

# Curriculum Vitae

Miriam Blaauboer

## Personal details:

Miriam Blaauboer, born 20 March 1971, married, three children (b. 2003, 2005 and 2008).

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## Education:

**Vrije Universiteit**, Amsterdam, Ph.D. Theoretical Physics (1998).

Thesis: *On Optical Phase Conjugation and Andreev Reflection*.

Thesis advisors: D. Lenstra and A. Lodder.

**Leiden University**, M.Sc., Mathematics, (1994).

**Leiden University**, M.Sc., Physics, (1993).

## Employment:

**Technische Universiteit Delft**, The Netherlands (November 2007 - present),  
assistant professor (tenured in April 2009).

**Technische Universiteit Delft**, The Netherlands (October 2004 - October 2007),  
VIDI researcher.

**Technische Universiteit Delft**, The Netherlands (October 2001 - September 2004),  
post-doctoral fellow.

**Harvard University**, Department of Physics, Cambridge, MA (January 2000 - September 2001),  
post-doctoral fellow.

**Weizmann Institute of Science**, Rehovot, Israel (1999),  
post-doctoral fellow.

**Vrije Universiteit**, Amsterdam (November - December 1998),  
research assistant.

## **Awards and Fellowships:**

FOMm/v stimuleringsprogramma (2001-2004).  
Talent Stipendium, NWO (2000).  
Second prize, NTvN “Prijsvraag voor pas-gepromoveerden” (1999).  
Fellowship, Israeli Council for Higher Education (1999).  
NWO junior scientist travel grant (1997).  
Nuffic junior scientist fellowship for scientific exchange (1996-1997).  
Prize for research proposal, PhD course on “mesoscopic physics”, Delft (1995).  
Prize for best oral presentation at the “VU Science Day”, Vrije Universiteit Amsterdam (1995).

## **Teaching:**

Leader Grassroots project 'Digital testing' (coordinating the set-up of a digital testing environment for online examination of Bachelor Course on Classical Mechanics 2009-2010).  
Lecturer, 2<sup>nd</sup>-year Bachelor course 'Klassieke Mechanica', Delft (2009-present).  
Lecturer, 3<sup>rd</sup>-year Bachelor course 'Klassieke en Quantum Mechanica A', Delft (2006-2009).  
Student advisor (“studie loopbaan begeleider” docent), firstyear Bachelor students (2007-present).  
Werkcollege, “Klassieke en Quantum Mechanica A”, Delft (2002-2005).  
Supervision, Master projects (4 students).  
Supervision, Bachelor projects (2 students).  
Lecturer, international school on “Quantum entanglement, decoherence, information and geometrical phases in complex systems”, ICTP, Trieste, (1-12 November 2004).  
Guest lecturer, graduate course on quantum chaos, Harvard (2000).  
Teaching assistant, Master course on “Advanced Elektromagnetism”, Vrije Universiteit, Amsterdam, (1995-1998).

## **Conference activities:**

Co-organizer, ISF Workshop on “Decoherence, entanglement and information in complex systems”, Eilat, Israel (27 February - 3 March 2006).  
Organizer, International workshop on “Control of decoherence in solid-state and atomic quantum systems”, Delft (31 January - 1 February 2005).

## **Editorial and review activities:**

Chief Editor NTvN (September 2009-present).  
Topical Editor, book on “Decoherence, Entanglement, and Information Protection in Complex Quantum Systems”, (Springer, The Netherlands, 2005).  
Co-editor (together with Dr. K. Allaart) book “Van electromigratie tot supergeleiding”, dedicated to Prof. Dr. A. Lodder on the occasion of his retirement (April 2004).  
Reviewer for NSF (US), Research Corporation (US), BSF (Israel), FOM.  
Referee for e.g. Physical Review Letters, Physical Review B, Europhysics Letters.

## Committees:

NWO, Veni grant review committee (2006).

**Technische Universiteit Delft**, TN Master-program evaluation committee (2006).

**Technische Universiteit Delft**, TNW “POWER” (Project on Women Enhanced Research) committee (2005-present) and DEWIS steering committee (2006-present).

**Technische Universiteit Delft**, Nanoscience Frontiers program (2004-2006).

## Outreach:

**Radio Rijnmond** Interview about start of LHC CERN experiments (11 September 2008).

**Nationale Wetenschapsdag**, Quizmaster during National Science Day (Public Library DOK Delft, 21 October 2007).

**Technische Universiteit Delft**, Popular lectures on “What is Nanotechnology?” for children taking part in the “First Lego League”, (1, 15 and 22 November 2006).

**Science Café Nijmegen**, Panel, together with Dr. Wim Beenakker and Prof. Wim van der Zande, in discussion on “Quantum mechanica: God dobbelt wel” (14 June 2006).

**VARA Nieuwslicht**, Einstein Quiz (15 april 2005).

## Publications (international refereed journals):

1. *Tunable Kondo effect in a single donor atom*, G.P. Lansbergen, G.C. Tettamanzi, J. Verduijn, N. Collaert, S. Biesemans, M. Blaauboer and S. Rogge, arXiv:0909.5602, accepted in Nanoletters.
2. *Quantum phase pumping in a double quantum dot*, G.M.M. Wakker, M. Blaauboer, and P.W. Brouwer, in preparation for Phys. Rev. Lett.
3. *Implementation of the quantum walk step operator in lateral quantum dots*, K.A. van Hoogdalem and M. Blaauboer, Phys. Rev. B **80**, 125309 (2009).
4. *Modeling the decay of entanglement for electron spin qubits in quantum dots*, F. Bodoky, O. Gühne and M. Blaauboer, J. Phys.: Condens. Matter **21**, 395602 (2009).
5. *Multiparticle entanglement under the influence of decoherence*, O. Gühne, F. Bodoky and M. Blaauboer, Phys. Rev. A **78** 060301 (Rap. Comm.) (2008).
6. *An analytical decomposition protocol for optimal implementation of two-qubit entangling gates*, M. Blaauboer and R.L. de Visser, J. Phys A: Math. Theor. **41**, 395307 (2008).
7. *Production of multipartite entanglement for electron spins in quantum dots*, F. Bodoky and M. Blaauboer, Phys. Rev. A **76**, 052309 (2007).
8. *Deterministic teleportation of electrons in a quantum dot nanostructure*, R.L. de Visser and M. Blaauboer, Phys. Rev. Lett. **96**, 246801 (2006).
9. *Detecting entanglement using a double-quantum-dot turnstile*, M. Blaauboer and D.P. DiVincenzo, Phys. Rev. Lett. **95**, 160402 (2005).

10. *Analytical solution of the time evolution of an entangled electron spin pair in a double quantum dot nanos tructure*, M. Blaauboer, J. Math. Phys. **46**, 083518 (2005) (20 pages).
11. *Spin pump turnstile: parametric pumping of a spin-polarized current through a nearly-closed quantum dot*, M. Blaauboer and C.M.L. Fricot, Phys. Rev. B **71**, 041303(R) (2005).
12. *Quantum Pumping and Nuclear Polarization in the Integer Quantum Hall Regime*, M. Blaauboer, Europhys. Lett. **69**, 109 (2005).
13. *Quantum Pumping and quantized magnetoresistance in a Hall Bar*, M. Blaauboer, Phys. Rev. B **68**, 205316 (2003).
14. *Self-induced transparency and giant nonlinearity in doped photonic crystals*, G. Kurizki, D. Petrosyan, T. Opatrny, M. Blaauboer, and B.A. Malomed, JOSA B **19**, 2066-2074 (2002)
15. *One-way transport in quantum dots*, M. Blaauboer, Physics World **15**, 21-21 (October 2002).
16. *Charge Pumping in Mesoscopic Systems coupled to a Superconducting Lead*, M. Blaauboer, Phys. Rev. B **65**, 235318 (5 pages) (2002).
17. *Light-Bullet Modes in Self-Induced-Transparency media with Refractive Index Modulation*, M. Blaauboer, G. Kurizki, and B.A. Malomed, JOSA B **19**, 1376-1379 (2002).
18. *Statistical Distribution of Coulomb Blockade Peak Heights in Adiabatically Pumped Quantum Dots*, M. Blaauboer and E.J. Heller, Phys. Rev. B **64**, 241301-241304 (2001).
19. *Multiple Scattering Theory in Clean Superconducting Layered Structures*, R.T.W. Koperdraad, R.E.S. Otadoy, M. Blaauboer, and A. Lodder, J. Phys.: Cond. Mat. **13**, 8707-8723 (2001).
20. *Mesoscopic scattering in the half-plane: squeezing conductance through a small hole*, A.H. Barnett, M. Blaauboer, A. Mody, E.J. Heller, Phys. Rev. B **63**, 245312-245319 (2001).
21. *Random Scattering by Atomic Density Fluctuations in Optical Lattices*, M. Blaauboer, G. Kurizki, and V.M. Akulin, Phys. Rev. Lett. **86**, 3518-3521 (2001).
22. *Localization in a random phase-conjugating medium*, M. Blaauboer Phys. Rev. A **62**, 041804(R)-041807(R) (2000).
23. *Spatiotemporally localized solitons in resonantly absorbing Bragg reflectors*, M. Blaauboer, G. Kurizki, and B.A. Malomed, Phys. Rev. E **62**, R57-R59 (2000).
24. *Spatiotemporally localized solitons in Self-Induced Transparency Media*, M. Blaauboer, B.A. Malomed, and G. Kurizki, Phys. Rev. Lett. **84**, 1906-1909 (2000).
25. *Optical tachyons in parametric amplifiers: how fast can quantum information travel?*, G. Kurizki, A.E. Kozhekin, A.G. Kofman, and M. Blaauboer, Optics and Spectroscopy **87**, 505-512 (1999).
26. *Superluminal pulse transmission through a phase-conjugating mirror*, M. Blaauboer, A.E. Kozhekin, A.G. Kofman, G. Kurizki, D. Lenstra, and A. Lodder, Opt. Comm. **148**, 295-299 (1998).
27. *Superluminal optical phase conjugation: Pulse reshaping and instability*, M. Blaauboer, A.G. Kofman, A.E. Kozhekin, G. Kurizki, D. Lenstra, and A. Lodder, Phys. Rev. A **57**, 4905-4912 (1998).
28. *Giant phase-conjugate reflection with a normal mirror in front of an optical phase-conjugator*, M. Blaauboer, D. Lenstra, and A. Lodder, Superlattices and Microstructures **23**, 937-943 (1998)

29. *Steady state behavior in atomic three-level lambda and ladder systems with incoherent population pumping*, M. Blaauboer, Phys. Rev. A **55**, 2459-2462 (1997).
30. *Size-effects in the density of states in NS and SNS junctions*, M. Blaauboer, R.T.W. Koperdraad, A. Lodder, and D. Lenstra, Phys. Rev. B **54**, 4283-4288 (1996).
31. *Helicity modulus and effective hopping in the two-dimensional Hubbard model using slave-boson methods*, P.J.H. Denteneer and M. Blaauboer, J. Phys.: Cond. Matter **7**, 151-173 (1995); *ibid.* 2377-2377 (1995).

### **Other Publications:**

1. *Referenties naar wikipedia*, M. Blaauboer, NTvN **75**, 322 (September 2009).
2. *Vrouwen in de koffiefabriek*, M. Blaauboer, NTvN **71**, 348-348 (November 2005).
3. *De Bell-ongelijkheid testen met elektronen*, M. Blaauboer, NTvN **71**, 308-311 (October 2005).
4. *Coherent transport by adiabatic pumping: an application to electrons in a quantum dot coupled to a superconducting lead*, M. Blaauboer, in “Decoherence, Entanglement and Information Protection in Complex Quantum Systems”, p. 605-614 Editors: V. M. Akulin, A. Sarfati, G. Kurizki and S. Pellegrin (Springer, The Netherlands, 2005).
5. *Probe Scattering by Fluctuating Multiatom Ensembles in Optical Lattices*, M. Blaauboer, G. Kurizki, and V.M. Akulin, *ibid.*, p. 573-580.
6. *Coherence and Entanglement in Mesoscopic Systems*, M. Blaauboer, N. Davidson, M. Heiblum, G. Kurizki, D. O’Dell, A.M. Dykhne and E. Sarnelli, *ibid.* p. 565-572.
7. *Het pompen van lading door een mesoscopische geleider met een supergeleidend contact*, Liber Amicorum, dedicated to Prof. A. Lodder (Amsterdam, April 2004).
8. *Het begrip “positie” in de vakgroep theoretische natuurkunde*, Jaarboek VvTP (Delft, 2003).
9. *Adiabatic Pumping of Electrons in Mesoscopic Systems coupled to a Superconducting Lead*, M. Blaauboer, Proceedings of the ICPS 2002, edited by A.R. Long and J.H. Davies (IoP, Bristol/Philadelphia, 2002).
10. *Quantum optics in photonic crystals*, G. Kurizki, T. Opatrny, D. Petrosyan, and M. Blaauboer, in “Photonic Bandgap Materials and Devices”, edited by A. Adibi, A. Scherer, and S. Lin, Vol. 4655, (San Jose, California, 2002).
11. *Faseconjugerende spiegels: over tijdsomkeer en pulsvervorming*, M. Blaauboer, NTvN **65/4**, 90-93 (April 1999).

### **Invited talks:**

- *Quantum walks in nanospace*, Colloquium (Groningen, 19 November 2009).

- *The Quantum Computer: Science and/or Fiction?*,  
FMF Lustrum Symposium on 'A Bit of Information' (Groningen, 18 November 2009).
- *Wetenschapster in de natuurkunde*,  
VvTP 'Ladies Day' (Delft, 9 October 2009).
- *Implementing quantum walks in quantum dots*,  
Theoretical seminar, University of Aarhus (Aarhus, 31 October 2008).
- *Quantum phase pumping in quantum dots*,  
Heraeus workshop on 'Single-charge effects in semiconductor nanostructures' (Bad Honnef, 29 September-1 October 2008) (declined).
- *Quantum random walks in solid-state nanostructures*,  
ESF exploratory workshop on 'Coherence, decoherence and entanglement of non-degenerate massive quantum systems', (Vienna, Austria, 5-7 October 2007).
- *Dynamical control of decoherence for solid-state qubits*,  
Gordon Conference on "Quantum Control of Light and Matter", (Rhode Island, 12-17 August 2007).
- *Efficient implementation of quantum gates*,  
Workshop on "Quantum effects in arrays of nanocrystals", (Lorentz Center Leiden, 23-27 April 2007).
- *Electron spins as quantum bits: one, two, three, ... infinity?*,  
Voorjaarsbijeenkomst Atomic and Molecular Physics, (Lunteren, 4-5 April 2007).
- *How to do quantum information processing with solid-state qubits*,  
Colloquium TU Eindhoven, (Eindhoven, 15 February 2007).
- *Towards quantum phase pumping in a metallic conductor*,  
Workshop on Quantum Pumping, Technion, (Israel, 6-13 January 2007).
- *Quantum operations with solid-state qubits*,  
Colloquium Bonn University, (Bonn, 19 December 2006).
- *Feit en fictie van de kwantum computer*,  
Symposium "Nanophysics: great science on a small scale", studievereniging van der Waals, (Eindhoven, 11 December 2006).
- *Teleportation of electrons in solid-state nanosystems*,  
Utrecht University, (Utrecht, 8 June 2006).
- *Quantum communication with electrons*,  
Fysica 2006, (Leiden, 28 April 2006).
- *Solid-state nanostructures as a resource of entangled electrons?*,  
Ben Gurion University, (Beer Sheva, Israel, 6 March 2006).
- *Deterministic teleportation of electrons in a quantum dot nanostructure*,  
Workshop DEICS III, (Eilat, Israel, 26 February - 3 March 2006).
- *Entanglement and teleportation in quantum dot nanostructures*,  
Colloquium Institute of Molecular Materials, (Nijmegen, 7 February 2006).

- *Quantum entanglement in solid-state nanostructures*,  
Tutorial FOM Vaste stof decemberdagen, (Veldhoven, 13 December 2005).
- *Strategies for succesfull fundraising*,  
Tutorial FOMm/v workshop, (Rotterdam, 23 September 2005).
- *Spin pumping: control of electrons and nuclei in nanostructures*,  
Regensburg University, (Regensburg, 14 May 2004).
- *Proposal for a Bell test using a double quantum dot turnstile*,  
Workshop on “Decoherence, entanglement, and information protection in complex quantum systems”, (Les Houches, 26-30 April 2004).
- *Detecting entanglement in semiconducting nanosystems*,  
Universiteit Groningen, (Groningen, 23 March 2004).
- *Towards entanglement in quantum dot structures*,  
International workshop on “Entanglement in microscopic and macroscopic quantum systems”,  
(Vienna, 5-7 September 2003).
- *Quantum pumping: Control of Electrons and Nuclei in Nanostructures*,  
Gordon Conference on “Quantum Control of Light and Matter”, (South Hadley, 3-8 August 2003).
- *Transport without bias on a mesoscopic scale*,  
Colloquium Vrije Universiteit, (Amsterdam, 6 March 2002).
- *Coulomb blockade peaks in adiabatically pumped quantum dots*,  
Theoretical seminar, Delft University of Technology (Delft, June 2001).
- *Coulomb blockade peaks in adiabatically pumped quantum dots*,  
Theoretical seminar, Harvard (Cambridge, MA, June 2001).
- *Light bullets in self-induced transparency media*,  
International Conference on ”Quantum Control, Coherence and Information”, (Nof-Genossar, Israel, 14-19 November, 1999).
- *Pulse reshaping by optical phase conjugation*,  
TMR workshop on ”Microlaser and Cavity QED”, (Ulm, 19-23 October 1998).

### **Contributed talks:**

- *Proposal for a Bell test using a double quantum dot turnstile*,  
330th Heraeus seminar on “Controlling decoherence”, (Bad Honnef, 26-28 July 2004).
- *Proposal for a Bell test using a double quantum dot turnstile*,  
PASPS3 conference on physics and applications of spin-related phenomena in semiconductors,  
(Santa Barbara, CA, 21-23 July 2004).
- *Charge pumping in quantum dots coupled to a superconducting lead*,  
FOM vaste-stof meeting, (Veldhoven, 18 December 2002).

- *Charge pumping in mesoscopic NS systems*,  
Workshop on “Mesoscopic Physics and Electron Interaction”, (ICTP Trieste, 24 June - 5 July 2002).
- *Light bullets in self-induced transparency media*,  
Tel Aviv University, (Tel Aviv, October 1999).
- *Optical phase conjugation and Andreev reflection*,  
Vrije Universiteit, (Amsterdam, September 1998).
- *Size effects in the density of states of SNS junctions*,  
EPS conference of the condensed matter division, (Leuven, 25-28 August 1997).

### **Posters:**

- *How to do a Bell measurement with electron spin qubits*,  
Openingsymposium SSQIP, (Delft, 13 april 2006).
- *Charge Pumping in Integer Quantum Hall Systems*,  
Workshop Nanoscience Leiden-Delft, (Egmond aan Zee, 2 juni 2003).
- *Charge pumping in mesoscopic systems coupled to a superconducting lead*,  
ICPS conference, (Edinburgh, 29 July - 2 August 2002).
- *Adiabatic quantum pumping in quantum dots*,  
FOM vaste-stof meeting, (Veldhoven, 18-19 December 2001).