

# Peter Zoller

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University of Innsbruck, and Institute for Quantum Optics and Quantum  
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## Education

University of Innsbruck, Austria: Ph.D. Physics - Feb 1977 (Theoretical Physics); Gymnasium Innsbruck,  
Austria (High School including college) 1962 - 1970

## Field of Specialization

Theoretical Quantum Optics and Quantum Information, for a complete list of publications see:  
<http://bozon.uibk.ac.at/qo/zoller/PZListOfPublications.html>

## Awards

[UNESCO's Niels Bohr Medal](#) (2005)  
[Max Planck Medaille 2005](#) (German Physical Society)  
K. Innitzer Award (2001)  
Senior Humboldt Award (2000)  
[Schrödinger Prize 1998](#) (Austrian Academy of Sciences)  
[Max Born Award 1998](#) (Optical Society of America)  
[Wittgenstein Award 1998](#) (Austrian Federal Ministry of Science)  
[Ludwig – Boltzmann Award 1983](#) (Austrian Physical Society)  
Award of the City of Innsbruck (1981)

## Membership

[Member of the Austrian Academy of Sciences](#) since 2001, corresponding member since 1999.  
Fellow of the American Physical Society (since 1993); Member of the Optical Society of America; Member of  
the Austrian Physical Society

## Professional Experience

9/1994 – present	Professor of Physics with tenure (o. Univ. Prof.) , Institute for Theoretical Physics, University of Innsbruck, Austria; Vicedean of studies (2001-2004); Head of the Institute of Theoretical Physics (1995-1999)
11/2003 – present	Scientific Director at the Institute for Quantum Optics and Quantum Information of the Austrian Academy of Sciences, Innsbruck, Austria

4/2005; 6/2005	Lorentz Professor, Lorentz Center for Theoretical Physics, University of Leiden , Leiden , Holland .
11/2004	Chair Professor Tsinghua University, Beijing, China; Yan Jici Chair Professorship, The University of Science and Technology, Hefei, China
2/2004;11/2004	Loeb Lecturer Harvard, Boston, MA
1/91 - 8/94	Professor of Physics with tenure, Department of Physics, and JILA-Fellow, Joint Institute for Laboratory Astrophysics, University of Colorado
1981-1982; 1988	JILA Visiting Fellow, University of Colorado, Boulder, CO
1986	Guest Professor, University Paris - Sud, Orsay, France
1977-1990	Assistant Professor, University of Innsbruck; Habilitation 1981; tenure since 1981
1978-1979	Max Kade Fellow, University of Southern California, Los Angeles, CA

### **Professional Activities**

2005	Member International Advisory Committee for the Institute of Theoretical Physics Beijing: of the Chinese Academy of Sciences
2005-present	Member Advisory Board Chinese National Lab, UTSC, Hefei
2005-present	Member Advisory Board Arnold Sommerfeld Center LMU Munich
2005	Member Advisory Board Perimeter Institute, Canada
2003-present	Member Advisory Board BEC Institute, Trento , Italy
2001-present	Member Advisory Board Max Planck Institute for Quantum Optics, Garching
1999-present	Speaker Sonderforschungsbereich Quantum Control and Measurement Innsbruck – Vienna
1999-2003	Editor Reviews of Modern Physics
1994-1998	Divisional Associate Editor Physical Review Letters
1996-1999	Member Advisory Board ITAMP, Harvard University

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## **Peter Zoller's List of Publications**

*Peter Zoller*

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1. [Preprints](#)
2. [Papers](#) (listed in order [2005](#) [2004](#) [2003](#) [2002](#) [2001](#) [2000](#) [99](#) [98](#) [97](#) [96](#) [95](#) [94](#) [93](#) [92](#) [91](#) [90](#) [89](#) and earlier)
3. [Books](#)
4. [Contribution to Books and Conference Proceedings](#)
5. [Organizer and Workshops](#)
6. [Invited Talks](#)
7. [Colloquia and Seminars](#)

### ***Preprints***

- o M. Cozzini, T. Calarco, A. Recati, P. Zoller, *Fast Rydberg gates without dipole blockade via quantum control*, submitted (2005). [Abstract](#)

- P. Zoller, *Quantenphysik in Österreich*, Vortrag beim Österreichischen Wissenschaftstag 2005. [Abstract](#)
- A. Micheli, G.K. Brennen, P. Zoller, *A toolbox for lattice spin models with polar molecules*, submitted (2005). [Abstract](#)
- S. Trebst, U. Schollwoeck, M. Troyer, P. Zoller, *d-wave resonating valence bond states of fermionic atoms in optical lattices*, submitted (2005). [Abstract](#)
- A. Micheli and P. Zoller, *A Single Atom Mirror for 1D Atomic Lattice Gases*, submitted (2005). [Abstract](#)
- J. M. Taylor, G. Giedke, H. Christ, B. Paredes, J. I. Cirac, P. Zoller, M. D. Lukin, A. Imamoglu, *Quantum information processing using localized ensembles of nuclear spins*, submitted (2004). [Abstract](#)

## **Papers**

- P. Bushev, D. Rotter, A. Wilson, F. Dubin, C. Becher, J. Eschner, R. Blatt, V. Steixner, P. Rabl, P. Zoller, *Feedback cooling of a single trapped ion*, Phys. Rev. Lett. 96 , 043003 (2006). [Abstract](#)
- W. H. Zurek, U. Dorner, P. Zoller, *Dynamics of a Quantum Phase Transition*, Phys. Rev. Lett. 96 , 105701 (2005). [Abstract](#)
- J. M. Taylor, W. Dür, P. Zoller, A. Yacoby, C. M. Marcus, M. D. Lukin, *Solid-state circuit for spin entanglement generation and purification*, Phys. Rev. Lett. 94 , 236803 (2005). [Abstract](#)
- J. M. Taylor, H.-A. Engel, W. Dür, A. Yacoby, C. M. Marcus, P. Zoller and M. D. Lukin, *Fault-tolerant architecture for quantum computation using electrically controlled semiconductor spins*, Nature Physics 1 , 177-183 (2005). [Presentation](#); [Abstract](#)
- J. I. Cirac and P. Zoller, *Qubits, Gatter und Register*, Physik Journal, Heft 11, s. 31, November 2005 [Journal](#)
- H.P. Büchler, M. Hermele, S.D. Huber, Matthew P.A. Fisher, P. Zoller, *Atomic quantum simulator for lattice gauge theories and ring exchange models*, Phys. Rev. Lett. 95 , 040402 (2005). [Abstract](#)
- A. Griessner , A. J. Daley , D. Jaksch , P. Zoller, *Fault-Tolerant Dissipative Preparation of Atomic Quantum Registers with Fermions*, Phys. Rev. A 72 , 032332 (2005). [Abstract](#)
- P. Rabl, V. Steixner, P. Zoller, *Quantum limited velocity readout and quantum feedback cooling of a trapped ion via electromagnetically induced transparency*, Phys. Rev. A 72 , 043823 (2005). [Abstract](#)
- A. J. Daley, S. R. Clark, D. Jaksch, P. Zoller, *Numerical Analysis of Coherent Many-Body Currents in a Single Atom Transistor*, Phys. Rev. A 72 , 043618 (2005). [Abstract](#)
- P. Rabl, V. Steixner, P. Zoller, *Quantum feedback cooling of a single trapped ion in front of a mirror*, Phys. Rev. A 72 , 043826 (2005). [Abstract](#)
- U. Dorner, T. Calarco, P. Zoller, A. Browaeys, P. Grangier, *Quantum logic via optimal control in holographic dipole traps*, J. Opt. B: Quantum Semiclass. Opt. 7, 341 (2005). [Abstract](#)
- K. Osterloh, M. Baig, L. Santos, P. Zoller, M. Lewenstein, *Cold atoms in non-Abelian gauge potentials: From the Hofstadter "moth" to lattice gauge theory*, Phys. Rev. Lett. 95 , 010403 (2005). [Abstract](#)
- J. M. Taylor, W. Dür, P. Zoller, A. Yacoby, C. M. Marcus, M. D. Lukin, *Solid-state circuit for spin entanglement generation and purification*, Phys. Rev.

Lett. 94 , 236803 (2005) and Virtual Journal of Nanoscale Science & Technology, June 27, 2005 . Abstract

- J. J. Garcia-Ripoll, P. Zoller, J. I. Cirac, *Coherent control of trapped ions using off-resonant lasers*, Phys. Rev. A 71 , 062309 (2005). Abstract
- P. Zoller (Editing author), *Quantum Information Processing and Communication*, Strategic report on current status, visions and goals for research in Europe, Version 1.0, April 2005, <http://www.cordis.lu/ist/fet/qipc-sr.htm>, and as ERA-Pilot QIST (Work Package 1) on web site: <http://iqoqi001.uibk.ac.at/qist> or <http://qist.ect.it>
- J. J. García-Ripoll, P Zoller, J. I. Cirac, *Quantum information processing with cold atoms and trapped ions*, J. Phys. B: At. Mol. Opt. Phys. 38, 567 (2005) Abstract
- A. Recati, P.O. Fedichev, W. Zwerger, J. von Delft, P. Zoller, *Atomic Quantum Dots Coupled to a Reservoir of a Superfluid Bose-Einstein Condensate*, Phys. Rev. Lett. 94 , 040404 (2005). Abstract
- D. Jaksch and P. Zoller, *The cold atom Hubbard toolbox*, Annals of Physics 315, 52-79 (2005). Abstract
- L. Tian, R. Blatt, P. Zoller, *Scalable Ion Trap Quantum Computing without Moving Ions*, Eur. Phys. J. D - Atomic, Molecular and Optical Physics, 32, 201-208 (2005). Abstract
- B. Paredes, J.J. García-Ripoll, P. Zoller and J.I. Cirac, *Strong correlation effects and quantum information theory of low dimensional atomic gases*, *Journal de Physique IV*, 116, 135 (2004).
- L. Tian, P.Zoller, *Coupled ion - nanomechanical systems*, Phys. Rev. Lett. 93, 266403 (2004) . Abstract
- P. Rabl, A. Shnirman, P. Zoller, *Generation of Squeezed States of Nanomechanical Resonators by Reservoir Engineering*, Phys. Rev. B 70, 205304 (2004) . Abstract
- A. Micheli, A. J. Daley, D. Jaksch, P. Zoller, *A Single Atom Transistor in a 1D Optical Lattice*, Phys. Rev. Lett. 93, 140408 (2004). Abstract
- W. Vincent Liu , F. Wilczek and P. Zoller, *Spin-dependent Hubbard model and a quantum phase transition in cold atoms*, Phys. Rev. A 70 , 033603 (2004). Abstract
- L. Tian, P. Rabl, R. Blatt, P. Zoller, *Interfacing quantum optical and solid state qubits*, Phys. Rev. Lett. 92, 247902 (2004). Abstract
- T. Calarco, U. Dorner, P. Julienne, C. Williams, and P. Zoller, *Quantum computations with atoms in optical lattices: marker qubits and molecular interactions*, Phys. Rev. A 70, 012306 (2004). Abstract
- H.P. Büchler, P. Zoller, W. Zwerger, *Spectroscopy of Superfluid Pairing in Atomic Fermi Gases*, Phys. Rev. Lett. 93, 080401 (2004). Abstract
- A. Griessner, D. Jaksch, P. Zoller, *Cavity Assisted Nondestructive Laser Cooling of Atomic Qubits*, J. Phys. B: At. Mol. Opt. Phys. 37 (2004). Abstract
- I. Wilson-Rae, P. Zoller, A. Imamoglu, *Laser cooling of a nanomechanical resonator mode to its quantum ground state*, Phys. Rev. Lett. 92, 075507 (2004). Abstract
- I. Martin, A. Shnirman, L. Tian, P. Zoller, *Ground state cooling of mechanical resonators*, Phys. Rev. B 69, 125339 (2004). Abstract
- E.Pazy, T. Calarco, P.Zoller, *Spin State Readout by Quantum Jump Technique: For the Purpose of Quantum Computing*, IEEE Transactions on Nanotechnology Vol:3 (1) 10 (2004). Abstract

- J. I. Cirac and P. Zoller, *New Frontiers in Quantum Information With Atoms and Ions*, Physics Today, p. 38-44, March 2004. [Abstract](#)
- P.O. Fedichev, M.J. Bijlsma, P. Zoller, *Extended molecules and geometric scattering resonances in optical lattices*, Phys. Rev. Lett. 92, 080401 (2004). [Abstract](#)
- A. J. Daley, P. O. Fedichev, P. Zoller, *Single Atom Cooling by Superfluid Immersion: A Non-Destructive Method for Qubits*, Phys. Rev. A 69, 022306 (2004). [Abstract](#)
- J. J. Garcia-Ripoll, J. I. Cirac, P. Zoller, C. Kollath, U. Schollwoeck, J. von Delft, *Variational ansatz for the superfluid Mott-insulator transition in optical lattices*, Opt. Express 12, 42 (2004). [Abstract](#)
- J.I. Cirac, L.-M. Duan, D. Jaksch, and P. Zoller, *Quantum information processing with quantum optics*, Ann. Henri Poincare 4, 661 (2003) .[Abstract](#)
- A. Recati, P.O. Fedichev, W. Zwerger, P. Zoller, *Fermi 1D quantum gas: Luttinger liquid approach and spin-charge separation*, J. Opt. B: Quantum Semiclass. Opt. 5, 55 (2003). [Abstract](#)
- Lin Tian and P. Zoller, *Quantum computing with atomic Josephson junction arrays*, Phys. Rev. A 68, 042321 (2003). [Abstract](#)
- P. Rabl, A. J. Daley, P. O. Fedichev, J. I. Cirac, P. Zoller, *Defect-Suppressed Atomic Crystals in an Optical Lattice*, Phys. Rev. Lett. 91, 110403 (2003). [Abstract](#)
- J. J. García-Ripoll, P. Zoller, and J. I. Cirac, *Speed Optimized Two-Qubit Gates with Laser Coherent Control Techniques for Ion Trap Quantum Computing*, Phys. Rev. Lett. 91, 157901 (2003). [Abstract](#)
- T. Calarco, A. Datta, P. Fedichev, E. Pazy, P. Zoller, *Spin-based all-optical quantum computation with quantum dots: understanding and suppressing decoherence*, Phys. Rev. A 68, 012310 (2003). [Abstract](#)
- A. Imamoglu, E. Knill, L. Tian, P. Zoller, *Optical pumping of quantum dot nuclear spins*, Phys. Rev. Lett. 91, 017402 (2003). [Abstract](#)
- U. Dorner, P. Fedichev, D. Jaksch, M. Lewenstein, P. Zoller, *Entangling strings of neutral atoms in 1D atomic pipeline structures*, Phys. Rev. Lett. 91, 073601 (2003). [Abstract](#)
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- J. I. Cirac and P. Zoller, *How to Manipulate Cold Atoms*, Science 301, 176 (2003) [Abstract](#)
- D. Jaksch, P. Zoller, *Creation of effective magnetic fields in optical lattices: The Hofstadter butterfly for cold neutral atoms*, New J. Phys. 5, 56 (2003). [Abstract](#)
- E. Jané, G. Vidal, W. Dür, P. Zoller, J.I. Cirac, *Simulation of quantum dynamics with quantum optical systems*, Quantum Information and Computation, Vol. 3, No. 1, 15-37 (2003). [Abstract](#)
- E. Pazy, E. Biolatti, T. Calarco, I. D'A mico, P. Zanardi, F. Rossi, P. Zoller, *Spin-based optical quantum gates via Pauli blocking in semiconductor quantum dots*, Europhys. Lett. 62, 175 (2003).[Abstract](#)

- B. Damski, L. Santos, E. Tiemann, M. Lewenstein, S. Kotochigova, P. Julienne, P. Zoller, *Creation of a dipolar superfluid in optical lattices*, Phys. Rev. Lett. 90, 110401 (2003). [Abstract](#)
- A. Recati, P.O. Fedichev, W. Zwerger, P.Zoller, *Spin-charge separation in ultra-cold quantum gases*, Phys. Rev. Lett. 90, 020401 (2003). [Abstract](#)
- A. Micheli, D. Jaksch, J. I. Cirac, P. Zoller, *Many particle entanglement in two-component Bose-Einstein Condensates*, Phys. Rev. A 67, 013607 (2003) . [Abstract](#)
- W. Hofstetter, J.I. Cirac, P. Zoller, E. Demler, M.D. Lukin, *High-temperature superfluidity of fermionic atoms in optical lattices*, Phys. Rev. Lett. 89, 220407 (2002). [Abstract](#)
- B. Paredes, P. Zoller, J. I. Cirac, *Fermionizing a small gas of ultracold bosons*, Phys. Rev. A 66, 033609 (2002). [Abstract](#)
- L.-M. Duan, J. I. Cirac, P. Zoller, *Three-dimensional theory for interaction between atomic ensembles and free-space light*, Phys. Rev. A 66, 023818 (2002). [Abstract](#)
- A. Recati, T. Calarco, P. Zanardi, J.I. Cirac, P. Zoller, *Holonomic quantum computation with neutral atoms*, Phys. Rev. A 66, 032309 (2002). [Abstract](#)
- U. Dörner, P. Zoller, *Laser driven atoms in half-cavities*, Phys. Rev. A 66, 023816 (2002). [Abstract](#)
- T. Calarco, D. Jaksch, J.I. Cirac, and P. Zoller, *Controlling dynamical phases in quantum optics*, J. Opt. B 4, 430 (2002). [Abstract](#)
- D. Jaksch, V. Venturi, J.I. Cirac, C.J. Williams, P. Zoller, *Creation of a molecular condensate by dynamically melting a Mott-insulator*, Phys. Rev. Lett. 89, 040402 (2002). [Abstract](#)
- P. Zoller, *Making it with molecules*, Nature 417, 493 (2002) [Abstract](#)
- D. Jaksch, J.I. Cirac, P. Zoller, *Dynamically turning off interactions in a two component condensate*, Phys. Rev. A 65, 033625 (2002). [Abstract](#)
- L.-M. Duan, J. I. Cirac, P. Zoller, *Quantum entanglement in spinor Bose-Einstein condensates*, Phys. Rev. A 65, 033619 (2002). [Abstract](#)
- L.-M. Duan, J. I. Cirac, and P. Zoller, *Geometric Manipulation of Trapped Ions for Quantum Computation*, Science 292, 1695. (2001) [Abstract](#)
- G. Giedke, B. Kraus, L.-M. Duan, P. Zoller, M. Lewenstein, and J. I. Cirac, *Separability and Distillability of Gaussian states -- the complete story*, Fort. Phys. 49, 973 (2001) [Abstract](#)
- L. Duan, M. Lukin, J. I. Cirac, P. Zoller, *Long-distance quantum communication with atomic ensembles and linear optics*, Nature 414, 413 (2001). [Abstract](#)
- G. Giedke, L.-M. Duan, J. I. Cirac, and P. Zoller, *Distillability Criterion for all bipartite Gaussian States*, Quant. Inf. Comp. 1, 3, 79 (2001) [Abstract](#)
- D. Jaksch, S.A. Gardiner, K. Schulze, J.I. Cirac, P. Zoller, *Uniting Bose-Einstein condensates in optical resonators*, Phys. Rev. Lett. 86, 4733 (2001). [Abstract](#)
- B. Paredes, P. Fedichev, J. I. Cirac, P. Zoller, *1/2-Anyons in small atomic Bose-Einstein condensates*, Phys. Rev. Lett. 87, 010402 (2001). [Abstract](#)
- M. D. Lukin, M. Fleischhauer, R.Cote, L. M. Duan, D. Jaksch, J. I. Cirac, P. Zoller, *Dipole Blockade and Quantum Information Processing in Mesoscopic Atomic Ensembles*, Phys. Rev. Lett. 87, 037901 (2001). [Abstract](#)
- S.A. Gardiner, K.M. Gheri, P. Zoller, *Cavity assisted quasiparticle damping in a Bose-Einstein condensate*, Phys. Rev. A 63, 051603 (2001). [Abstract](#)

- G.M.Bruun, P.Torma, M.Rodriguez, P.Zoller, *Laser probing of Cooper-paired trapped atoms*, Phys. Rev. A 64, 033609 (2001). [Abstract](#)
- T. Calarco, J.I. Cirac, P. Zoller, *Entangling ions in arrays of microscopic traps*, Phys. Rev. A 63, 062304 (2001). [Abstract](#)
- A. Sørensen, Lu-Ming Duan, J. I. Cirac, P. Zoller, *Many-particle entanglement with Bose-Einstein condensates*, Nature 409, 63 (2001). [Abstract](#)
- C.Menotti, J.R.Anglin, J.I.Cirac, P.Zoller, *Dynamic splitting of a Bose-Einstein Condensate*, Phys. Rev. A 63, 023601 (2001). [Abstract](#)
- L. J. Garay, J. R. Anglin, J. I. Cirac, P. Zoller, *Sonic black holes in dilute Bose-Einstein condensates*, Phys. Rev. A 63, 023611 (2001) [Abstract](#)
- T. Calarco, H.-J. Briegel, D. Jaksch, J.I. Cirac, P. Zoller, *Quantum Computing with Trapped Particles in Microscopic Potentials*, Fortschritte der Physik 48, 945 (2000) [Abstract](#)
- L. J. Garay, J. R. Anglin, J. I. Cirac, P. Zoller, *Sonic Analog of Gravitational Black Holes in Bose-Einstein Condensates*, Phys. Rev. Lett. 85, 4643 (2000). [Abstract](#)
- Lu-Ming Duan, J.I. Cirac, P. Zoller, E. S. Polzik, *Quantum communication between atomic ensembles using coherent light*, Phys. Rev. Lett. 85, 5643(2000). [Abstract](#)
- L.-M. Duan, A. Sørensen, J. I. Cirac, P. Zoller, *Squeezing and entanglement of atomic beams*, Phys. Rev. Lett. 85, 3991 (2000). [Abstract](#)
- Lu-Ming Duan, G. Giedke, J. I. Cirac, and P. Zoller, *Continuous variable entanglement purification and its physical implementation*, Journal of Modern Optics, 47, 2529 (2000).
- D. Jaksch, T. Calarco, P. Zoller, *Auf dem Weg zum universellen Quantencomputer*, Physik in unserer Zeit 31, 260 (2000). [Abstract](#)
- J. F. Poyatos, J. I. Cirac, and P. Zoller, *Schemes of Quantum Computations with Trapped Ions*, Fortschr. Phys. 48, 785 (2000). [Abstract](#)
- T. Calarco, H. -J. Briegel, D. Jaksch, J. I. Cirac and P. Zoller, *Entangling neutral atoms for quantum information processing*, Journal of Modern Optics, 47, 2137 (2000). [Abstract](#)
- Lu-Ming Duan, G. Giedke, J. I. Cirac, and P. Zoller *Physical implementation for entanglement purification of Gaussian continuous-variable quantum states*, Phys. Rev. A 62, 032304 (2000). [Abstract](#)
- D. Jaksch, J.I. Cirac, P. Zoller, S.L. Rolston, R. Cote, M.D. Lukin, *Fast quantum gates for neutral atoms*, Phys. Rev. Lett. 85, 2208 (2000). [Abstract](#)
- L. Santos, G. V. Shlyapnikov, P. Zoller, M. Lewenstein, *Bose-Einstein condensation in trapped dipolar gases*, Phys. Rev. Lett. 85, 1791 (2000). [Abstract](#) ( Erratum : Phys. Rev. Lett. 88, 139904 (2002) [Abstract](#))
- P. Törma, and P. Zoller, *Laser probing of atomic Cooper pairs*, Phys. Rev. Lett. 85, 487 (2000). [Abstract](#)
- S. A. Gardiner, D. Jaksch, R. Dum, J. I. Cirac, P. Zoller, *Nonlinear Matter Wave Dynamics with a Chaotic Potential*, Phys. Rev. A 62, 023612 (2000). [Abstract](#)
- C. Saavedra, K. M. Gheri, P. Törmä, J. I. Cirac, and P. Zoller, *Controlled source of entangled photonic qubits*, Phys. Rev. A 61, 062311 (2000) [Abstract](#)
- Lu-Ming Duan, G. Giedke, J. I. Cirac, P. Zoller, *Inseparability criterion for continuous variable systems*, Phys. Rev. Lett. 84, 2722 (2000). [Abstract](#)
- Lu-Ming Duan, G. Giedke, J. I. Cirac, P. Zoller, *Entanglement purification of Gaussian continuous variable quantum states*, Phys. Rev. Lett. 84, 4002 (2000). [Abstract](#)



- J. J. García-Ripoll, J. I. Cirac, J. Anglin, V. Pérez-García, and P. Zoller, *Spin monopoles with Bose-Einstein condensates*, Phys. Rev. A 61, 053609 (2000). [Abstract](#)
- H.-J. Briegel, T. Calarco, D. Jaksch, J. I. Cirac, P. Zoller, *Quantum computing with neutral atoms*, Journal of Modern Optics, 47, 415 (2000). [Abstract](#)
- J. I. Cirac, and P. Zoller, *A scalable quantum computer with ions in an array of microtraps*, Nature 404, 579 (April 06. 2000). [Abstract](#)
- P. Zoller, *Tricks with a single photon*, Nature 404, 340 ( March 23. 2000). [Abstract](#)
- C. W. Gardiner, and P. Zoller, *Quantum Kinetic Theory V: Quantum kinetic master equation for mutual interaction of condensate and noncondensate*, Phys. Rev. A. 61, 033601 (2000). [Abstract](#)
- T. Calarco, D. Jaksch, E.A. Hinds, J. Schmiedmayer, J.I. Cirac, P. Zoller, *Quantum gates with neutral atoms: Controlling collisional interactions in time dependent traps*, Phys. Rev. A. 61, 022304 (2000). [Abstract](#)
- K. M. Gheri, P. Törmä, P. Zoller, *Quantum state engineering with photonic qubits*, Acta-Physica-Slovaca. 49, 523 (1999). [Abstract](#)
- S.J. van Enk, H.J. Kimble, J.I. Cirac, and P. Zoller, *Quantum Communication with dark photons*, Phys. Rev. A. 59, 2659 (1999). [Abstract](#)
- G. Morigi, J. Eschner, J.I. Cirac, P. Zoller, *Laser Cooling of two trapped ions: Sideband cooling beyond the Lamb-Dicke limit*, Phys. Rev. A. 59, 3797 (1999). [Abstract](#)
- G. Giedke, H. Briegel, J. I. Cirac, and P. Zoller, *Lower Bounds for Attainable Fidelities in Entanglement Purification*, Phys. Rev. A. 59, 2641 (1999). [Abstract](#)
- C. Cabrillo, J. I. Cirac, P. García-Fernández, and P. Zoller, *Creation of entangled states of distant atoms by interference*, Phys. Rev. A. 59, 1025 (1999). [Abstract](#)
- J. I. Cirac, and P. Zoller, *Engineering Entangled States of Trapped Ions*, Physics World, January (1999). [Abstract](#)
- D. Jaksch, H.-J. Briegel, J.I. Cirac, C. W. Gardiner, and P. Zoller, *Entanglement of atoms via cold controlled collisions*, Phys. Rev. Lett. 82, 1975 (1999). [Abstract](#)
- W. Dür, H.-J. Briegel, J. I. Cirac, and P. Zoller, *Quantum repeaters based on entanglement purification*, Phys. Rev. A. 59, 169 (1999). [Abstract](#) [Erratum](#): Phys. Rev. A. 60, 725 (1999). [Abstract](#)
- J. F. Poyatos, J. I. Cirac, P. Zoller *Characterization of decoherence processes in quantum computation*, Optics Express 2: (9) 372 (1998).
- S. van Enk, J.I. Cirac, P. Zoller, H. J. Kimble, and H. Mabuchi *Transmission of quantum information in a quantum network: A quantum optical implementation*, Fortschritte der Physik-Progress of Physics 46: (6-8) 689 (1998).
- Th. Busch, J.R. Anglin, J. I. Cirac, and P. Zoller, *Inhibition of spontaneous emission in Fermi gases*, Europhys. Lett. 44, 1 (1998). [Abstract](#)
- H.-J. Briegel, W. Dür, J. I. Cirac and P. Zoller, *Quantum Repeaters: The Role of Imperfect Local Operations in Quantum Communication*, Phys. Rev. Lett. 81, 5932 (1998). [Abstract](#)
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- P. Zoller, *Emission spectra of atoms strongly driven by finite bandwidth laser light*, J. Phys. B 11, 805 (1978).
- P. Zoller and F. Ehlotzky, *Resonance fluorescence in modulated laser fields*, J. Phys. B 10, 3023(1977).
- P. Zoller, *Fokker-Planck equation treatment of atomic relaxation and resonance fluorescence in phase modulated laser light*, J. Phys. B 10, L321 (1977).

## **Books**

- C.W. Gardiner, and P. Zoller, *Quantum Noise: A Handbook of Markovian and Non-Markovian Quantum Stochastic Methods with Applications to Quantum Optics*, Springer Verlag (1999). [Abstract](#)

### ***Contributions to Books and Proceedings***

- P. Zoller and J. I. Cirac, *Quantum information processing with atoms and ions*, Quantum Information Processing & Communications in Europe, Luxembourg: Office for Official Publications of the European Communities, pag. 155, November 2005, ISBN 92-894-8924-3.
- A. J. Daley, J. I. Cirac, and P. Zoller, The Development of Quantum Hardware for Quantum Computing , in *Disappearing Architecture*, (Ed. Georg Flachbart, Peter Weibel), pp.62-77 (Birkhauser, Basel, Switzerland, 2005).
- A.J. Daley, P.O. Fedichev, P. Rabl, A. Recati, J.I. Cirac, J. Von Delft, P. Zoller and W. Zwerger, *Spectroscopy of strongly correlated cold atoms*, Laser Spectroscopy, proceedings of the XVI International Conference (Ed. by P. Hannaford, A. Sidorov, H. Bachor and K. Baldwin - World Scientific)pp 145 - 152, Palm Cove, Queensland , Australia, 13-18 July 2003.
- L.-M. Duan, W. Dür, J.I. Cirac, D. Jaksch, G. Vidal, and P. Zoller, *Quantum computing and quantum communication with atoms*, Proceedings of the XVIII International Conference on Atomic Physics (Ed. by H. R. Sadeghpour, E. J. Heller, and D. E. Pritchard), pp 273-282 (2003). [Abstract](#)
- P. Zoller, J.I. Cirac, L. Duan, J.J. García-Ripoll, Quantum entanglement and information processing, "Quantum communication and quantum computing with cold atoms and photons", Les Houches Summer School - Session LXXIX, EuroSummer School, Chamonix valley, France, June 30- July 25 (2003). ([Lecture.pdf](#) 1799Kb)
- E. Pazy, E Biolatti, T. Calarco, I. D'Amico, P. Zanardi, F. Rossi and P. Zoller, "Paving the road for an all-optical spin-based quantum computer" Poster contribution to QCMC02 (Sixth International Conference on Quantum Communication, Measurement and Computing), MIT, Boston, USA, July 22-26, (2002).
- J. I. Cirac, L. M. Duan, P. Zoller, *Quantum optical implementation of quantum information processing*, Proceedings of International School of Physics "Enrico Fermi" Courses (2001). [Abstract](#)
- H.-J. Briegel, J. I. Cirac and P. Zoller, EPR correlations made useful. A quantum communication perspective, in "Cybernetics and Systems '98", R. Trappl, ed., Vienna: Austrian Society for Cybernetic Studies, ISBN 3 85206 139 3.
- H. -J. Briegel, J. I. Cirac, C. Gardiner, D. Jaksch, P. Zoller, Quantum computing in optical lattices, Technical Digest. Summaries of papers presented at the Quantum Electronics and Laser Science Conference. Postconference Edition. Opt. Soc. America, Wasington, DC, USA, 1999; 283 pp. p.112.
- H. -J. Briegel, T. Calarco, D. Jaksch, J.-I. Cirac, P. Zoller, Quantum optical systems for implementation of quantum information processes, Laser Spectroscopy. 14th International Conference. ICOLS99. World Scientific, Singapore; 1999; xxii+373 pp. p.256-65.
- H. -J. Briegel, J. I. Cirac, P. Zoller, Creation of Maximally Entangled Pairs of Atoms over a noisy channel: a finite-means approach, Proceedings of the 5th International Wigner Symposium, Vienna, Austria (August 25-29, 1997)

World Scientific Publishing Co. Pte. Ltd. 1998, edited by Peter Kasperkovitz and Dietrich Grau, pag. 422.

- H. Briegel, W. Dür, S. Van Enk, J. I. Cirac, P. Zoller, Quantum Communication and Computation. Proceedings of the International Conference on Atomic Physics (ICAP 98), in Windsor, Canada 3. - 7. Aug 1998. [preprint.pdf](#)
- T. Pellizzari, J. F. Poyatos, J. I. Cirac and P. Zoller, Quantum Computing and Decoherence in Quantum Optical Systems. Proceedings of the Third International Conference on Quantum Communication and Measurement (September 25-30, 1996, in Shizuoka, Japan) Plenum Press 1997, edited by O. Hirota, A. S. Holevo, and C. M. Caves., p. 159.
- J. I. Cirac, S. Gardiner, T. Pellizzari, J. Poyatos and P. Zoller, Synthesis of Entangled States and Quantum Computing. Fifteenth International Conference on Atomic Physics, Zeeman-Effect Centenary (August 5-9, 1996, in Amsterdam, The Netherlands), World Scientific Publishing 1997, edited by H. B. Van Linden Van Den Heuvell, J. T. M. Walraven and M. W. Reynolds, p. 16.
- P. Zoller, and C. W. Gardiner, Quantum noise in quantum optics, the Stochastic Schrödinger Equation, Les Houches (Session LXIII, 27 June-28 July 1995), Quantum Fluctuations Elsevier 1997, edited by S. Reynaud, E. Giacobino, and J. Zinn-Justin, p. 79. [Abstract](#)
- T. Pellizzari, S. Gardiner, and P. Zoller, Synthesis of entangled atomic states and quantum computations, in L. Mandel J.H. Eberly and E. Wolf, editors, Proceedings of the 8th Rochester Conference on Coherence and Quantum Optics, Plenum (1996). [Abstract](#)
- J.I. Cirac, R. Blatt, A.S. Parkins, and P. Zoller, Non-classical states of motion and quantum collapse and revival in an ion trap, in Quantum Optics VI, Proceedings of the Sixth International Symposium on Quantum Optics, Rotorua, New Zealand, pages 112-120, Berlin, Heidelberg, January 24-28 1994, Springer-Verlag.
- H.-R. Xia, B. Kohler J. I. Cirac and S. Swartz, D. S. Elliott, J. L. Hall, and P. Zoller, Intensity dependent phase shifts in frequency modulation spectroscopy, in Laser Spectroscopy, XI th International Conference, AIP Conf. Proc. 290, page 302 (1994).
- P. Zoller A. S. Parkins, P. Marte and H. J. Kimble, Fock state superpositions in cavity QED with dark atoms, in Fundamentals of Quantum Optics, volume III, page 210, Springer-Verlag (1993).
- J. I. Cirac, R. Blatt, A. S. Parkins, and P. Zoller, Non-classical states of motion in an ion trap, in F. Ehlotzky, editor, Fundamentals of Quantum Optics, Volume III, page 156. Springer-Verlag (1993). [Abstract](#)
- P. Zoller P. Marte and J. L. Hall, Coherent deflection of atoms by adiabatic passage in multilevel systems, in A. D. Bandrauk and S. C. Wallace, editors, Coherence Phenomena in Atoms and Molecules in Laser Fields, NATO ASI Series. Plenum, 1991.
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- P. Zoller, G. Alber, and . Giusti-Suzor, A quantum defect theory of Rydberg states in laser fields, in H. B. Gilbody, W. R. Newell, F. H. Read, and A. C. H. Smith, editors, Electronic and Atomic collisions (Proceedings of ICPEAC), p. 557, Amsterdam, Oxford, New York, Tokyo (1988), North Holland.

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- P. Zoller, Rydberg thresholds in laser fields, applying MQDT to quantum optics problems in quantum optics, in A. Kujawski and M. Lewenstein, editors, Proceedings of the Sixth Summer School on Coherent Optics, Ustron, Poland, Sep. 19-26 1985.
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- P. Zoller, E. Matthias, and S. J. Smith, Configuration interaction in multiphoton ionization, in A. Barut et al., editor, Proceedings of the NATO Summer School on Quantum Optics (1983).
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- P. Lambropoulos and P. Zoller, Multiphoton processes in non-monochromatic electromagnetic fields(invited paper), in Proceedings of the Second International Conference on Multiphoton Processes (ICOMP), Budapest, April 1980.
- A. T. Georges, P. Lambropoulos, and P. Zoller, Saturation and stark-splitting of resonant transitions in stochastically fluctuating laser fields of arbitrary bandwidth, in H. Walter and K. W. Rohte, editors, Laser Spectroscopy IV, p. 368. Springer Verlag (1979).

### ***Organizer and Workshops***

- Co-organizer at the Bose-Einstein Condensation and Quantum Information, International Symposium at the Erwin Schrödinger Institute for Mathematical Physics Vienna, *Cold Atoms and Molecules in Optical Lattices*, 17. - 20. Dec. (2005).
- Collaboration meeting Harvard - Yale, *Polar Molecules in Optical Lattices*, Yale University, New Haven, USA, 21 September (2005).
- International School of Physics "Enrico Fermi" on "Quantum Computers, Algorithms and Chaos", Varenna, Italy, July 5th - 15th (2005).
- ITAMP workshop, Mesoscopic Physics, Quantum Optics, and Quantum Information, "Single Atom Switches and Mirrors by Quantum Interference: Single Atom Transistors", Harvard University, May 10 (2004).
- Workshop on Fundamentals of Solid State Quantum Information Processing, "Interfacing quantum optical and solid state qubits", Lorentz Center, Leiden University, 08 - 12 December (2003).
- Pan American Advanced Studies Institute on the Physics of Information, Summer School and Workshop on the Physics of Information, "Quantum computing with trapped ions", "Quantum computing with neutral atoms", "Quantum communication with atomic ensembles", Búzios, Brazil, 04 - 09 December (2003).

- Co-organizer at the ASPEN 2003 Summer Program, "Exploring the Interface Between Cold Atom and Condensed Matter Physics: From Strong Correlation To Entanglement", Aspen Center for Physics, Aspen, Colorado, USA, 16 June - 6 July (2003).
- Organizer at the Obergurgl Meeting 2003, Obergurgl (Ötztal), Tirol, February 23 - March 1 (2003).
- IQEC/LAT 2002 „International Quantum Electronics Conference“, Program co-chair for the section „Quantum Information and Quantum Computing“, Moscow, June 22-28 (2002).
- Co-organizer at the "Quantum computers and Quantum Chaos" Conference, Villa Olmo, Como, Italy, June 28-30 (2001).
- Harvard Workshop "Quantum Information and Entanglement" Boston, Harvard, March (2001).
- Australia Quantum Information Theory Workshop, "*Many-particle entanglement with atomic ensembles*", Jan.21-25 Greenmount Beach Resort, Gold Coast, (2001).

### ***Invited Talks***

- *Quantum information processing with polar molecules*, Noosa Blue Resort, Australien, 22-26 January (2006).
- Urania, *Quanten - Einsteins ungeliebte Kinder*, Institute for Theoretical Physics Karl-Franzens University Graz, 14. Dec. (2005).
- QCCC, PhD Programme Quantum Computing, Control & Communication, *Quantum-Information Processing Implemented by Quantum Optics*, Max-Planck-Institute for Quantum Optics MPQ, Garching, 12. Dec. (2005).
- GDEST Quantum Information and Coherence, National Academy of Sciences and Max Planck Society, *Quantum computing with polar molecules*, Munich, 8 - 9 Dec. (2005).
- *Quantencomputer*, Öffentlicher Vortrag an der Volkshochschule Innsbruck, 24. Nov. (2005).
- UNESCO Niels Bohr Medal, *Quantum Information with Quantum Optics*, Copenhagen, 15. Nov. (2005).
- Symposium on Quantum Information, Royal Danish Academy of Sciences and Letters, *Quantum Information Processing and Quantum Optics with Polar Molecules*, Copenhagen, 18. Nov. (2005).
- Österreichischer Wissenschaftstag 2005 "Bilanzen und Perspektiven", "Quantenphysik in Österreich", Semmering 27.-29. Okt 2005.
- IAC meeting, Institute for Applied Physics and Computational Mathematics, Beijing, China, 29 September (2005).
- ESF Research Conference on Bose-Einstein Condensation, EuroConference on Ultracold Gases and their Applications, *Quantum information and strongly correlated systems with cold atoms in optical lattices*, Sant Feliu de Guixols (Costa Brava), Spain, 10 – 15 September (2005).
- Tyrol Day, Research excellence in Tyrol: Physicists as a case in point, Alpbach, Austria, 21. August (2005).
- International Workshop on Physical Sciences at the Microscale and IAAC Meeting of HFNL, *Quantum optical and solid state implementation of quantum information*, Hefei, China, Aug 9 (2005).

- Quantum Physics of Nature & 6th European QIPC Workshop, *Quantum optics - solid state interfaces: from quantum repeaters to nanotraps*, University of Vienna, Austria, May 20th - 21st (2005).
- International Symposium on Nanoscience and -Technology, "Quantum information processing: from quantum optical systems to solid state", Mauterndorf, Province of Salzburg, Austria, 29. March -1. April (2005).
- ESF-JSPS Frontier Science Conference on "Quantum Information and Quantum Physics", *Quantum Information Processing and Condensed Matter Physics with Cold Atoms*, Kanagawa, Japan, 12-18 march (2005).
- 5th European Quantum Information Processing & Communication Workshop, *Quantum computing with quantum optical systems*, Università di Roma, La Sapienza, Rom, 20 -22 September (2004).
- The Brijuni Conference - Exploring fundamental problems in science, Quantum computing and quantum communication with quantum optical systems, Brijuni (Brioni) Island, Croatia, 30 August - 3 September (2004).
- Boulder Summer School for Condensed Matter and Material Physics, "Introduction to Ideas and Techniques of Quantum Optics", 5 - 30 July (2004).
- Quantum Information with Atoms, Ions and Photons, "Single atom switches in optical lattices", La Thuile, Italy, 6 - 12 March (2004).
- 9th Japan-US Seminar on Quantum Correlation and Coherence, "Atomic Quantum Dots", Yatsugatake, Japan, 17 - 19 September (2003).
- Quantum Information and Ordered Systems, NORDITA/QUANTOP(NBI), "Cold atoms in optical lattices: from strongly correlated systems to entanglement", Copenhagen, 11-13 September (2003).
- Symposium Quantum Challenges, "Atomic Quantum Dots", Warsaw, Poland, 4 - 7 September (2003).
- ICOLS 03 - 16th International Conference on Laser Spectroscopy, "Engineering strongly interacting condensed matter systems with cold atoms", Palm Cove, Tropical North Queensland, Australia, 13 - 18 July (2003).
- Les Houches Summer School - Session LXXIX, Euro Summer School, Quantum entanglement and information processing, "Quantum communication and quantum computing with cold atoms and photons", Chamonix valley, France, June 30- July 25 (2003). ([Lecture.pdf](#) 1799Kb)
- CLEO/Europe - EQEC 2003, European Conference on Lasers and Electro-Optics and the European Quantum Electronics Conference, "Quantum Engineering with Cold Atoms", Munich ICM, June 23 - 27 (2003).
- Start- und Wittgensteinveranstaltung FWF, "Quantum Information with Quantum Optics", Wien, June 14 (2003).
- GRC Program on Quantum Information Science, "Quantum Computing with Neutral Atoms", Ventura-California, March 23-28 (2003).
- XIII Chilean Physics Symposium, *Quantum computing and quantum communication with quantum optics*, Concepción, Chile, November 13-15 (2002).
- Schrödinger Lecture Series, *Quantum Computing and Quantum Communication*, University of Cork, University of Limerick, and Trinity College Dublin, November 05-07 (2002).
- Special Symposium on "Coherent and strong field interactions of laser radiation with matter", "*Quantum computing with quantum optical systems - the ultimate form of quantum control*", Elounda Bay, Crete, Greece, October 23 (2002).

- AMO Symposium, Department of Energy, Airlie, Virginia, USA, October 07 (2002).
- ICAP2002 "18th International Conference on Atomic Physics", "Quantum Information Processing with Neutral Atoms", Cambridge, Massachusetts, USA, July 27 - August 02 (2002).
- TH-2002 "International Conference on Theoretical Physics" UNESCO, "Quantum Communication: Concepts and Quantum Optical Implementation", Paris, July 22-27 (2002).
- AAAS Annual Meeting, Conquering the Light: Quantum Storage, Teleportation and Communication: *Quantum Repeater with Atomic Ensembles*, Boston, February 16 (2002).
- Aspen Winter Conference on Condensed Matter Physics: Quantum Coherence and Dissipation, *Theory of atoms in traps and lattices*, Aspen Center for Physics, February 12 (2002).
- Collège de France Seminar, Paris, January 07-10 (2002)
- XXII International Solvay Conference in Physics, "The Physics of Communication", Delphi and Lamia, Greece, November 24-30 (2001).
- CUA-ITAMP Workshop, Beyond BEC: Ultracold Atoms beyond Mean-Field Physics, "Quantum Information & Cold Atoms" Cambridge, November 2-3 (2001).
- Conference Huang-Shan on Quantum Information, China, September 3 - 9 (2001).
- International School of Physics "Enrico Fermi", "Experimental Quantum Computation and Information", Varenna, Lago di Como, Italy, July 17- 27 (2001). Article.
- Quantum Applications Symposium 2001, "Implementation of Quantum Computing and Quantum communications with Quantum Optical Systems", University of Michigan, Ann Arbor, Michigan, July 1-3 (2001).
- 16th International Supercomputer Conference (SC2001), Heidelberg Convention Center, "*The post Moore's Law era: Quantum Computing*", Heidelberg, June 21 - 23 (2001).
- International Conference on Quantum Information (ICQI) and Eighth Rochester Conference on Coherence & Quantum Optics (CQO8), University of Rochester, Rochester, New York, June 11-13 (2001).
- 4th Annual Workshop on Resonances and Time Asymmetric Quantum Theory, Universidad de Zaragoza, Jaca, Spain, June (2001).
- 75 Jahre Schrödinger Gleichung, Wien Erwin Schrödinger Institut, "*Engineering quantum entanglement*", Vienna, Mai (2001).
- Information Society Technologies Event 2000 NICE, "*Quantum computing & communications: Quantum Optical Implementations*", Nice, November 08 (2000).
- Festkolloquium 75 Jahre Quantenmechanik, "*Quantum computing & communications*", Göttingen, October 30 (2000).
- Scuola Normale Superiore, Pisa, Italy, October 13. (2000).
- Quantum Optics XI, *Euroconference 2000*, Mallorca, Spain "*Quantum Computation with Atoms and Ions*", October 14 - 19 (2000).
- Physics Event ÖPG 2000, *Austrian Physical Society*, Karl-Franzens University Graz, "*Quantum Computing and Quantum Communications: a Quantum Optical Perspective*", September 25 - 29 (2000) Talk.pdf 722 Kb

- Mysteries, Puzzles and Paradoxes in Quantum Mechanics, Gargnano (Lago di Garda), "*Quantum Communication between atomic ensemble using coherent light*", September 18 - 20 (2000)
- Euro conference on Atom Optics and Interferometry, Cargèse (Corsica) July 25 - 27 (2000)
- Benasque Center for Science, Spain, July 11 - 18 (2000)
- Quantum Communication Measurement and Computing, Capri, "*Fast quantum gates for neutral atoms*" July 02 -09 (2000)
- CLEO/QELS 2000, San Francisco, "*Purification of Gaussian States*" May 07-12 (2000).
- Quantum Information Science (QIS) Workshop in Arlington, Washington, USA, "*Quantum Computing with Atoms*" October 28 - 29 (1999).
- Workshop on Entanglement and Decoherence in Palazzo Feltrinelli, Gargnano, Garda Lake, Italy September 20-25 (1999).
- Conference "*Bose-Einstein Condensation*", San Feliu de Guixols, Spain. September 11 -16 (1999).
- Benasque Center for Science, Spain, "*Quantum Gases and Quantum Liquids*" July 04 - 24 (1999).
- Atomic Physics Gordon Conference in New Hampshire/USA, Plymouth State College, July 05 - 09 (1999).
- APS Centennial Meeting, Georgia World Congress Center, "*From Bose condensates in optical lattices to quantum*", Atlanta, March 25 (1999).
- Workshop on Bose-Einstein Condensation and Degenerate Fermi Gases, "*Cold Bosonic Atoms in Optical Lattices and Applications*", JILA Auditorium, University of Colorado February 10. - 12. (1999).
- Pathfinder Quantum Computing and Communication Project, "*Quantum computing and communications: quantum optical in implementations*" Helsinki Conference, September 26. - 28. (1998).
- Epistemological & Experimental Perspectives on Quantum Physics (International Symposium), "*Quantum Repeaters for Communication*", Vienna, September 3. - 6. (1998).
- Spring Meeting of the German Physical Society (Quantum Optics), "*quantum computing and quantum communications*" Konstanz, March 16.- 19. (1998).
- School on nonlinear and quantum optics, Universidade de São Paulo, S. Carlos, SP, Brazil, January 12.-17. (1998).
- Royal Society Discussion Meeting, "*Quantum computation: theory and experiment, Quantum computation with cold trapped ions, theory and experiment*", London, November 5.- 6. (1997).
- Universidad de Castilla la Mancha, Física aplicada y Matemática aplicada, Almagro meeting on Quantum Information, Analytical and computational studies of Bose-Einstein condensates dynamics, Almagro, Spanien, Oct 16. - 19. (1997).
- European Research Conference on ``Quantum Optics'', Communication in a quantum network, quantum optical implementations, Castelvecchio Pascoli, Italy, Sep 13-18 (1997).
- ITAMP Topical Group Meeting, Experimental Realizations of Quantum Logic, Harvard University, Cambridge, USA, August 1-15 (1997).
- European Research Conference on ``Bose Einstein Condensation'', Kinetics of Bose-Einstein Condensation in a Trap, Castelvecchio Pascoli, Italy, July 15 (1997).



- Working Conference on Quantum Optics and Quantum Computation, Quantum state transfer among distant nodes in a quantum network, a Quantum Optical implementation, Scuola Normale Superiore, Pisa, Italy, June 25-28 (1997).
- Workshop on Basic Quantum Concepts and Phenomena, University of Uppsala, Sweden, June 18 (1997).
- Nobel Symposium 104, Modern Studies of Basic Quantum Concepts and Phenomena, Uppsala, Sweden, June 13-17 (1997).
- Symposium in honor Glauber (honorary doctorate), University Essen, Essen, Germany, June 12 (1997)
- Workshop "Open Quantum Systems, Information and Irreversibility", Correcting for decoherence in quantum transmission and quantum computations, Istituto Italiano per gli Studi Filosofici, Naples, April 04 (1997).
- "Virtuelles Institut für Quanten-Informatik", Theoretisch-Physikalische Aspekte, Schloß Dagstuhl, Wadern, Germany, Feb. 21 (1997).
- Workshop on Atom Lasers, Optical Sciences Center, University of Arizona, Tucson, Arizona, Jan. 23-24 (1997)
- Quantum Communication and Measurement Conference, Japan, Sep 1996
- EQEC, Hamburg, Sep 1996 (Tutorial)
- ZICAP, Amsterdam, Aug 1996
- Workshop on Quantum Computation, Pisa, Jun 1996
- QELS, Anaheim, May 1996
- Les Houches, Workshop on Bose Einstein Condensation, Apr 1996
- Quantum Nondemolition Measurement, Konstanz, Mar 1996
- Norddeutscher Lasertag, Hannover, Dec 1995
- Research Conference on Quantum Optics, Davos, Switzerland, Sep 1995
- Gordon Conference on Atomic Physics, Brewster Academy, Wolfeboro, NH, July 1995
- LIC-C'95, Workshop on Laser Assisted Dynamic Interactions, Elounda, Crete, May 1995
- Main Lecturer at Les Houches (Session LXIII, 27 June-28 July 1995), Quantum Fluctuations
- Rochester Conference on Quantum Optics and Coherence, Jun 1995
- Workshop on Quantum Optics, Corvara Jan 1995
- Workshop on Quantum Electronics, Snowbird, Utah, Jan 1995 (Plenary talk)
- Tagung der Österreichischen Physikalischen Gesellschaft, Innsbruck, Sep 1994
- US-Japan Laser Seminar, Napa Valley, 7 Aug 1994
- International Conference on Quantum Electronics (IQEC'94), Anaheim, May 1994
- Research Conference on Quantum Optics, Davos, Switzerland, Sep 1993
- Gordon Conference on Nonlinear Optics, Brewster Academy, Wolfeboro, NH, Aug 1993
- Gordon Conference on Atomic Physics, Brewster Academy, Wolfeboro, NH, July 1993
- Workshop on Elements of Quantum Optics, Kühtai, Austria, Mar 1993
- Workshop on Coherence and Interference in Atomic Physics and Quantum Optics, Crested Butte, CO, Sep 1992
- OSA Annual Meeting, Albuquerque, NM, Sep 1992
- Workshop on Atomic Interferometry, Konstanz, Germany, Jun 1992
- QELS, Annaheim, CA, May 1992 DAMOP, Chicago, May 1992

- Workshop on Coherent Atom-Laser Interactions, International Center for Theoretical Physics, Trieste, Feb/Mar 1992
- NSF Workshop on Autoionizing States in External Fields, JILA, University of Colorado, Boulder, CO Aug 1991
- Workshop on Foundations of Quantum Mechanics, Santa Fe, NM, Jun 1991
- NATO Workshop on Quantum Measurements in Optics, Cortina, Italy, Jan 1991
- NATO Workshop on Coherence in Atomic and Molecular Interactions, Hamilton, Canada, May 1991
- Quantum Optics Conference, Hyderabad, India, Jan 1991 (paper given by H. Ritsch)
- European Group of Atomic Spectroscopy (EGAS), conference, Uppsala, Sweden, Jul 1990
- Schwerpunkt Atomphysik, Arbeitstreffen der Deutschen Forschungsgemeinschaft, Freiburg, FRG, Apr 1990
- Gordon Conference on Atomic Physics, New London, NH, Jul 1989
- Frühjahrstagung der DPG/ÖPG, Quantenoptik, Hauptvortrag, Essen, FRG, Mar 1989
- Finnish-Soviet Laser Seminar, Helsinki, Apr 1988
- Atoms in Strong Fields, Grainau, FRG, Sep 1988
- IX Vavilov Conference (Seminar), Jun 1987
- ICPEAC 1987 (Progress Report), Brighton, England, Jul 1987
- International Conference on Quantum Electronics (IQEC) IV, Baltimore, Apr 1987
- Nordita Summer School, Sonderbjorg, Denmark, Aug 1986
- Fourth Workshop on Quantum Optics, Hamilton, New Zealand, Feb 1986
- Sixth Summer School on Coherent Quantum Optics, Ustron, Poland, Sep 1985
- Second European Conference on Atomic and Molecular Physics, Amsterdam, Apr 1985
- XXIII. Internationale Universitätswochen für Kernphysik, Schladming 1984, Stochastic Methods and Computer Techniques in Quantum Dynamics, Feb 1984
- International Conference on Multiphoton Processes (ICOMP) III, Heraklion, Crete, Sep 1984
- Tagung der Österreichischen Physikalischen Gesellschaft, Linz, Sep 1983
- Fifth Conference on Quantum Optics and Coherence, Rochester, Jun 1983
- NATO-Summer School, Fundamentals of Quantum Optics, Boulder, CO, May 1983
- International Conference on Multiphoton Processes (ICOMP) II, Budapest, Jun 1980
- Second New Zealand Summer School on Laser Physics, Hamilton New Zealand, Jan 1980

### ***Colloquia and Seminars***

- *QIPC with polar molecules*, University of Otago, Dunedin, Feb 1 2006 (Seminar).
- Tsinghua University, 28 September (Seminar).
- *Quantum Noise in Quantum Optics and Quantum Information*, Tsinghua University Beijing, China, Aug 5, 2005 (2 Lectures).

- *Quantum Phase Transitions - an exactly solvable model*, Instituut-Lorentz for Theoretical Physics, University of Leiden, The Netherlands, June 7, 2005 (Seminar).
- *Quantum information with cold atoms*, Colloquium of the Institute for Theoretical Physics, University of Amsterdam, June 2, 2005 (Colloquium).
- *Quantum information processing with atoms and ions*, Colloquium Ehrenfestii, Instituut-Lorentz for Theoretical Physics, University of Leiden, The Netherlands, June 1, 2005 (Colloquium).
- *Solid State and Optics Seminar and CQUP Distinguished Visitor Lecture: "A Tutorial on Ion Trap Quantum Computing and Gates"*, Faculty of Engineering, Yale University, New Haven, Connecticut, USA, May 10 (Lecture).
- *Solid State and Optics Seminar and CQUP Distinguished Visitor Lecture: "Quantum Repeater: Quantum Optics and Solid State Implementations"*, Faculty of Engineering, Yale University, New Haven, Connecticut, USA, May 9 (Lecture).
- *Quantum information processing with atoms and ions*, Seminars Institute for Theoretical Physics and Spinoza Institute, Utrecht University, The Netherlands, April 27, 2005 (Colloquium).
- *Quantum Optics and Quantum Information*, Lorentz Chair, Instituut-Lorentz for Theoretical Physics, University of Leiden, The Netherlands, April 14-28, 2005 (3 Lectures).
- *Cold atoms: from quantum information to condensed matter physics*, 69. Jahrestagung der Deutschen Physikalischen Gesellschaft (DPG; German Physical Society), Humboldt-Universität zu Berlin, March 7, 2005 (Talk).
- "QIPC Roadmap" - Strategic report on current status, visions and goals for quantum information processing research in Europe, February 2005 (Talk).
- *Cold atoms and quantum information*, University of Graz, February 1, 2005 (Colloquium).
- *Ultrakalte Gase in optischen Gittern*, Fakultät für Physik, Universität Karlsruhe (TH), January 14, 2005 (Colloquium).
- *Kalte Atome: von Quanteninformation bis exotische Quantenphasen*, Theoretical Physics in Essen, University of Duisburg-Essen, January 13, 2005 (Colloquium).
- Department of Electrical Engineering, University of Princeton, December 3, 2004 (Colloquium).
- Tsinghua University, "Quantum computing with trapped ions and atoms, and the quantum repeater", Chair Professor, Beijing, China, November 2004 (3 Lectures).
- The University of Science and Technology, "Quantum information with quantum optics", Yan Jici Chair Professorship, Hefei, China, November 2004. LOB-Lecture, Department of Physics, University of Harvard, November 27 - December 2, 2004 (Colloquium).
- Tutorial for Exotic Quantum Phases and Quantum Gases Program, Kavli Institute for Theoretical Physics, University of California at Santa Barbara, May 5, 2004.
- Department of Physics, University of California at Santa Barbara, April 18, 2004 (Colloquium).
- NIST Gaithersburg, February 25, 2004 (Seminar).
- The Morris Loeb Lectureship, Harvard University Department of Physics, Cambridge, February 02 - 22, 2004 (Lectures and Colloquium).
- Universität Stuttgart, 27. January 2004 (Colloquium).

- "Atomic Impurities in Optical Lattices: from Transport to Quantum Switches", Center for Ultracold Atoms, Harvard / MIT, November 25, 2003 (Seminar).
- Theoretical Physics Seminar, "Quantum Optics: Theory", ETH Zurich, May 19, 2003 (Seminar).
- Open Information Workshop - QIPC review meeting, "Qubits technologies: overview and current status", Bad Nauheim, Germany, March 10 - 11, 2003
- "Quantum Computing and Quantum Communication", Quantum Optics Group at the ETH Zurich, November 11, 2002 (Colloquium).
- Condensed Matter Theory Seminar, Univ of Maryland, College Park, Maryland, USA, October 8, 2002 (Seminar).
- "Quanteninformation mit Methoden der Quantenoptik", LMU, Munich, June 4, 2002 (Seminar).
- Quantum Information Science (QIS) Summer School, Hotel Europa Tyrol in Innsbruck, May 30, 2002 (Seminar).
- Center for ultracold atoms, MIT, February 19, 2002 (Seminar).
- JILA, University of Colorado, February 2, 2002 (Seminar).
- SFB Hannover, Quantum communication with atomic ensembles, Hannover, December 12, 2001 (Sonderkolloquium).
- Harvard University, Department of Physics, Monday Colloquia, November 5, 2001 (Colloquium).
- Caltech, September 21, 2001 (seminar).
- Institute for Theoretical Physics, University of California at Santa Barbara, Member of the quantum information program pedagogical lecture, September 24, 2001 (Seminar).
- Institute for theoretical physics, Chinese Academy of Sciences, Beijing, August 31, 2001 (Seminar).
- NIST Gaithersburg, August 07-08, 2001 (2 Seminars).
- University of Heidelberg, Physikalisches Institut Heidelberg, June 22, 2001 (Colloquium).
- University of Connecticut, Storrs, USA, March 12, 2001 (Colloquium).
- California Institute of Technology, Los Angeles, May 05, 2000 (Seminar).
- 26th Hanan Rosenthal Lecture, Yale, Mar 24, 2000.
- Quantum Computing Seminar, ITAMP Harvard, Rydberg gates, Mar 21, 2000.
- University of Rochester, New York, 10. Nov. 1999 (Colloquium).
- NIST Gaithersburg, MD, 09. Nov 1999 (3 Seminars).
- Laboratoire Kastler-Brossel, Department de Physique de l'ENS, Paris, Juni 01, 1999 (Seminar).
- University of Auckland, "Cold Bosonic Atoms in Optical Lattices and Applications", 19. Feb 1999 (Seminar)
- University of Otago, "Entanglement via Cold Coherent Collisions", Dunedin 03. March 1999 (Seminar)
- University of Otago, "Quantum optical implementations of quantum computing and quantum communications", Dunedin 08. March 1999 (Colloquium)
- University of Leiden, Dec 15, (1998) (Seminar)
- FOM-Institute for Atomic and Molecular Physics (AMOLF), *Quantum Communications*, Amsterdam, The Netherlands, Dec 14, (1998) (Colloquium)
- Universität Augsburg, *Quantum Communications*, Augsburg, November 16, (1998) (Colloquium)
- Baltimore Convention Center, *Quantum Communications*, Maryland, October 4. - 9. (1998) (Colloquium)

- Bill Phillips, Nist Gaithersburg, *Quantum Computing with Optical Lattices*, October 10. - 14. (1998) (seminar)
- Institute for Theoretical Physics, University of California at Santa Barbara, *BEC and Quantum Computing?*, June 1998 (seminar)
- Caltech, Pasadena, *Cold bosonic atoms in optical lattices*, May 1998 (seminar)
- JILA, University of Colorado, *Cold bosonic atoms in optical lattices*, May 1998 (seminar)
- Institute for Theoretical Physics, University of California at Santa Barbara, Feb 1998 (seminar)
- Universität Bonn, Physikalisches Institut, Quantum computing, Nov 14. (1997) (Colloquium)
- Karlsruhe University, April 25 (1997) (Colloquium)
- Harvard University, Mar 03 (1997) (Colloquium)
- Universität Saarbrücken, Feb 20 (1997) (Colloquium)
- JILA, Boulder, University of Colorado, Jan 1997 (Seminar)
- Optical Sciences Center, University of Tucson, Jan 1997 (Colloquium)
- Caltech, Jan 1997 (Seminar)
- Universität Wien, Jan 1997 (Seminar)
- Universität Düsseldorf, Nov 1996 (Colloquium)
- Quantum Computing Workshop ITP, Santa Barbara, Oct 1996 (2 Seminars)
- Max-Planck Institute for Plasmaphysics, Munich, Mar 1996 (Colloquium)
- University of Auckland, Feb 1996 (Seminar)
- University of Wellington, Feb 1996 (Colloquium)
- Victoria University, Wellington, New Zealand, Feb 1996 (Seminar)
- University of Auckland, New Zealand, Feb 1996 (Seminar)
- Caltech, Jan 1996 (Seminar)
- Joint Symposium on Quantum Optics `95, Abteilung für Quantenphysik, Universität Ulm, 27-28 November 1995
- Universität Karlsruhe, Dec 1995 (Seminar)
- Universität Kaiserslautern, Dec 1995 (Colloquium)
- Universität Freiburg, Dec 1995 (Colloquium)
- Universität München, Mar 1995 (Colloquium)
- University of New Mexico, Oct 1995 (Seminar)
- Los Alamos, Oct 1995 (Seminar)
- JILA, University of Colorado, Oct 1995 (Seminar)
- Caltech, Jan 1995 (Seminar) JILA, University of Colorado, Jan 1995 (Seminar)
- Max-Planck Institute for Quantum Optics, Munich, Dec 1994 (Seminar)
- University of Las Vegas, Nevada, Mar 1994 (Colloquium)
- University of Oregon, Eugene, OR, Feb 1994 (Colloquium)
- Colorado School of Mines, Golden, Oct 1993 (Colloquium)
- Univ. of Edmonton, Canada, Aug 1993 (Seminar)
- Univ. of Hamburg, Hamburg, Mar 1993 (Seminar)
- Max Planck Institut für Quantenoptik, Munich, Mar 1993 (Seminar)
- Univ. of Texas, Austin, Jan 1993 (Atomic Physics Seminar)
- Caltech, Jan 1993 (Seminar)
- NIST Gaithersburg, Mar 1992 (Seminar)
- University of Wyoming, Laramie, Feb 1992 (Colloquium)
- Max Planck Institut für Quantenoptik, Garching, Jan 1992 (Seminar)
- Universität Innsbruck, Jan 1992 (Colloquium)
- Dept. of Physics, University of Rochester, Oct 1991 (Seminar)

- Caltech, Sep 1991 (Seminar) Institute of Optics, University of Rochester, Oct 1991 (Colloquium)
- University of Southern California, Sep 1991 (Colloquium)
- University of Dunedin, New Zealand, Dec 1990 (Colloquium, Seminar)
- University of Queensland, Brisbane, Australia, Dec 1990 (Colloquium)
- University of Auckland, New Zealand, Nov 1990 (Seminar)
- Universität Konstanz, Apr 1990 (Colloquium)
- Harvard University, Boston, Apr 1990 (Colloquium)
- Universität Ulm, Apr 1990 (Seminar)
- JILA, University of Colorado, Mar 1990 (Colloquium)
- Atominstytut der Österreichischen Hochschulen, Wien, Dec 1989 (Seminar)
- Universität Linz, Austria, Nov 1989 (Seminar)
- New York University at Stony Brook, Jul 1989 (Seminar)
- Universität Graz, Austria, Apr 89 (Seminar)
- Universität Göttingen, Germany, Jan 1989 (Seminar)
- Technische Universität Graz, Austria, Nov 1988 (Seminar)
- Optical Sciences Center, Tuscon, Arizona, Mar 1988 (Colloquium)
- JILA, University of Colorado, Mar 1988 (Colloquium)
- University of Lincoln, Neb, Feb 1988 (Colloquium)
- JILA, University of Colorado, Feb 1988 (Colloquium)
- FOM-Institute, Amsterdam, Nov 1987 (Colloquium)
- ETH Zürich, Nov 1987 (LaserSeminar)
- Universität Freiburg, Nov 1987 (Colloquium)
- Universität Essen, Jun 1986 (Seminar) Universität München, Jan 1987 (Seminar)
- Universität Hamburg, Jun 1986 (Seminar)
- University of Dunedin, New Zealand, Mar 1986 (Seminar)
- Research Institute for Theoretical Physics, Helsinki Oct 1985 (Seminar)
- Institute of the Polish Academy of Sciences, Feb 1985 (Seminar)
- University of Warsaw, Feb 1985 (Seminar)
- General Physics Institute, Moscow, Feb 1985 (Seminar) Ioffe Institute, Leningrad, Feb 1985 (Seminar)
- JILA, University of Colorado, Dec 1985 (Seminar)
- University of Notre Dame, Ind, Nov 1985 (Seminar)
- Freie Universität Berlin, Feb 1984 (Colloquium and Seminar)
- JILA, University of Colorado, Apr 1983 (Seminar) Universität Zürich, Dec 1983 (Colloquium)
- JILA, University of Colorado, Sep 1982 (Colloquium)
- Universität Freiburg, May 1982 (Colloquium)
- Research Institute for Theoretical Physics, Helsinki Mar 1982 (Seminar)
- Universität Ulm, Oct 1981 (Colloquium)
- University of Lincoln, Neb, Aug 1981 (Seminar and Colloquium)
- JILA, University of Colorado, Aug 1981 (Seminar)
- University of Warsaw, Oct 1980 (Seminar)