

Publications and Talks

Prof. Dr. Michael J. Hartmann

Department Physik
Friedrich-Alexander Universität Erlangen-Nürnberg
Staudtstr. 7
91058 Erlangen
Germany

Tel: +49 9131-85-28461

michael.j.hartmann@fau.de

PUBLICATIONS

PUBLICATIONS IN HIGH-IMPACT JOURNALS:

1. M. J. Hartmann and G. Carleo: *Neural-Network Approach to Dissipative Quantum Many-Body Dynamics*,
Phys. Rev. Lett. **122**, 250502 (2019).
2. M. C. Collodo, A. Potočnik, S. Gasparinetti, J.-C. Besse, M. Pechal, M. Sameti, M. J. Hartmann, A. Wallraff and C. Eichler: *Observation of the Crossover from Photon Ordering to Delocalization in Tunably Coupled Resonators*,
Phys. Rev. Lett. **122**, 183601 (2019).
3. M. J. Seitner, M. Abdi, A. Ridolfo, M. J. Hartmann, and E. M. Weig: *Parametric oscillation, frequency mixing and injection locking of strongly coupled nanomechanical resonator modes*
Phys. Rev. Lett. **118**, 254301 (2017).
4. M. Abdi, P. Degenfeld-Schonburg, M. Sameti, C. Navarrete-Benlloch, and M. J. Hartmann: *Dissipative optomechanical preparation of macroscopic quantum superposition states*
Phys. Rev. Lett. **116**, 233604 (2016).
5. M. Abdi, M. Pernpeintner, R. Gross, H. Hübl, and M. J. Hartmann: *Quantum State Engineering with Circuit Electromechanical Three-Body Interactions*
Phys. Rev. Lett. **114**, 173602 (2015).
6. M. Leib and M. J. Hartmann: *Synchronized switching in a Josephson junction crystal*
Phys. Rev. Lett. **112**, 223603 (2014).
7. L. Neumeier, M. Leib, and M. J. Hartmann: *Single Photon Transistor in Circuit Quantum Electrodynamics*
Phys. Rev. Lett. **111**, 063601 (2013).
8. R. Stassi, A. Ridolfo, O. Di Stefano, M. J. Hartmann, and S. Savasta: *Spontaneous conversion from virtual to real photons in the ultrastrong coupling regime*
Phys. Rev. Lett. **110**, 243601 (2013).

9. J. Jin, D. Rossini, R. Fazio, M. Leib, and M. J. Hartmann: *Photon solid phases in driven arrays of non-linearly coupled cavities*
Phys. Rev. Lett. **110**, 163605 (2013).
10. A. Ridolfo, S. Savasta, and M. J. Hartmann: *Nonclassical Radiation from Thermal Cavities in the Ultrastrong Coupling Regime*
Phys. Rev. Lett., **110**, 163601 (2013).
11. S. Rips, and M. J. Hartmann: *Quantum Information Processing with Nanomechanical Qubits*
Phys. Rev. Lett. **110**, 120503 (2013).
12. A. Ridolfo, M. Leib, S. Savasta and M. J. Hartmann: *Photon Blockade in the Ultrastrong Coupling Regime*
Phys. Rev. Lett. **109**, 193602 (2012).
13. E. del Valle, A. Gonzalez-Tudela, F. P. Laussy, C. Tejedor and M. J. Hartmann: *Theory of frequency-filtered and time-resolved N-photon correlations*
Phys. Rev. Lett. **109**, 183601 (2012).
14. G. Nikoghosyan, M. J. Hartmann and M. B. Plenio: *Generation of mesoscopic entangled states in a cavity coupled to an atomic ensemble*
Phys. Rev. Lett. **108**, 123603 (2012).
15. M. J. Hartmann: *Polariton crystallization in driven arrays of lossy nonlinear resonators*
Phys. Rev. Lett. **104**, 113601 (2010).
16. M. J. Hartmann, J. Prior, S. R. Clark and M. B. Plenio: *Density matrix renormalization group in the Heisenberg picture*
Phys. Rev. Lett. **102**, 057202 (2009).
17. M. J. Hartmann and M. B. Plenio: *Steady state entanglement in the mechanical vibrations of two dielectric membranes*
Phys. Rev. Lett. **101**, 200503 (2008).
18. M. J. Hartmann and M. B. Plenio: *Migration of bosonic particles across a Mott insulator to superfluid phase interface*
Phys. Rev. Lett., **100**, 070602 (2008).
19. M. J. Hartmann, F. G. S. L. Brandão and M. B. Plenio: *Effective spin systems in coupled micro-cavities*
Phys. Rev. Lett., **99**, 160501 (2007).
20. M. J. Hartmann and M. B. Plenio: *Strong photon non-linearities and photonic Mott insulators*
Phys. Rev. Lett., **99**, 103601 (2007).
21. M. J. Hartmann, F. G. S. L. Brandão and M. B. Plenio: *Strongly Interacting Polaritons in Coupled Arrays of Cavities*
Nature Physics **2**, 849-855 (2006).
The paper has been selected as a “Quantum Mechanics Classic” by Google Scholar

22. M. Hartmann, G. Mahler and O.Hess: *Existence of Temperature on the Nanoscale*
Phys. Rev. Lett. **93**, 080402 (2004).

FURTHER PUBLICATIONS IN REFEREED JOURNALS:

23. M. Sameti and M. J. Hartmann: *Floquet engineering in superconducting circuits: from arbitrary spin-spin interactions to the Kitaev honeycomb model*,
Phys. Rev. A **99**, 012333 (2019).
24. O. T. Brown, and M. J. Hartmann: *Localization to delocalization transition in a driven nonlinear cavity array*
New J. Phys. **20**, 055004 (2018).
25. E. T. Owen, J. Jin, D. Rossini, R. Fazio, and M. J. Hartmann: *Quantum correlations and limit cycles in the driven-dissipative Heisenberg lattice*
New J. Phys. **20**, 045004 (2018).
26. E. T. Owen, O. T. Brown, and M. J. Hartmann: *Dissipation-induced mobility and coherence in frustrated lattices*
Phys. Rev. A **95**, 063851 (2017).
27. M. Sameti, A Potočnik, D. E. Browne, A. Wallraff, and M. J. Hartmann: *Superconducting Quantum Simulator for Topological Order and the Toric Code*
Phys. Rev. A **95**, 042330 (2017).
28. T. Mertz, I. Vasic, M. J. Hartmann, and W. Hofstetter: *Photonic currents in driven and dissipative resonator lattices*
Phys. Rev. A **94**, 013809 (2016).
29. Peter Degenfeld-Schonburg, Mehdi Abdi, Michael J. Hartmann, and Carlos Navarrete-Benlloch: *Degenerate optomechanical parametric oscillators: cooling in the vicinity of a critical point*
Phys. Rev. A **93**, 023819 (2016).
30. P. Degenfeld-Schonburg, C. Navarrete-Benlloch, and M. J. Hartmann: *Self-Consistent Projection Operator Theory in Nonlinear Quantum Optical Systems: A case study on Degenerate Optical Parametric Oscillators*
Phys. Rev. A **91**, 053850 (2015).
31. M. Abdi and M. J. Hartmann: *Entangling the motion of two optically trapped objects via time-modulated driving fields*
New J. Phys. **17**, 013056 (2015).
32. J. Ruiz-Rivas, E. del Valle, C. Gies, P. Gartner, and M. J. Hartmann: *Spontaneous, collective coherence in driven, dissipative cavity arrays*
Phys. Rev. A **90**, 033808 (2014).
33. J. Jin, D. Rossini, M. Leib, M. J. Hartmann, and R. Fazio: *Steady-state phase diagram of a driven QED-cavity array with cross-Kerr nonlinearities*
Phys. Rev. A **90**, 023827 (2014).

34. P. Degenfeld-Schonburg and M. J. Hartmann: *Self-Consistent Projection Operator Theory for Quantum Many-Body Systems*
Phys. Rev. B **89**, 245108 (2014).
35. S. Rips, I. Wilson-Rae, and M. J. Hartmann: *Nonlinear nanomechanical resonators for quantum optoelectromechanics*
Phys. Rev. A **89**, 013854 (2014).
36. R. Jirschik and M. J. Hartmann: *The Circuit Quantum Electrodynamical Josephson Interferometer*
Eur. Phys. J. Quantum Technology **1**, 4 (2014)
37. A. Ridolfo, E. del Valle, and M. J. Hartmann: *Photon correlations from ultra-strong optical nonlinearities*
Phys. Rev. A **88**, 063812 (2013).
38. E. del Valle and M. J. Hartmann: *Correlator expansion approach to stationary states of weakly coupled cavity arrays*
J. Phys. B: At. Mol. Opt. Phys., **46**, 224023 (2013).
39. A. Gonzalez-Tudela, F. P. Laussy, C. Tejedor, M. J. Hartmann and E. del Valle: *Two-photon spectra of quantum emitters*
New J. Phys. **15**, 033036 (2013).
40. A. Ridolfo, M. Leib, S. Savasta, and M. J. Hartmann: *Thermal emission in the ultrastrong coupling regime*
Phys. Scr. T **153**, 014053 (2013).
41. M. Leib and M. J. Hartmann: *Many Body Physics with Coupled Transmission Line Resonators*
Phys. Scr. T **153**, 014042 (2013).
42. M. Leib, F. Deppe, A. Marx, R. Gross and M. J. Hartmann: *Networks of nonlinear superconducting transmission line resonators*
New J. Phys. **14**, 075024 (2012).
43. K.V. Keesidis and M. J. Hartmann: *Bose-Hubbard model with localized particle losses*
Phys. Rev. A **85**, 063620 (2012).
44. S. Rips, M. Kiffner, I. Wilson-Rae and M. J. Hartmann: *Steady-state negative Wigner functions of nonlinear nanomechanical oscillators*
New J. Phys. **14**, 023042 (2012).
45. P. Degenfeld-Schonburg, E. del Valle and M. J. Hartmann: *Signatures of single site addressability in resonance fluorescence spectra*
Phys. Rev. A **85**, 013842 (2012).
46. G. Lepert, M. Trupke, M. J. Hartmann, M. B. Plenio, E. A. Hinds: *Arrays of waveguide-coupled optical cavities that interact strongly with atoms*
New J. Phys. **13**, 113002 (2011).

47. M. Kiffner and M. J. Hartmann: *Dissipation-induced correlations in 1D bosonic systems*
New J. Phys. **13**, 053027 (2011).
48. M. Leib and M. J. Hartmann: *Bose-Hubbard dynamics of polaritons in a chain of circuit quantum electrodynamic cavities*
New J. Phys. **12**, 093031 (2010).
49. M. Kiffner and M. J. Hartmann: *A master equation approach for interacting slow- and stationary-light polaritons*
Phys. Rev. A **82**, 033813 (2010).
50. M. Kiffner and M. J. Hartmann: *Dissipation induced Tonks-Girardeau gas of polaritons*
Phys. Rev. A **81**, 021806(R) (2010).
51. S. R. Clark, J. Prior, M. J. Hartmann, D. Jaksch and M. B. Plenio: *Exact matrix product solutions in the Heisenberg picture of an open quantum spin chain*
New J. Phys. **12**, 025005 (2010).
52. F. G. S. L. Brandão, M. J. Hartmann and M. B. Plenio: *Light-shift-induced photonic nonlinearities*
New J. Phys., **10**, 043010 (2008).
53. M. J. Hartmann, F. G. S. L. Brandão and M. B. Plenio: *A polaritonic twocomponent Bose-Hubbard model*
New J. Phys., **10**, 033011 (2008).
54. M. J. Hartmann, M.E. Reuter, M. B. Plenio: *Excitation and Entanglement Transfer Near Quantum Critical Points*
Opt. Spectrosc. **103**, 22 (2007).
55. D. Tsomokos, M. J. Hartmann, S.F. Huelga and M. B. Plenio: *Dynamics of entanglement in chains of qubits with noise and disorder*
New J. Phys. **9**, 79 (2007).
56. M. E. Reuter, M. J. Hartmann and M. B. Plenio: *Geometric Phases and Critical Phenomena in a Chain of Interacting Spins*
Proc. R. Soc. A. **463**, 1271-1285 (2007).
The paper has been selected as a highlight by the journal.
57. M. J. Hartmann, M. E. Reuter and M. B. Plenio: *Excitation and entanglement transfer versus spectral gap*
New J. Phys., **8**, 94 (2006).
58. M. J. Henrich, M. Michel, M. Hartmann, J. Gemmer and G. Mahler: *Global and local relaxation of a spin chain under exact Schrödinger and master-equation dynamics*
Phys. Rev. E, **72**, 026104 (2005).
59. M. Hartmann and G. Mahler: *Measurable Consequences of the Local Breakdown of the Concept of Temperature*
Europhys. Lett. **70**, 579-585 (2005).

60. M. Hartmann, G. Mahler and O. Hess: *Spectral Densities and Partition Functions of a Modular Quantum System as Derived from a Central Limit Theorem*
J. Stat. Phys., **119**, 1139-1151 (2005).
61. M. Hartmann, G. Mahler and O. Hess: *Nano-Thermodynamics: On the minimal length scale for the existence of temperature*
Proceedings of the FQMT04 conference, July 2004 in Prague, Czech Republic
Physica E, **29**, 66-73 (2004).
62. M. Hartmann, G. Mahler and O. Hess: *On Which Length Scales Can Temperature Exist in Quantum Systems?*
Proceedings of the SPQS conference, July 2004 in Sendai, Japan
J. Phys. Soc. Jpn. **74** Suppl., 26-29 (2005).
63. M. Hartmann, G. Mahler and O. Hess: *Local Versus Global Thermal States: Correlations and the Existence of Local Temperatures*
Phys. Rev. E **70**, 066148 (2004).
64. M. Hartmann, G. Mahler and O. Hess: *Gaussian Quantum Fluctuations in Interacting Many Particle Systems*
Lett. Math. Phys. **68**, 103 - 112 (2004).
65. M. Hartmann, J. Gemmer, G. Mahler and O. Hess: *Scaling behaviour of interactions in a modular quantum system and the existence of local temperature*
Europhys. Lett. **65**, 613-619 (2004).
66. M. Michel, M. Hartmann, J. Gemmer and G. Mahler: *Fourier's law confirmed for a class of small quantum systems*
Eur. Phys. J. B **34**, 325-330 (2003).

INVITED REVIEW ARTICLES:

67. M. J. Hartmann: *Quantum Simulation with Interacting Photons*
J. Opt. **18**, 104005 (2016).
68. M. J. Hartmann, F. G. S. L. Brandão and M. B. Plenio: *Quantum Many-Body Phenomena in Coupled Cavity Arrays*
Laser & Photon. Rev. **2**, 527-556 (2008).
69. M. Hartmann: *Minimal length scales for the existence of local temperature*,
Contemporary Physics, **47**, 89-102 (2006).

INVITED BOOK CHAPTERS:

70. M. J. Hartmann: *Minimal length scales for the existence of local temperature*
in Thermometry at the Nanoscale: Techniques and Selected Applications, L.D. Carlos and F. Palacio (Eds), RSC Publishing, Cambridge (2015).

71. M. Hartmann, G. Mahler and O.Hess: *Fundamentals of Nano-Thermodynamics* in Handbook of Theoretical and Computational Nanotechnology, M. Rieth and W. Schommers (Eds), American Scientific Publishers, USA (2005), cond-mat/0408133.
72. M. Hartmann: *On the Existence of Local Temperatures* in Quantum Thermodynamics, J. Gemmer, M. Michel and G. Mahler, Lecture Notes in Physics **657**, 200 - 209, Springer, Berlin (2004).

CONFERENCE PROCEEDINGS:

73. S. Okubo, M. Eto, P. Degenfeld-Schonburg, and M. J. Hartmann: *Study of coupled QED-cavities using the self-consistent Mori projector method* J. Phys.: Conf. Ser. **568**, 012014 (2014)
74. F. G. S. L. Brandão, M. J. Hartmann and M. B. Plenio: *Quantum Phase Transitions in Coupled Arrays of Cavities* AIP Conf. Proc. **963**, 744 (2007).
75. M. J. Hartmann, M.E. Reuter, M. B. Plenio: *Excitation and Entanglement Transfer Versus Spectral Gap* AIP Conf. Proc. **864**, 143 (2006).

OUTREACH:

76. M. J. Hartmann: *Quantum computer: we're planning to create one that acts like a brain* The Conversation, 10.01.2019.
77. M. J. Hartmann: *Why insights of Nobel physicists could revolutionise 21st-century computing* The Conversation, 06.10.2016.
78. M. J. Hartmann and M. B. Plenio: *Gefrorenes Licht* Physik Journal **4**, 41-46 (2010).

TALKS

All listed talks have been personally presented by myself.

INVITED COLLOQUIUM TALKS:

1. *Engineered Quantum Dynamics in Superconducting Circuits*
07.06.2018 Quantum Nanoscience Colloquium, TU Delft Netherlands
2. *Quantum Simulations with Interacting Photons*
03.05.2018, IPaQS Symposium, Heriot-Watt University, United Kingdom
3. *Quantum Simulations with Superconducting Circuits*
28.11.2016, Physics Colloquium, Ulm University, Germany
4. *Photons in Networks of Superconducting Circuits*
30.04.2014, IPaQS Colloquium, Heriot-Watt University, United Kingdom
5. *Driven Dissipative Quantum Many-Body Physics with Strongly Interacting Photons*
12.11.2013, Colloquium, Max Planck Institut for Quantum Optics, Germany
6. *Ein Quantencomputer aus vibrierenden Kohlenstoff-Nanoröhren*
13.06.2013, Physik Modern (inv. Prof. L. Oberauer), Ludwig Maximilians Universität München, Germany
7. *Networks of Interacting Photons*
01.06.2012, Colloquium of SFB CO.CO.MAT (inv. Prof. M. Plenio), Universität Ulm, Germany
8. *Gefrorenes Licht: Starke Korrelationen von Photonen in nichtlinearen Resonatoren und Wellenleitern*
21.01.2010, Physikalisches Kolloquium (inv. Prof. G. Morigi), Universität des Saarlandes, Germany

INVITED SUMMER SCHOOL LECTURES:

9. *Many Body Physics in Cavity QED*
lectures at ITAP-Cambridge summer school, September 2009, Marmaris, Turkey
10. *Quantum Simulators*
lectures at europe09 summer school, May 2009, Cortona, Italy

INVITED CONFERENCE TALKS:

11. *Driven-Dissipative Quantum Many-Body Systems: from Mott-Phases to Limit-Cycles, "Numerical methods for open quantum many-body systems"*, January 2018, Max Planck Institute for Quantum Optics, Garching, Germany

12. *Driven-Dissipative Quantum Many-Body Systems: from Mott-Phases to Limit-Cycles*, “Numerical methods for open quantum many-body systems”, January 2018, Max Planck Institute for Quantum Optics, Garching, Germany
13. *Superconducting Quantum Simulator for Topological Order and the Toric Code*, IOP meeting “Topological States in Strongly Interacting Light-Matter Systems”, March 2018, Horwood Estate, United Kingdom
14. *A Superconducting Quantum Simulator for Topological Order and the Toric Code*, “Quantum Sensing with Quantum Correlated Systems”, September 2017, MPIKS Dresden, Germany
15. *Engineered Quantum Matter in Superconducting Circuits*, “Quantum, Electronic, and Magnetic Materials (QEMM) Meeting”, May 2017, Edinburgh, United Kingdom
16. *Non-Equilibrium Collective Dynamics in Superconducting Circuits*, “Higgs and SUPA meeting on Non-Equilibrium Collective Dynamics”, February 2017, Perth, United Kingdom
17. *Many-Body Interactions and Topological Order with Superconducting Circuits*, “Correlations, integrability, and criticality in quantum systems”, October 2016, Evora, Portugal
18. *Ultra-Strong Coupling: From Single to Multiple Emitters*, “International Workshop on Ultra-Strong Light-Matter Interactions: theory and applications to quantum information”, September 2016, Bilbao, Spain
19. *A Superconducting Quantum Simulator for Topological Order and the Toric Code*, “Quantum Simulations and Many-Body Physics with Light”, June 2016, Chania, Crete, Greece
20. *Non-Classical Mechanical Motion in Optoelectromechanics*, “Optomechanics”, April 2016, University College London, United Kingdom
21. *Consistent Projection Operator Theory for Open Quantum Many-Body Systems*, “Numerical methods for open quantum many-body systems”, January 2016, Technical University Vienna, Austria
22. *Consistent Projection Operator Theory for Quantum Many-Body Systems*, “KITP Program Many-Body Physics with Light”, October 2015, University of California Santa Barbara, USA
23. *Resonator Lattices with Non-Linear Inter-Site Coupling*, “NIM Conference on Resonator QED”, August 2015, München, Germany
24. *Superconducting Quantum Simulator for Topological Order in the Toric Code*, “Charge Transfer meets Circuit Quantum Electrodynamics (CTCQED15)” workshop, June 2015, Dresden, Germany
25. *Quantum Information Processing with Superconducting Quantum Bits*, “8th Sino-German Frontiers of Science Symposium of the Alexander von Humboldt Foundation”, May 2015, Potsdam, Germany

26. *Strongly Interacting Photons: Coherence, Correlations and Propagation*, “International workshop on strongly correlated fluids of light and matter”, January 2015, ECT* Trento, Italy
27. *Driven-Dissipative Quantum Many-Body Physics with Strongly Interacting Photons*, “Non-linear Optics and Excitation Kinetics in Semiconductors (NOEKS12)” conference, September 2014, Bremen, Germany
28. *Self-Consistent Projection Operator Theory for Quantum Many-Body Systems*, Workshop “Nonlinear Physics at the Nanoscale, NPATN14”, May 2014, MPKS Dresden, Germany
29. *Nanomechanical Qubits*
Workshop on “Frontiers of Nanomechanics”, September 2013, ICTP Trieste, Italy
30. *Photon Statistics in the Ultra-Strong Coupling Regime*
CAMEL 9 workshop, June 2013, Nesebar, Bulgaria
31. *Nanomechanical Qubits*
WE-Heraeus-Seminar on “Hybrid Quantum Systems”, November 2012, Bad Honnef, Germany
32. *Quantum Simulations with Photons*
ITAMP workshop on “Quantum Simulations”, June 2012, Harvard University, USA
33. *Strongly Correlated Photons in the Driven Dissipative Regime*
“Nonequilibrium Phenomena in Ultra-cold Atoms and Strongly Interacting Photons”, June 2012, Princeton University, USA
34. *Non-Classical States of Nano-Mechanical Oscillators*
CAMEL 7 workshop, July 2011, Nesebar, Bulgaria
35. *Polaritons in Atom Cavity Systems*
5th International Conference on Spontaneous Coherence in Excitonic Systems (ICSCE-5), February 2011, Lausanne, Switzerland
36. *DMRG Simulations of Mixed State Dynamics: Heisenberg and Schrödinger Picture*
international workshop on “Density Matrix Renormalization Group and other Advances in Numerical renormalization Group Methods”, August 2010, Beijing, China
37. *Generating Strongly Correlated Photons via Dissipation*
ITAP-Cambridge workshop, September 2009, Marmaris, Turkey
38. *Effective Many-Body Systems in Coupled Arrays of Cavities*
CAMEL 4 workshop, June 2008, Nesebar, Bulgaria
39. *Effective Many-Body Systems in Coupled Arrays of Cavities*
SA-UK science workshop, March 2008, Durban, South Africa
40. *Simulations of Quantum Many-Body Dynamics*
SA-UK science workshop, March 2008, Durban, South Africa

41. *Effective Many-Body Systems in Coupled Arrays of Cavities*
QI@IC day, May 2007, Imperial College London, United Kingdom
42. *Effective Many-Body Systems in Coupled Arrays of Cavities*
International DFG Workshop: “Quantum Information Processing”, March 2007, Cochem, Germany
43. *Quantum Phase Transitions: Realization and Detection*
QAP Workshop “Quantum Simulation and Control”, March 2007, Maria Laach, Germany
44. *Strongly Interacting Polaritons in Coupled Arrays of Cavities*
“The Interplay between Quantum Information Theory and Quantum Many Body Physics”, November 2006, University of Hertfordshire, United Kingdom
45. *Strongly Interacting Polaritons in Coupled Arrays of Cavities*
“QUOXIC”, November 2006, Oxford, United Kingdom
46. *Excitation and Entanglement Transfer Versus Spectral Gap*
“ICQO’06”, May 2006, Minsk, Belarus
47. *Excitation and Entanglement Transfer Versus Spectral Gap*
“Quantum Computing: Back Action”, March 2006, Kanpur, India

SELECTED CONFERENCE CONTRIBUTIONS:

47. *Superconducting Quantum Simulator for Topological Order and the Toric Code*
EPS- CMD26 - Condensed Matter Conference, September 2016, Groningen, The Netherlands
48. *Nonclassical States of Nanomechanical Oscillators*
Quantum Optics workshop, February 2012, Obergurgl, Austria
49. *Stationary Phonon Fock States of Nanomechanical Oscillators*
QIPC11, September 2011, Zürich, Switzerland
50. *Strongly Correlated Photons in Nonlinear Resonators and Waveguides*
Quantum Simulations workshop, March 2011, Benasque, Spain
51. *Photon-Photon Interactions in Cavity-Waveguide Networks*
SOLID workshop, September 2010, Garching, Germany
52. *Strongly Correlated Photons Induced by Photon Losses*
17th Central European Workshop on Quantum Optics, June 2010, St. Andrews, United Kingdom
53. *Density Matrix Renormalisation Group in the Heisenberg Picture*
IMA Conference on Quantum Computing and Complexity of Simulation, March 2009, London, United Kingdom

54. *Steady State Entanglement in the Mechanical Vibrations of two Dielectric Membranes*
CLEO/Europe-EQEC 2009, June 2009, München, Germany
55. *Strongly Interacting Polaritons in Coupled Arrays of Cavities*
CLEO/Europe-IQEC 2007, June 2007, München, Germany
56. *Strongly Interacting Polaritons in Coupled Arrays of Cavities*
“Quantum Mechanics: From Fundamental Problems to Applications” (QMFP 2006),
December 2006, Bertinoro, Italy

INVITED SEMINAR TALKS:

57. *Simulating Quantum Magnets in Superconducting Circuits*
12.06.2018, Oxford Quantum Circuits (inv. Dr. Leek), United Kingdom
58. *Driven-Dissipative Quantum Many-Body Physics in Superconducting Circuits*
18.04.2018, Technical University Munich (inv. Prof. Pollmann), Germany
59. *Quantum Complexity, a Chance and a Challenge*
29.01.2018, Volkswagen Data:Lab Munich (inv. Prof. van der Smagt), Germany
60. *Photon Ordering in Superconducting Circuit Lattices with Nonlinear Couplers*
26.01.2018, WMI Garching (inv. Prof. R. Gross), Germany
61. *Driven-Dissipative Quantum Many-Body Systems: from Mott-Phases to Limit-Cycles*
29.11.2017, University of St Andrews (inv. Dr. Braunecker), United Kingdom
62. *Engineering and Simulating Quantum Matter with Light*
01.08.2017, University of Erlangen (inv. Prof. Marquardt), Germany
63. *Superconducting Quantum Simulator for Topological Order and the Toric Code*
10.11.2016, University of Cambridge (inv. Dr. Nunnenkamp), United Kingdom
64. *Superconducting Quantum Simulator for Topological Order and the Toric Code*
05.09.2016, University of Innsbruck (inv. Prof. P. Zoller), Austria
65. *Strongly Interacting Photons: Coherence, Correlations and Propagation*
10.12.2015, University of Warwick (inv. Prof. R. Römer), United Kingdom
66. *Photons in Networks of Superconducting Circuits*
04.12.2015, University of Sussex (inv. Dr. D. Porras), United Kingdom
67. *Driven-Dissipative Quantum Many-Body Dynamics in Superconducting Circuits*
06.11.2015, Google Inc. Santa Barbara (inv. Prof. J. Martinis), USA
68. *Strongly Interacting Photons: Coherence, Correlations and Propagation*
27.10.2015, Stanford University (inv. Prof. J. Vuckovic), USA
69. *Superconducting Quantum Simulator for Topological Order in the Toric Code*
19.06.2015, WMI Garching (inv. Prof. R. Gross), Germany

70. *Non-Classical Mechanical Motion in Optoelectromechanics*
23.04.2015, ETH Zürich (inv. Prof. A. Wallraff), Switzerland
71. *Photons in Networks of Superconducting Circuits*
31.10.2014, University of Saarland (inv. Prof. F. Wilhelm-Mauch), Germany
72. *Strongly Interacting Photons in Superconducting Circuit Networks*
29.07.2014, ETH Zürich (inv. Prof. A. Wallraff), Switzerland
73. *Engineered Quantum Dynamics in Nano-Mechanics and Superconducting Circuits*
24.07.2014, LMU München (inv. Prof. J. von Delft), Germany
74. *Driven-Dissipative Regimes of Bosonic Hubbard Models*
18.07.2014, Frankfurt University (inv. Prof. W. Hofstetter), Germany
75. *Self-Consistent Projection Operator Theory for Quantum Many-Body Systems*
12.03.2014, Imperial College London (inv. Prof. T. Rudolf), United Kingdom
76. *Nanomechanical Qubits*
11.03.2014, University College London (inv. Prof. S. Bose), United Kingdom
77. *Driven Dissipative Quantum Many-Body Physics with Strongly Interacting Photons*
17.02.2014, Atomic and Laser Physics Seminar, University of Oxford (inv. Dr. I. Mekhov),
United Kingdom
78. *Nanomechanical Qubits*
25.06.2013, Imperial College London (inv. Prof. M. Kim), United Kingdom
79. *Nanomechanical Qubits*
07.05.2013, University of Erlangen (inv. Prof. F. Marquardt), Germany
80. *Driven Dissipative Phases of Strongly Interacting Photons*
24.04.2013, University of Marburg (inv. Prof. F. Gebhard), Germany
81. *Engineered Quantum Dynamics in Optical and Nano-Mechanical Systems*
21.04.2013, Heriot-Watt University (inv. Prof. G. Buller), United Kingdom
82. *Photon-Photon Interactions in Superconducting Circuits with Ultrastrong Light-Matter
Coupling*
29.06.2012, Technical University Vienna (inv. Prof. J. Schmiedmayer), Austria
83. *Wechselwirkende Photonen*
26.06.2012, Karlsruhe Institut für Technologie (inv. Prof. G. Schön), Germany
84. *Networks of Interacting Photons*
23.01.2012, IQOQI and University of Innsbruck (inv. Prof. P. Zoller), Austria
85. *Strongly Correlated Photons in Nonlinear Resonators and Waveguides*
21.10.2011, CNSI seminar, University of California in Santa Barbara (inv. Prof. A.
Cleland), USA
86. *Non-Classical States of Nano-Mechanical Oscillators*
24.02.2011, ICFO Barcelona (inv. Prof. M. Lewenstein), Spain

87. *Engineered Quantum Dynamics with Strongly Interacting Photons and Nano-Mechanical Oscillators*
14.02.2011, Universität Mainz (inv. Prof. F. Schmidt-Kaler), Germany
88. *Strongly Correlated Photons in Nonlinear Resonators and Waveguides*
13.01.2011, Technische Universität Wien (inv. Dr. J. Majer), Austria
89. *Strongly Correlated Photons in Nonlinear Resonators and Waveguides*
16.12.2010, Universität Augsburg (inv. Prof. P. Hänggi), Germany
90. *Frozen Light: Strongly Correlated Photons in Nonlinear Resonators and Waveguides*
18.11.2010, Theory Colloquium, Kaiserslautern (inv. Prof. M. Fleischhauer), Germany
91. *Thermodynamics in Quantum Many-Body Systems with Local Addressability*
12.10.2010, MPQ München (inv. Prof. I. Bloch), Germany
92. *Strongly Correlated Photons Induced by Photon Losses*
20.07.2010, LMU München (inv. Prof. H. Weinfurter), Germany
93. *Creating Quantum Correlations with Light*
21.06.2010, LMU München (inv. Prof. J. Kotthaus), Germany
94. *Strongly Correlated Photons Induced by Photon Losses*
01.06.2010, Universität Stuttgart (inv. Prof. G. Mahler), Germany
95. *Strongly Correlated Photons Induced by Photon Losses*
23.04.2010, LMU München (inv. Prof. J. von Delft), Germany
96. *Strongly Correlated Photons Versus Photon Losses*
04.03.2010, Scuola Normale Superiore Pisa (inv. Prof. R. Fazio), Italy
97. *Quantum Many-Body Phenomena in Coupled Arrays of Cavities*
04.06.2009, Joint TCM/AMOP seminar (inv. Dr. M. Atatüre), Cambridge, United Kingdom
98. *Quantum Many-Body Phenomena in Coupled Arrays of Cavities*
27.11.2008, TU Graz (inv. Prof. W. von der Linden), Austria
99. *Minimal Length Scales for the Existence of Local Temperatures*
28.05.2008, Royal Holloway (inv. Dr. A. Ho), United Kingdom
100. *Effective Many-Body Systems in Coupled Arrays of Cavities*
07.03.2008, Universität Regensburg (inv. Dr. J. Siewert), Germany
101. *Effective Many-Body Systems in Coupled Arrays of Cavities*
28.02.2008, MPQ München (inv. Prof. I. Cirac), Germany
102. *Effective Many-Body Systems in Coupled Arrays of Cavities*
09.01.2008, Condensed Matter Group, Imperial College (inv. Dr. D. Lee) , United Kingdom
103. *Minimal Length Scales for the Existence of Local Temperatures*
30.05.2007, Cambridge (inv. Dr. Berry Groisman), United Kingdom

104. *Strongly Interacting Polaritons and Photons in Coupled Arrays of Cavities*
14.02.2007, Cambridge (inv. Dr. D. Angelakis), United Kingdom
105. *Strongly Interacting Polaritons and Photons in Coupled Arrays of Cavities*
12.02.2007, MPQ München (inv. Prof. G. Rempe), Germany
106. *Strongly Interacting Polaritons and Photons in Coupled Arrays of Cavities*
09.02.2007, Imperial College (inv. Prof. M. Plenio), United Kingdom
107. *Strongly Interacting Polaritons in Coupled Arrays of Cavities*
21.12.2006, ETH Zürich (inv. Prof. A. Imamoglu), Switzerland
108. *Strongly Interacting Polaritons in Coupled Arrays of Cavities*
19.12.2006, Universität Stuttgart (inv. Prof. G. Mahler), Germany
109. *Strongly Interacting Polaritons in Coupled Arrays of Cavities*
05.07.2006, Technische Universität München (inv. Prof. W. Zwerger), Germany
110. *Excitation and Entanglement Transfer Versus Spectral Gap*
18.05.2006, Universität Düsseldorf (inv. Prof. D. Bruss), Germany
111. *Excitation and Entanglement Transfer Versus Spectral Gap*
16.05.2006, Universität Osnabrück (inv. Prof. J. Gemmer), Germany
112. *Excitation and Entanglement Transfer Versus Spectral Gap*
27.03.2006, IQOQI Innsbruck (inv. Prof. H. Briegel), Austria
113. *Minimal Length Scales for the Existence of Local Temperatures*
12.01.2005, Imperial College (inv. Prof. M. Plenio), United Kingdom
114. *A Quantum Central Limit Theorem and some of its Potential Applications*
08.12.2004, Technische Universität München (inv. Prof. H. Spohn), Germany
115. *Minimal Length Scales for the Existence of Local Temperatures*
17.11.2004, Universität Genf (inv. Prof. M. Büttiker), Switzerland
116. *Breakdown of Temperature at the Nanoscale?*
08.11.2004, University of Surrey (inv. Prof. O. Hess), United Kingdom
117. *Local Versus Global Thermal States: Correlations and the Existence of Local Temperatures*
04.05.2004, Universität Stuttgart (inv. Prof. G. Mahler), Germany
118. *Cosmological Perturbations in Quintessential Models of Inflation*
28.06.2001, Humboldt Universität Berlin (inv. Prof. D. Lüst), Germany
119. *Cosmological Perturbations in Quintessential Models of Inflation*
09.01.2001, Max Planck Institut für Astrophysik Garching (inv. Dr. J. Niemeyer), Germany

MEDIA COVERAGE OF MY WORK

1. *Viewpoint: Neural Networks Take on Open Quantum Systems* by Maria Schuld, Ilya Sinayskiy and Francesco Petruccione, June 2019
<https://physics.aps.org/articles/v12/74>
2. *TUM Investigates Quantum Many-body System* by Klaus Neumann in *Superconductor Week* **27**, November 2013
<http://www.superconductorweek.com>
3. *Der letzte Schrei: Mechanische Computer* cover story by SCIENCE ORF.at.
March 2013
<http://science.orf.at/stories/1714989/>
4. *Quantencomputer mit Saiteneffekt* cover story by Heise Online.
March 2013
<http://www.heise.de/ct/meldung/Quantencomputer-mit-Saiteneffekt-1828096.html>
5. *Quantencomputer aus Kohlenstoff Nanoröhrchen* cover story by pro-physik.de.
March 2013
[http://www.pro-physik.de/details/news/4518601/
Quantencomputer_aus_Kohlenstoff-Nanoroehrchen.html](http://www.pro-physik.de/details/news/4518601/Quantencomputer_aus_Kohlenstoff-Nanoroehrchen.html)
6. *Quantum computers counting on carbon nanotubes* Press release by physics department of Technical University Munich.
March 2013
The press release triggered about 30 cover stories in the scientific media.
7. *Visible and Entangled* by Armand Niederberger in *Optics & Photonics Focus* **3**, Story 7
December 2008
<http://www.opfocus.org/index.php?topic=story&v=3&s=7>
8. *Schrödinger's Drum* by Michelangelo D'Agostino in *Phys. Rev. Focus*,
November 2008
<http://focus.aps.org/story/v22/st16>
9. *Light Impersonates Electrons* by Mark Buchanan in *Phys. Rev. Focus*,
September 2007
<http://focus.aps.org/story/v20/st8>
10. *Engaging photons in light conversation* by Mark Buchanan in *New Scientist*,
13 January 2007, p. 42
[http://www.newscientist.com/channel/fundamentals/
mg19325861.500-engaging-photons-in-light-conversation.html](http://www.newscientist.com/channel/fundamentals/mg19325861.500-engaging-photons-in-light-conversation.html)
11. Radio interview for Berkeley Groks Science Show on KLAX 90.7FM
November 2006
<http://www.ocf.berkeley.edu/~clgroks/1206to1006.html>

12. *Device breakthrough would aid quantum computer development* on CBCNews, Canada
November 2006
<http://www.cbc.ca/technology/story/2006/11/27/tech-quantumcomputer-061127.html>
13. *Quantum Phase Transitions of Polaritons in Arrays of Coupled Micro-Cavities* News story
by the QIPIRC
November 2006
<http://www.qipirc.org/news.php#45>
14. *New simulator is next step on the road to developing quantum computers* News release
by Imperial College, appeared on the welcome page of Imperial College, London.
November 2006
http://www3.imperial.ac.uk/newsandeventspggrp/imperialcollege/newssummary/news_27-11-2006-11-35-33?newsid=2993
This article also appeared on 13 further news pages.
15. *Quantum optics: Light does matter* by Fabrizio Illuminati in *Nature Physics, News and Views*
Nature Physics **2**, 803 - 804 (2006)
16. *Measuring the immeasurable* by Philip Ball in *Nature, Materials Update, Nanozone*,
June 2005
<http://www.nature.com/materials/nanozone/news/050616/portal/m050616-2.html>
17. *Exploring temperature at the nano-scale* by Dieter Gross in *Physics World*,
Oktober 2004
<http://physicsweb.org/articles/world/17/10/6/1>
18. *When temperature loses its meaning* by Jeff Hecht in *New Scientist*,
21 August 2004 p. 18
<http://www.newscientist.com/article.ns?id=mg18324612.500>
19. *Nanotubes may have no 'temperature'* by Mark Peplow in *news@nature.com*,
August 2004
<http://www.nature.com/news/2004/040816/full/040816-4.html>
This article also appeared on three other news pages.