



Curriculum vitae Christian Kurtsiefer

born August 20, 1967 in Munich, Germany

<i>Sept 87-Oct 91</i>	Diploma program in Physics at the University of Konstanz
<i>Sept 90-Mar 91</i>	Studies at the Université J. Fourier in Grenoble, France in a student exchange scheme (ERASMUS)
<i>Dec 91-Dec 92</i>	Diploma thesis in experimental atom optics in Konstanz
<i>Jan 93-July 97</i>	Doctoral thesis in the group of Prof. J. Mlynek on matter wave interference, correlated atom-photon pairs, quantum state tomography
<i>July 97-July 99</i>	Postdoc at the IBM Almaden Research Center in San Jose, CA on an experimental quantum computation project with single ions
<i>July 99 -Oct 03</i>	Scientific staff member in the group of Prof. H. Weinfurter at the University of Munich, with focus on optical quantum communication and single photon effects
<i>since Oct 03</i>	Faculty member of the Physics Department of the National University of Singapore; establishing of an experimental lab in quantum information technology with emphasis on entangled photon sources, their application to quantum key distribution and optimal quantum measurement strategies, and single-photon interaction with single trapped atoms
<i>since Jan 08</i>	Principal Investigator at the Centre for Quantum Technologies at the National University of Singapore
<i>July 09-July 12</i>	Faculty of Science Dean's Chair at the National University of Singapore
<i>since Aug 10</i>	Full Professor at the National University of Singapore
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Articles in peer-reviewed journals

1. H.S. Poh, S.K. Joshi, A. Cerè, A. Cabello, C. Kurtsiefer: *Approaching Tsirelson's Bound in a Photon Pair Experiment*, [*Phys. Rev. Lett.* **115**, 180408 \(2015\)](#).
2. G.K. Gulati, B. Srivathsan, B. Chng, A. Cerè, C. Kurtsiefer: *Polarization entanglement and quantum beats of photon pairs from four-wave mixing in a cold Rb-87 ensemble*, [*New Journal of Physics* **17**, 093034 \(2015\)](#).
3. V. Leong, S. Kosen, B. Srivathsan, G.K. Gulati, A. Cerè, and C. Kurtsiefer: *Hong-Ou-Mandel interference between triggered and heralded single photons from separate atomic systems*. [*Phys. Rev. A* **91**, 063829 \(2015\)](#).
4. V. Scarani and C. Kurtsiefer: *The black paper of quantum cryptography: real implementation problems*, [*Theoretical Computer Science* **560**, 27-32 \(2014\)](#).
5. B. Srivathsan, G.K. Gulati, A. Cerè, B. Chng, and C. Kurtsiefer: *Reversing the temporal envelope of a heralded single photon using a cavity*, [*Phys. Rev. Lett.* **113**, 163601 \(2014\)](#).
6. K. Durak, C.H. Nguyen, V. Leong, S. Straupe, and Christian Kurtsiefer: *Diffraction-limited Fabry-Perot Cavity in the Near Concentric Regime.*, [*New Journal of Physics* **16**, 103002 \(2014\)](#).
7. G.K. Gulati, B. Srivathsan, B. Chng, A. Cerè, D. Matsukevich, and C. Kurtsiefer: *Generation of an exponentially rising single-photon field from parametric conversion in atoms*, [*Phys. Rev. A* **90**, 033819 \(2014\)](#).
8. P.K. Tan, G.H. Yeo, H.S. Poh, A.H. Chan, and C. Kurtsiefer: *Measuring Temporal Photon Bunching in Blackbody Radiation*, [*Astrophysics Journal* **789**, L10 \(2014\)](#).
9. Q. Liu, A. Lamas-Linares, C. Kurtsiefer, J. Skaar, V. Makarov, and I. Gerhardt: *A universal setup for active control of a single-photon detector*, [*Rev. Sci. Instrum.* **85**, 013108 \(2014\)](#).
10. B. Srivathsan, G.K. Gulati, B. Chng, G. Maslennikov, D. Matsukevich, and C. Kurtsiefer: *Narrow Band Source of Transform-Limited Photon Pairs via Four-Wave Mixing in a Cold Atomic Ensemble*, [*Phys. Rev. Lett.* **111**, 123602 \(2013\)](#).
11. S.A. Aljunid, G. Maslennikov, Y. Wang, D. H. Lan, V. Scarani, and C. Kurtsiefer: *Excitation of a single atom with exponentially rising light pulses*, [*Phys. Rev. Lett.* **111**, 103001 \(2013\)](#).
12. H.M.Y. Ng, S. Koduru Joshi, C.M. Chia, C. Kurtsiefer, and S. Wehner: *Experimental implementation of bit commitment in the noisy-storage model*, [*Nature Communications* **3**, 1326 \(2012\)](#).
13. H.L. Dao, S.A. Aljunid, G. Maslennikov, and C. Kurtsiefer: *Preparation of an Exponentially Rising Optical Pulse for Efficient Excitation of Single Atoms in Free Space*, [*Rev. Sci. Instr.* **83**, 083104 \(2012\)](#).
14. I. Gerhardt, Q. Liu, A. Lamas-Linares, J. Skaar, V. Scarani, V. Makarov, and C. Kurtsiefer: *Experimentally faking the violation of Bell's inequalities*, [*Phys. Rev. Lett.* **107**, 170404 \(2011\)](#).
15. I. Gerhardt, Q. Liu, A. Lamas-Linares, J. Skaar, C. Kurtsiefer, and V. Makarov: *Full-field implementation of a perfect eavesdropper on a quantum cryptography system*, [*Nature Communications*, **2**, 349 \(2011\)](#).
16. S.A. Aljunid, B. Chng, M. Paesold, G. Maslennikov, and C. Kurtsiefer: *Interaction of light with a single atom in the strong focusing regime*, [*J. Mod. Opt.* **58**, 299-305 \(2011\)](#).
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18. I. Gerhardt, L. Mai, A. Lamas-Linares, and C. Kurtsiefer: *Detection of Single Molecules Illuminated by a Light-Emitting Diode*, *Sensors* **11**, 905-916 (2011).
19. M. Fürst, H. Weier, S. Nauerth, D.G. Marangon, C. Kurtsiefer, and H. Weinfurter: *High speed optical quantum random number generation*, [*Optics Express* **18**, 13029 \(2010\)](#).
20. H.S. Poh, J. Lim, I. Marcikic, A. Lamas-Linares, C. Kurtsiefer: *Eliminating Spectral Distinguishability in Ultrafast Spontaneous Parametric Down-conversion*, [*Phys. Rev. A* **80**, 043815 \(2009\)](#).
21. S.A. Aljunid, M. K. Tey, B. Chng, T. Liew, G. Maslennikov, V. Scarani, and C. Kurtsiefer: *Phase shift of a weak coherent beam induced by a single atom*, [*Phys. Rev. Lett.* **103**, 153601 \(2009\)](#).
22. C. Ho, A. Lamas-Linares, and C. Kurtsiefer: *Clock synchronization by remote detection of correlated photon pairs*, [*New J. Phys.* **11**, 045011 \(2009\)](#).

23. M. P. Peloso, I. Gerhardt, C. Ho, A. Lamas-Linares, and C. Kurtsiefer: *Daylight operation of a free space, entanglement-based quantum key distribution system*, [*New J. Phys.* **11**, 045007 \(2009\)](#) .
24. M.K. Tey, G. Maslennikov, T.C.H. Liew, S.A. Aljunid, F. Huber, B. Chng, Z. Chen, V. Scarani, and C. Kurtsiefer: *Interfacing light and single atoms with a lens*, [*New J. Phys.* **11**, 043011 \(2009\)](#).
25. M.K. Tey, Z. Shen, S.A. Aljunid, B. Chng, F. Huber, G. Maslennikov and C. Kurtsiefer: *Strong interaction between light and a single trapped atom without the need for a cavity*, [*Nature Physics* **4**, 924-927 \(2008\)](#).
26. T. Durt, C. Kurtsiefer, A. Lamas-Linares, and A. Ling, *Wigner tomography of two-qubit states and quantum cryptography*, [*Phys. Rev. A* **78**, 042338 \(2008\)](#).
27. A. Ling, M. Peloso, I. Marcikic, A. Lamas-Linares, V. Scarani, and C. Kurtsiefer: *Experimental quantum key distribution based on a Bell test*, [*Phys. Rev. A* **78**, 020301\(R\), \(2008\)](#).
28. C. Branciard, N. Brunner, N. Gisin, A. Lamas-Linares, A. Ling, C. Kurtsiefer and V. Scarani: *Testing quantum correlations versus single-particle properties within Leggett's model and beyond*, [*Nature Physics* **4**, 681-685 \(2008\)](#).
29. A. Ling, A. Lamas-Linares and C. Kurtsiefer: *Absolute emission of spontaneous parametric down conversion into single transverse Gaussian modes*, [*Phys. Rev. A* **77**, 043834 \(2008\)](#).
30. S. Gaertner, M. Bourennane, C. Kurtsiefer, A. Cabello and H. Weinfurter: *Experimental demonstration of a quantum protocol for Byzantine agreement and liar detection* , [*Phys. Rev. Lett.* **100**, 070504 \(2008\)](#).
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39. Alexander Ling, Kee Pang Soh, Antia Lamas-Linares, Christian Kurtsiefer: *Experimental polarization state tomography using optimal polarimeters*, [*Phys. Rev. A* **74**, 22309 \(2006\)](#).
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41. Markus Weber, Juergen Volz, Karen Saucke, Christian Kurtsiefer, and Harald Weinfurter: *Analysis of a single-atom dipole trap*, [*Phys. Rev. A* **73**, 043406 \(2006\)](#).
42. Carsten Schuck, Gerhard Huber, Christian Kurtsiefer, and Harald Weinfurter: *Complete Deterministic Linear Optics Bell State Analysis*, [*Phys. Rev. Lett.* **96**, 190501 \(2006\)](#).
43. Alexander. Ling, Kee Pang Soh, Antia Lamas-Linares, and Christian Kurtsiefer: *An optimal photon counting polarimeter*, [*J. Mod. Opt.* **53**, 1523-1528 \(2006\)](#).
44. M. Bourennane, M. Eibl, S. Gaertner, N. Kiesel, Ch. Kurtsiefer, and H. Weinfurter: *Entanglement Persistency of Multiphoton Entangled States*, [*Phys. Rev. Lett.* **96**, 100502 \(2006\)](#).
45. C. Wang, Ch. Kurtsiefer, H. Weinfurter and B. Burchard: *Single photon emission from SiV centres in diamond produced by ion implantation*, [*J. Phys. B* **39**, 37-41 \(2006\)](#).
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49. A. Poppe, A. Fedrizzi, T. Loruenser, O. Maurhardt, R. Ursin, H. R. Boehm, M. Peev, M. Suda, C. Kurtsiefer, H. Weinfurter, T. Jennewein, A. Zeilinger: *Practical Quantum Key Distribution with Polarization-Entangled Photons*, [Opt. Express **12**, 3865-3871 \(2004\)](#).
50. K. J. Resch, M. Lindenthal, B. Blauensteiner, H. R. Boehm, A. Fedrizzi, C. Kurtsiefer, A. Poppe, T. Schmitt-Manderbach, M. Taraba, R. Ursin, P. Walther, H. Weier, H. Weinfurter, A. Zeilinger: *Distributing entanglement and single photons through an intra-city, free-space quantum channel*, [Opt. Express **13**, 202-209 \(2005\)](#).
51. P. Trojek, Ch. Schmid, M. Bourennane, Ch. Kurtsiefer, and H. Weinfurter: *Compact source of polarization-entangled photon pairs*, [Optics Express **12**, 276-281 \(2004\)](#).
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59. N. Kiesel, M. Bourennane, Ch. Kurtsiefer, H. Weinfurter; D. Kazlikowski, W. Laskowski, M. Zukowski: *Three photon W state*, [Journal of Modern Optics **50**, 1131 \(2002\)](#).
60. O. Schulz, R. Steinhübl, M. Weber, B.-G. Englert, Ch. Kurtsiefer, H. Weinfurter: *Ascertaining the values of $\sigma(x)$, $\sigma(y)$, and $\sigma(z)$ of a polarization qubit*, [Phys. Rev. Lett. **90**, 177901 \(2003\)](#).
61. Ch. Braig, P. Zarda, Ch. Kurtsiefer, and H. Weinfurter: *Experimental Demonstration of Complementarity with Single Photons*, [Applied Physics B **76**, 113 \(2003\)](#).
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73. T. Pfau, Ch. Kurtsiefer, J. Mlynek: *Double Slit Experiments with Correlated Atom-Photon States*, [Journal of Quantum and Semiclassical Optics **8**, 665-671 \(1996\)](#).
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75. Christian Kurtsiefer, Oliver Dross, Dirk Voigt, Christopher R. Ekstrom, Tilman Pfau, and Jürgen Mlynek: *Observation of correlated atom-photon pairs on the single particle level*, [Phys. Rev. A **55**, R2539 \(1997\)](#).
76. Ch. Kurtsiefer, J. Mlynek: *A 2-dimensional detector with high spatial and temporal resolution for metastable rare gas atoms*, [Appl. Phys. B **64**, 85-90 \(1996\)](#).
77. C.R. Ekstrom, Ch. Kurtsiefer, D. Voigt, O. Dross, T. Pfau, J. Mlynek: *Coherent excitation of a He* beam observed in atomic momentum distributions*, [Opt. Comm. **123**, 505 \(1996\)](#).
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Patents

1. Magiq technologies, M. Bourennane, C. Kurtsiefer, C. Schmid, P. Trojek, H. Weinfurter, M. Zukowski: Single-particle quantum-enhanced secret sharing, PCT/US2006/000072, filed: 3.1.2006
2. Ch. Kurtsiefer, H. Weinfurter: *Vorrichtung und Verfahren für die Quantenkryptographie*, Patent Nr. 101 17 272.A1, Deutsches Patentamt (2001).
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Proceedings

1. A. Cerè, V. Leong, S. Kosen, B. Srivathsan, G.K. Gulati, C. Kurtsiefer: *Controlling the interference of single photons emitted by independent atomic sources*, Quantum Communications and Quantum Imaging XIII, [Proc. SPIE **9615**, 96150Q \(2015\)](#).
2. S.A. Aljunid, M.K. Tey, B. Chng, G. Maslennikov, C. Kurtsiefer: *Phase Shift of a Weak Coherent Beam by a Single Atom*, Conference on Lasers and Electro-optics / Quantum Electronics and Laser Science (CLEO/QELS 2009), Vols. 1-5, 2123 (2009)
3. I. Gerhardt, M.P. Peloso, C. Ho, A. Lamas-Linares, C. Kurtsiefer: *Entanglement-based Free Space Quantum Cryptography in Full Daylight*, Conference on Lasers and Electro-Optics/Quantum Electronics and Laser Science (CLEO/QELS 2009), Vols. 1-5, 2405 (2009)
4. J. Lee, S.A. Aljunid, M.K. Tey, G. Maslennikov, C. Kurtsiefer: *Measuring atomic oscillator strengths by single atom spectroscopy*, Conference on Lasers and Electro-Optics/Quantum Electronics and Laser Science Conference (CLEO/QELS 2009), Vols. 1-5, 2969-2970 (2009)
5. M.K. Tey, S.A. Aljunid, F. Huber, B. Chng, Z. Chen, J. Lee, T. Liew, G. Maslennikov, V. Scarani, C. Kurtsiefer: *Interfacing light and single atoms with a lens*, Proc. SPIE Vol. 7236, Masahide Sasaki (ed.), p. 723606 (2009).

6. A. Ling, M. Peloso, I. Marcikic, A. Lamas-Linares, C. Kurtsiefer: *Experimental E91 quantum key distribution*, Proc. SPIE Vol. 6903 (Advanced optical concepts in quantum computing, memory, and communication), Z.U. Hasan; A.E. Craig; P.R. Hemmer (eds.), p.U9030 (2008).
7. A. Ling, P. Y. Han, A. Lamas-Linares, and C. Kurtsiefer: *Preparation of Bell States with Controlled White Noise*, *Laser Physics*, Vol. 16, No. 7, 1140-1144 (2006).
8. John G. Rarity, Phil M. Gorman, P. R. Knight, Harald Weinfurter, and Christian Kurtsiefer: *Quantum communication in space*, Proc. SPIE Vol. 5161 (Quantum Communications and Quantum Imaging, R.E. Meyers, Y. Shih (eds.)), pp. 240-251 (2004).
9. M. Bourennane, M. Eibl, S. Gaertner, C. Kurtsiefer, H. Weinfurter, A. Cabello, O. Guhne, P. Hyllus, D. Bruss, M. Lewenstein, A. Sanpera. *Four photon polarization entanglement tests and applications*. Conference proceedings for the 3rd ERATO Quantum Information Science Conference (EQIS 03) *International Journal of Quantum Information* **2**, 133-147 (2004).
10. M. Bourennane, M. Eibl, S. Gaertner, N. Kiesel, Ch. Kurtsiefer, and H. Weinfurter: *Multiphoton entanglement*; S. Liu, G. Guo, H.-K. Lo, N. Imoto (eds.): *Quantum optics in computing and communications*, Proceedings SPIE 4917, pp. 45-53 (2002).
11. C. Kurtsiefer, P. Zarda, Matthäus Halder, P.M. Gorman, P.R. Tapster, J.G. Rarity, and H. Weinfurter: *Long distance free-space quantum cryptography* S. Liu, G. Guo, H.-K. Lo, N. Imoto (eds.): *Quantum optics in computing and communications*, Proceedings SPIE 4917, pp. 25-31 (2002).
12. A. Beige, B.-G. Englert, Ch. Kurtsiefer, and H. Weinfurter: *Communication with qubit pairs*, R. Brylinski, G. Chen (eds.): *Mathematics of quantum computation*, CRC Press, pp. 359 (2002).
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14. Christian Kurtsiefer, Markus Oberparleiter, Jürgen Volz, Harald Weinfurter: *Efficient Generation of Polarization-Entangled Photon Pairs with a Laser Diode Source*, *Laser Physics at the limits*, pp. 449-457. Springer Verlag (2001).
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17. T. Pfau, Ch. Kurtsiefer, C.R. Ekstrom, R.J.C. Spreeuw, M. Hartl, U. Janicke, M. Wilkens, and J. Mlynek: *"Non-classical" atom optics*, p. 529, Proc. of the Int. School of Physics "Enrico Fermi," Varenna, Course CXXXI on Coherent and Collective Interactions of Particles and Radiation Beams, eds: A. Aspect, W. Barletta, and R. Bonifacio, IOS Press (1996).
18. Ch. Kurtsiefer, T. Pfau, S. Spälter, C. R. Ekstrom, and J. Mlynek: *A Heisenberg microscope for atoms*, *Ann. of the New York Acad. of Sci.* **755**, 162 (1995).
19. T. Pfau, A. Schnetz, C.S. Adams, Ch. Kurtsiefer, M. Sigel, J. Mlynek: *"Diffraction of atoms from Optical potentials"*, Proc. of the workshop "Quantum Interferometry", Trieste, Italy; ed.: F. De Martini, G. Denardo, A. Zeilinger, (1993).
20. M. Sigel, T. Pfau, C.S. Adams, Ch. Kurtsiefer, W. Seifert, C. Heine, J. Mlynek: *"Optical Elements for atoms"*, Proc. of the 5th Meeting on Laser Phenomena, Kühtai, Austria; ed.: F. Ehlotzki, (1993).

Conferences

1. 15th Asian Quantum Information Science conference, 24-30 August 2015, KIAS, Seoul, South Korea, *Experimental Techniques for Strong Interaction between Photons and Atoms*, invited talk.
2. 15th Asian Quantum Information Science conference (Satellite workshop), 24-30 August 2015, KIAS, Seoul, South Korea, *Bell tests with Entangled Photons - what is left?* invited talk.
3. CLEO/Europe -EQEC 2015, 21-25 June 2015, Munich, Germany, *Reversing the Temporal Envelope of a Heralded Single Photon using a Cavity*, talk EA.6.2
4. CLEO/Europe -EQEC 2015, 21-25 June 2015, Munich, Germany, *co-author of another talk and two posters*
5. Congressi Stefano Franscini / NCCR "Quantum Systems and Technology", 7-12 June 2015, Monte Verità 2015, Ascona, Switzerland, *Temporal shaping of narrow-band optical photons for interaction with atoms*, .

Invited talk

6. Conference on Resonator QED (CCQED), 9-13 Sept 2013, Munich, Germany, *Atom-light interaction with strongly focused fields*, Germany, invited talk.
7. Conference on Lasers and Electro-Optics 2013, 9-14 June 2013, San Jose, CA, *coauthor of two talks by members of my research group*.
8. Asia Pacific workshop on Quantum Information Science APWQIS2013, 21-23 May 2013, Tokyo, Japan, *Correlated and entangled narrowband photons for interaction with atomic systems*, invited talk
9. CLEO/Europe-IQEC Conference 2013, 12-16 May 2013, Munich, Germany, *coauthor of two talks by members of my research group*.
10. Coherent Control of Complex Quantum Systems, 14-17 April 2013, Okinawa, Japan, *Coupling single Photons to single Atoms*, invited talk.
11. IPS meeting 2013, 4-6 March 2013, NTU Singapore, *Chairman and organizer, several contributions as co-author*
12. DAMOP 2012, Anaheim, US, June 2012; *coauthor of two contributions by members of my research group*.
13. DPG Tagung 2012, 12.-16. Mar 2012, Stuttgart, Germany, *Efficient narrowband PPKTP source for Polarization-entangled photons, 3 other contributions as co-author*
14. IPS meeting 2012, 23.-24. Feb 2012, NUS Singapore, *Chairman and main organizer, several contributions as co-author*
15. CLEO/Europe-EQEC 2011, 22.-26. May 2011, Munich, Germany, *three contributions as co-author*
16. Conference on Lasers and Electro-optics (CLEO2011), 1.-6. May 2011, Baltimore, MD, *Full Eavesdropping on a practical QKD system*, invited talk
17. DPG Tagung 2011, 11.-13. March 2011, Dresden, Germany, *four contributions as co-author*
18. Institute of Physics Singapore annual research meeting 2010, NUSH Singapore, *Chairman, several contributions as co-author*
19. Workshop on Quantum Information Processing (QIP2011), 10.-14. January 2011, Sentosa, Singapore, *Implementation of an attack scheme on a practical QKD system*, invited talk
20. Workshop on Cryptography from Storage Imperfections, 19.-23. March 2010, IQI Caltech, Pasadena, CA, *Implementation of an attack scheme on a practical QKD system*, invited talk
21. DPG Tagung 2010, 8.-13. Mar 2010, Hannover, Germany, *Implementation of an attack scheme on a practical QKD system*
22. ICQIT 2009 - Int. Conf. on Quantum information and Technology, 2.-5. Dec 2009, NII Tokyo, Japan, *Implementation of an attack scheme on a practical QKD system*, invited talk
23. SPW09 - Single photon workshop 2009, 3.-6. Nov 2009, NIST Boulder, CO: *Substantial scattering of photons by a Single Atom*, invited talk
24. EQEC09-CLEO/Europe, 14.-19. June 2009, Munich, Germany, *Substantial scattering of a Weak Coherent Beam by a Single Atom*, invited talk
25. SPIE Photonics West, 24.-29. January 2009, San Jose, CA: *Interfacing light and single atoms with a lens*, keynote presentation
26. UQC2008, 1.-2. December 2008, Akihabara Tokyo: *Status of R&D on Quantum communication and related R&D in Singapore*, invited talk
27. DEFCON 16, 8.-10. August 2008, Las Vegas: The Quantum Lounge (experimental exhibition of an entanglement-based QKD system)
28. Black Hat 2008, 2.-7. August 2008, Las Vegas: The Quantum Spookshow (experimental exhibition of an entanglement-based QKD system)
29. 17th International Laser Physics Workshop (LPHYS08), 30. June- 4. July 2008, Trondheim, Norway: *What can one do with single photons?* plenary talk
30. DAMOP2008 meeting, 27.-31. May 2008, Penn State (USA): *Strong Interaction Between Light and a Single Trapped Atom Without a Cavity*, co-authored talk
31. CLEO/QUELS 08, 4.-9. May 2008, San Jose, CA: *QFE6 Absolute Emission Rates of Spontaneous Parametric*

- Down Conversion into a Single Transverse Gaussian Mode* co-authored talk
32. CLEO/QUELS 08, 4.-9. May 2008, San Jose, CA: *QTuB6 Strong Interaction between Light and a Single Trapped Atom without a Cavity* co-authored talk
 33. 24th Chaos Communication Congress (24C3), 27.-30. Dec 2007, Berlin (Germany): *Quantum Cryptography and possible attacks*, plenary talk
 34. 6th International conference on cryptology and network security (CANS), 8.-10. Dec 2007, Singapore: *Aspects of Practical Quantum Key Distribution Schemes*, inv. talk
 35. Workshop on Theory and Realisation of Practical Quantum Key Distribution (TROPICAL QKD), 11.-14. June 2007, Waterloo (Canada): *Spying on a quantum key distribution system through a timing side channel*, poster
 36. Workshop on Theory and Realisation of Practical Quantum Key Distribution (TROPICAL QKD), 11.-14. June 2007, Waterloo (Canada): *Free-space QKD with polarization-entangled photon pairs*, inv. talk
 37. DAMOP 2007 meeting, 5.-9. June 2007, Calgary (Canada): *Free-space QKD using polarization-entangled photon pairs*, inv. talk
 38. Eighth international conference on quantum communication, measurement and computation (QCMC2006) 28. Nov-3. Dec 2006, Tsukuba, Japan: *Joint spectrum mapping of polarization entanglement in parametric down conversion*, poster.
 39. Eighth international conference on quantum communication, measurement and computation (QCMC2006) 28. Nov-3. Dec 2006, Tsukuba, Japan: *Free-space quantum key distribution using polarization entangled photons*, contrib. talk
 40. Defence Technology Prize Exhibition '06, November 2006: *Life demonstration of an entangled-photon based QKD system in daylight conditions* (experimental exhibit)
 41. ARDA-NIST Workshop Toward the Production of a Fast, Robust Source of Entangled Photons on Demand, October 7-8, 2004: *beacon-mode/beam-like twin photons*, inv. talk
 42. Conference on Quantum Information and Quantum Control „Tools for experimental quantum cryptography“, July 19-23, 2004, Toronto, Canada, inv. talk
 43. 2nd Asia-Pacific Workshop on Quantum Information Science, December 15-19, 2003: *Experimental Quantum Cryptography*, inv. talk
 44. Chaos Communication Congress (19C3) Berlin, December 27-30, 2003: *Quantenkryptographie*, inv. Talk
 45. European Research Conference „Quantum Atom Optics“ San Feliu, Spain, September 21-26, 2002: *Long Distance Quantum Cryptography*, inv. talk
 46. DPG-Tagung Osnabrück (2002): *Freiraum-Quantenkryptographie*, inv. talk
 47. Second European Commission QIPC workshop, 28.-31. October 2001, Torino, Italy: *Free space quantum cryptography*, inv. talk
 48. The Second ESF Quantum Information Technologies Conference, Gdansk, Poland, July 10-18, 2001: *Violation of a Bell's inequality with an entangled 4-photon state*, inv. talk
 49. Coherence and Quantum Optics Conference CQOC8, Rochester, NY (USA), June 13-15, 2001: *Experimental Four Photon Entanglement*, poster; *Efficient collection of polarization-entangled photons on type-II parametric down conversion*, contrib. talk
 50. International Conference on quantum Information IQCI, Rochester, NY (USA), June 2001: *Tools for practical quantum cryptography*, poster
 51. QUICK conference on Quantum interference and cryptographic keys, Cargese, Corsica/France, April 7-13, 2001: *Tools for practical Quantum Cryptography*, invited talk
 52. IQEC/CLEO-Europe, 12 - 14 September 2000, Nice (France): *A Robust All-Solid Source for Single Photons*, contrib. talk
 53. DPG-Tagung Bonn (2000): *Kompakte Quelle für einzelne Photonen*, contrib. talk
 54. Current trends in Nano-optics, May 14-18, 2000 Physikzentrum, Bad Honnef, Germany: *A robust all-solid-state source for single photon*, poster
 55. MYSTERIES, PUZZLES AND PARADOXES IN QUANTUM MECHANICS Workshop on ENTANGLEMENT AND DECOHERENCE, Gargnano (Italy), 20-25 September 1999: *Towards a quantum*

- computing experiment with Ba-137 ions, poster; Playing around with type-II parametric down conversion, poster*
56. First Annual Workshop of the SquInT network, Albuquerque (USA), March 30 - May 2, 1999: *Towards a quantum computing experiment with ^{137}Ba ions*, poster
 57. IQEC '98, San Francisco (USA): *"Recent experimental results in using ^{137}Ba in a miniaturized ion trap for quantum computation"*, poster
 58. Spring Meeting of the German Physical Society, Mainz, March 3.-6., 1997: *"Vermessung der Wigner-Funktion in einem Doppelspalt-Atominterferometer"*, contrib. talk.
 59. EQEC '96, Hamburg (Germany): *"Measurement of the Wigner Function of a Matter Wave Packet"*, contrib. talk (1996); *"Coherent Excitation of a He^* Beam Observed in Atomic Momentum Distributions"*, contrib. talk (1996)
 60. IQEC '96, Sidney (Australia): *"Correlation measurements between atoms and photons on the single particle level"*, inv. talk (1996); *"Excitation of a metastable He beam by adiabatic transfer"*, poster
 61. Workshop on atom interferometry, Cairns (Australia): *"Excitation of a metastable He beam by adiabatic transfer"*, poster; *"Measurement of the Wigner function of a matter wave packet"*, poster (1996)
 62. DPG-Tagung Jena (Germany): *"Atom-photon correlations on a single particle level"*, contr. talk; *"Excitation of a metastable He beam by adiabatic transfer"*, poster
 63. Conference on Quantum interference, Trieste (Italy): *"A Heisenberg microscope for He^* atoms"*, inv. talk (1995)
 64. DPG-Tagung Innsbruck (Austria): *"A Heisenberg microscope for atoms"*, inv. talk (1995)
 65. CLEO/EQEC '94, Amsterdam (Netherlands): *"A detector for metastable rare gas atoms with high spatial and temporal resolution"*, poster, (1994)
 66. New York Academy of Science: Fundamental Problems in Quantum Theory, Baltimore: *"A Heisenberg microscope for Helium Atoms"*, inv. talk (1994)
 67. European Quantum Electronics Conference EQEC '93, Firenze (Italy): *"Experimental demonstration of a magneto-optical beamsplitter"*, (1993)
 68. OSA-Meeting Toronto: *"A magneto-optical beamsplitter for atoms"*, inv. talk (1994)
 69. DPG-Tagung Berlin (Germany): *"Experimental realization of a magneto-optical beamsplitter"*, contrib. talk (1993)
 70. European Research Conference on Quantum Optics, Davos (Switzerland): *"Magneto-optical beamsplitter"*, poster (1993)

Seminars / Lectures

1. Quantum Interface Fest at ICFO, Casteldefels, Spain, 28. June 2012: *Single atom-photon interfaces with strongly focused optical modes*
2. Lecture Block on at IAS Summer school of Physics, 28/29. May 2012, NTU Singapore: *Atom-Light interaction in the strong focusing regime*
3. Seminar at NIST Boulder, 10. May 2011: *Interaction of photons in strongly focused modes with single atoms*
4. Seminar at LMU Munich, Germany; 15. March 2010: *Substantial scattering of photons by a Single Atom*
5. Sonderkolloquium Experimentelle Quantenoptik, 1.-2. March 2010, Universität Ulm, Germany: *Strongly focused optical fields - an alternative to cavity quantum electrodynamics?*
6. Workshop on Atom-Photon Interaction, 14. January 2010, ICFO Castelldefels, Spain: *Substantial scattering of Photons by a Single Atom in the Strong Focusing Regime*
7. Lecture block at the Les Houches Singapore summer school, July 2009 (together with A. Lamas-Linares): *Quantum optics devices*

8. Sonderkolloquium Physik-Department der Universität Freiburg, 26. June 2009, Freiburg i.Br., Germany: *Substantial scattering of photons by a single atom*
9. Lecture at the Asher Peres summer school: From Qubits to Black Holes, Chowder bay, Sydney, 17.-22. November 2008: *A taste of experimental quantum information techniques*, and: *Aspects of Quantum Cryptography*
10. Lecture in QKD summer school: Information security in a Quantum World, Waterloo, Canada, 7.-11. August 2008: *Some aspects of practical QKD systems*
11. Seminar in the Atomic and Optical Physics Group of NIST, Gaithersburg, 3.06.2008: *Quantum crypto: E91, attacks*
12. Defence Research & Development Seminar 2006, NTU Singapore, 23.05.2006: *Free-Space Quantum Secret Key distribution using polarization-entangled photons*
13. Seminar in the Atomic and Optical Physics Group of NIST, Gaithersburg, 23.01.2004: *A free space longdistance QKD experiment*
14. Seminar in the statistical physics group, 22.01.2003, Universität Regensburg: *Experimentelle Freiraum-Quantenkryptographie*
15. Education for Physics teachers: Quantenmechanik: „Erfolgreiche experimentlle Bestätigungen und paradoxe Interpretation“, Universität Bayreuth, 10. Oktober 2002: *Quantenkryptographie und experimentelle Quantenkommunikation*
16. Education for Physics teachers „Neues von Quanten“ am Physikzentrum Bad Honnef, 26.-30. August 2002: *Neue Experimente zu Quantenkryptographie*
17. Faculty colloquium Sektion Physik an der Ludwig-Maximilians-Universität München, 17. Juli 2002: *Experimentelle Quantenkommunikation*
18. Quantenforum am Institut für Physik der Universität Stuttgart, 16.05.2002: *Quantenkommunikation mit wenigen Photonen*
19. Quantum optics school for advanced students, April 2-12, Bonn (Germany): *Quantum communication*
20. BSI NOSTACK workshop, 21.-23. January 2002, Weyberhöfe (Germany) : *Free space quantum cryptography*
21. KOLLOQUIUM Quanten-Kommunikation, 10.-11.7.2000, Universität Erlangen-Nürnberg: *Quantenkommunikation mit einzelnen Photonen und Photonenpaaren*
22. Kolloquium of the SFB 'Control and measurement of coherent Quantum Systems', 17.3.2000, University of Innsbruck: *All solid-state single photon source.*
23. Los Alamos sessions of the Quantum technology seminar, May 25, 1999, Los Alamos: *Towards quantum computation in an ion trap - First experimental Raman cooling results with Ba-137*
24. Seminar des Optik-Zentrum Konstanz, 5.12.1996, Universität Konstanz: *Experimente mit korrelierten Atom-Photon-Paaren*

Bibliometry

Details under ResearcherID C-2849-2009. Numerics as of Sept 2015 according to ISI web of science:

- 4765 citations, including about 4% self-citations
- over 43 citations per listed item
- h-index: 34

Awards / Honors

- IPS World Scientific Medal (February 2013)
- Elected IPS fellow (May 2010)
- NUS Faculty of Science Teaching Award (Nov 2009)

- Named Dean's Chair in the Faculty of Science of NUS (July 2009)
- National Science Award Singapore 2008 (together with A. Lamas-Linares and V. Scarani) for „outstanding theoretical and experimental studies on quantum entanglement” (specifically the violation of the Leggett model on nonlocal hidden variables)
- NUS Faculty of Science research award 2007
- Elected Fellow of the American Physical Society (2007)
- Phillip Morris Research Award 2003 (together with Harald Weinfurter) for the development of compact modules for quantum cryptography

Outreach

- Exhibition at Singapore X-pariment! 2015 with experiments on single NV center magnetometry (July 2015)
- Exhibition at Singapore Mini Maker Faire 2014 and X-pariment! 2014 with experiments on optical spectroscopy of ambient light (July 2014)
- Enrichment session at Anderson Junior College and Tampines JC (May 2014)
- Exhibition at Singapore Mini Maker Faire 2013 with experiments on optical diffraction and entangled photons
- Exhibition of an experiment on Bell inequality violation with photon pairs with X-pariment! 2010 exhibition in Marina Square Shopping Mall (30. Jul-1. Aug 2010)
- Singapore Amazing Machine Competition @Singapore Science Centre: Juror (22. August 2009)
- DEFCON17, 31. July-2. August 2009: Demonstration of a Bell inequality violation and the hacking of a QKD system (experimental exhibition)
- Exhibition at the Singapore Science Centre (15.-31. March 2009)
- Offer and judging of special research projects for secondary school students (SRP)
- National Junior Robotics competition 2006: Juror (Sept. 2006)
- Physics Enrichment Camp 2006: Quantum computing or quantum information or How a funky theory may affect how we calculate things in the future (May 29-June 1, 2006, Nat. Univ. Singapore)
- Physics Enrichment Camp 2005: Quantum computing or quantum information: Concepts, hopes, and promises - and what we can do at the moment (May 30-June 2, 2005, Nat. Univ. Singapore)
- Exhibition of an entangled photon pair source for quantum cryptography in the framework of the Infocomm Technology Foresight symposium organized by IDA (March 8, 2005, Raffles City Hotel, Singapore)
- IDA symposium on Quantum Cryptography: Seminar to Industrial and academic representatives : *Quantum cryptography: Status and Updates*, (22. September 2004, National University of Singapore)
- Exhibition of an experiment on Interference and the Speed of light in the context of the X-pariment '04 exhibition in Suntec City Mall (3.-5. September 2004)

Teaching activities

Universität Konstanz

- Beginners lab course tutorial for science students
- Tutorials in atom and molecular physics
- Tutorials in classical optics (for final exam topics)
- Tutorials in theoretical electrodynamics
- Supervision of diploma students

Universität München

- Beginners lab course for science students
- Design, setup and supervision of an advanced optics lab experiment on Gaussian optics
- Tutorials in experimental physics: optics, atom- and molecular physics
- Tutorials in theoretical mechanics, exam preparation & correction
- Tutorials in quantum mechanics, exam preparation & correction
- Tutorials in classical electrodynamics, exam preparation & correction
- Student seminar on quantum information and -communication
- together with H. Weinfurter: lecture „Experimentelle Quantenoptik“
- Supervision of diploma- and PhD students
- Student seminar on quantum computation

National University of Singapore

- Supervisor in 3rd year lab
- Supervision of honors, masters and graduate students in experimental quantum optics
- Lecture and Tutorials for honours year module PC4246 (Quantum Optics)
- Lecture and Tutorials for honours year module PC4243 (Atomic and Molecular Physics II)
- Formulation and Supervision of various (6) undergraduate research projects (UROPS)
- Supervision of an independent studies module on Bose-Einstein Condensation
- Graduate module design and lecture/labs on basic experimental techniques (PC5214)
- Graduate module supervisor for QT5201B (formalized assessment for Les Houches summer school attendees)
- Special Programme in Science module supervisor (SPS2172) on stellar interferometry
- Graduate module coordinator for QT5201I (BREAKTHROUGH TECHNIQUES IN ATOMIC AND MANY-BODY PHYSICS)
- Special Programme in Science module supervisor (SPS2172) on sonoluminescence
- Lecture for 2nd year undergraduate module PC2132 (Classical Mechanics)

Research Grants

Universität München

- SFB 631 (Festkörperbasierte Quanteninformationsverarbeitung: Physikalische Konzepte und Materialaspekte / Solid State Based Quantum Information Processing: Physical Concepts and Materials Aspects): *Einzelphotonenquellen für Quantenkommunikation und Quantencomputer* (role: Co-PI)
- Landesschwerpunkt (A8 - Quanteninformation): Mehrteilchen- und Mehrzustands-Quantenkryptographie (role: Co-PI)

National University of Singapore

- Experimental quantum communication (Nat. Univ. Singapore Acad. Research Fund, granted: S\$176,000, role: PI)
- Quantum Key Distribution Research (Defence Science and Technology Agency, granted: S\$399,000, role: PI)
- Characterization of Quantum Dots for Quantum Information Processing (NUS ARF, granted: S\$178,000, role: PI)
- Reference-Free quantum communication (ASTAR/SERC, granted: S\$769,000, role: PI)
- Light sources for Quantum Interfaces (NUS ARF, granted: S\$86,000, role: PI)
- Multiphoton state preparation and characterization (NUS ARF, granted: S\$106,600; role: Co-PI)
- Initiating member of the Centre for Quantum Technologies, an RCE in Singapore, funded by the National Research Foundation and the Ministry of Education in Singapore (total grant sum S\$158M over 5-10 years)
- Principal investigator at CQT with several projects on quantum information, focused in quantum optics and elementary atom-light interaction and quantum interfaces (core funding of about S\$1.3M/yr for the quantum optics group as PI, or Co-PI together with Asst/P Antia Lamas-Linares)
- Partner in the EU 7th framework proposal cluster AQUTE with a project on cavityless atom-photon coupling
- Randomness from quantum processes (MoE Tier-3 grant, Co-PI, granted about S\$9.8M)
- DSO grant on magnetometry (about S\$280k, PI)
- Hybrid Quantum Technologies (NRF Competitive Research Programme round 12, PI, granted: S\$4.3M TPV, with 3 Co-PI)

Academic service

Universität Konstanz

- Mittelbauvertreter im Fakultätsrat

National University of Singapore

- Panel member in Technology scan group "Nanotechnology" for the Singapore Infocom Development Agency (IDA) roadmap
- Member in the Physics Department Strategic Planning Committee
- Undergraduate / graduate curriculum committee member at NUS
- Member in outreach committee / workshop committee in the NUS Physics Department
- Member of curriculum committee at NUS Physics Dept
- Member of various search committees for faculty hiring in the NUS Physics Department
- Chair of the welfare committee at NUS Physics Dept
- Research representative for building infrastructure of the Research Center of Excellence in Quantum Technologies and chair of space allocation committee
- Member of standing search committee for faculty recruitment at the Centre for Quantum Technologies
- Member of graduate studies committee in the Department of Physics at NUS
- Member of the graduate studies committee at the Centre for Quantum Technologies
- Chair of experimental infrastructure committee at the Centre for Quantum Technologies
- Member of the Faculty Promotion and Tenure committee (senior) at the Science Faculty, NUS
- Chairman Workshop committee of the Physics Department, NUS

Other academic activities

- Peer reviewer for various Journals (Nature, Nature Physics, Nature Photonics, Phys. Rev. Lett, PRA, Opt. Comm., NJP, APL, Appl. Phys. B, several physics journals published by World Scientific, JMO, Optics Express)
- Grant proposal review for national, regional and university research funds in Canada, US and Europe
- Grant proposal reviewer for research networks supported by VDI/BMBF (Association of German engineers/Ministry for technology and research), Germany
- Review for Marie Curie and ERC grants of the European Union
- Council member (ongoing) and treasurer (2007-2008) of the Institute of Physics Singapore
- External thesis examiner for graduate students (Germany, Australia, S Africa, Spain)
- Initiator and chairman of the annual meetings of the Institute of Physics in Singapore