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Date of Birth: October 18, 1971 (United States citizen)

Education

Graduate: 1998 Ph.D. in Physics, California Institute of Technology

Undergrad: 1992 A.B. in Physics, Magna cum laude, Princeton University

Academic appointments

- 2007 – Professor of Applied Physics, Stanford University
2010 – 2016 Chair, Department of Applied Physics, Stanford University
2001 – 2007 Associate Professor of Physics and Control & Dynamical Systems,
California Institute of Technology
1998 – 1999 Visiting Fellow in Chemistry, Princeton University
1998 – 2001 Assistant Professor, California Institute of Technology

Selected awards (research)

- 2020 Pittsburgh Quantum Institute Distinguished Lectureship (inaugural)
2012 Institute for Systems Research Distinguished Lectureship, University of Maryland
2006 Institute of Optical Sciences Distinguished Visiting Scientist, University of Toronto
2002 Mohammed Dahleh Distinguished Lectureship, UCSB (inaugural)
2000 – 2005 John D. and Catherine T. MacArthur Foundation Fellowship
2000 Discover Magazine's Twenty Scientists to Watch in the Next Twenty Years
2000 – 2003 Office of Naval Research Young Investigator Award
1999 – 2001 A. P. Sloan Fellowship
1999 Technology Review Magazine's top 100 young innovators

Selected invited talks

- 2022 Silicon Valley Japan Platform Annual Meeting, Half Moon Bay
2022 OFC, San Diego
2021 SPIE Photonics West, San Francisco
2019 Quantum Science, Engineering and Technology Conference (keynote), Canberra
2019 Coherent Neural Network Conference, Atsugi
2016 IEEE Conference on Rebooting Computing (keynote), San Diego
2015 Technical seminars at Amazon, Google, Qualcomm
2011 American Chemical Society Fall Meeting (Single-Molecule Biophysics), Denver
2011 Ecole de Physique des Houches, Series of six lectures (Quantum Control)

Outreach and synergistic activities

Panelist, "The Future of the Universe Science Fiction Film Festival" (1/01, Caltech); Invited participant, "Colloquium on Museums and the Community of Children" (6/01, Children's Museum of Los Angeles); Speaker, Watson Public Lecture Series (11/01, Caltech); Organizing Committee for 8th Annual NAE Symposium on Frontiers of Engineering; Panelist, Los Angeles Philharmonic's *Upbeat Live!* Series (4/02); Greenwall Foundation panel on "Gene Patents, Scientific Inquiry, and the Cultural Imagination" (11/05); Inaugural Chair of the APS Topical Group on Quantum Information, Concepts and Computation (05-06); Scripps College Humanities Core Curriculum External Review Committee (07-08); Program Co-Chair, QELS 2010, and General Co-Chair, CLEO 2012; Inaugural editorial board, Quantum Science and Technology (IOP); Panelist, MacArthur Foundation and Getty Museum event "Ways of Seeking: Art, Science and Spirituality" (12/16); Panelist, MacArthur x BGC "What is Research?" (11/19)

Academic service (current)

H&S Natural Sciences Curriculum Committee; Making@Stanford ExComm; Breadth Governance Board (as Vice Chair); Public Art Committee

Undergraduate courses

Stanford University: ARTHIST284/484, with Marci Kwon, **Material Metonymy: Ceramics and Asian America** (Spr 2023); JAPAN126/226, with Ariel Stilerman and Craig Milroy, **Japanese Functional Objects**; APPPHYS100Q **Indigo**; ARTHIST206, with Fabio Barry, **The alchemy of art: substance and transformation in artistic practice**; APPPHYS100B **The questions of cloth: weaving, pattern complexity and structures of fabrics**; APPPHYS189 **Physical Analysis of Artworks**; ANTHRO188, with I. Hodder, **Matter and Mattering: Transdisciplinary Thinking about Things**; OSPKYOTO18 **Ceramic Art and Technology, from Ancient to Modern**; APPPHYS100 **The questions of clay: craft, creativity and scientific process**; APPPHYS010AX, with D. Fuzzell, **The expressive vessel: an immersive introduction to clay**

Caltech: CDS101 **Design and analysis of feedback systems**; CDS 110a **Introductory control theory**; Physics 12c **Statistical mechanics**; Physics 196 **Introduction to dynamical systems and analytic mechanics**; Physics 195 **Intensive quantum mechanics**; Physics 125 **Quantum mechanics**

Graduate courses

Stanford University: APPPHYS225 **Probability and quantum mechanics**; APPPHYS217 **Estimation and control methods for applied physics**; APPPHYS206, with D. Fisher, **Dynamical systems: Linear, nonlinear and stochastic**; APPPHYS376, with A. Safavi-Naeini, **Literature of cavity QED and cavity optomechanics**; APPPHYS473b, with A. Kapitulnik, **Quantum matter meets quantum optics**; APPPHYS203, with P. Bucksbaum, **Atoms, fields and photons**; APPPHYS202, with Y. Yamamoto, **Quantum probability and quantum information**; APPPHYS383 **Introduction to atomic processes**; APPPHYS227, with Y. Yamamoto **Quantum device physics of atomic and semiconductor systems**; APPPHYS376 **Literature of cavity quantum electrodynamics**. Caltech: Physics 225 **Advanced quantum mechanics**; CDS273 **Frontiers in control and dynamical systems**; CDS140a **Introduction to dynamics**

Extracurricular projects (selected)

- 2018 “Hand and Eye: Contemporary Reflections of East Asian Ceramic Traditions” – lead curator
- 2017 “The Red and the Black: Art and Science of Iron-Bearing Ceramic Surfaces” – lead organizer
- 2015 MacArthur Fellows meeting on art, science and craft – co-organizer with Joan Abrahamson
- 2005 Caltech/AFOSR/NSF/ARO Quantum Control Summer School – lead organizer
- 2004 Caltech Computing Beyond Silicon Summer School – subject coordinator
- 2003 MacArthur Fellows meeting on science and literature – co-organizer with Joan Abrahamson
- 2001 Special summer project on Scientific Creativity and Digital Media, co-sponsored by the USC Multimedia Literacy Project and Caltech’s SURF program

Invited lectures outside academic physics (selected)

- 2022 Auerglass and Friends, SFMoMA performance event (lecturer)
- 2022 Science as Art, Union of Concerned Scientist virtual panel (panelist)
- 2018 Shared Ground: Cross-Disciplinary Approaches to Craft Studies symposium presented by Bard Graduate Center, the Center for Craft, and the Museum of Arts and Design (panelist), New York
- 2016 Leonardo Art/Science Evening Rendezvous: University of San Francisco
- 2015 Americans for the Arts Annual Convention (keynote panelist)
- 2010 Gordon Conference on Research and Education in Physics: Experimental Research and Labs
- 2002 2nd John Seely Brown Symposium on Technology and Society, Ann Arbor
- 2002 Gordon Conference on Research and Education in Physics: Quantum Mechanics, Mt. Holyoke

Teaching awards

- 2015 Hoagland Award for Curricular Innovation (Vice Provost for Undergraduate Education, Stanford)
- 2000 Classroom Teaching Award (Graduate Student Council, Caltech)

arXiv manuscripts (4)

1. “Broadband Parametric Downconversion as a Discrete-Continuum Fano Interaction,” R. Yanagimoto, E. Ng, M. P. Jankowski, T. Onodera, M. M. Fejer and H. Mabuchi, arXiv:2009.01457.
2. “Efficient entangled-pulse generation inside a coherent Ising machine by means of measurement feedback,” R. Yanagimoto, P. L. McMahon, T. Onodera, E. Ng and H. Mabuchi, arXiv:1906.04902.
3. “Nonlinear optical response of a local surface plasmon coupled to a 2D material,” D. B. Soh, R. Yanagimoto, E. Chatterjee and H. Mabuchi, arXiv:1902.06943.
4. “Factorization of Linear Quantum Systems with Delayed Feedback,” G. Tabak, R. Hamerly and H. Mabuchi, arXiv:1803.01539.

Publications in refereed journals (133)

1. “Quantum nondemolition measurements with optical parametric amplifiers for ultrafast universal quantum information processing,” R. Yanagimoto, R. Nehra, R. Hamerly, E. Ng, A. Marandi and H. Mabuchi, PRX Quantum **4**, 010333 (2023).
2. “Degenerate optical parametric amplification in CMOS silicon,” D. Heydari, M. Catuneanu, E. Ng, D. J. Gray Jr., R. Hamerly, J. Mishra, M. Jankowski, M. M. Fejer, K. Jamshidi and H. Mabuchi, Optica **10**, 430 (2023).
3. “Temporal trapping of ultrashort pulses enables deterministic optical quantum computation,” R. Yanagimoto, E. Ng, M. Jankowski, H. Mabuchi and R. Hamerly, to appear in Optica (2022).
4. “Onset of non-Gaussian quantum physics in pulsed squeezing with mesoscopic fields,” R. Yanagimoto, E. Ng, A. Yamamura, T. Onodera, L. G. Wright, M. Jankowski, M. M. Fejer, P. L. McMahon and H. Mabuchi, Optica **9**, 379 (2022).
5. “Laser-induced patterning of the diffraction grating for X-ray Optics,” J. Park, P. Zalden, E. Ng, S. Johnston, S. W. Fong, C. Chang, C. J. Tassone, D. Van Campen, W. Mok, M. J. Rooks, H. Mabuchi, H.-S. P. Wong, E. Pop, Z.-X. Shen, A. M. Lindenberg and A. Sakdinawat, Opt. Mat. Express **12**, 1408 (2022).
6. “Nonlinear quantum behavior of ultrashort-pulse optical parametric oscillators,” T. Onodera, E. Ng, C. Gustin, N. Lörch, A. Yamamura, R. Hamerly, P. L. McMahon, A. Marandi and H. Mabuchi, Phys. Rev. A **105**, 033508 (2022).
7. “Efficient sampling of ground and low-energy Ising spin configurations with a coherent Ising machine,” E. Ng, T. Onodera, S. Kako, P. McMahon, H. Mabuchi and Y. Yamamoto, Phys. Rev. Research **4**, 013009 (2022).
8. “Efficient simulation of ultrafast quantum nonlinear optics with matrix product states,” R. Yanagimoto, E. Ng, L. G. Wright, T. Onodera and H. Mabuchi, Optica **8**, 1306 (2021).
9. “Mid-infrared nonlinear optics in thin-film lithium niobate on sapphire,” J. Mishra, T. P. McKenna, E. Ng, H. S. Sotkowski, M. Jankowski, C. Langrock, D. Heydari, H. Mabuchi, M. M. Fejer and A. H. Safavi-Naeini, Optica **8**, 921-924 (2021).
10. “Coherent Ising Machines—Quantum optics and neural network perspectives,” Y. Yamamoto, T. Leleu, S. Ganguli and H. Mabuchi, Appl. Phys. Lett. **117**, 160501 (2020).
11. “Thermo-optic multistability and relaxation in silicon microring resonators with lateral diodes,” D. Gray, R. Hamerly, M. Namdari, M.-T. Cătuneanu, K. Jamshidi, N. Bogdanowicz and H. Mabuchi, Phys. Rev. Applied **14**, 024073 (2020).

Publications in refereed journals (continued)

12. "Engineering a Kerr-based Deterministic Cubic Phase Gate via Gaussian Operations," R. Yanagimoto, T. Onodera, E. Ng, L. G. Wright, P. L. McMahon and H. Mabuchi, *Phys. Rev. Lett.* **124**, 240503 (2020).
13. "Coherent control of two-dimensional excitons," C. Rogers, D. Grey Jr., N. Bogdanowicz, T. Taniguchi, K. Watanabe and H. Mabuchi, *Phys. Rev. Research* **2**, 012029(R) (2020).
14. "Low-temperature annihilation rate for quasilocalized excitons in monolayer MoS₂," E. Chatterjee, D. B. Soh, C. Rogers, D. J. Gray Jr. and H. Mabuchi, *Phys. Rev. B* **100**, 155405 (2019).
15. "Adiabatic Fock-state-generation scheme using Kerr nonlinearity," R. Yanagimoto, E. Ng, T. Onodera and H. Mabuchi, *Phys. Rev. A* **100**, 033822 (2019).
16. "Integrated Coherent Ising Machines Based on Self-Phase Modulation in Microring Resonators," N. Tezak, T. Van Vaerenbergh, J. S. Pelc, G. J. Mendoza, D. Kielpinski, H. Mabuchi and R. G. Beausoleil, *IEEE J. Sel. Top. Quantum Electron.* **26**, 5900115 (2020).
17. "Experimental investigation of performance differences between Coherent Ising Machines and a quantum annealer," R. Hamerly, T. Inagaki, P. L. McMahon, D. Venturelli, A. Marandi, T. Onodera, E. Ng, C. Langrock, K. Inaba, T. Honjo, K. Enbutsu, T. Umeki, R. Kasahara, S. Utsunomia, S. Kako, K. Kawarabayashi, R. L. Byer, M. M. Fejer, H. Mabuchi, D. Englund, E. Rieffel, H. Takesue and Y. Yamamoto, *Science Advances* **5**, eaau0823 (2019).
18. "Scanning microwave imaging of optically patterned Ge₂Sb₂Te₅," S. R. Johnston, E. Ng, S. W. Fong, W. Y. Mok, J. Park, P. Zalden, A. Sakdinawat, H.-S. P. Wong, H. Mabuchi and Z.-X. Shen, *Appl. Phys. Lett.* **114**, 093106 (2019).
19. "Self-oscillation in the Maxwell-Bloch Equations," J. Wu and H. Mabuchi, *J. Opt. Soc. Am. B* **35**, 2382 (2018).
20. "Laser annealing of radiatively broadened MoSe₂ grown by chemical vapor deposition" C. M. Rogers, Dodd Gray, N. Bogdanowicz and H. Mabuchi, *Phys. Rev. Materials* **2**, 093002 (2018).
21. "Mechanism of stochastic switching in single-atom absorptive bistability," J. Wu and H. Mabuchi, *Phys. Rev. A* **98**, 013812 (2018).
22. "Measurement of Mesoscale Conformational Dynamics of Freely Diffusing Molecules with Tracking FCS," C. Limouse, J. C. Bell, C. J. Fuller, A. F. Straight and H. Mabuchi, *Biophys. J.* **114**, 1539 (2018).
23. "Optical nonlinearities of excitons in monolayer MoS₂," D. B. Soh, C. Rogers, D. J. Gray, E. Chatterjee and H. Mabuchi, *Phys. Rev. B* **97**, 165111 (2018).
24. "Single-molecule fluorescence reveals commonalities and distinctions among natural and in vitro-selected RNA tertiary motifs in a multi-step folding pathway," S. Bonilla, C. Limouse, N. Bisaria, M. Gebala, H. Mabuchi and D. Herschlag, *J. Am. Chem. Soc.* **139**, 18576 (2017).
25. "Low-dimensional manifolds for exact representation of open quantum systems," N. Tezak, N. H. Amini and H. Mabuchi, *Phys. Rev. A* **96**, 062113 (2017).
26. "Quantitative tests of a reconstitution model for RNA folding thermodynamics and kinetics," N. Bisaria, M. Greenfeld, C. Limouse, H. Mabuchi and D. Herschlag, *Proc. Nat. Acad. Sci USA* **114**, E7688 (2017).

Publications in refereed journals (continued)

27. "Orientation-resolved domain mapping in tetragonal SrTiO₃ using polarized Raman spectroscopy," D. J. Gray Jr., T. A. Merz, Y. Hikita, H. Y. Hwang and H. Mabuchi, *Phys. Rev. B* **94**, 214107 (2016).
28. "Reduced models and design principles for half-harmonic generation in synchronously-pumped optical parametric oscillators," R. Hamerly, A. Marandi, M. Jankowski, M. M. Fejer, Y. Yamamoto and H. Mabuchi, *Phys. Rev. A* **94**, 063809 (2016).
29. "A fully programmable 100-spin coherent Ising machine with all-to-all connections," P. L. McMahon, A. Marandi, Y. Haribara, R. Hamerly, C. Langrock, S. Tamate, T. Inagaki, H. Takesue, S. Utsunomiya, K. Aihara, R. L. Byer, M. M. Fejer, H. Mabuchi and Y. Yamamoto, *Science* **354**, 614 (2016).
30. "Comprehensive analysis of the optical Kerr coefficient of graphene," D. B. S. Soh, R. Hamerly and H. Mabuchi, *Phys. Rev. A* **94**, 023845 (2016).
31. "A Kinetic and Thermodynamic Framework for P4-P6 RNA Folding Reveals a Modulation of the Preferred Pathway and Tertiary Motif Modularity," N. Bisaria, M. Greenfeld, C. Limouse, D. Pavlichin, H. Mabuchi and D. Herschlag, *Proc. Nat. Acad. Sci. USA* **113**, E4956 (2016).
32. "Topological defect formation in 1D and 2D spin chains realized by network of optical parametric oscillators," R. Hamerly, K. Inaba, T. Inagaki, H. Takesue, Y. Yamamoto, H. Mabuchi, *Int. J. Mod. Phys. B* **30**, 1630014 (2016).
33. "Trapped Optical Cavity Modes in Linear Quantum Stochastic Networks with Delays," G. Tabak and H. Mabuchi, *EPJ Quantum Technology* **3**:3 (2016).
34. "All-mechanical quantum noise cancellation for accelerometry: broadband with momentum measurements, narrow band without," K. Jacobs, N. Tezak, H. Mabuchi and R. Balu, *J. Opt.* **18**, 034002 (2016).
35. "Protein flexibility is required for vesicle tethering at the Golgi," P.-Y. P. Cheung, C. Limouse, H. Mabuchi and S. R. Pfeffer, *eLife* 10.7554/eLife.12790 (2015).
36. "Optical devices based on limit cycles and amplification in semiconductor optical cavities," R. Hamerly and H. Mabuchi, *Phys. Rev. Applied* **4**, 024016 (2015).
37. "Quantum noise of free-carrier dispersion in semiconductor optical cavities," R. Hamerly and H. Mabuchi, *Phys. Rev. A* **92**, 023819 (2015).
38. "A coherent perceptron for all-optical learning," N. Tezak and H. Mabuchi, *EPJ Quantum Technology* **2**:10 (2015).
39. "Photonic circuits for iterative decoding of a class of low-density parity check codes," D. S. Pavlichin and H. Mabuchi, *New J. Phys.* **16**, 105017 (2014).
40. "Quantum noise in large-scale coherent nonlinear photonic circuits," C. Santori, J. S. Pelc, R. G. Beausoleil, N. Tezak, R. Hamerly and H. Mabuchi, *Phys. Rev. Applied* **1**, 054005 (2014).
41. "Calculation of divergent photon absorption in ultrathin films of a topological insulator," J. Wang, H. Mabuchi and X.-L. Qi, *Phys. Rev. B* **88**, 195127 (2013).
42. "Femtojoule-scale all-optical latching and modulation via cavity nonlinear optics," Y.-D. Kwon, M. A. Armen and H. Mabuchi, *Phys. Rev. Lett.* **111**, 203002 (2013).
43. "Squeezed light in an optical parametric oscillator network with coherent feedback quantum control," O. Crisafulli, N. Tezak, D. B. S. Soh, M. A. Armen and H. Mabuchi, *Opt. Express* **21**, 18371 (2013).
44. "Gauge subsystems, separability, and robustness in autonomous quantum memories," G. Sarma and H. Mabuchi, *New J. Phys.* **15**, 035014 (2013).

Publications in refereed journals (continued)

45. "Transformation of quantum photonic circuit models by term rewriting," G. Sarma, R. Hamerly, N. Tezak, D. S. Pavlichin and H. Mabuchi, *IEEE Photonics* **5**, 7500111 (2013).
46. "Coherent controllers for optical-feedback cooling of quantum oscillators," R. Hamerly and H. Mabuchi, *Phys. Rev. A* **87**, 013815 (2013).
47. "Advantages of coherent feedback for cooling quantum oscillators," R. Hamerly and H. Mabuchi, *Phys. Rev. Lett.* **109**, 173602 (2012).
48. "Specification of photonic circuits using Quantum Hardware Description Language," N. Tezak, A. Niederberger, D. S. Pavlichin, G. Sarma and H. Mabuchi, *Phil. Trans. Roy. Soc. A* **370**, 5270-5290 (2012).
49. "Single Molecule Analysis Research Tool (SMART): An integrated approach for analyzing single molecule data," M. Greenfeld, D. S. Pavlichin, H. Mabuchi and D. Herschlag, *PLoS ONE* **7**(2): e30024 (2012).
50. "Qubit limit of cavity nonlinear optics," H. Mabuchi, *Phys. Rev. A* **85**, 015806 (2012).
51. "Remnants of semiclassical bistability in the few-photon regime of cavity QED," J. Kerckhoff, M. A. Armen and H. Mabuchi, *Opt. Express* **19**, 24468 (2011).
52. "Nonlinear interferometry approach to photonic sequential logic," H. Mabuchi, *Appl. Phys. Lett.* **99**, 153103 (2011).
53. "Design of nanophotonic circuits for autonomous subsystem quantum error correction," J. Kerckhoff, D. S. Pavlichin, H. Chalabi and H. Mabuchi, *New J. Phys.* **13**, 055022 (2011).
54. "Coherent-feedback control strategy to suppress spontaneous switching in ultra-low power optical bistability," H. Mabuchi, *Appl. Phys. Lett.* **98**, 193109 (2011).
55. "The dressed atom as binary phase modulator: towards attojoule/edge optical phase-shift keying," J. Kerckhoff, M. A. Armen, D. S. Pavlichin and H. Mabuchi, *Opt. Express* **19**, 6478 (2011).
56. "Designing quantum memories with embedded control: photonic circuits for autonomous quantum error correction," J. Kerckhoff, H. I. Nurdin, D. Pavlichin and H. Mabuchi, *Phys. Rev. Lett.* **105**, 040502 (2010).
57. "Intramolecular fluorescence correlation spectroscopy in a feedback tracking microscope," K. McHale and H. Mabuchi, *Biophys. J.* **99**, 313 (2010).
58. "Precise characterization of the conformational fluctuations of freely diffusing DNA: beyond Rouse and Zimm," K. McHale and H. Mabuchi, *J. Am. Chem. Soc.* **131**, 17901 (2009).
59. "Continuous quantum error correction as classical hybrid control," H. Mabuchi, *New J. Phys.* **11**, 105044 (2009).
60. "Quantum filter reduction for measurement-feedback control via unsupervised manifold learning," A. E. B. Nielsen, A. Hopkins and H. Mabuchi, *New J. Phys.* **11**, 105043 (2009).
61. "Cavity-QED models of switches for attojoule-scale nanophotonic logic," H. Mabuchi, *Phys. Rev. A* **80**, 045802 (2009).
62. "Spontaneous dressed-state polarization in the strong driving regime of cavity QED," M. Armen, A. E. Miller and H. Mabuchi, *Phys. Rev. Lett.* **103**, 173601 (2009).
63. "Van der Waals enhancement of optical atom potentials via resonant coupling to surface polaritons," J. Kerckhoff and H. Mabuchi, *Opt. Express* **17**, 14744 (2009).
64. "Physical model of continuous two-qubit parity measurement in a cavity-QED network," J. Kerckhoff, L. Bouten, A. Silberfarb and H. Mabuchi, *Phys. Rev. A* **79**, 024305 (2009).
65. "Coherent-feedback quantum control with a dynamic compensator," H. Mabuchi, *Phys. Rev. A* **78**, 032323 (2008).

Publications in refereed journals (continued)

66. "A quantum stochastic calculus approach to modeling double-pass atom-field coupling" G. Sarma, A. Silberfarb and H. Mabuchi, *Phys. Rev. A* **78**, 025801 (2008).
67. "Derivation of Maxwell-Bloch-type equations by projection of quantum models," H. Mabuchi, *Phys. Rev. A* **78**, 015801 (2008).
68. "Quantum dot photon statistics measured by three-dimensional particle tracking," K. McHale, A. J. Berglund and H. Mabuchi, *Nano Lett.* **7**, 3535-3539 (2007).
69. "Scattering of polarized laser light by an atomic gas in free space: A quantum stochastic differential equation approach," L. Bouten, J. K. Stockton, G. Sarma and H. Mabuchi, *Phys. Rev. A* **75**, 052111 (2007).
70. "Fluctuations in closed-loop fluorescent particle tracking," A. J. Berglund, K. McHale and H. Mabuchi, *Opt. Express* **15**, 7752-7773, (2007).
71. "Feedback localization of freely diffusing fluorescent particles near the optical shot-noise limit," A. J. Berglund, K. McHale and H. Mabuchi, *Opt. Lett.* **32**, 145-147 (2007).
72. "Finesse and sensitivity gain in cavity-enhanced absorption spectroscopy of biomolecules in solution," T. McGarvey, A. Conjusteau and H. Mabuchi, *Opt. Express* **14**, 10441-10451 (2006).
73. "Integration of high- Q SiN_x microdisks with magnetostatic atom chips," P. Barclay, K. Srinivasan, O. Painter, B. Lev and H. Mabuchi, *Appl. Phys. Lett.* **89**, 131108 (2006).
74. "Feedback cooling of atomic motion in cavity QED," D. A. Steck, K. Jacobs, H. Mabuchi, S. Habib and T. Bhattacharya, *Phys. Rev. A* **74**, 012322 (2006).
75. "Low-lying bifurcations in cavity QED," M. Armen and H. Mabuchi, *Phys. Rev. A* **73**, 063801 (2006).
76. "Tensor polarizability and dispersive quantum measurement of multilevel atoms," JM Geremia, J. K. Stockton and H. Mabuchi, *Phys. Rev. A* **73**, 042112 (2006).
77. "Performance bounds on single particle tracking by fluorescence modulation," A. J. Berglund and H. Mabuchi, *Appl. Phys. B* **83**, 127 (2006).
78. "Tracking-FCS: Fluorescence correlation spectroscopy of individual particles," A. J. Berglund and H. Mabuchi, *Optics Express* **13**, 8069-8082 (2005).
79. "Principles and applications of control in quantum systems," H. Mabuchi and N. Khaneja, *International Journal of Robust and Nonlinear Control* **15**, 647-667 (2005).
80. "Modeling and feedback control design for quantum state preparation," R. van Handel, J. K. Stockton, and H. Mabuchi, *J. Opt. B: Quantum Semiclass. Opt.* **7**, S179-S197 (2005).
81. "Quantum projection filter for a highly nonlinear model in cavity QED," R. van Handel and H. Mabuchi, *J. Opt. B: Quantum Semiclass. Opt.* **7**, S226-S236 (2005).
82. "Feedback control of quantum state reduction," R. van Handel, J. K. Stockton, and H. Mabuchi, *IEEE T. Automat. Contr.* **50**, 768 (2005).
83. "Quantum information processing in cavity-QED," S. J. van Enk, H. J. Kimble, and H. Mabuchi, *Quantum Information Processing* **3**, 75 (2004).
84. "Proposed magneto-electrostatic ring trap for neutral atoms," A. Hopkins, B. Lev, and H. Mabuchi, *Phys. Rev. A* **70**, 053616 (2004).
85. "Deterministic Dicke state preparation with continuous measurement and control," J. K. Stockton, R. van Handel, and H. Mabuchi, *Phys. Rev. A* **70**, 022106 (2004).
86. "Feasibility of detecting single atoms using photonic bandgap cavities," B. Lev, K. Srinivasan, P. Barclay, O. Painter, and H. Mabuchi, *IEEE T. Nanotechnol.* **15**, S556 (2004).
87. "Quantum feedback control of atomic motion in an optical cavity," D. A. Steck, K. Jacobs, H. Mabuchi, T. Bhattacharya, and S. Habib, *Phys. Rev. Lett.* **92**, 223004 (2004).

Publications in refereed journals (continued)

88. "Bayesian estimation for species identification in single-molecule fluorescence microscopy," K. McHale, A. J. Berglund, and H. Mabuchi, *Biophys. J.* **86**, 3409 (2004).
89. "Feedback controller design for tracking a single fluorescent molecule," A. J. Berglund and H. Mabuchi, *Appl. Phys. B* **78**, 653 (2004).
90. "Robust Quantum Parameter Estimation: Coherent Magnetometry with Feedback," J. K. Stockton, JM Geremia, A. C. Doherty, and H. Mabuchi, *Phys. Rev. A* **69**, 032109 (2004).
91. "Quantum Kalman filtering and the Heisenberg limit in atomic magnetometry," JM Geremia, J. K. Stockton, A. C. Doherty, and H. Mabuchi, *Phys. Rev. Lett.* **91**, 250801 (2003).
92. "An atom mirror etched from a hard drive," B. Lev, Y. Lassailly, C. S. Lee, A. Scherer, and H. Mabuchi, *Appl. Phys. Lett.* **83**, 395-397 (2003).
93. "Quantum jumps between dressed states: a proposed cavity-QED test using feedback," J. E. Reiner, H. M. Wiseman, and H. Mabuchi, *Phys. Rev. A* **67**, 042106 (2003).
94. "Characterizing the entanglement of symmetric many-particle spin-1/2 systems," J. K. Stockton, J. M. Geremia, A. C. Doherty, and H. Mabuchi, *Phys. Rev. A* **67**, 022112 (2003).
95. "Programmable logic devices in experimental quantum optics," J. Stockton, M. Armen, and H. Mabuchi, *J. Opt. Soc. Am. B* **19**, 3019 (2002).
96. "Cavity quantum electrodynamics: coherence in context," (invited review) H. Mabuchi and A. C. Doherty, *Science* **298**, 1372 (2002).
97. "Exact analysis of concatenated quantum codes," B. Rahn, A. C. Doherty, and H. Mabuchi, *Phys. Rev. A* **66**, 032304 (2002).
98. "Adaptive homodyne measurement of optical phase," M. A. Armen, J. K. Au, J. K. Stockton, A. C. Doherty, and H. Mabuchi, *Phys. Rev. Lett.* **89**, 133602 (2002).
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