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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)

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
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

2019 Quantum Science, Engineering and Technology Conference (keynote), Canberra
2019 Coherent Neural Network Conference, Atsugi
2016 Tutorial series on quantum engineering at Japan Science & Technology Agency, Tokyo
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); Author, weekly physics blog series "micro Mondays" for the National Council on Education in the Ceramic Arts; Panelist, MacArthur Foundation and Getty Museum event "Ways of Seeking: Art, Science and Spirituality" (12/16)

Academic service (current)

Product Realization Laboratory Future Leadership Committee (Mechanical Engineering), Graduate Study committee (Applied Physics), Masters Advising committee (Applied Physics)

Undergraduate courses

Stanford University: APPPHYS189 **Physical Analysis of Artworks** (Winter 2020); ANTHRO188, with I. Hodder, **Matter and Mattering: Transdisciplinary Thinking about Things** (Winter 2019); 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 physics”

- 2018 Cultural Confluence Wood Fire Symposium, Helena
- 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
- 2018 National Council on Education for the Ceramic Arts Annual Conference (panelist, lecturer)
- 2016 National Council on Education for the Ceramic Arts Annual Conference (panelist)
- 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)

Articles in preparation (6)

1. “Derivation of low-temperature exciton-exciton annihilation rate for quasi-localized excitons in monolayer MoS₂,” E. Chatterjee, D. B. Soh, C. Rogers, D. J. Gray Jr. and H. Mabuchi, in preparation (2019).
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, submitted to Phys. Rev. Lett. (2019).
3. “Nonlinear quantum behavior of ultrashort-pulse optical parametric oscillators,” T. Onodera, E. Ng, N. Lörch, A. Yamamura, R. Hamerly, P. L. McMahon, A. Marandi and H. Mabuchi, submitted to Phys. Rev. A (2019).
4. “Coherent control of two-dimensional excitons,” C. Rogers, D. Grey Jr., N. Bogdanowicz, T. Taniguchi, K. Watanabe and H. Mabuchi, submitted to Phys. Rev. Lett. (2019).
5. “Nonlinear optical response of a local surface plasmon coupled to a 2D material,” D. B. Soh, R. Yanagimoto, E. Chatterjee and H. Mabuchi, submitted to Phys. Rev. Lett. (2019).
6. “Factorization of Linear Quantum Systems with Delayed Feedback,” G. Tabak, R. Hamerly and H. Mabuchi, submitted to EPJ Quantum Technology (2018).

Publications in refereed journals (118)

1. “Adiabatic Fock-state-generation scheme using Kerr nonlinearity,” R. Yanagimoto, E. Ng, T. Onodera and H. Mabuchi, Phys. Rev. A **100**, 033822 (2019).
2. “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. (2019); DOI:10.1109/JSTQE.2019.2929184.
3. “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).
4. “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).
5. “Self-oscillation in the Maxwell-Bloch Equations,” J. Wu and H. Mabuchi, J. Opt. Soc. Am. B **35**, 2382 (2018).
6. “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).
7. “Mechanism of stochastic switching in single-atom absorptive bistability,” J. Wu and H. Mabuchi, Phys. Rev. A **98**, 013812 (2018).
8. “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).
9. “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).

Publications in refereed journals (continued)

10. "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).
11. "Low-dimensional manifolds for exact representation of open quantum systems," N. Tezak, N. H. Amini and H. Mabuchi, *Phys. Rev. A* **96**, 062113 (2017).
12. "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).
13. "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).
14. "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).
15. "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).
16. "Comprehensive analysis of the optical Kerr coefficient of graphene," D. B. S. Soh, R. Hamerly and H. Mabuchi, *Phys. Rev. A* **94**, 023845 (2016).
17. "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).
18. "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).
19. "Trapped Optical Cavity Modes in Linear Quantum Stochastic Networks with Delays," G. Tabak and H. Mabuchi, *EPJ Quantum Technology* **3**:3 (2016).
20. "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).
21. "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).
22. "Optical devices based on limit cycles and amplification in semiconductor optical cavities," R. Hamerly and H. Mabuchi, *Phys. Rev. Applied* **4**, 024016 (2015).
23. "Quantum noise of free-carrier dispersion in semiconductor optical cavities," R. Hamerly and H. Mabuchi, *Phys. Rev. A* **92**, 023819 (2015).
24. "A coherent perceptron for all-optical learning," N. Tezak and H. Mabuchi, *EPJ Quantum Technology* **2**:10 (2015).
25. "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).
26. "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).

Publications in refereed journals (continued)

27. "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).
28. "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).
29. "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).
30. "Gauge subsystems, separability, and robustness in autonomous quantum memories," G. Sarma and H. Mabuchi, *New J. Phys.* **15**, 035014 (2013).
31. "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).
32. "Coherent controllers for optical-feedback cooling of quantum oscillators," R. Hamerly and H. Mabuchi, *Phys. Rev. A* **87**, 013815 (2013).
33. "Advantages of coherent feedback for cooling quantum oscillators," R. Hamerly and H. Mabuchi, *Phys. Rev. Lett.* **109**, 173602 (2012).
34. "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).
35. "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).
36. "Qubit limit of cavity nonlinear optics," H. Mabuchi, *Phys. Rev. A* **85**, 015806 (2012).
37. "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).
38. "Nonlinear interferometry approach to photonic sequential logic," H. Mabuchi, *Appl. Phys. Lett.* **99**, 153103 (2011).
39. "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).
40. "Coherent-feedback control strategy to suppress spontaneous switching in ultra-low power optical bistability," H. Mabuchi, *Appl. Phys. Lett.* **98**, 193109 (2011).
41. "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).
42. "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).
43. "Intramolecular fluorescence correlation spectroscopy in a feedback tracking microscope," K. McHale and H. Mabuchi, *Biophys. J.* **99**, 313 (2010).
44. "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).
45. "Continuous quantum error correction as classical hybrid control," H. Mabuchi, *New J. Phys.* **11**, 105044 (2009).
46. "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).

Publications in refereed journals (continued)

47. "Cavity-QED models of switches for attojoule-scale nanophotonic logic," H. Mabuchi, *Phys. Rev. A* **80**, 045802 (2009).
48. "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).
49. "Van der Waals enhancement of optical atom potentials via resonant coupling to surface polaritons," J. Kerckhoff and H. Mabuchi, *Opt. Express* **17**, 14744 (2009).
50. "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).
51. "Coherent-feedback quantum control with a dynamic compensator," H. Mabuchi, *Phys. Rev. A* **78**, 032323 (2008).
52. "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).
53. "Derivation of Maxwell-Bloch-type equations by projection of quantum models," H. Mabuchi, *Phys. Rev. A* **78**, 015801 (2008).
54. "Quantum dot photon statistics measured by three-dimensional particle tracking," K. McHale, A. J. Berglund and H. Mabuchi, *Nano Lett.* **7**, 3535-3539 (2007).
55. "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).
56. "Fluctuations in closed-loop fluorescent particle tracking," A. J. Berglund, K. McHale and H. Mabuchi, *Opt. Express* **15**, 7752-7773, (2007).
57. "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).
58. "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).
59. "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).
60. "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).
61. "Low-lying bifurcations in cavity QED," M. Armen and H. Mabuchi, *Phys. Rev. A* **73**, 063801 (2006).
62. "Tensor polarizability and dispersive quantum measurement of multilevel atoms," JM Geremia, J. K. Stockton and H. Mabuchi, *Phys. Rev. A* **73**, 042112 (2006).
63. "Performance bounds on single particle tracking by fluorescence modulation," A. J. Berglund and H. Mabuchi, *Appl. Phys. B* **83**, 127 (2006).
64. "Tracking-FCS: Fluorescence correlation spectroscopy of individual particles," A. J. Berglund and H. Mabuchi, *Optics Express* **13**, 8069-8082 (2005).
65. "Principles and applications of control in quantum systems," H. Mabuchi and N. Khaneja, *International Journal of Robust and Nonlinear Control* **15**, 647-667 (2005).
66. "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).
67. "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).
68. "Feedback control of quantum state reduction," R. van Handel, J. K. Stockton, and H. Mabuchi, *IEEE T. Automat. Contr.* **50**, 768 (2005).

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69. "Quantum information processing in cavity-QED," S. J. van Enk, H. J. Kimble, and H. Mabuchi, *Quantum Information Processing* **3**, 75 (2004).
70. "Proposed magneto-electrostatic ring trap for neutral atoms," A. Hopkins, B. Lev, and H. Mabuchi, *Phys. Rev. A* **70**, 053616 (2004).
71. "Deterministic Dicke state preparation with continuous measurement and control," J. K. Stockton, R. van Handel, and H. Mabuchi, *Phys. Rev. A* **70**, 022106 (2004).
72. "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).
73. "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).
74. "Bayesian estimation for species identification in single-molecule fluorescence microscopy," K. McHale, A. J. Berglund, and H. Mabuchi, *Biophys. J.* **86**, 3409 (2004).
75. "Feedback controller design for tracking a single fluorescent molecule," A. J. Berglund and H. Mabuchi, *Appl. Phys. B* **78**, 653 (2004).
76. "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).
77. "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).
78. "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).
79. "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).
80. "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).
81. "Programmable logic devices in experimental quantum optics," J. Stockton, M. Armen, and H. Mabuchi, *J. Opt. Soc. Am. B* **19**, 3019 (2002).
82. "Cavity quantum electrodynamics: coherence in context," (invited review) H. Mabuchi and A. C. Doherty, *Science* **298**, 1372 (2002).
83. "Exact analysis of concatenated quantum codes," B. Rahn, A. C. Doherty, and H. Mabuchi, *Phys. Rev. A* **66**, 032304 (2002).
84. "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).
85. "Photon statistics and dynamics of Fluorescence Resonance Energy Transfer," A. J. Berglund, A. C. Doherty, and H. Mabuchi, *Phys. Rev. Lett.* **89**, 068101 (2002).
86. "Optimization of Q-factors in microcavities based on free-standing membranes," J. Vuckovic, M. Loncar, H. Mabuchi, and A. Scherer, *IEEE J. Quantum Electron.* **38**, 850 (2002).
87. "The quantum-classical transition in nonlinear dynamical systems," S. Habib, K. Jacobs, H. Mabuchi, R. Ryne, K. Shizume, and B. Sundaram, *Phys. Rev. Lett.* **88**, 040402 (2002).
88. "Design of photonic crystal microcavities for cavity QED," J. Vuckovic, M. Loncar, H. Mabuchi, and A. Scherer, *Phys. Rev. E* **65**, 016608 (2002).
89. "Quantum trajectories for realistic detection," P. Warszawski, H. M. Wiseman, and H. Mabuchi, *Phys. Rev. A* **65**, 023802 (2002).
90. "Quantum networks based on Cavity QED," H. Mabuchi, M. Armen, B. Lev, M. Loncar, J. Vuckovic, H. J. Kimble, J. Preskill, M. L. Roukes, and A. Scherer, *Quantum Information and Computation* **1**, Special Issue 7-12 (2001).

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91. "Sensitivity optimization in quantum parameter estimation," F. Verstraete, A. C. Doherty, and H. Mabuchi, *Phys. Rev. A* **64**, 032111 (2001).
92. "Robust control in the quantum domain," A. C. Doherty, J. C. Doyle, H. Mabuchi, K. Jacobs, and S. Habib, in *Proceedings of the 39th IEEE Conference on Decision and Control* (2000).
93. "Ro-vibrational spectroscopy of the $v=6$ manifold in $^{12}\text{C}_2\text{H}_2$ and $^{13}\text{C}_2\text{H}_2$," H. K. Srivastava, A. Conjusteau, H. Mabuchi, A. Callegari, K. K. Lehmann, G. Scoles, M. Silva, and R. W. Field, *J. Chem. Phys.* **113**, 7376-7383 (2000).
94. "A sub-doppler resolution double resonance molecular beam infrared spectrometer operating at chemically relevant energies (~ 2 eV)," H. K. Srivastava, A. Conjusteau, H. Mabuchi, A. Callegari, K. K. Lehmann, and G. Scoles, *Rev. Sci. Instrum.* **71**, 4032-4038 (2000).
95. "Quantum feedback control and classical control theory," A. C. Doherty, S. Habib, K. Jacobs, H. Mabuchi, and S. M. Tan, *Phys. Rev. A* **62**, 012105 (2000).
96. "Physical Implementations for Quantum Communication in Quantum Networks," H. J. Briegel, J.-I. Cirac, W. Dur, S. J. van Enk, H. J. Kimble, H. Mabuchi, and P. Zoller, *Lect. Notes Comput. Sc.* **1509**, 373-382 (1999).
97. "Entanglement of Assistance," D. P. DiVincenzo, C. A. Fuchs, H. Mabuchi, J. A. Smolin, A. Thapliyal, and A. Ullman, *Lect. Notes Comput. Sc.* **1509**, 247-257 (1999).
98. "Full observation of single-atom dynamics in cavity QED," H. Mabuchi, J. Ye, and H. J. Kimble, *Appl. Phys. B* **68**, 1095-1108 (1999).
99. "Quantum manipulation and measurement of single atoms in optical cavity QED," J. Ye, C. J. Hood, T. Lynn, H. Mabuchi, D. W. Vernooy, and H. J. Kimble, *IEEE T. Instrum. Meas.* **48**, 608-612 (1999).
100. "Transmission of quantum information in a quantum network: A quantum optical implementation," S. J. van Enk, J. I. Cirac, P. Zoller, H. J. Kimble, and H. Mabuchi, *Fortschr. Phys.* **46**, 689-695 (1998).
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