Lucent Dist. Lect. Series (Ann Arbor, MI)
- Nov-01, “Quantum Computers and Schrodinger’s Cat,” University of Virginia (Charlottesville, VA)
- Nov-01, “Quantum Computing with Individual Atoms,” William and Mary (Williamsburg, VA)
- Apr-01, “Quantum Computers,” University of Toledo (Toledo, OH)
- Mar-01, “Bell Inequality Violations with Perfect Detectors,” Harvard University (Cambridge, MA)
- Feb-01, “Quantum information Science,” Calvin College (Grand Rapids, MI)
- Nov-00, “Quantum Computing with Trapped Ions,” University of Texas (Austin, TX)

- Oct-00, “Negative Probabilities and the Wigner Function,” University of Michigan (Ann Arbor, MI)
- Oct-00, “Quantum Computing with individual atoms,” Argonne National Laboratory (Argonne, IL)
- Apr-00, “Quantum Computing with Trapped Ions,” Univ. of New Mexico (Albuquerque, NM)
- Apr-00, “Entanglement of Four Particles,” Santa Fe Institute (Santa Fe, NM)
- Mar-00, “Quantum Information Science,” Florida Atlantic Univ. (Boca Raton, FL)
- Mar-00, “Entanglement of Trapped ions and Quantum Computing,” Univ. of Michigan (Ann Arbor, MI)
- Feb-00, “Quantum Computation,” Amherst College “What’s New in Physics” colloquium (Amherst, MA)
- Feb-00, “Entanglement and Quantum Information Science,” Yale University (New Haven, CT)
- Jan-00, “Trapped Ion Quantum Computing,” University of Rochester (Rochester, NY)
- Oct-99, “Control of Trapped Ions for Quantum Computing,” Univ. California (Berkeley, CA)
- May-99, “The Ion Trap Quantum Computer,” National Security Agency (Fort Meade, MD)
- Apr-99, “Negative Probabilities, Quantum Entanglement, Schrodinger’s Cat,” Univ. California (San Diego, CA)
- Feb-99, “Quantum Logic Gates with Individual Atoms,” Colorado State University (Fort Collins, CO)
- Dec-98, “Quantum Computing and Schrodinger’s Cat,” Rice University (Houston, TX)
- Oct-98, “Negative Probabilities, Quantum Entanglement, Schrodinger’s Cat,” Indiana Univ. (Bloomington, IN)
- Sept-98, “Nonclassical States of the Harmonic Oscillator,” Stanford University, Stanford, CA
- Jul-98, “On-demand Entanglement for Quantum Info. Science,” Ecole Normal Supérieure (Paris, France)
- Mar-98, “Negative Probabilities,” Photonics Research Ontario (Toronto, ONT)
- Mar-98, “Quantum Computing and Schrodinger’s Cat,” University of Toronto (Toronto, ONT)
- Dec-97, “Quantum Entanglement and its Uses,” University of Rochester (Rochester, NY)
- Nov-97, “Quantum Computing,” University of Washington (Seattle, WA)
- Nov-97, “Negative Probabilities and Wigner Functions,” University of Colorado, JILA (Boulder, CO)
- Mar-97, “Quantum Computing,” Michigan State University (East Lansing, MI)
- Jan-97, “Quantum Computing with Trapped Atoms,” University of Michigan (Ann Arbor, MI)
- Jan-97, “Negative Probabilities, Quantum Entanglement, Schrodinger’s Cat,” Univ. of Wisc. (Madison, WI)
- Nov-96, “Quantum Information Science,” Northwestern University (Evanston, IL)
- Oct-96, “Quantum Computing with Individual Atoms,” University of Illinois (Champaign, IL)
- Oct-96, “Quantum Information, Schrodinger’s Cat, and All That,” MIT Dept. of Physics (Cambridge, MA)
- Oct-96, “Quantum Information Science,” University of Florida (Gainesville, FL)
- Sept-96, “Quantum Computing,” University of Wyoming (Laramie, WY)
- Aug-96, “Quantum Gates with Trapped Atomic Ions,” University of California (Santa Barbara, CA)
- May-96, “Quantum Entanglement and Quantum Optics,” Rocky Mountain Optical Soc. (Boulder, CO)
- Feb-96, “Quantum Computing with Individual Atoms,” University of Colorado (Boulder, CO)
- Nov-95, “The Ion Trap Quantum Computer,” IBM Almaden Labs (San Jose, CA)
- Jul-95, “Trapped Ion Tricks,” Los Alamos National Lab. (Los Alamos, NM)
- Mar-95, “Demonstration of a Quantum Logic Gate,” California Institute of Tech. (Pasadena, CA)
- Feb-95, “Entangling Quantum Logic Gates with Trapped Ions,” University of Connecticut (Storrs, CT)
- Feb-95, “Demonstration of a Quantum Logic Gate,” IBM Watson Laboratory (Yorktown Hts, NY)
- Feb-94, “Interactions between Cold Ions and Atoms,” University of Illinois at Chicago (Chicago, IL)

Invited Presentations at Meetings (including presentations by group members)

- Feb-17, The Royal Society, Workshop on the Breakdown of ergodicity in quantum systems (**P. Hess**)
- Jan-17, US Dept. of Energy Quantum Testbed Workshop, Washington DC
- Nov-16, KITP workshop on thermalization and many body localization, Santa Barbara, CA (**P. Hess**)
- Dec-16, conference on Quantum Simulations, Hsinchu, Taiwan (**G. Pagano**)
- Aug-16, 4th European Conference on Trapped Ions (ECTI), Arosa, Switzerland
- July-16, Int’l Conf. Atomic Physics (ICAP), Seoul, Korea
- July-16, Seoul Conf. on Frontiers of Quantum Information Science, Seoul, Korea
- June-16, Itzykson Conference on Quantum Many Body Systems, Saclay, France
- May-16, Symposium in Honor of Paul Benioff, Argonne National Laboratory, Argonne, IL

- Apr-16, Hamamatsu Quantum Optics Workshop, Hamamatsu, Japan
- Jan-16, Center for Ultracold Atoms, Winter Retreat, Plymouth, NH
- Dec-15, IBM ThinkQ Workshop on few-qubit Quantum Computers, Yorktown Heights, NY
- Nov 15, KITP Workshop on Many Body Localization, Santa Barbara, CA
- Oct 15, APS Mid-Atlantic Regional Annual Meeting, Plenary Speaker, Morgantown, WV
- Oct 15, Purdue Quantum Center Kickoff Workshop, West Lafayette, IN
- Oct 15, Frontiers in Quantum Information and Computer Science, QuICS Center, College Park, MD
- Sept 15, UK Quantum Hubs Annual Meeting, Oxford, UK
- Sept 15, US-Japan 12th Workshop on Quantum Electronics and Laser Spectroscopy, Madison, WI
- Sept 15, Workshop on Synthetic Magnetism, Max Planck Institute for Condensed Matter, Dresden, Germany
- Jun 15, Trustworthy Quantum Information Workshop, Univ. Michigan, Ann Arbor, MI
- Jun 15, International Conference on Rydberg Atoms, Durham, United Kingdom (**B. Neyenhuis**)
- Jun 15, APS DAMOP meeting, “Controlling Atomic Qubits with Lasers and Photon,” Columbus, OH
- Jun 15, ETH Workshop, “Quantum Magnetism with Trapped Ions,” Monte Verita, Switzerland (**P. Richerme**)
- May 15, KITP workshop on “Entanglement in Strongly-Correlated Quantum Matter,” Santa Barbara, CA
- Apr 15, SPIE meeting on Defense, Security, and Sensing, Baltimore, MD
- Jan-15, Center for Ultracold Atoms, Winter Retreat, Plymouth, NH
- Jan-15, “Building a Modular Quantum Computer with Trapped Ions,” SQUINT meeting, Berkeley, CA
- Dec 14, Workshop on Many-Body Quantum Systems, Bad Honnef, Germany
- Nov 14, US-Korea Workshop on Quantum Information Science, Los Angeles CA
- Oct 14, Quantum Optics VII (QO14), Mar del Plata, Argentina
- Oct 14, Workshop on Quantum Dynamics in Many-body Atomic Systems, Glasgow, Scotland
- Sept 14, Workshop on Long-Range Interacting Atomic Systems, Palaiseau, France
- July-14, Int’l Conf. Atomic Physics (ICAP), Washington DC (**P. Richerme**)
- July-14, Gordon Conference on Quantum Science, Stonehill, MA (**C. Senko and C. Monroe**)
- July-14, Int’l Conf. Atomic Physics (ICAP), Washington DC (**P. Richerme**)
- June-14, Adiabatic Quantum Computing (AQS-IV), Los Angeles CA
- June-14, APS Division of AMO Physics annual meeting, Madison, WI (**C. Senko and B. Neyenhuis**)
- Mar 14, Workshop on Quantum Information and Dynamics in Ion Traps (QION-14), Cartagena, Spain
- Mar-14, Workshop on Manybody Localization, Princeton University, NJ
- Mar-14, Harvard-ITAMP, Workshop on “Quantum Complexity,” Cambridge, MA
- Sept-14, Workshop on Quantum Simulations, Benasque, Spain
- Sept-13, Harvard-ITAMP, Workshop on “Quantum Applications with Trapped Ions,” Cambridge, MA (**P. Richerme**)
- Aug-13, Conference on Quantum Information and Quantum Control, Univ. Toronto, Toronto, Ontario
- Aug-13, Gordon Conference on Quantum Control, Mt. Holyoke College, MA (**B. Neyenhuis**)
- Aug-13, Gordon Conference on Atomic Physics, Salve Regina College, RI
- July-13, Quantum Information Processing and Computing Conference (QIPC) 2013, Florence, Italy (**S. Clark**)
- June-13, APS Division of AMO Physics annual meeting, Quebec, Canada (**C. Senko**)
- June-13, Tenth Rochester Conference on Coherence and Quantum Optics, Rochester, NY
- Apr-13, Workshop on Quantum Information and Dynamics in Ion Traps (QION-13), Obergurgl, Austria (**C. Senko**)
- Mar-13, Conference on Adiabatic Quantum Computing, London, UK (**Phil Richerme**)
- Feb-13, Southwestern Quantum Information Network, S. Barbara, CA (**Phil Richerme, Brian Neyenhuis**)
- Oct-12, Symposium on Quantum Foundations, University of Maryland
- Oct-12, Workshop on Quantum Simulations, Bilbao, Spain (**C. Senko**)
- Sept-12, Workshop on QIS in Computer and Natural Sciences, University of Maryland
- Sept-12, Royal Society International Scientific Seminar on Quantum Enhancements in Technology (Oxford, UK)
- Sept-12, 2nd European Conference on Trapped Ions (ECTI), Obergurgl, Austria
- Aug-12, Int’l Conf. on Quantum Foundation and Technology (ICQFT), Dunhuang, China
- Aug-12, Gordon Conference on Quantum Science, Mt. Holyoke College, MA

- July-12, Int'l Conf. Atomic Physics (ICAP), Palaiseau, France
- June-12, Quantum Foundations and Experiment, Vaxjo, Sweden (**S. Clark**)
- June-12, APS Division of AMO Physics annual meeting, Anaheim, CA (**R. Islam**)
- May-12, IonTech: Techniques for Trapped Ions, Siegen, Germany (**D. Hayes**)
- Mar-12, Workshop on Quantum Information and Dynamics in Ion Traps (QION-12), Tel Aviv, Israel
- Mar -12, 1st Workshop on Adiabatic Quantum Comp., Sandia National Laboratory, Albuquerque, NM (**E. Edwards**)
- Feb-12, International Conference on Quantum Optics, Obergurgl, Austria
- Oct-11, Workshop on Solid State Implementation of Quantum Information Hardware, Princeton, NJ
- Oct-11, Netherlands Physical Society Annual Meeting, Lunteren, Netherlands
- Oct-11, Fitzpatrick Optics Institute Annual Symposium, Duke University, Durham NC
- Oct-11, OSA meeting on Frontiers in Optics (FiO), San Jose, CA (**S. Clark**)
- Sept-11, Quantum Information Processing and Communication (QIPC), Zurich, Switzerland
- June-11, International Conference on Laser Spectroscopy ICOLS, Hannover, Germany (**W. Campbell**)
- May-11, European Workshop on Quantum Science and Technology, Trento, Italy
- May-11, German National Academy of Sciences Workshop on Quantum Technologies, Munich, Germany
- Mar-11, APS March Meeting, Dallas TX
- Mar-11, Workshop on Quantum Simulations, Benasque, Spain (**E. Edwards**)
- Feb-11, Ion Trap Technology Workshop, Boulder, CO
- Feb-11, Southwestern Quantum Information Network, Boulder, CO (**K. Kim**)
- Dec-10, Workshop on Foundations and Applications of Quantum Science, Univ. Vienna (Vienna, Austria)
- Sept-10, 1st European Ion Trap Workshop, Durham, UK
- Sept-10, Workshop on Quantum Decoherence, Benasque, Spain
- May-10, APS Division of AMO Physics annual meeting, Houston, TX (**S. Olmschenk, K. Kim, D. Hayes**)
- May-10, CLEO/QELS, San Jose, CA
- Mar-10, APS March Meeting, Portland, OR
- Feb-09, Southwestern Quantum Information Network, Seattle, WA (**D. Hayes**)
- Oct-09, OSA Annual Meeting – Frontiers in Optics, San Jose, CA (**P. Maunz**)
- Sep-09, Quantum Information Processing and Computing (QIPC), Rome, Italy
- Aug-09, Conference on Quantum Information and Quantum Control, Univ. Toronto, Toronto, Ontario
- July-09, Atomic Physics Gordon Conf., Tilton, NH
- May-09, CLEO/IQEC, Baltimore, MD (**D. Hayes**)
- May-09, CLEO/IQEC, Baltimore, MD (**K. Kim**)
- May-09, APS Division of AMO Physics annual meeting, Charlottesville, VA (**D. Matsukevich**)
- Mar-09, German Physical Society annual meeting (**P. Maunz**)
- Feb-09, Southwestern Quantum Information Network, Seattle, WA
- Feb-09, 2nd Workshop on Integrated Atomic Systems (IAS II), Seattle, WA (**S. Olmschenk**)
- Feb-09, Quantum Information with Atoms, Ions and Photons (EU Network Workshop), Cortina, Italy
- Nov-08, ITAMP Workshop on Open Quantum Systems, Cambridge, MA
- Aug-08, Gordon Conference on Quantum Information Science, Big Sky, MT (**D. Matsukevich**)
- May-08, APS Division of AMO Physics Annual Meeting, State College, PA (**D. Moehring, Thesis Prize**)
- May-08, Quantum Electronics and Laser Science (QELS), San Jose, CA (**D. Matsukevich**)
- Feb-08, Ultrafast and Ultracold Processes, Kibbutz Ein Gedi, Israel (**P. Maunz**)
- Nov-07, Workshop on Integrated Atomic Systems, Georgia Tech (Atlanta, GA)
- Sept-07, NEC Workshop on Quantum Communication (Princeton, NJ)
- Aug-07, Quantum Enabled Science and Technology (QUEST), Santa Fe, NM (**D. Stick**)
- Jul-07, Gordon Conference on Quantum Control, Salve Regina College, RI
- Jun-07, APS Division of AMO Physics Annual Meeting, Calgary, Alberta
- Jun-07, Workshop on Quantum Engineering with Neutral Atoms and Light, Herrsching, Germany (**P. Maunz**)
- Jun-07, Workshop on Fault-Tolerant Quantum Error Correction, Perimeter Institute, Waterloo, Ont.
- Jun-07, International Conference on Quantum Information, Rochester, NY
- May-07, Harvard-Smithsonian ITAMP Workshop of Hybrid Quantum Information, Cambridge, MA
- May-07, Plenary Speaker, US-Canada Cross Border Workshop, Toronto, Ontario
- Apr-07, Gordon Conference on Quantum Information Science, Pisa, Italy
- Mar-07 “Quantum Networking with Atoms & Photons,” JQI Symposium, College Park, MD

Mar-07, APS March Meeting, Denver, CO

Mar-07, Int'l Workshop on Measurement-Based Quantum Computing, Oxford, UK (**D. Moehring**)

Feb-07, CIAR Conference on Quantum Simulations, Vancouver, BC

Nov-06, IEEE-LEOS Annual Meeting, Montreal, Canada (**P. Maunz**)

Aug-06, Quantum Enabled Science and Technology (QUEST), Santa Fe, NM (**D. Moehring**)

Aug-06, "The Principles and Applications of Control in Quantum Systems," Harvard Univ., Cambridge, MA

July-06, IEEE-LEOS Topical on Quantum Communication Networks, Quebec City, Canada

Feb-06, Workshop on "Decoherence at the Crossroads," Vancouver, BC Canada (**L. Deslauriers**)

Feb-06, 2nd Int'l Workshop on Trapped Ion Quantum Computing, Boulder., CO

Feb-06, Southwestern Quantum Information Technology Annual Meeting, Albuquerque, NM (**P. Maunz**)

Nov-05, Hereaus Workshop: "The Photon-Generation, Detection and Application," Cologne, Germany

Nov-05, Midwestern Cold Atom Workshop, Champaign, IL (**Kathy-Anne Brickman**)

Nov-05, ARO-Harvard Workshop on Quantum Repeaters, Cambridge, MA

Oct-05, Optical Society of America Annual Meeting, Tucson, AZ (**M. Madsen, P. Lee**)

Aug-05, Quantum Enabled Science and Technology (QUEST), Santa Fe, NM (**L. Deslauriers**)

Jun-05, Gordon Conference on Atomic Physics, Tilton, NH (**P. Haljan**)

Jul-05, Hereaus Workshop: "Control of quantum correlations in tailored matter," Germany (**W. Hensinger**)

May-05, Quantum Physics of Nature: Theory, Experiment, and Interpretation, Vienna, Austria

May-05, APS Division of AMO Physics Annual Meeting, Lincoln, NE

Mar-05, Gordon Conference on Quantum Information Science, Ventura, CA (**P. Lee**)

Dec-04, National Academy of Sciences Frontiers of Science, "Quantum Metrology," Irvine, CA

Sept-04, Isaac Newton Programme on Quantum Information Theory, Cambridge, UK

Aug-04, Neils Bohr Symposium on Quantum Optics, Copenhagen, DK

Aug-04, Quantum Enabled Science and Technology (QUEST), Santa Fe, NM (**P. Haljan**)

Aug-04, 2nd Feynman Festival, College Park, MD (**W. Hensinger**)

Jun-04, FOCUS Workshop on Coherent Control Comp. Devices, Ann Arbor, MI

May-04, 1st Int'l Workshop on Trapped Ion Quantum Computing, Ann Arbor, MI

May-04, APS Division of AMO Physics annual meeting, Tucson, AZ (**B. Blinov**)

May-04, Harvard-Smithsonian ITAMP Mesoscopic Physics Workshop, Cambridge, MA

Apr-04, NIST Quantum Information Science and Emerging Technologies, Boulder, CO

Mar-04, QUEST European Network on Atoms/Ions as Qubits, Torino, Italy (**P. Haljan**)

Dec-03, European Union Focus Meeting on Few-Qubit Applications, Budmerice, Slovakia

Oct-03, Optical Society of America Annual Meeting, Tucson, AZ (**P. Haljan**)

Aug-03, Quantum Enabled Science and Technology (QUEST), Santa Fe, NM (**B. Blinov**)

Jul-03, European Network Meeting: Quantum Information Processing and Communication (QUIPC), Oxford, UK

Jun-03, Discussion Leader, Gordon Conference on Atomic Physics, Tilton School, NH

Jun-03, THINQC – NSA/ARDA Workshop on Theory in Quantum Computing, Harper's Ferry, WV

May-03, Quantum and Reversible Computation, Stony Brook, NY

May-03, Quantum Electronics and Laser Science, Baltimore, MD

Apr-03, APS Ohio Section Meeting, East Lansing, MI

Mar-03, Discussion Leader, Inaugural Gordon Conference on Quantum Information, Ventura, CA

Oct-02, External Invited Speaker, DOE Basic Energy Sciences Annual Meeting, Washington, DC

Oct-02, Optical Society of America Annual Meeting, Orlando, FL (**B. Blinov**)

Aug-02, Michigan Center for Theoretical Physics Wkshop on Quantum Decoherence, Ann Arbor, MI

Aug-02, Trapped Particles and Fundamental Interactions, Munich, Germany (**B. Blinov**)

Aug-02, Decoherence Control and Quantum Computing Workshop, Ann Arbor, MI

Jun-02, Neutral Atom Quantum Computing Workshop, NIST, Gaithersburg, MD

May-02, US-Canadian Cross-Border Workshop on Laser Science, Rochester, NY

Apr-02, Quantum Institute Inaugural, Michigan State University, East Lansing, MI

Mar-02, "Science and Ultimate Reality" symposium in honor of John A. Wheeler, Princeton, NJ

Nov-01, APS Southeastern Section Meeting, Charlottesville, VA

Jul-01, Quantum Applications Symposium, Ann Arbor, MI

Jul-01, Quantum Communication Measurement & Computing, Capri, Italy

Jun-01, National Academy of Sciences “Frontiers of Science,” Bad Homburg, Germany

Jun-01, APS Division of AMO Physics Annual Meeting, London, ONT

Jun-00, International Conference on Atomic Physics, Florence, Italy

Sept-99, NIST Director’s Workshop on Cryptography, Gaithersburg, MD

Jul-99, Gordon Conference on Atomic Physics, Plymouth, NH

May-99, Quantum Electronics and Laser Science, Baltimore, MD

Sept-98, Trapped Charged Particles and Fundamental Physics, Monterey, CA

Jul-98, Workshop on Quantum Computing, Benasque, Spain

Jun-98, Workshop on Quantum Control, Albuquerque, NM

May-98, SPIE Aerosense meeting, Orlando, FL

Nov-97, National Academy of Science “Frontiers of Science”, Irvine, CA

Oct-97, Optical Society of America Annual Meeting, Long Beach, CA

Aug-97, Harvard University Dept. of Physics and Smithsonian ITAMP, Cambridge, MA

Jul-97, Gordon Conference on Nonlinear Optics, Colby-Sawyer, NH

May-97, German Science Foundation (DFG) “Schwerpunktprogramm”, Bonn, Germany

May-97, Quantum Control Workshop, Albuquerque, NM

Mar-97, SPIE Optics in Computing, Incline Village, NV

Feb-97, AAAS Annual Meeting, Seattle, WA

Sept-96, European Science Foundation Quantum Optics Meeting, Castelvecchio, Italy

Jun-96, Quantum Electronics and Laser Science, Anaheim, CA

May-96, APS Division of AMO Physics Annual Meeting, Ann Arbor, MI

Oct-95, DARPA “ULTRA” Electronics Meeting, Boulder, CO

Sept-95, Optical Society of America Annual Meeting, Portland, OR

Jun-95, Twelfth International Conference on Laser Spectroscopy, Capri, Italy

Apr-95, American Chemical Society Annual Meeting, Anaheim, CA

Jan-95, Rencontres de Moriond, Villars, Switzerland

Apr-92, Quantum Electronics and Laser Science, Anaheim, CA

Lecture Series, Tutorials, Physics Schools

July-16, International Conference on Atomic Physics (ICAP), Seoul, Korea

July-16, Les Houches International School of Physics, Les Houches, France

Aug-12, Tsinghua University Quantum Summer School, Beijing, China

June-12, Institute for Quantum Computing Summer School on Quantum Information, Waterloo, Ont, Canada

June-12, APS Division of AMO Physics Annual Meeting Graduate Symposium, Anaheim, CA

May-12, Univ. Michigan 3rd Summer School on Quantum Physics, Ann Arbor, MI

Sept-11, Vienna Quantum Center Summer School, Vienna, Austria

Aug-10, Univ. Michigan 2nd Summer School on Quantum Physics, Ann Arbor, MI

Oct-09, School on the Physical Implementation of Quantum Information, Montreal, Quebec

Jun-08, Univ. Michigan Summer School on Quantum Physics, Ann Arbor, MI

May-08, Les Houches International School of Physics, Les Houches, France

Feb-06, 2nd Workshop on Trapped Ion Quantum Computing, Boulder, CO

Jan-05, Ohio State University, Frontiers of Spectroscopy Lecture Series, Columbus, OH

Aug-04, Neils Bohr Institute, Quantum Optics Summer School, Copenhagen, Denmark

Jul-04, Perimeter Institute Summer School on Quantum Information, Waterloo, Ont, Canada

May-02, APS Division of AMO Physics Annual Meeting Graduate Symposium, Williamsburg, VA

May-02, Cross Border Workshop on Laser Science, Rochester, NY

Jul-01, Enrico Fermi School of Physics, “Quantum Information,” Varenna, Italy

Mar-01, Les Houches International School of Physics, Chamonix, France

Nov-99, Sweden Autumn Physics School, Stockholm, Sweden

Aug-99, Co-Director, Southwestern Quantum Inf. Network (SQUINT) Summer School, Santa Barbara, CA

Mar-98, APS March Meeting Tutorial, Los Angeles, CA

Jan-96, Jorge Andre Swieca Summer School for Quantum Optics, Rio de Janeiro, Brazil

Public Lectures

Apr-17, Univ. Pittsburgh Quantum Institute Annual Symposium, Pittsburgh, PA

Mar-17, Penn State Univ. Marker Lecture, State College, PA
 Jan-17, UC-Berkeley CQCS Inaugural Symposium, Berkeley, CA
 Oct-16, Univ. Stuttgart Inaugural Symposium for the Stuttgart IQST Institute
 Feb-16, Gunnar Källén Lecture, University of Lund, Lund, Sweden
 Oct-15, Plenary Speaker, Optical Society of America Annual Meeting, “Quantum Computing with Light,” San Jose, CA
 Sept-14, MIT Alumni Club of Washington DC, “Quantum Computers,” Washington, DC
 Jan-14, Washington Area CTO roundtable, “Quantum Information Science,” Crystal City, VA
 Oct-13, Plenary Speaker, Optical Society of America Annual Meeting, “Quantum Computing,” Orlando, FL
 July-12, University of Maryland Kapell Piano Competition, “The Physics of the Piano”, College Park, MD
 Dec-10, Public Lecture, “Art and Quantum Physics,” Inauguration of the Vienna Quantum Center (Vienna, Austria)
 Sept-08, NIST Public Colloquium, “The Physics of Music” (Gaithersburg, MD)
 Mar-07, Saturday Morning Physics Public Lecture, “The Music of Quantum Physics,” University of Michigan
 Mar-07, Saturday Morning Physics Public Lecture, “The Physics of Music,” University of Michigan

Student and Postdoctoral Advisees

Research Scientists

5. Norbert Linke, Univ. Maryland (2017—)
4. Jason Amini, Univ. Maryland (2016—)
3. Marko Cetina, Univ. Maryland (2015—)
2. Kai Hudek, Univ. Maryland (2015—)
1. Jonathan Mizrahi, Univ. Maryland (2015-2016)

Postdoctoral Researchers

32. Michael Goldman, JQI and Univ. Maryland (2017—)
31. Kristin Beck, JQI and Univ. Maryland (2016—)
30. Steven Moses, JQI and Univ. Maryland (2016—)
29. Guido Pagano, JQI and Univ. Maryland (2015—)
28. Martin Lichtman, JQI and Univ. Maryland (2015—)
27. Jiehang Zhang, JQI and Univ. Maryland (2015—)
26. Norbert Linke, JQI and Univ. Maryland (2015-2017)
25. Paul Hess, JQI and Univ. Maryland (2014—)
24. Grahame Vittorini, JQI and Univ. Maryland (2013—) – physicist, Honeywell, Inc.
23. Brian Neyenhuis, JQI and Univ. Maryland (2012—) – physicist, Lockheed, Inc.
22. Phil Richerme, JQI and Univ. Maryland (2012—) – Asst. Prof., Indiana University
21. Chenglin Cao, JQI and Univ. Maryland (2012-2013) – postdoc, Penn State University
20. Taeyoung Choi, JQI and Univ. Maryland (2011-2014) – physicist, IBM-Almaden
19. Susan Clark, JQI and Univ. Maryland (2010-2013) – Staff scientist, Sandia National Laboratories
18. Emily Edwards, JQI and Univ. Maryland (2009-2011) – Director of Scientific outreach, JQI
17. Qudsia Quraishi, JQI and Univ. Maryland (2008-2010) – Staff Scientist, Army Res. Laboratory, Adelphi, MD
16. Le Luo, JQI and Univ. Maryland (2008-2011) – Asst. Prof., Indiana Univ. Purdue Univ. Indianapolis, IN
15. Wesley Campbell, JQI and Univ. Maryland (2008-2012) – Asst. Prof, UCLA
14. Kihwan Kim, JQI and Univ. Maryland (2008-2011) – Asst. Prof., Tsinghua Univ, Beijing, China
13. Dzmitry Matsukevich, Univ. Michigan/Maryland (2006—) – Asst. Prof., National Univ. Singapore
12. Ming-Shien Chang, Univ. Michigan/Maryland (2006-2009) – Asst. Prof., Academia Sinica, Taipei, Taiwan
11. Peter Maunz, Univ. Michigan/Maryland (Postdoc: 2005-2008; Research Scientist: 2009)
10. Paul Haljan, Univ. Michigan (2003-2005) – Asst. Prof., Simon Fraser Univ. (Canada)
9. Winfried Hensinger, Univ. Michigan (2003-2005) – Asst. Prof., Univ. Sussex (U.K.)
8. Boris Blinov, Univ. Michigan (2001-2005) – Asst. Prof., Univ. Washington
7. Mary Rowe, NIST (1999-2000) – Staff physicist, NIST
6. Quentin Turchette, NIST (1997-2000) – Physicist, Research Electrooptics (Boulder, CO)
5. Cass Sackett, NIST (1997-2000) – Assoc. Prof, Univ. Virginia
4. Christopher Wood, NIST (1996-1998) – Optical Physicist, Network Photonics (Boulder, CO)
3. Christopher Myatt, NIST (1996-1998) – CEO and Founder, Precision Photonics Inc. (Boulder, CO)
2. Dietrich Leibfried, NIST (1995-1997) – Staff physicist, NIST (Boulder, CO)
1. Dawn Meekhof, NIST (1994-1997) – Physicist (Seattle, WA)

Graduate Students

40. Tuan Nguyen, Univ. Maryland (2016–)
39. Wen-Lin Tan, Univ. Maryland (2016–)
38. Allison Carter, Univ. Maryland (2016–)
37. Patrick Becker, Univ. Maryland (2016–)
36. Daiwei Zhu, Univ. Maryland (2016–)
35. Antonis Kyprianidis, Univ. Maryland (2015–)
34. Kevin Landsmann, Univ. Maryland (2015–)
33. Ksenia Sosnova, Univ. Maryland (2015–)
32. Chris Rickerd, Univ. Maryland (2014-2016)
31. Alexis Parsagian, Univ. Maryland (2014-2016)
30. Harvey Kaplan, Univ. Maryland (2014–)
29. Clayton Crocker, Univ. Maryland (2013–)
28. David Campos, Univ. Maryland (2013–)
27. Caroline Figgatt, Univ. Maryland (2012–)
26. Ken Wright, Univ. Maryland (2012–)
25. Aaron Lee, Univ. Maryland (2012–2016) – Northrup Grumman, Inc.
24. Ismail Inlek, Univ. Maryland (2011–2016) - postdoc with Jungsang Kim (Duke)
23. Kale Johnson, Univ. Maryland (2011–2016) – postdoc with Jack Harris (Yale)
22. Jake Smith, Univ. Maryland (2011–2016) – postdoc at Sandia National Laboratories
21. Shantanu Debnath, Univ. Maryland (2010–2016) – postdoc with Dan Stamper-Kurn (UC Berkeley)
20. David Hucul, Univ. Maryland (2009–2015) – postdoc with Wes Campbell (JILA/Univ. of Colorado)
19. Crystal Senko, Univ. Maryland (2009–2014) – Asst. Prof, University of Waterloo Dept of Physics
18. Jonathan Mizrahi, Univ. Maryland (2008–2014) – postdoc at Sandia National Laboratories
17. Andrew Manning, Univ. Maryland (2007– 2013) – Northrup Grumman, Inc.
16. Simcha Korenblit, Univ. Michigan/Maryland (2006–2013) – postdoc with N. Katz (Hebrew University, Israel)
15. Rajibul Islam, Univ. Maryland (2007-2012) – Asst. Prof, University of Waterloo Dept of Physics
14. David Hayes, Univ. Maryland (2007-2012) – physicist at Lockheed Martin
13. Yisa Rumala, Univ. Michigan (2006-2007) – grad. student with A. Leanhardt (U. Michigan)
12. Kelly Younge, Univ. Michigan (2005-2007) – grad. student with G. Raithel (U. Michigan)
11. Jon Sterk, Univ. Michigan/Maryland (2005-2010) – physicist at Sandia National Laboratory
10. Steven Olmschenk, Univ. Michigan/Maryland (2004-2009) – Asst. Prof., Denison University
9. Mark Acton, Univ. Michigan (2003-2007) – science teacher at Deerfield Academy, MA
8. Daniel Stick, Univ. Michigan (2002-2007) – physicist at Sandia National Laboratory
7. Kathy-Anne Brickman, Univ. Michigan (2002-2007) – physicist at Air Force Research Laboratory, Rome NY
6. David Moehring, Univ. Michigan (2002-2007) – CEO, ionQ, Inc.
5. Martin Madsen, Ph.D., Univ. Michigan (2002-2006) – Asst. Prof., Wabash College, IN
4. Louis Deslauriers, Ph.D., Univ. Michigan (2001-2005) – research scientist at Harvard University
3. Patricia Lee, Ph.D., Univ. Michigan (2000-2005) – engineer at Lockheed Martin, Inc.
2. David Kielpinski, Ph.D., Univ. Colorado (1994-1999; with D. Wineland) – Asst. Prof., Griffith Univ. (Australia)
1. Brian King, Ph.D., Univ. Colorado (1994-1999; with D. Wineland) – Asst. Prof., McMaster Univ. (Canada)

Undergraduate Students

16 undergraduates and 2 high school students hosted in laboratory in past ten years.