

Dr. Martina Hentschel

Max-Planck-Institut für Physik komplexer Systeme, Dresden

Curriculum Vitae

Dr. Martina Hentschel

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Personal

born 5 November 1971, married, one child (born March 2009)

Education

- Dr. rer. nat. October 2001, *magna cum laude*, Max Planck Institute for Physics of Complex Systems (MPIPKS), Dresden and Technical University of Dresden, Germany
(*Ph.D.*) Thesis: Mesoscopic wave phenomena in electronic and optical ring structures
Advisors: Prof. Dr. Klaus Richter and Prof. Dr. Peter Fulde
April 1998 – Oct. 2001: Research Assistant at MPIPKS Dresden
April 1997 – March 1998: Research Assistant at the Technical University of Dresden
- Diploma March 1997, *with distinction*, Technical University of Dresden, Germany
(*Master*) Thesis: Diphoton production in relativistic heavy ion collisions
Advisors: Prof. Dr. Burkhard Kämpfer and Prof. Dr. Gerhard Soff
Sept. 1994 – March 1997: Student in Physics at the Technical University of Dresden
- ICID August 1994, Imperial College International Diploma, London, Great Britain
Sept. 1993 – Aug. 1994: Student in Physics at Imperial College London
- Prediploma July 1992, *with distinction*, Technical University of Dresden, Germany
Sept. 1990 – Aug. 1993: Student in Physics at the Technical University of Dresden
- Abitur June 1990, *with distinction*, Special Highschool for Mathematics, Sciences, and Technology “M. A. Nexö” Dresden (School visit since 1978 in Dresden)

Work Experience

- April 2006 - present Head of the independent Research Group “Mesoscopic Systems” at the Max Planck Institute for Physics of Complex Systems, Dresden, Germany, funded by the Emmy-Noether Programme of the German Research Foundation (DFG)
- April 2009 - March 2010 Maternity and parenty leave after my daughter’s birth in March 2009
- April 2004 – March 2006 Scientific Assistant, Institute for Theoretical Physics, University of Regensburg, Germany, in the group “Quantum Transport and Dissipation” of Prof. Dr. Milena Grifoni
- Oct. 2005– Dec. 2005 Invited Researcher at ATR Wave Engineering Laboratories, Kyoto, Japan, in the group of Dr. Takahisa Harayama
- Aug. 2002 – March 2004 Postdoctoral Associate, Duke University, Durham, USA, in the Nanophysics group of Prof. Harold Baranger, with a Feodor-Lynen Fellowship of the Humboldt Foundation

Nov. 2001 – July 2002	Postdoctoral Researcher, Max Planck Institute for Physics of Complex System, Dresden, Germany, in the group “Waves in Complex Media and Mesoscopic Systems” of Dr. Henning Schomerus
April 1998 – Oct. 2001	Research Assistant, Max Planck Institute for Physics of Complex System, Dresden, Germany, in the Mesoscopic Physics group of Prof. Dr. Klaus Richter
March 2000 – May 2000	Visiting Research Assistant, Department of Applied Physics, Yale University, New Haven, USA, in the group of Prof. Douglas Stone
April 1997 – March 1998	Research Assistant, Technical University of Dresden, Germany, Institute for Materials Science, group of Prof. Dr. Wolfgang Pompe
Oct. 1994 – March 1997	Student Researcher, Technical University of Dresden, Germany, in the Theoretical Nuclear Physics group of Prof. Dr. Gerhard Soff

Previous interviews and short lists

October 2009	Invitation to an interview for a W2 position (non-tenured) at the FU Berlin, short listed.
Jan./Febr. 2009	Invitation to interviews for a W3 position in Erlangen and for W2 positions in Bochum and Hamburg.
April 2008	Short listed for a W2 position (non-tenured) at the FU Berlin.
October 2007	Offer of a Senior Lectureship at the University of Aberdeen (not accepted).

Research Activities and Expertise

Present research fields:

- *Quantum chaos and semiclassics in optical microcavities*: Goos-Hänchen effect and corrections to ray optics at curved dielectric interfaces, Husimi functions in open systems.
- *Far-field characteristics of optical microcavities*: Ray picture vs. wave simulations vs. experimental results for microlasers of spiral and Limaçon shape; quest for directional emission.
- *Negative-index optical microcavities*: Wave propagation and deviations from conventional resonators.
- *Nonlinear optical transport*: Similarities and differences between transport and chaos-assisted tunneling in nonlinear optical Kerr media and Bose-Einstein condensates.
- *Many-body effects in mesoscopic systems*: Anderson orthogonality catastrophe and Fermi-edge singularities in chaotic and regular systems and in graphene, signatures of many-body effects in the photoabsorption cross section and transport quantities.
- *Mesoscopic Kondo box*: Chances and limitations of a mean-field approximation.
- *Graphene*: Visibility of a Dirac-like density of states in Fermi-edge singularities and influence of edge states, also in graphene-like photonic crystals.

Previous research fields (in chronological order starting with the most recent):

- *Quantum computing*: Quantum-dot based charge qubits - operation and dissipation properties.
- *Spindependent electronic transport in the presence of inhomogeneous magnetic fields*: Aharonov-Bohm and Berry phases in ballistic rings, spin-flip effects and spintronics.
- *Reaction-diffusion systems*: Cahn-Hilliard description of binary multilayer systems.
- *Heavy-ion collisions*: Quark-gluon plasma and possible detection based on the diphoton signal.

Publications and Invited Talks

39 Research articles in refereed journals, 3 submitted

10 Conference articles and book chapters

14 Invited talks on international conferences, 36 invited seminar and colloquium talks

Fellowships and Awards

Emmy-Noether Fellowship of the German Research Foundation (DFG) 2006-2012
Research Grant as project leader of the Research Group 760 (DFG, 2nd funding period) 2010-2013
Fellowship in the Program “Fast Track” of the Robert-Bosch Foundation 2008-2010
Research Grant as project leader within the Research Group 760 (DFG) 2007-2010
Travel grant from the Alexander von Humboldt Foundation Sept./Oct. 2004
Feodor-Lynen Fellowship of the Alexander von Humboldt Foundation 2002-2004
Research Fellowship of the German Research Foundation (DFG) 2002-2004 (not accepted)
Fellowships of the German Academic Exchange Service 1993 and 2000
Scholarship of the Foundation “Studienstiftung des deutschen Volkes” 1991-1997

Third Party Funding

- Emmy-Noether Research Group HE 3493/3-1 “*Many-body effects in chaotic and regular mesoscopic systems*” of the German Research Foundation (DFG).
Period: 2006-2012.
Volume: includes the group leader position, three PhD student grants, one Postdoc position for five years, extensive budget for travel, conferences, schools, visits, and guest scientists.
- Research Grant HE 3494/4-1 in collaboration with Dr. Jan Wiersig (University of Magdeburg) “*Quantum chaos in optical microcavities*” of the German Research Foundation (DFG).
Period: 2007-2010, renewed 2010-2013.
Volume: includes one PhD student grant and extensive travel budget.
Context: Subproject of the DFG Research Unit 760 “*Scattering Systems with Complex Dynamics*”.
- Grant in the Fast Track Program of the Robert Bosch Foundation.
Period: 2008-2010.
Volume: 4800 Euro for travel, seminars, and conference visits; four weekend trainings.

Research Group “Mesoscopic Systems” at MPIPKS Dresden

PhD and Diploma Students:

- Georg Röder (since 07/2006)
- Rainer Bedrich (since 02/2007)
- Daniel Kotik (since 07/2009)

Postdocs:

- Jung-Wan Ryu (since 03/2009)
- Susumu Shinohara (since 04/2009)

Previous Group Members:

- Swarnali Bandopadhyay (07/2006 – 09/2008)
- Tae-Yoon Kwon (11/2006 – 09/2008)
- Jeong-Bo Shim (04/2007 – 06/2009)
- Grigory Tkachov (01/2007 – 09/2009)

Teaching

- Winter term 2007/08: *Lecture* “Condensed matter physics in nanostructures”, Technical University of Dresden
- Winter term 2006/07: *Lecture* “Modern topics in quantum physics”, Technical University of Dresden
- Organiser of the Seminar Series “*Mesoscopic Systems*” at the Max Planck Institute for Physics of Complex Systems, Dresden (since October 2006)
- Organiser of a discussion group for young scientists, the “*Scientific Jam Session*”, at the Max Planck Institute for Physics of Complex Systems, Dresden (since June 2006)
- Winter Term 2005/06: *Tutorials* in Theoretical Physics, University of Regensburg
- Summer term 2005: *Tutorials and Recitations* for the course “Thermodynamics and Quantum Statistics”, University of Regensburg (chief responsibility for implementation of exercises)
- Winter term 2004/05: *Reading course* “Quantum Computing” and *Recitations* for the course “Structure of Matter: Atoms and Molecules”, University of Regensburg
- Summer term 2004: *Tutorials and Recitations* for the course “Thermodynamics and Quantum Statistics”, University of Regensburg (chief responsibility for implementation of exercises)

Conference and Workshop organisation

- International Workshop on Microcavities and their Applications, Seoul, Korea, August 2011 (together with Kyungwon An, Seoul National University, Korea and Sang Wook Kim, Pusan National University, Korea).
- International Summer School *Mesoscopic physics in complex systems*, Cargèse, Corsica, July 12-16, 2010 (together with B. van Tiggelen, Université Joseph Fourier/CNRS Grenoble, France and H.-J. Stöckmann, University of Marburg).
- 3rd Asian-German Workshop on Optical Microcavities: *Quantum Chaos in Open Systems Meets Optical Resonators*, MPIPKS Dresden, May 17-21, 2010 (together with S. Shinohara and J.-W. Ryu, both MPIPKS Dresden).
- Internal Workshop of the Research Group (DFG Forschergruppe 760), Riezlern, September 15-20, 2008 (together with Jan Wiersig, University of Magdeburg).
- International Conference and Seminar “*New Frontiers of Quantum Chaos in Mesoscopic Systems*”, MPIPKS Dresden, May 19-30, 2008 (together with Mark G. Raizen, University of Texas, USA and Jan Wiersig, University of Magdeburg).
- Asian-German Miniworkshop “*Optical Microcavities: From rays to waves. From passive to active*”, MPIPKS Dresden, July 6-13, 2007.

External Collaborators

(in alphabetic order)

Harold Baranger (Duke University, Durham, USA)
Federico Capasso (Harvard University, USA)
Hui Cao (Yale University, USA)
Francisco Guinea (Instituto de Ciencia de Materiales, Madrid, Spain)
Karl Leo (Technical University of Dresden, Germany)
Dirk Morr (University of Illinois at Chicago, USA)
Eduardo Mucciolo (University of Central Florida, Orlando, USA)
Roland Ketzmerick (Technical University of Dresden, Germany)
Achim Richter (Technical University of Darmstadt, Germany)
Peter Schlagheck (University of Liege, Belgium)
Henning Schomerus (Lancaster University, UK)
Hans-Jürgen Stöckmann (University of Marburg, Germany)
Qijie Wang (University of Singapore, Singapore)
Jan Wiersig (University of Magdeburg, Germany)

Professional Activities and Memberships

- Referee for the journals Physical Review Letters, Physical Review A, B, and E, European Physical Journal B, Physica E, Applied Physics Letters, Optics Letters, and Optics Express (since 2002)
- Member of the German Physical Society (since 1997)

Outreach Activities

- Schülervortrag *Quantenchaos mit Licht oder was die Schildbürger falsch gemacht haben*, Martin-Anderson-Nexö-Gymnasium (MANOS), Dresden, Germany (November 6, 2008).
- Lange Nacht der Wissenschaften (*Long Night of Science*) and Girl’s Day 2006, 2007: Various talks, e.g. *Quantenchaos mit Licht (Quantum chaos with light)*.

References

(in alphabetic order)

Prof. Harold U. Baranger
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Prof. Federico Capasso

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