

## **HOMEPAGE HANS J. BRIEGEL**

**Prof. Dr. Hans J. Briegel**

**Professor of Physics**

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**Institute of Theoretical Physics**

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### **Areas of Research**

Quantum Information and Computation, Theoretical Quantum Optics,  
Foundations of Quantum Mechanics.

### **Education**

Diploma in Physics: Ludwig-Maximilians-Universität München, Sept. 1990.

Thesis: *Quantisation of the relativistic Hamiltonian of a spinless particle*

Doctorate (Ph.D.) in Theoretical Physics, LMU München, April 1994.

Thesis: *Dissipative Jaynes Cummings model and applications to microlasers*

Habilitation in Theoretical Physics, LMU München, July 2002.

Thesis: *Quantum information and computer*

### **Professional Experience**

Jan 05 - present

Head of the Institute of Theoretical Physics, University of Innsbruck

Scientific Director at the Institute for Quantum Optics and Quantum Informa

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|----------------------------|---|
| Jan 04 - present           | Austrian Academy of Sciences<br>Chair Professor, Tsinghua University, Beijing |
| Nov 04<br>Nov 03 - present | Full Professor, University of Innsbruck<br>Privatdozent University of Munich  |
| Nov 02 - Oct 03            | Wissenschaftlicher Assistent, University of Munich                            |
| Sep 97 - Oct 02:           | TMR-Postdoc, University of Innsbruck  |
| Juli 97 - Aug 98:          | Visiting Scientist, Harvard-Smithsonian Center for Astrophysics               |
| Juli 96 - May 97:          | Postdoctoral Fellow, Harvard University                                       |
| Jan 96 - Dec 96:           | Research Associate, Texas A&M University                                      |
| Apr 94 - Dec 95:           |   |

## **Fellowships**

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|----------|---|
| 1994-97: | Feodor Lynen Fellow (Alexander von Humboldt Foundation) |
| 1996-97: | Smithsonian Fellowship (ITAMP)                          |
| 1991-93: | Studienstiftung des deutschen Volkes                    |
| 1990-91: | University of Munich (State of Bavaria)                 |
| 1986-87: | German Academic Exchange Service (DAAD)                 |

## **Grants**

DFG - German Research Foundation

Projects: (1) *Quantum computing based on atom interferometry*

(2) *Role of imperfect and noisy operations in quantum communication*

PROSECCO - IST-2001-39227- European Community Project (Partner)

QUPRODIS - IST-2001-38877- European Community Project (Partner)

## **Publications**

Preprints

Papers

Book contributions

Proceedings

Seminars and Colloquia

Invited conference talks

Contributed conference talks

## **Preprints**

J. Calsamiglia, L. Hartmann, W. Dür and H.-J. Briegel

**Entanglement and decoherence in spin gases**

E-print: quant-ph/0502017.

O. Gühne, G. Toth and H.-J. Briegel

**Multipartite entanglement in spin chains**

E-print: quant-ph/0502160.

C. Mora, H.J.Briegel

**Algorithmic complexity of quantum states**

E-print quant-ph/0412172.

W. Dür, J. Calsamiglia and H.-J. Briegel

**Blind purification of multipartite entangled states**

quant-ph/0411209 (to appear in Phys. Rev. A).

W. Dür, L. Hartmann, M. Hein, H. J. Briegel

**Entanglement in spin chains and lattices with long-range interactions,**

E-print quant-ph/0407075

M. Hein, W. Dür, H. J. Briegel,

**Entanglement properties of multipartite entangled states under the influence of decoherence,**

E-print quant-ph/0408165

O. Guehne, G. Toth, Ph. Hyllus, H. J. Briegel,

**Bell Inequalities for Graph States**

E-print quant-ph/0410059

H. Aschauer, W. Dür, and H.-J. Briegel,

**Multipartite entanglement purification for two-colorable graph states,**

E-print quant-ph/0405045

H. Aschauer, M. Hein, and H.-J. Briegel,

**Local invariants for multi-partite entangled states, allowing for a simple entanglement criterion,**

E-print quant-ph/0306048.

## Papers

M. Hein, J. Eisert, and H.-J. Briegel,

**Multi-party entanglement in graph states,**

Physical Review A **69**, 06231 (2004)

Zhi Zhao, Yu-Ao Chen, An-Ning Zhang, Tao Yang, Hans J. Briegel, and Jian-Wei Pan ,

**Experimental demonstration of five-photon entanglement and open-destination teleportation,**

Nature **430**, 54-58 , 02643 (2004)

W. Dür and H.-J. Briegel,

**Stability of macroscopic entanglement under decoherence,**

Physical Review Letters **92**, 180403 (2004)

W. Dür, H. Aschauer, and H.-J. Briegel,

**Multiparticle entanglement purification for graph states,**

Physical Review Letters **91**, 107903 (2003)

R. Raussendorf, D.E. Browne, and H.-J. Briegel,

**Measurement-based quantum computation on cluster states,**

Physical Review A **68**, 022312 (2003)

W. Dür and H.-J. Briegel,

**Entanglement purification for quantum computation,**

Physical Review Letters **90**, 067901 (2003)

W. Dür, R. Raussendorf, V. Kendon, and H.-J. Briegel,

**Quantum random walks in optical lattices,**

Physical Review A **66**, 052319 (2002)

H. Aschauer and H.-J. Briegel,

**Private entanglement over arbitrary distances, even using a noisy apparatus,**

Physical Review Letters **88**, 047902 (2002)

H. Aschauer and H.-J. Briegel,

**A security proof for quantum cryptography based entirely on entanglement purification,**

Physical Review A **66**, 032302 (2002)

R. Raussendorf and H.-J. Briegel,

**Computational model for the one-way quantum computer: Concepts and Summary**

E-print quant-ph/0207183

R. Raussendorf and H.-J. Briegel,

**Computational model underlying the one-way quantum computer,**

Quantum Information & Computation **2**, 344-386 (2002)

H.-J. Briegel, R. Raussendorf and A. Schenzle,

**Optical lattices as a playground for studying multiparticle entanglement,**

in "Laserphysics at the limit" (H. Figger, D. Meschede, C. Zimmermann, eds.), Springer, 2002, pp. 433-477

H. Aschauer and H.-J. Briegel,

**Der Quantenfingerabdruck,**

Physik Journal **1**, 22 (2002)

H. Aschauer and H.-J. Briegel,  
**Quantum communication and decoherence,**  
E-print quant-ph/0208014

R. Raussendorf and D.E. Browne and H.-J. Briegel,  
**The one-way quantum computer - a non-network model of quantum computation,**  
Journal of Modern Optics 49, 1299 (2002)

H. Aschauer and H.-J. Briegel,  
**Entanglement purification with noisy apparatus can be used to factor out an eavesdropper,**  
Eur. Phys. J. D **18**, 177 (2002)

R. Raussendorf and H.-J. Briegel,  
**A one-way quantum computer,**  
Physical Review Letters **86**, 5188 (2001)

H.-J. Briegel and R. Raussendorf,  
**Persistent entanglement in arrays of interacting particles,**  
Physical Review Letters **86**, 910 (2001)

J. Eisert and H.-J. Briegel,  
**Schmidt measure as a tool for quantifying multi-particle entanglement,**  
Physical Review A **64**, 022306 (2001)

H.-J. Briegel and A. Schenzle,  
**Quantencomputer und Kryptographie,**  
Einsichten -- Forschung an der LMU München, Nr.18, 26 (2000)

H.-J. Briegel, T. Calarco, D. Jaksch, J. I. Cirac, and P. Zoller,  
**Quantum computing with neutral atoms,**  
Journal of Modern Optics 47, 415 (2000) [Special issue on quantum computing]

H.-J. Briegel,

**Geheime Schlüssel mit verschränkten Photonen,**

Physikalische Blätter **56** (6), 12 (2000)

T. Calarco, H.-J. Briegel, D. Jaksch, J. I. Cirac, and P. Zoller,

**Quantum computing with trapped particles in microscopic potentials,**

Fortschr. Phys. **48**, 945 (2000)

T. Calarco, H.-J. Briegel, D. Jaksch, J.I. Cirac, and P. Zoller,

**Entangling atoms for quantum information processing,**

Journal of Modern Optics **47**, 2137 (2000)

H.-J. Briegel, J. I. Cirac, and P. Zoller,

**Quantencomputer: Wie sich Verschränkung für die Informationsverarbeitung nutzen lässt,**

Physikalische Blätter **55** (9), 37 (1999)

D. Jaksch, H.-J. Briegel, J. I. Cirac, C. W. Gardiner, and P. Zoller,

**Entanglement of atoms via cold controlled collisions,**

Physical Review Letters **82**, 1975 (1999)

G. Giedke, H.-J. Briegel, J. I. Cirac, and P. Zoller,

**Lower bounds for entanglement purification,**

Physical Review A **59**, 2641 (1999)

W. Dür, H.-J. Briegel, J. I. Cirac, and P. Zoller,

**Quantum repeaters based on entanglement purification,**

Physical Review A **59**, 169 (1999); *ibid.* **60**, 729 (1999)

H.-J. Briegel, W. Dür, J. I. Cirac, and P. Zoller,

**Quantum repeaters: The role of imperfect local operations in quantum communication,**

Physical Review Letters **81**, 5932 (1998)

H.-J. Briegel, W. Dür, S. J. van Enk, J. I. Cirac, and P. Zoller,

**Quantum communication and the creation of maximally entangled pairs of atoms over a noisy channel,**

Phil. Trans. Roy. Soc. Lond. A **356**, 1841 (1998)

G. M. Meyer and H.-J. Briegel,

**Pump-operator treatment of the ion-trap laser,**

Physical Review A **58**, 3210 (1998)

H.-J. Briegel, B.-G. Englert, M. O. Scully, and H. Walther,

**Atom interferometry and the quantum theory of measurement,**

in “Atom Interferometry”, ed. Paul Berman, Academic Press, San Diego, USA, 1997

G. M. Meyer, H.-J. Briegel, and H. Walther,

**Ion-trap laser,**

Europhysics Letters, **37**, 317 (1997)

H.-J. Briegel, B.-G. Englert, and M. O. Scully,

**Spectral properties of a micromaser: Atomic-beam statistics and the field correlation function,**

Physical Review A **54**, 3603 (1996)

H.-J. Briegel, G. M. Meyer, and B.-G. Englert,

**Dynamic noise reduction in multilevel lasers: Nonlinear theory and the pump-operator approach,**

Physical Review A **53**, 1143 (1996)

H.-J. Briegel, G. M. Meyer, B.-G. Englert,

**Pump operator for lasers with multi-level excitation,**

Europhysics Letters **33**, 515 (1996)

H.-J. Briegel and B.-G. Englert,

**Macroscopic dynamics of a maser with non-Poissonian atomic injection,**

Physical Review A **52**, 2361 (1995)

H.-J. Briegel, B.-G. Englert, C. Ginzler, and A. Schenzle,

**One-atom maser with periodic and noisy pump: An application of damping bases,**

Physical Review A **49**, 5019 (1994)

H.-J. Briegel, B.-G. Englert, N. Sterpi, and H. Walther,

**One-atom maser: Statistics of detector clicks,**

Physical Review A **49**, 2962 (1994)

C. Ginzler, H.-J. Briegel, U. Martini, B.-G. Englert, and A. Schenzle,

**Quantum optical master equations: The one-atom laser,**

Physical Review A **48**, 732 (1993)

H.-J. Briegel and B.-G. Englert,

**Quantum optical master equations: The use of damping bases,**

Physical Review A **47**, 3311 (1993)

H.-J. Briegel, B.-G. Englert, and G. Süssmann,

**Canonical quantization of the classical Hamiltonian for a relativistic spinless particle,**

Z. Naturforsch. **46A**, 933 (1991)

H.-J. Briegel, B.-G. Englert, M. Michaelis, and G. Süssmann,

**Über die Wurzel aus der Klein-Gordon-Gleichung als Schrödingergleichung eines Spin-0-Teilchens,**

Z. Naturforsch. **46A**, 925 (1991)

## **Book contributions & Theses**

H.-J. Briegel

**Quantisierung der relativistischen Hamiltonfunktion eines spinlosen Teilchens,**  
Diplomarbeit. LMU München, 1991

H.-J. Briegel

**Das Jaynes-Cummings-Modell mit Dissipation und seine Anwendung auf die Dynamik von mikroskopischen Masern und Lasern,**  
Dissertationsschrift. LMU München, 1993

H.-J. Briegel

**Quanten-Information und Computer,**  
Habilitationsschrift. LMU München, 2002

H.-J. Briegel,

**Entanglement purification and long-distance quantum communication,**

in “Quantum computation and quantum information theory”, C. Macchiavello and G. M. Palma and

A. Zeilinger (Eds.). Reprint volume with introductory notes for the ISI TMR Network School.  
World Scientific, 2001

H.-J. Briegel,

**Quantum information in optical lattices,**  
*ibid.*, World Scientific, 2000.

H.-J. Briegel,

**Basics of entanglement purification,**

in “The Physics of Quantum Information”, D. Bouwmeester, A. Ekert,

A. Zeilinger, (Eds.), Springer, 2000

H.-J. Briegel, S. van Enk, J.I. Cirac, and P. Zoller,

**Quantum networks I: Entangling atoms at different locations,**

*ibid.*, Springer, 2001

H.-J. Briegel, W. Dür, J.I. Cirac, and P. Zoller,

**Quantum networks II: Communication over noisy channels,**

*ibid.*, Springer, 2000

H.-J. Briegel, J.I. Cirac, W. Dür, G. Giedke, and P. Zoller,

**Quantum repeaters for quantum communication,**

in “Epistemological and experimental perspectives on quantum physics”, (Yearbook 7, 1999 Vienna Circle), Kluwer, 1999

### **Proceedings**

H.J. Briegel, J.I. Cirac, W. Dür, et al.

**Physical implementations for quantum communication in quantum networks,**  
LECTURE NOTES IN COMPUTER SCIENCE 1509: 373-382 1999

G. Giedke, H. J. Briegel, W. Dür, J. I. Cirac, and P. Zoller,

**Quantum communication with imperfect means: Entanglement purification and the quantum repeater,**

Proceedings of the Conference on Quantum Communication, Measurement, and Computing (QCM98), in Evanston, USA, 22.8.-27.8.1998, Plenum Press 1999

H.-J. Briegel, J. I. Cirac, and P. Zoller,

**EPR correlations made useful. A quantum communication perspective,**

Proceedings of the Fourteenth European Meeting on Cybernetics and Systems Research (EMCSR 98), Wien, 14.4.-17.4.1998

H.-J. Briegel, T. Calarco, D. Jaksch, J.I. Cirac, and P. Zoller,

**Quantum optical systems for implementation of quantum information processes,**

Proceedings of the Int. Conference on Laser Spectroscopy, Innsbruck, Austria, 7.6.-11.6.1999

H.-J. Briegel, W. Duer, 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, 2.8.-3.8.1998

H.-J. Briegel, J. I. Cirac, and P. Zoller,

**Creation of maximally entangled pairs of atoms over a noisy channel: a finite-means approach,**

Proceedings of the Wigner Symposium, Vienna, 1997

H.-J. Briegel, G. M. Meyer, B.-G. Englert,

**Correlated atomic excitation in multi-level lasers,**

in "Nonlinear Dynamics in Lasers" (N. B. Abraham and Y. I. Khanin, eds.), pp. 43--53, Proc. SPIE 2792, Bellingham, WA, 1996

## **Invited Seminars and Colloquia**

Hefei, Hefei USTC, *Theory of graph states*, 2.11.-15.11.2004 (Seminar)

Peking, Tsinghua University, (1) *Measurement-based quantum computation*, (2) *Theory of graph states*, 2.11.-15.11.2004 (Seminar)

Zürich, ETH Zürich, *Theory of graph states*, 24.5.2004 (Seminar)

Garching, MPI für Quantenoptik, *Multiparticle entanglement & Quantum Computing*, 4.5.2004 (Seminar)

Wien, Technical University, *Theory of graph states*, 15.3.2004 (Seminar)

Caltech, Institute for Quantum Information, *Graph states: Properties & Application*, 10.2.2004 (Seminar)

Essen, University, *Quantencomputer: Konzepte und Perspektiven*, 10.12.2003 (Colloquium)

Dresden, MPI für komplexe Systeme, *Multiparty entanglement purification of a class of graph states*, 28.4.2003 (Colloquium)

Tübingen, University, *Quantencomputer: Konzepte und Perspektiven*, 5.2.2003 (Colloquium)

Innsbruck, University, *Quantencomputing and Quantencommunication*, 24.1.2003 (Colloquium)

Düsseldorf, University, 12.6.2002 (Seminar)

München, LMU University, *Quanten-Information und Computer*, 29.11.2002 (Tag der Informatik)

Bell Labs (Lucent), *Quantum computing using cluster states*, 18.1.2002 (Seminar)

Stuttgart, University, *Entanglement, Correlation, and Logic*, 10.1.2002 (Seminar)

Innsbruck, University, *Quanteninformationsverarbeitung*, 14.12.2001 (Computer Science Colloquium)

Neuchatel, University, *Quantum information and computer*, 29.1.2001 (Colloquium)

Braunschweig, University *Multiparticle entanglement and quantum computation*, 24.1.2001 (Seminar)

Darmstadt, Technical University *Quantenkommunikation und Quantencomputer*, 5.1.2001 (Colloquium)

Karlsruhe, University *Skalierbare Quantenrechner*, 7.11.2000 (Computer Science Colloquium)

Infineon (Company), *Quantencomputer und Kryptographie*, 29.6.2000 (Seminar)

Oxford University, *Persistent entanglement in arrays of interacting particles*, 30.5.2000 (Seminar - Ekert group)

LMU München, *Quantencomputer und Kryptographie*, 23.5.2000. Öffentlicher Informationsabend zum Thema: "Mit Quanten ist zu rechnen. Kalte Materie, Chaos und Computer aus quantenmechanischer Sicht".

Halle, University, *Quantum information and computer*, 19.1.2000 (Seminar)

Erlangen, University, *Quantencomputer und Quantenkommunikation*, 13.12.1999 (Colloquium)

Stuttgart, Technical University, *Quantum information and computing*, 7.12.1999 (Seminar)

Munich, University (LMU), *Quantencomputer und Quantenkommunikation*, 17.11.1999 (Fakultätskolloquium)

Munich, Technical University (TU), *Quantencomputer und Quantenkommunikation*, 30.6.1999 (Theoretical Physics Colloquium)

Hamburg, Institut für Laserphysik, *Quantum computing in optical lattices*, 8.6.1999 (Seminar)

NIST Gaithersburg, *Quantum computing in optical lattices*, Bill Phillips Group, 28.5.1999 (Seminar)

Harvard University, *Quantum computing in optical lattices*, Joint Atomic Physics Colloquium, 15.5.1999

Pavia University, *Quantum computing in optical lattices*, Theoretical Quantum Optics Seminar, 25.3.1999

Oxford University, *Quantum repeaters*, Centre for Quantum Computation, Artur Ekert group, 27.1.1999 (Seminar)

Hannover, *Verschränkung -- EPR-Paare und ihre Relevanz für die Quantenkommunikation*, Norddeutscher Lasertag, 9.12.1998 (Plenary Talk)

Innsbruck, University, *Quantum repeaters and communication*, 29.4.1998, (Seminar)

Munich, University (LMU), *Quantum repeaters and communication*, Oberseminar über aktuelle Probleme der Theoretischen Physik, 20.2.1998

Optical Science Center, *Interactive Photon Counting*, Quantum Optics Seminar, Tucson, Arizona, USA, 14.1.1997

Harvard-Smithsonian Center for Astrophysics, *Interactive Photon Counting*, ITAMP Colloquium, Massachusetts, USA, 9.12.1996

Harvard University, *Laser dynamics of single (trapped) atoms*, Rick Heller group seminar, Cambridge, Massachusetts, USA, 2.2.1996 and 23.2.1996

UT Austin, *Laser dynamics of single (trapped) atoms*, Atomic Physics Seminar, Austin, Texas, USA 17.11.1995

Oregon, University, *Atomic beam statistics and the emission spectrum of a microlaser*, Quantum Optics Seminar, Eugene, Oregon, USA, 24.8.1995

Munich University (LMU), *Dynamic noise reduction in multilevel lasers*, Quantum Optics Seminar, Munich, Germany, 13.7.1995

Gesamthochschule Essen, *Dynamic noise reduction in multilevel lasers*, Quantum Optics Seminar, Essen, Germany, 19.6.1995

Innsbruck, University, *Dynamic noise reduction in multilevel lasers*, Quantum Optics Seminar, Innsbruck, Austria, 4.7.1995

Harvard University, *Dynamics of microscopic lasers and masers*, Atomic Physics Seminar, Cambridge, Massachusetts, USA, 22.3.1995

University of North Texas, *Quantum effects in microscopic lasers and masers*, Colloquium, Denton, Texas, USA, 28.2.1995

University of Houston, *Quantum effects in microscopic lasers and masers*, Colloquium, Houston, Texas, USA, 7.2.1995

Texas A&M University, *Theory of damping-bases*, Atomic Physics Seminar, College Station, Texas, USA, 6.12.1994

Max-Planck-Institut für Quantenoptik, *The damping-basis method: A novel approach to treating dissipative systems in quantum optics*, Theory Seminar, Garching, Germany, 30.6.1994

AG Nichtklassische Strahlung, Humboldt University Berlin, *Dynamics of a microlaser with a periodic and noisy pump*, Laser Seminar, Berlin, Germany, Feb. 1994

University of Munich (LMU), *Ein-Atom-Maser mit variabler Pumpstatistik*, Quantum Optics Seminar, Munich, Germany, 26.2.1993

Max-Planck-Institut für Quantenoptik, *Jaynes-Cummings model with damping*, Theory Seminar, Garching, Germany, 12.2.1992

University of Munich (LMU), *Jaynes-Cummings Modell mit Dämpfung*, Seminar, Munich, Germany, 17.1.1992

### **Invited conference talks (workshops)**

3rd Asia Workshop on Quantum Information Science, *Lecture Series on graph states & applications in Quantum Information, Entanglement and decoherence in spin gases*, Singapore, 4.1.-15.1.2005

Workshop on Quantum Entanglement in Physical and Information Sciences, *Entanglement and Decoherence in semi-quantal gases*, Pisa, Italy, 14.12.-18.12.2004

2004-QIS, Quantum Information Science, *Entanglement in semi-quantal gases*, Cambridge, GB, 20.9-1.10.2004, 29.11-2.12.2004

International Symposium on Entanglement, Information & Noise, *Theory of graph states*, Krzywowa (Kreisau), Poland, 15.6.-18.6.2004

Dagstuhl Perspectives Workshop on Quantum Computing, *Quantum computing and multiparticle entanglement*, Schloss Dagstuhl, Wadern, Germany, 11.5.-14.5.2004

Hirschegg International DFG workshop, Quantum Entanglement – From Error Correction to Secure Key Distribution, *Theory of graph states*, Hirschegg, Germany, 1.4.-2.4.2004

Gordon Conference on Quantum Information Science, *Macroscopic entanglement*, (Chairman) Ventura, California, USA, 22.2.-27.2.2004

NORDITA/QUANTOP Workshop on Spin Chains and Perspectives, *Graph states and their applications*, Niels Bohr Institute, Copenhagen, Denmark, 11.9.-14.9.2003

Benasque meeting on quantum information and quantum optics, *Graph states and their applications*, Benasque, Spain, 22.6.-11.7.2003

ESF meeting on Quantum Information and Computation, *Multi-party entanglement purification of a class of graph states*, Erice, Sicily, 15.3.-22.3.2003.

Obergurgl Quantum Optics Meeting, *Multi-party entanglement purification of a class of graph states*, Obergurgl, Austria, 23.2.-1.3.2003

Mathematics in Nanoscale Science and Engineering -- IPAM/MSRI Workshop on Quantum Computing, *Measurement-based quantum computation*, Institute for Pure and Applied Mathematics (IPAM), University of California, Los Angeles, USA, 21.10-23.10.2002

Quantum Foundations in the Light of Quantum Information, *The quantum-foundational significance of measurement-based models of quantum computation*, Centre de Recherches Mathematiques (CRM) Universite de Montreal, Canada, 13.10.-20.10.2002

NIST Meeting on Quantum Computation in Optical Lattices, *Measurement-based quantum computation*, National Institute of Standards and Technology (NIST), Gaithersburg, Maryland, USA,

3.6.-5.6.2002

Wigner Centennial Conference, *Measurement-based quantum computation*, Pecs, Hungary,

8.7.-12.7.2002

QIP 2002 -- The Fifth Workshop on Quantum Information Processing. IBM T.J. Watson Research Center, *Quantum computing using cluster states*, Yorktown Heights, New York, USA, 14.1.-17.1.2002

NOSTACK Workshop on the implications of recent results in quantum computing for the future of information security, *Security of quantum repeaters and long distance quantum communication*, Schlosshotel Weyberhoeefe, Sailauf, Germany, 21.1.-23.1.2002

Quantum Information Theory Workshop, *Private entanglement over noisy channels*, Trinity College, Dublin, Ireland, 21.3.-23.3.2002

ITP Conference on Quantum Information, *Quantum computing using one-qubit-measurements only*, Santa Barbara, California, USA, 26.12.-30.12.2001

ECAMP / DPG Frühjahrstagung Berlin , *Quantum computers and multiparticle entanglement* (“Hot topic talk”), Berlin, Germany, 2.4.-6.4.2001

Workshop on coherent evolution in noisy environments (COHEVOL), *Multiparticle entanglement and quantum computation in spin lattices with an Ising-type interaction*, Max-Planck-Institut für komplexe Systeme, Dresden, Germany, 25.5.2001

Workshop on solid-state quantum computing, *Quantum computers and multi-particle entanglement in spin-lattices*, Warsaw, Poland, 26.4.-29.4.2001

GAFOS 2001- German-American Frontiers of Science Symposium, *Theory of quantum information and computation* (Invited Poster), Bad Homburg, Germany, 7.6.-10.6.2001

Cryptography meeting, *Security in long-distance quantum cryptography*, Royal Holloway College, London, GB, 26.5.2000

Quantum Electronics and Laser Science Conference (QELS), *Quantum information, networks, and computing*, Baltimore, Maryland, USA, 23.5.-28.5.1999

Laser 99 (Budapest), *Quantum computing in optical lattices*, Budapest, Hungary, 2.7.-6.7.1999

Spring meeting of the German Physical Society, *Quantum repeaters: Quantum communication over dissipative information channels*, Konstanz, Germany, March 1998

QIKI Workshop über Quanten-Informatik, *Quanten-Computing in optischen Gittern*, Universität Karlsruhe, Germany, 21.12.-22.12.1998

International Conference on Trapped Charged Particles and Fundamental Physics, *Quantum computing in optical lattices*, Monterey, California, USA, 31.8.-4.10.1998

QCM98 - Conference on Quantum Communication, Measurement, and Computing, *Quantum repeaters for communication*, Evanston, Illinois, USA, 22.8.-27.8.1999

Workshop on Quantum Information and Quantum Optics, *Quantum repeaters for communication*, Benasque, Spain, July 1998

Workshop on Quantum Computation and Mesoscopic Physics, *Quantum repeaters for communication*, Scuola Normale Superiore, Pisa, Italy, 25.6.-27.6.1998

Dagstuhl-Seminar on Quantum Algorithms, *Quantum repeaters for communication*, Schloss Dagstuhl, Wadern, Germany, 10.5.-15.5.1998

EMCSR98 - Meeting on Cybernetics and Systems Research, *Einstein-Podolsky-Rosen correlations made useful: A quantum-communication perspective*, Vienna, Austria, 14.4.-17.4.1998

Almagro workshop on quantum information, Universidad Castilla la Mancha, *Quantum communication over noisy channels*, Almagro (Ciudad Real) Spain, 16.10.-19.10.1997

24th Winter Colloquium on the Physics of Quantum Electronics, *Interactive photodetection in cavity-QED experiments*, Snowbird, Utah, USA, 12.1.-15.1.1997

NSF Summer School on the Foundations and Applications of Quantum Mechanics, *Quantum Theory of the Laser*, Casper College, Wyoming, USA, 1.8-6.8.1995

Conference on Quantum Coherence and Interference in Fundamental and Applied Physics, *Influence of atomic-beam statistics on the emission spectrum of a microlaser*, Alta, Wyoming, USA,

9.8.-12.8.1995

25th Winter Colloquium on the Physics of Quantum Electronics, *Spectral properties of a laser with nonpoissonian atomic injection*, Snowbird, Utah, USA, 3.1-6.1.1995

Atomic Physics Symposium in Honor of Willis E. Lamb, *Coherent atom-field interaction and the quantum theory of the laser*, Texas A\&M University, Texas, USA, 18.11-19.11.1994

Conference on Atomic Coherence and Interference in Applied and Fundamental Physics, *Dynamical noise reduction in the ion-trap laser*, Crested Butte, Colorado, USA, 7.8-11.8.1994

MPQ Summer Festival 92, *Master equations for lossy systems*, July 1992

### **Contributed conference talks**

Workshop on quantum information processing and communication (QIPC), *Persistent entanglement in arrays of interacting particles*, Potsdam, Germany, 27.9-29.9.2000

Workshop on quantum information and quantum optics, *Multiparticle entanglement in arrays of interacting particles*, Benasque, Spain, 10.7.2000

Spring meeting of the German Physical Society, *Imperfekte lokale Operationen und ihre Bedeutung für die Quantenkommunikation*, Heidelberg, Germany, March 1999

Spring meeting of the German Physical Society, *Quantum computing in optischen Gittern*, Heidelberg, Germany, March 1999

TMR meeting on the Physics of Quantum Information, *Quantum repeaters*, Helsinki, Finland, 24.9.-26.9.1998

APS annual meeting, *Multiple light scattering from a pair of non-identical atoms*, (Poster) Washington, USA, April 1997

Laser Optics Conference 95, *Dynamic noise reduction in multi-level lasers: Nonlinear theory and the damping basis approach*, St. Petersburg, Russia, 26.6-1.7.1995

Annual Meeting of the Optical Society of America, *Corrections to reservoir theory in the one-atom laser*, Dallas, Texas, USA, 2.10-7.10.1994

Spring meeting of the German Physical Society, *Ein-Atom-Maser mit periodischem und verdrauschten Pumpen*, Hamburg, Germany, March 1994

Spring meeting of the German Physical Society, *Jaynes-Cummings-Modell mit Dämpfung*, Hamburg, Germany, 23.2.1992