

## Personal Data

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## Education

1994 - 2000 Diploma in physics (with distinction), Ludwig Maximilians University Munich, Germany  
 1997 - 1998 Visiting student, University of Oxford, UK, project with Prof. Artur Ekert  
 2000 - 2004 PhD in physics, Ludwig Maximilians University Munich and Università dell'Insubria, Como, Italy; advisors: Prof. Italo Guarneri, Prof. Andreas Buchleitner; Thesis title: *Chaos and localisation: quantum transport in periodically driven atomic systems*

## Honors and Awards

1994 - 2000 Fellowships: BayBFG and Studienstiftung des deutschen Volkes  
 2004 - 2006 Fellowships from the Alexander von Humboldt Foundation and the Scuola di Dottorato Galileo Galilei, Pisa, Italy  
 2008 Award for young researchers' conference, Heidelberg Academy of Sciences and Humanities, Heidelberg, Germany  
 2009 Klaus-Georg and Sigrig Hengstberger Prize, Heidelberg University, Germany  
 2010 "Akademierpreis" of the Heidelberg Academy of Sciences and Humanities  
 2010 - 2015 "Kollegiat" of the Heidelberg Academy of Sciences and Humanities  
 2011 Habilitation with thesis *Dynamik kalter Quantengase* at Heidelberg University  
 2013 Habilitation for Full and Associate Professorships in Italy (section 02/B2)  
 2014 Association to Istituto Nazionale di Fisica Nucleare (INFN), Section Milan-Bicocca  
 2019 Habilitation for Full Professorships in Italy (sections 02/A2 and 02/B2)

## Summary of Profession Activities

- Published over 100 papers in peer-reviewed journals, 1 Springer textbook, 1 edited book, 4 book chapters, of which over 15 invited papers. Total of more than 2700 (1750) citations, h-index: 31 (26), according to Google Scholar (WOS).
- Gave more than 100 invited talks at conferences, workshops, research institutes and universities.
- Regular teaching at Heidelberg University and Parma University; guest lecturer at many Graduate Schools (in Greifswald, Heidelberg, Jena, Palermo, Parma).
- Collaborated with more than 30 senior scientists from over 15 countries. Mentored 44 undergraduate and graduate students and 2 postdoctoral scholars in research.
- Awarded over 850 kEuro in research grants and fellowships.

## Research Topics

- General: Modelling and numerical simulation of complex classical & quantum dynamical systems; Light-matter interaction; Atoms in external fields; Finite quantum systems; Non-equilibrium quantum transport; Quantum & classical control theory; Floquet-Bloch theory; Nonlinear dynamics; Atom-surface interactions
- Specific/Recent: (Spinor) Bose-Einstein condensates; Open and dissipative systems; Classical and quantum localization phenomena; Nonlinear and many-body tunneling; Control and synchronization of multi-mode systems; Topology and quantum search; Quantum reflection & Nanoplasmonics

## Highlights of Scientific Accomplishments

- Theory for nonlinear & noisy Landau-Zener (avoided-level crossing) problem and its quantum control
- Developed model and numerical treatment based on Floquet-Bloch theory and exact diagonalization of 2-band and 2-dimensional (Bose-)Hubbard systems

- Developed theory and numerical methods for open (spinor) Bose-Einstein condensate in mean-field and many-body regimes, in close collaboration with many experimental groups
- Produced exhaustive theory for atom-optics experiments with applications in quantum chaos, decoherence, semiclassics, ballistic and spin-dependent transport, quantum and classical walks

### Scientific Employment

2000 - 2004	PhD student and PostDoc at MPI-PKS, Dresden, Germany
2004 - 2006	Feodor-Lynen Fellow at Pisa University, Italy, with Prof. Ennio Arimondo
2006 - 2007	Research scientist at Politecnico di Torino, Italy
2007 - 2013	Research group leader at Heidelberg University, Germany
2014 - 2016	Senior researcher at Parma University, Italy
2017 -	Associate professor at Parma University, Italy

### Selected Scientific Invitations

11/1999 - 1/2000	Weizmann Institute of Science, Israel, with Prof. Uzy Smilansky
2006, 2008, 2012	Palermo University, Italy, with Prof. Rosario Mantegna
11/2007, 9-10/2013	Pisa University, Italy, with Prof.s Ennio Arimondo and Riccardo Mannella
10-11/2010	University of Electro-Communications, Tokyo, Japan, with Prof. Ken'ishi Nakagawa
9/2011	Oklahoma State University, Stillwater, USA, with Prof. Gil Summy
2011, 2012, 2016	Liège University, Belgium, with Prof. Peter Schlagheck
2014 - 2017	Guest scientist at the ITP, Heidelberg University, Germany
2014, 2017, 2018	Freiburg University, Germany, with Prof. Andreas Buchleitner
10/2014, 10/2019	Guest lecturer at the doctorate school HGSFP, Heidelberg University, Germany
2/2015	Guest professorship at the Abbe School of Photonics, Jena University, Germany
3/2016	Calí University, Colombia, with Prof. Javier Madroñero
10/2016, 2/2018	RIEC, Tohoku University, Sendai, Japan, with Prof. Mark Sadgrove

### Academic Management

- Editorial-Board member: Fluctuation & Noise Letters, Reviews in Physics, 4Open, Adv. in Math. Phys.
  - Guest editor of Condensed Matter, European Physical Journal D & of a conference proceedings book
  - Peer reviewer for over 30 international scientific journals and publishers (incl. Springer Nature, Physical Review, Cambridge University Press); *Outstanding Referee* of APS, Physica A, Phys. Lett. A, NJP
  - Referee for research funding agencies from Austria, EU, France, Germany, New Zealand, Poland
  - Member of PhD committees in Heidelberg, Milan, Palermo, Parma and of selection committees for PhD (2015) and PostDoc (2016, 2019) positions at Parma University
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| 2007 - 2014 | Co-organizer of the semiannual school <i>Heidelberg Physics Graduate Days</i>   |
| 2008 - 2012 | Consultant for industrial company, Selex-Galileo, Turin, Italy  |
| 2010        | Organizer of conferences <i>New Perspectives in Quantum Statistics and Correlations &amp; Hybrid Quantum Systems: New Perspectives on Quantum State Control</i> , Heidelberg, Germany |
| 2012        | Organizer of workshop on <i>Noisy many-body systems</i> , Heidelberg, Germany   |
| 2014 -      | Member of PhD commission ("collegio docenti") for physics at Parma University   |
| 2014 - 2018 | Co-organizer of annual conference <i>Statistical Physics and Complex Systems</i> , Parma, Italy   |
| 2016 -      | Program committee member for annual conference <i>Complexis</i>   |
| 2018 -      | Representative of disadvantaged groups at Department, Parma University  |

### Publication Highlights

- D. Witthaut, S. Wimberger, R. Burioni, and M. Timme, *Classical synchronization indicates persistent entanglement in isolated quantum systems*, Nature Comm. (2017) **8**, 14829 (WOS: 12 citations)
- M. Sadgrove, S. Wimberger, and S. Nic Chormaic, *Quantum coherent tractor beam effect for atoms trapped near a nanowaveguide*, Nature Sci. Rep. (2016) **6**, 28905 (WOS: 8 citations)
- R. Labouvie, B. Santra, S. Heun, S. Wimberger, and H. Ott, *Negative differential conductivity in an interacting quantum gas*, Phys. Rev. Lett. (2015) **115**, 5, 050601 (WOS: 49 citations)
- S. Wimberger, *Nonlinear Dynamics and Quantum Chaos: An Introduction*, Graduate Texts in Physics, Springer-Verlag (2014) (Bookmetrix: 21 citations, > 9.6k downloads)

## Personal presentation

Since 2017 I am an associate professor at Parma University, in the area of theoretical condensed-matter physics (fisica teorica della materia 02/B2). I graduated from the LMU Munich in 2000 and was awarded one of the first binational German-Italian Ph.D. degrees from Insubria University (Como) and LMU in 2004. During a project with Prof. Artur Ekert at the University of Oxford in 1997-98 I got in touch with the fundamental questions as well as the immediate applications of quantum mechanics. These interests have guided my research since then. During my Ph.D. I collaborated for the first time with an experimental cold-atom group, which was based at the University of Oxford. After my PostDoc as a Humboldt Fellow at Pisa University in the experimental Bose-Einstein condensation group of Prof. Ennio Arimondo, I held a temporary researcher position at Turin Politecnico and was a Junior Research Group Leader at Heidelberg University as well as a junior fellow (“Kollegiat”) of the Heidelberg Academy of Sciences and Humanities. At Heidelberg I still keep the status of a visiting professor and Privatdozent. In 2015 I was awarded a visiting professorship from the Abbe School of Photonics at Jena University.

I have been teaching physics classes at all levels in the faculties of physics and engineering, since 2007 in Heidelberg and since 2014 in Parma. I (co-)organized a large school for graduate students twice a year (2008-2014) and a series of research workshops with active participation of students at Heidelberg. From 2014 to 2018 I co-organized the annual conference on *Statistical Physics and Complex Systems* in Parma. Combining my research interests in nonlinear classical and quantum dynamics with my main teaching activities, I authored a Springer textbook on *Nonlinear Dynamics and Quantum Chaos* (Graduate Texts in Physics, 2014). I advised more than 40 students at all career levels and two PostDocs at Pisa, Heidelberg, and Parma. Most of them are currently holding research positions in academics and industry all over the world.

My continuing collaborations with many experimental groups worldwide are well documented by our joint publications. At present, I am particularly interested in quantum control by light-matter interaction and in the non-equilibrium dynamics of many-body quantum systems.

We are actively working with theorists at Parma, Prof. Raffaella Burioni, on synchronization in classical and quantum systems, with Prof. Stefano Carretta and Prof. Paolo Santini on quantum control, and with Prof. Massimo Pietroni on applications of our numerical know-how for cold-dark matter problems. The latter project involves Prof. Luca Amendola from Heidelberg University, too. On the experimental side, we are collaborating with Prof. Gil Summy from Oklahoma State University (Stillwater, USA) on quantum transport with Bose-Einstein condensates, with applications for discrete-time quantum walks and their use in quantum search algorithms and topology.

Since 2016 we are running the interdisciplinary *Center for Quantum Information Science* at Parma University, which concentrates our efforts towards the subject, hosts guests and offers research seminars, workshops and collaborations between physics and information engineering.

## Outline of future research

My current research projects are:

- Atom-surface interactions mediated by electromagnetic fields: quantum reflection, Casimir effects, investigation of surfaces, nano-plasmonics;
- Theory and numerical techniques to design coherent control (superadiabatic) protocols for applications to accelerated STIRAP and quantum state control, the quantum speed limit and the creation of entanglement;
- Investigating synchronization effects in many-body systems such as ultracold atoms in optical lattices, Josephson junction arrays, nonlinear optics, and classical applications;
- Realization of quantum walks and the control of their dynamics in coupled spin-momentum space, with applications in quantum search of marked target states;
- Modelling and numerical many-body methods for lead-to-lead quantum transport of neutral atoms;
- Building up a numerical method for integrating a (3+1) dimensional Schrödinger-Poisson equation model for cosmological cold-dark matter and its time evolution.

## Publications in peer-reviewed journals:

### Invited reviews/feature articles

- (1) J. Ni, S. Dadras, W. K. Lam, R. K. Shrestha, M. Sadgrove, S. Wimberger, and G. S. Summy, *Quantum ratchets*, Ann. Phys. (Weinheim, D, 2017) **529**, 8, 1600335
- (2) S. Wimberger, *Applications of fidelity measures to complex quantum systems*, Phil. Trans. A of the Royal Society (London, UK, 2016) **374**, 20150153
- (3) G. Kordas, D. Witthaut, P. Buonsante, A. Vezzani, R. Burioni, A. I. Karanikas, and S. Wimberger, *The dissipative Bose-Hubbard model: Methods and examples*, Eur. Phys. J. ST (Heidelberg, D, 2015) **224**, 11, pp. 2127–2171
- (4) M. Sadgrove and S. Wimberger, *A pseudo-classical method for the atom-optics kicked rotor: from theory to experiment and back*, Advances in Atomic, Molecular, and Optical Physics, E. Arimondo, P. R. Berman, and C. C. Lin (editors), vol. **60**, Elsevier, Amsterdam (San Diego, USA, 2011), pp. 315–369
- (5) J. Madroñero, A. Ponomarev, A. R. R. Carvalho, S. Wimberger, C. Viviescas, A. R. Kolovsky, K. Hornberger, P. Schlagheck, A. Krug, and A. Buchleitner, *Quantum chaos, transport, and control – in quantum optics*, Advances in Atomic, Molecular, and Optical Physics, G. Rempe and M. O. Scully (editors), vol. **53**, Elsevier, Amsterdam (San Diego, USA, 2006), pp. 33–73

### Publications in peer-reviewed journals

- (6) S. Dadras, A. Gresch, C. Groiseau, S. Wimberger, and S. G. Summy, *Momentum-Space Quantum Walk of Ultra-Cold Atoms*, Phys. Rev. A (College PK, USA, 2019), **99**, 4, 043617
- (7) F. Petiziol, B. Dive, S. Carretta, R. Mannella, F. Mintert, and S. Wimberger, *Accelerating adiabatic protocols for entangling two qubits in circuit QED*, Phys. Rev. A (College PK, USA, 2019), **99**, 4, 042315
- (8) F. Petiziol and S. Wimberger, *Effect of phase errors on a quantum control protocol using fast oscillations*, Condens. Matter (Basel, CH, 2019) **4**, 1, 34
- (9) C. Groiseau and S. Wimberger, *Spontaneous Emission in Quantum Walks of a Kicked Bose-Einstein Condensate*, Phys. Rev. A (College PK, USA, 2019), **99**, 1, 7, 013610
- (10) C. Groiseau, A. Wagner, G. Summy, and S. Wimberger, *Impact of Lattice Vibrations on the Dynamics of a Spinor Atom-Optics Kicked Rotor*, Condens. Matter (Basel, CH, 2019) **4**, 1, 10
- (11) S. Dadras, A. Gresch, C. Groiseau, S. Wimberger, and S. G. Summy, *Quantum walk in momentum space with a Bose-Einstein condensate*, Phys. Rev. Lett. (College PK, USA, 2018), **121**, 7, 070402
- (12) F. Petiziol, B. Dive, F. Mintert, and S. Wimberger, *Fast adiabatic evolution by oscillating initial Hamiltonians*, Phys. Rev. A (College PK, USA, 2018), **98**, 4, 043436
- (13) A. K. Kolovsky, Z. Denis, and S. Wimberger, *Landauer-Büttiker equation for bosonic carriers*, Phys. Rev. A (College PK, USA, 2018) **98**, 4, 043623
- (14) C. Groiseau, A. Gresch, and S. Wimberger, *Quantum Walks of kicked Bose-Einstein condensates*, J. Phys. A (Bristol, UK, 2018) **51**, 27, 275301
- (15) Z. Denis and S. Wimberger, *Two-time correlation functions in dissipative and interacting Bose-Hubbard chains*, Condens. Matter (Basel, CH, 2018) **3**, 1, 2
- (16) Z. Denis, A. Tiene, L. Salasnich, and S. Wimberger, *Asymmetric many-body loss in a bosonic double well*, Phys. Rev. A (College PK, USA, 2018) **97**, 1, 013602
- (17) A. E. Tarkhov, S. Wimberger, and B. V. Fine, *Extracting Lyapunov exponents from the echo dynamics of Bose-Einstein condensates in a lattice*, Phys. Rev. A (College PK, USA, 2017) **96**, 2, 023624
- (18) A. Alberti and S. Wimberger, *Quantum walk of a Bose-Einstein condensate in the Brillouin zone*, Phys. Rev. A (College PK, USA, 2017) **96**, 2, 023620
- (19) M. Theisen, F. Petiziol, S. Carretta, P. Santini, and S. Wimberger, *Superadiabatic driving of a three-level quantum system*, Phys. Rev. A (College PK, USA, 2017) **96**, 1, 013431
- (20) D. Witthaut, S. Wimberger, R. Burioni, and M. Timme, *Classical synchronization indicates persistent entanglement in isolated quantum systems*, Nature Comm. (London, UK, 2017) **8**, 14829

- (21) D. Fischer and S. Wimberger, *Models for a multimode bosonic tunneling junction*, Ann. Phys. (Weinheim, D, 2017) **529**, 7, 1600327
- (22) M. H. Muñoz-Arias, C. A. Parra-Murillo, J. Madroñero, and S. Wimberger, *Occupation-constrained interband dynamics of a non-hermitian two-band Bose-Hubbard Hamiltonian*, Fluctuation and Noise Letters (Singapore, 2017) **16**, 3, 1750023
- (23) E. Galiffi, C. Sünderhauf, M. DeKieviet, and S. Wimberger, *Two-dimensional simulation of quantum reflection*, J. Phys. B (Bristol, UK, 2017) **50**, 9, 095001
- (24) C. A. Parra-Murillo, M. H. Muñoz-Arias, J. Madroñero, and S. Wimberger, *Generation of robust entangled states in a non-hermitian periodically driven two-band Bose-Hubbard system*, Phys. Rev. A (College PK, USA, 2017) **95**, 3, 032125
- (25) J. Ni, W. K. Lam, S. Dadras, M. F. Borunda, S. Wimberger, and G. S. Summy, *Initial state dependence of a quantum-resonance ratchet*, Phys. Rev. A (College PK, USA, 2016) **94**, 4, 043620
- (26) M. Sadgrove, S. Wimberger, and S. Nic Chormaic, *Quantum coherent tractor beam effect for atoms trapped near a nanowaveguide*, Sci. Rep. (London, UK, 2016) **6**, 28905
- (27) D. Fischer, D. Hoffmann, and S. Wimberger, *Spectral analysis of two-dimensional Bose-Hubbard Models*, Phys. Rev. A (College PK, USA, 2016) **93**, 4, 043620
- (28) G. Summy and S. Wimberger, *A quantum random walk of a Bose-Einstein condensate in momentum space*, Phys. Rev. A (College PK, USA, 2016) **93**, 2, 023638
- (29) C. A. Parra-Murillo, J. Madroñero, and S. Wimberger, *Chaotic level mixing in a two-band Bose-Hubbard model*, Ann. Phys. (Weinheim, D, 2015) **527**, 9-10, pp. 656–662
- (30) G. Kordas, D. Witthaut, and S. Wimberger, *Non-equilibrium dynamics in dissipative Bose-Hubbard chains*, Ann. Phys. (Weinheim, D, 2015) **527**, 9-10, pp. 619–628
- (31) M. Weiß, C. Groiseau, W. K. Lam, R. Burioni, A. Vezzani, G. Summy, and S. Wimberger, *Steering random walks with ultracold atoms*, Phys. Rev. A (College PK, USA, 2015) **92**, 3, 033606
- (32) R. Labouvie, B. Santra, S. Heun, S. Wimberger, and H. Ott, *Negative differential conductivity in an interacting quantum gas*, Phys. Rev. Lett. (College PK, USA, 2015) **115**, 5, 050601
- (33) C. A. Parra-Murillo, J. Madroñero, and S. Wimberger, *Exact numerical methods for a many-body Wannier-Stark system*, Comp. Phys. Comm. (Amsterdam, NL, 2015) **186**, 1, pp. 19–30
- (34) C. A. Parra-Murillo, J. Madroñero, and S. Wimberger, *Quantum diffusion and thermalization at resonant tunneling*, Phys. Rev. A (College PK, USA, 2014) **89**, 5, 053610
- (35) C. A. Parra-Murillo and S. Wimberger, *Manifold approach for a many-body Wannier-Stark system: localization and chaos in energy space*, Acta Phys. Pol. A (Warsaw, Poland, 2013) **124**, 6, 1091
- (36) C. A. Parra-Murillo, J. Madroñero, and S. Wimberger, *A two-band Bose-Hubbard model for many-body resonant tunneling in the Wannier-Stark system*, Phys. Rev. A (College PK, USA, 2013) **88**, 3, 032119
- (37) R. K. Shrestha, J. Ni, W. K. Lam, G. S. Summy, and S. Wimberger, *Dynamical tunneling of a Bose-Einstein condensate*, Phys. Rev. E (College PK, USA, 2013) **88**, 3, 034901
- (38) B. Herwerth, M. DeKieviet, J. Madroñero, and S. Wimberger, *Quantum reflection from an oscillating surface*, J. Phys. B (FTC) (Bristol, UK, 2013) **46**, 14, 141002
- (39) A. Ivanov, G. Kordas, A. Komnik, and S. Wimberger, *Bosonic transport through a chain of quantum dots*, Eur. Phys. J. B (New York, USA, 2013) **86**, 8, 345
- (40) S. Wimberger and R. Mannella, *Preface to the Special Issue on Workshop on noisy many body systems*, Fluctuation and Noise Letters (Singapore, 2013) **12**, 2, 1302001
- (41) T. Schell, M. Sadgrove, K. Nakagawa, and S. Wimberger, *Engineering transport by concatenated maps*, Fluctuation and Noise Letters (Singapore, 2013) **12**, 2, 1302004
- (42) M. Kraft, S. Burkhardt, R. Mannella, and S. Wimberger, *Landau-Zener transitions in the presence of noise*, Fluctuation and Noise Letters (Singapore, 2013) **12**, 2, 1302005
- (43) C. Palmisano, G. Gervino, M. Balma, D. Devona, and S. Wimberger, *Resonant driving of a nonlinear Hamiltonian system*, J. Phys. Conf. Ser. (Bristol, UK, 2013) **442**, 1, 012063

- (44) S. Wimberger, C. A. Parra-Murillo, and G. Kordas, *Non-hermitian approach to decaying ultracold bosonic systems*, J. Phys. Conf. Ser. (Bristol, UK, 2013) **442**, 1, 012029
- (45) S. Burkhardt, M. Kraft, R. Mannella, and S. Wimberger, *Noise assisted transport in the Wannier-Stark system*, New J. Phys. (Bristol, UK, 2013) **15**, 4, 045008
- (46) S. Micciche, A. Buchleitner, F. Lillo, R. Mantegna, T. Paul, and S. Wimberger, *Scale-free relaxation of a wave packet in a quantum well with power-law tails*, New J. Phys. (Bristol, UK, 2013) **15**, 3, 033033
- (47) G. Kordas, S. Wimberger, and D. Witthaut, *Decay and fragmentation in an open Bose-Hubbard chain*, Phys. Rev. A (College PK, USA, 2013) **87**, 4, 043618
- (48) R. K. Shrestha, S. Wimberger, J. Ni, W. K. Lam, and G. S. Summy, *Fidelity of the quantum delta-kicked accelerator*, Phys. Rev. E (College PK, USA, 2013) **87**, 2, 020902(R)
- (49) L. Chotorlishvili, A. Sukhov, S. Wimberger, and J. Berakdar, *Theoretical proposal for the dynamical control of the nonlinear optical response frequency*, Fluctuation and Noise Letters (Singapore, 2013) **12**, 1350003
- (50) M. Sadgrove, T. Schell, K. Nakagawa, and S. Wimberger, *Engineering quantum correlations to enhance transport in cold atoms*, Phys. Rev. A (College PK, USA, 2013) **87**, 1, 013631
- (51) G. Kordas, S. Wimberger, and D. Witthaut, *Dissipation induced macroscopic entanglement in an open optical lattice*, Europhys. Lett. (Mulhouse, F, 2012) **100**, 3, 30007
- (52) R. K. Shrestha, J. Ni, W. K. Lam, S. Wimberger, and G. S. Summy, *Controlling the momentum current of an off-resonant ratchet*, Phys. Rev. A (College PK, USA, 2012) **86**, 4, 043617
- (53) A. R. Kolovsky, J. Link, and S. Wimberger, *Energetically constrained co-tunneling of cold atoms*, New J. Phys. (Bristol, UK, 2012) **14**, 7, 075002
- (54) M. Sadgrove, S. Wimberger, and K. Nakagawa, *Phase-selected momentum transport in ultra-cold atoms*, Eur. Phys. J. D (New York, USA, 2012) **66**, 6, 155
- (55) N. Lörch, F. Pepe, H. Lignier, D. Ciampini, R. Mannella, O. Morsch, E. Arimondo, P. Facchi, G. Florio, S. Pascazio, and S. Wimberger, *Wave function renormalization effects in resonantly enhanced tunneling*, Phys. Rev. A (College PK, USA, 2012) **85**, 5, 053602
- (56) R. Dubertrand, I. Guarneri, and S. Wimberger, *Fidelity for kicked atoms with gravity near a quantum resonance*, Phys. Rev. E (College PK, USA, 2012) **85**, 3, 036205
- (57) C. Albrecht and S. Wimberger, *Induced delocalization by correlation and interaction in the one-dimensional Anderson model*, Phys. Rev. B (College PK, USA, 2012) **85**, 4, 045107
- (58) M. Lubasch, F. Mintert, and S. Wimberger, *Dynamical enhancement of spatial entanglement in massive particles*, Phys. Rev. A (College PK, USA, 2011) **84**, 6, 063615
- (59) L. Chotorlishvili, A. Ugulava, G. Mchedlishvili, A. Komnik, S. Wimberger, and J. Berakdar, *Nonlinear dynamics of two coupled nano-electromechanical resonators*, J. Phys. B (Bristol, UK, 2011) **44**, 21, 215402
- (60) G. Tayebirad, R. Mannella, and S. Wimberger, *Engineering of interband transport by time-dependent disorder*, Phys. Rev. A (College PK, USA, 2011) **84**, 3, 031605(R)
- (61) B. Probst, R. Dubertrand, and S. Wimberger, *Fidelity of the near resonant quantum kicked rotor*, J. Phys. A (Bristol, UK, 2011) **44**, 33, 335101
- (62) L. Chotorlishvili, Z. Toklikishvili, S. Wimberger, and J. Berakdar, *Two-photon driven nonlinear dynamics and entanglement of an atom in a nonuniform cavity*, Phys. Rev. A (College PK, USA, 2011) **84**, 1, 013825
- (63) D. Witthaut, F. Trimborn, H. Hennig, G. Kordas, T. Geisel, and S. Wimberger, *Beyond mean-field dynamics in open Bose-Hubbard chains*, Phys. Rev. A (College PK, USA, 2011) **83**, 6, 063608
- (64) P. Plötz, M. Lubasch, and S. Wimberger, *Detection of avoided crossings by fidelity*, Physica A (Amsterdam, NL, 2011) **390**, 7, pp. 1363-1369
- (65) P. Plötz and S. Wimberger, *Stückelberg-Interferometry with ultra-cold atoms*, Eur. Phys. J. D (New York, USA, 2011) **65**, 1-2, pp. 199-205

- (66) F. Trimborn, D. Witthaut, H. Hennig, G. Kordas, T. Geisel, and S. Wimberger, *Decay of a Bose-Einstein condensate in a dissipative lattice: the mean-field approximation and beyond*, Eur. Phys. J. D (New York, USA, 2011) **63**, 1, pp. 63-71
- (67) P. Plötz, P. Schlagheck, and S. Wimberger, *Effective spin model for interband transport in a Wannier-Stark lattice system*, Eur. Phys. J. D (New York, USA, 2011) **63**, 1, pp. 47-53
- (68) S. Wimberger, *Editorial: Hybrid quantum systems: new perspectives on quantum state control*, Eur. Phys. J. D (New York, USA, 2011) **63**, 1, pp. 1-2
- (69) G. Tayebirad, R. Mannella, and S. Wimberger, *Engineering of Landau-Zener tunneling*, Appl. Phys. B (New York, USA, 2011) **102**, 3, pp. 489-495
- (70) K. Rapedius, C. Elsen, D. Witthaut, S. Wimberger, and H.-J. Korsch, *Nonlinear resonant tunneling of Bose-Einstein condensates in tilted optical lattices*, Phys. Rev. A (College PK, USA, 2010) **82**, 6, 063601
- (71) G. Tayebirad, A. Zenesini, D. Ciampini, R. Mannella, O. Morsch, E. Arimondo, N. Lörch, and S. Wimberger, *Time-resolved measurement of Landau-Zener tunneling in different bases*, Phys. Rev. A (College PK, USA, 2010) **82**, 1, 013633
- (72) P. Plötz, J. Madroñero, and S. Wimberger, *Collapse and revival in inter-band oscillations of a two-band Bose-Hubbard model*, J. Phys. B (FTC) (Bristol, UK, 2010) **43**, 8, 081001
- (73) A. Zenesini, H. Lignier, G. Tayebirad, J. Radogostowicz, D. Ciampini, R. Mannella, S. Wimberger, O. Morsch, and E. Arimondo, *Time-resolved measurement of Landau-Zener tunneling in periodic potentials*, Phys. Rev. Lett. (College PK, USA, 2009) **103**, 9, 090403
- (74) M. Abb, I. Guarneri, and S. Wimberger, *Pseudoclassical theory for fidelity of nearly resonant quantum rotors*, Phys. Rev. E (College PK, USA, 2009) **80**, 3, 035206(R)
- (75) M. Sadgrove and S. Wimberger, *Pseudo-classical theory for directed transport at quantum resonance*, New J. Phys. (Bristol, UK, 2009) **11**, 8, 083027
- (76) D. Witthaut, F. Trimborn, and S. Wimberger, *Dissipation-induced coherence and stochastic resonance of an open two-mode Bose-Einstein condensate*, Phys. Rev. A (College PK, USA, 2009) **79**, 3, 033621
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- (89) P. Schlagheck and S. Wimberger, *Nonexponential decay of Bose-Einstein condensates: a numerical study based on the complex scaling method*, Appl. Phys. B (New York, USA, 2007) **86**, 3, pp. 385-390
- (90) S. Wimberger, D. Ciampini, O. Morsch, R. Mannella, and E. Arimondo, *Engineered quantum transport in extended periodic potentials*, J. Phys. Conf. Ser. (Bristol, UK, 2007) **67**, 1, 012060
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- (96) S. Wimberger, P. Schlagheck, and R. Mannella, *Tunnelling rates for the nonlinear Wannier-Stark problem*, J. Phys. B. (Bristol, UK, 2006) **39**, 3, pp. 729-740
- (97) M. Sadgrove, S. Wimberger, S. Parkins, and R. Leonhardt, *Ballistic and localized transport for the atom-optics kicked rotor in the limit of vanishing kicking period*, Phys. Rev. Lett. (College PK, USA, 2005) **94**, 17, 174103
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- (101) L. Rebuzzini, S. Wimberger, and R. Artuso, *Delocalized and resonant quantum transport in nonlinear generalizations of the kicked rotor model*, Phys. Rev. E (College PK, USA, 2005) **71**, 3, 036220
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- (103) S. Wimberger, I. Guarneri, and S. Fishman, *A classical scaling theory of quantum resonances*, Phys. Rev. Lett. (College PK, USA, 2004) **92**, 8, 084102
- (104) M. B. d'Arcy, R. M. Godun, G. S. Summy, I. Guarneri, S. Wimberger, S. Fishman, and A. Buchleitner, *Decoherence as a probe of coherent quantum dynamics*, Phys. Rev. E (College PK, USA, 2004) **69**, 2, 027201
- (105) S. Wimberger, I. Guarneri, and S. Fishman, *Quantum resonances and decoherence for delta-kicked atoms*, Nonlinearity (Bristol, UK, 2003) **16**, 4, pp. 1381-1420
- (106) A. Krug, S. Wimberger, and A. Buchleitner, *Decay, interference, and chaos: How simple atoms mimic disorder*, Eur. Phys. J. D (New York, USA, 2003) **26**, 1, pp. 21-26
- (107) S. Wimberger, A. Krug, and A. Buchleitner, *Decay rates and survival probabilities in open quantum systems*, Phys. Rev. Lett. (College PK, USA, 2002) **89**, 26, 263601
- (108) S. Wimberger and A. Buchleitner, *Signatures of Anderson localization in the ionization rates of periodically driven Rydberg states*, J. Phys. A (Bristol, UK, 2001) **34**, 36, pp. 7181-7193

### **Books, book chapters, and other invited publications**

- (109) S. Mailoud Sekkouri and S. Wimberger, *Mean-field transport of a Bose-Einstein condensate*, in Emergent Complexity from Nonlinearity, in Physics, Engineering and the Life Sciences, G. Mantica et al. (editors), Springer Proceedings in Physics **191**, Springer International Publishing, Cham (2017)
- (110) S. Wimberger, *Nonlinear Dynamics and Quantum Chaos: An Introduction*, textbook in series *Graduate Texts in Physics*, Springer-Verlag, Cham (2014)
- (111) E. Arimondo and S. Wimberger, *Tunneling of ultracold atoms in time-independent potentials*, ch. 11, in Dynamical Tunneling, S. Keshavamurthy and P. Schlagheck (editors), Taylor & Francis – CRC Press, Boca Raton (2011), pp. 257–287 (invited and peer-reviewed)
- (112) S. Wimberger, *Vom Chaos zur modernen Physik*, Ruperto Carola Research Magazine, Heidelberg University (2011) **3**, pp. 44-45 (invited and panel-reviewed)
- (113) S. Wimberger and T. Paul, *Kalt, kälter, am kältesten*, Ruperto Carola Research Magazine, Heidelberg University (2009) **2**, pp. 44-46 (invited and panel-reviewed)

### **Edited special issues and proceedings**

- (114) S. Wimberger (editor), Special Issue on *Many-Body Quantum Chaos* (dedicated to Prof. Shmuel Fishman), Condensed Matter (2020), in preparation
- (115) M. Hiller, F. de Melo, P. Pickl, T. Wellens, and S. Wimberger (editors), *Proceedings of New Perspectives in Quantum Statistics and Correlations*, XII, 65 pages, Akademiekonferenz Band 14, Universitätsverlag Winter, Heidelberg (2012)
- (116) S. Wimberger and R. Mannella (editors), Special Issue on *Workshop on noisy many body systems*, Fluctuation and Noise Letters (Singapore, 2013) **12**, 2
- (117) S. Wimberger (editor), Special Issue on *Hybrid quantum systems: new perspectives on quantum state control*, Eur. Phys. J. D (New York, USA, 2011) **63**, 1

### **Preprints**

- (118) M. Delvecchio, F. Petziol, and S. Wimberger, *Equivalence of resonant quantum kicked rotor and one-dimensional continuous-time quantum walk*, J. Phys. A (Bristol, UK, 2019), submitted
- (119) F. Petziol, E. Arimondo, L. Gannelli, F. Mintert, and S. Wimberger, *Optimized three-level quantum transfers based on frequency-modulated optical excitations*, Sci. Rep. (London, UK, 2019), submitted

### **Recent invited/plenary talks at international conferences**

- (1) *Momentum-Space Quantum Walk of a Spinor Bose-Einstein Condensate*, Quantum Systems in Extreme Conditions, Heidelberg University (2019), Heidelberg, Germany
- (2) *Accelerating Quantum-Control Protocols*, SuperFluctuations2019, Padova University (2019), Padova, Italy
- (3) *Quantum walk in momentum space with a Bose-Einstein condensate*, EAS - EXTREME ATOMIC SYSTEMS Meeting (17 - 22 February 2019), Riezlern, Austria
- (4) *Quantum walk in momentum space with a Bose-Einstein condensate*, SuperFluctuations2018, Camerino University (2018), San Benedetto del Tronto, Italy
- (5) *Quantum Transport With Neutral Atoms*, SuperFluctuations2017, Camerino University (2017), San Benedetto del Tronto, Italy
- (6) *Atomtronics: Computing With Neutral Atoms*, International Workshop on Quantum-Classical Transition in Many-Body Systems: Indistinguishability, Interference and Interactions, Max Planck Institute for the Physics of Complex Systems (2017), Dresden, Germany
- (7) *Numerical simulation of lattice models for interacting bosons*, Workshop on Quantum Dynamics: From Algorithms to Applications (2016), Greifswald, Germany
- (8) *Quantum random walk of a Bose-Einstein condensate in momentum space*, International Workshop on Disordered Systems IWDS10 (2016), Brescia, Italy
- (9) *Non-equilibrium transport of interacting bosons*, Workshop on Optical and Molecular Spectroscopy of the Centre for Bioinformatics and Photonics (CIBioFi) (2016), Cali, Colombia

- (10) *A quantum random walk of a Bose-Einstein condensate in momentum space* (Gruppenbericht), DPG (German Physical Society) Spring Meeting of the Atomic, Molecular, Plasma Physics and Quantum Optics Section (2016), Hannover, Germany
- (11) *Transport and non-equilibrium dynamics with cold atoms*, EPS conference on Nonlinear Dynamics of Electronic Systems — NDES (2015) Como, Italy
- (12) *Transport and non-equilibrium dynamics with cold atoms*, International Workshop on Quantum Correlated Matter and Chaos - International Workshop in Honor of the Life and Work of Richard Prange, Max Planck Institute for the Physics of Complex Systems (2015), Dresden, Germany
- (13) *Non-equilibrium transport in dissipative Bose-Hubbard chains*, Mini-Symposium on Cold Atoms and Quantum Transport (2015), Lund University, Sweden
- (14) *Fidelity - Applications in complex quantum systems*, International Workshop on Echoes in Complex Systems, Max Planck Institute for the Physics of Complex Systems (2014), Dresden, Germany
- (15) *BEC with loss — a paradigm for an open many-body system* (Gruppenbericht), DPG (German Physical Society) Spring Meeting of the Atomic, Molecular, Plasma Physics and Quantum Optics Section (2014), Berlin, Germany
- (16) *Dynamics of ultracold atoms in leaky optical lattices*, Quantum Many-Body Dynamics in Open Systems, 534. Wilhelm and Else Heraeus Seminar (2013), Bad Honnef, Germany
- (17) *Many-body dynamics in dissipative optical lattices*, International Workshop on Advances in Quantum Chaotic Scattering: From (Non-)Linear Waves to Few-Body Systems, Max Planck Institute for the Physics of Complex Systems (2013), Dresden, Germany
- (18) *Taming quantum chaos in the Wannier-Stark system*, 6th Workshop on Quantum Chaos and Localisation Phenomena (2013), Warsaw, Poland
- (19) *News from the (quantum) kicked rotor*, Symposium at the XXXIII Dynamics Days Europe (2013), Madrid, Spain
- (20) *Where did the avoided crossing go?*, Festkolloquium in honor of H. J. Korsch at the Technical University of Kaiserslautern (2013), Germany
- (21) *Dynamics of ultra-cold atoms in optical lattices* (Hauptvortrag), DPG (German Physical Society) Spring Meeting of the Atomic, Molecular, Plasma Physics and Quantum Optics Section (2013), Hannover, Germany

**Acquired external funding** ( > 850 kEuro)

**Research projects**

- (1) Bando Leonardo Da Vinci, Azione 2: mobilita di giovani MIUR, Italy, co-PI with PhD student Francesco Petziol, 2019 (4.7 k€)
- (2) European Partners Fund on *Driven Quantum Systems*, Imperial College London, UK, co-PI in collaboration with Prof. Florian Mintert, 2019 (5 k€)
- (3) Finanziamento delle attività base di ricerca, Ministero dell'Istruzione, dell'Università e della Ricerca, Italy, 2017 (3 k€)
- (4) Fondi Locali per la Ricerca (FIL 2014) project for researches at Parma University, 2015-2016 (4.2 k€, PI)
- (5) Associate to the research program *BIOPHYS*, Istituto Nazionale di Fisica Nucleare (INFN), Section Milan-Bicocca, Parma group, 2014 -
- (6) Individual Research Grant by the German Research Foundation (DFG) on *Many-body Quantum Transport with Ultracold Bosons*, 2014-2018 (160 k€, ex-PI, in collaboration with Prof. Andreas Buchleitner, Universität Freiburg, Germany)
- (7) Member of the COST action MP1209 (European Cooperation in Science and Technology) on *Quantum Thermodynamics*, 2014-2017
- (8) *Helmholtz Alliance Cosmic Matter in the Laboratory - ExtreMe Matter Institute* (EMMI), 2008-2014 (30 k€, part of Heidelberg theory node)

- (9) Forschergruppe 760 Scattering Systems with Complex Dynamics of the German Research Foundation (DFG); experimental and theoretical project *Semiclassical Limit for Bose-Einstein Condensate Dynamics*, 2010-2013 (120 k€, PI)
- (10) Overhead through the Heidelberg Graduate School of Fundamental Physics, 2007-2013 (80 k€, junior research group leader)
- (11) Industry collaboration with Selex-Galileo (Turin, Italy) on *Light-matter interaction*, 2008-2012 (30 k€, consultant)
- (12) Research grant by the Enable Fund of the Initiative for Excellence (3. Säule, Heidelberg University) for the theoretical and experimental collaboration with Prof. Italo Guarneri (Università dell'Insubria, Como, Italy) and Dr. Mark Sadgrove (Institute for Laser Science, University of Electro-Communication, Tokyo, Japan) on *Accessing Chaos-assisted Tunneling via Fidelity*, 2011 (30 k€, PI)
- (13) Research grant by the Heidelberg Centre for Quantum Dynamics on *Transport across a Bose-Hubbard chain*, 2010 (16 k€, PI)
- (14) Research grant by the Heidelberg Centre for Quantum Dynamics on the *Casimir-Polder Force between an Atom and a Liquid*, 2010 (25 k€, co-PI)
- (15) Exchange and travel grant by the Global Networks Mobility Measures of the Initiative for Excellence (3. Säule, Heidelberg University) on the *Dynamics of Bose-Einstein Condensates in Stochastic Potentials* for the support of scientific interchange with the Università di Pisa (Prof. Ennio Arimondo) and the LPTMS at the Université Paris Sud in Orsay (Prof. Patricio Leboeuf), 1/2009-12/2010 (10.5 k€, PI)

#### **Funding for personnel**

- (16) Research grant by the Frontier Innovation Fund of the Initiative for Excellence (3. Säule, Heidelberg University) for a research assistant on *Hybrid Many-Body Systems*, 2009-2011 (106 k€, PI)
- (17) Feodor-Lynen Return Fellowship by the Alexander von Humboldt Foundation for the postdoctoral researcher Dr. Tobias Paul, 2008-2009 (candidate: 18 kEuro, overhead: 6.4 k€)
- (18) Ph.D. grant for Ghazal Tayebirad by the Landesgraduiertenförderung Baden-Württemberg, through the Heidelberg Graduate School of Fundamental Physics, 2007-2010 (ca. 40 k€)
- (19) Ph.D. grant for Patrick Plötz by the Klaus-Tschira-Stiftung, through the Heidelberg Graduate School of Fundamental Physics, 2007-2010 (ca. 50 k€)
- (20) Feodor-Lynen Fellowship by the Alexander von Humboldt Foundation, 2004-2006 (ca. 40 k€)

#### **Funding of conferences**

- (21) Conference support by the Heidelberg Centre for Quantum Dynamics and the Heidelberg Graduate School of Fundamental Physics for the Workshop *Noisy Many-body Systems*, 5 - 7 March 2012 (3.5 k€, organizer)
- (22) Klaus-Georg und Sigrid Hengstberger Prize for the organisation of the Ruperto-Carola International Symposium on *Hybrid Quantum Systems: New Perspectives on Quantum State Control*, 12-15 May 2010 (12.5 kEuro, organiser); additionally supported by the Heidelberg Graduate School of Fundamental Physics (10.5 k€)
- (23) Award by the Heidelberg Academy of Sciences and Humanities for the organisation of a scientific conference on *New Perspectives in Quantum Statistics and Correlations*, 1-5 March 2010 (ca. 15 k€, organiser)

#### **Additional funding**

- (24) Visiting grants from CNR-INO/CNR-INFM/CNISM (Pisa), MIPKs Dresden, DAAD (to Como), the Heidelberg Graduate School of Fundamental Physics (to Pisa), the Heidelberg Graduate Academy (to Krasnoyarsk, Cuernavaca), the Institute for Theoretical Atomic, Molecular and Optical Physics (ITAMP, Harvard), the DFG Forschergruppe 760 (visit of fellow Shmuel Fishman in Heidelberg), and the Abbe School of Photonics (Jena), 2007 - (15 k€)
- (25) Academy Award 2010 of the Heidelberg Academy of Sciences and Humanities, 2010 (6 k€)
- (26) Funding of a computer cluster by the Heidelberg University, 2010 (6 k€)

- (27) Baden-Württemberg Cluster (bwGRiD), Interdisziplinäres Zentrum für Wissenschaftliches Rechnen, Heidelberg University, high performance computing, 2008-2013

### **Teaching experience**

#### **Semester courses**

1. *General Physics 1 (for Engineers)*, Parma University (6 hours per week (=SWS), SS 2017, 2018, 2019)
2. *Theoretical Physics*, Parma University (6 SWS, WS 2016/17, 2017/18, 2018/19, 2019/20)
3. *Quantum Mechanics*, Parma University (6 SWS, WS 2015/16)
4. *Complex Classical and Quantum Systems*, Parma University (4 SWS, SS 2015)
5. *Physics of Complex Systems*, Parma University (4 SWS, SS 2014)
6. *Advanced Quantum Theory*, Heidelberg University (2 SWS, SS 2013)
7. *Quantum Chaos*, Heidelberg University (4 SWS, SS 2012)
8. *Quantum Chaos: An Introduction*, Heidelberg University (2 SWS, SS 2010)
9. *Nonlinear Dynamics and Quantum Chaos*, Heidelberg University (2 SWS, SS 2008)

#### **Block courses**

1. *Classical and Quantum Dynamical Systems*, Heidelberg Physics Graduate Days (one week, WS 2019/20)
2. *Lecture series on Quantum Information*, Scuola di Dottorato in Ingegneria e Architettura & Scuola di dottorato in Scienze e Tecnologie, with partners from Parma University (3x8 hours, SS 2018)
3. *Lecture series on Introduction into Quantum Mechanics*, Scuola di Dottorato in Ingegneria e Architettura, Parma University (6 hours, WS 2016/17)
4. *Hamiltonian Chaos*, Heidelberg Physics Graduate Days (one week, WS 2014/15)
5. *Quantum Chaos*, Heidelberg Physics Graduate Days (one week, SS 2013)
6. *Nonlinear Hamiltonian Dynamics*, University of Palermo (one week, WS 2010/11)
7. *Nonlinear Hamiltonian Dynamics*, Heidelberg Physics Graduate Days (one week, WS 2009/10)

#### **Seminars**

- *Zufall und Komplexität in der Physik*, German National Academic Foundation (Studienstiftung des deutschen Volkes), Olang, Italy (two weeks, WS 2012/13)
- Compulsory seminar for Bachelor students on *Theoretical Mechanics*, Heidelberg University (2 SWS, WS 2012/13, WS 2011/12, WS 2009/10)
- Oberseminar on *Correlated Quantum Systems*, Heidelberg University (2 SWS, from WS 2008/09 to SS 2015)
- Many journal clubs and group seminars, Heidelberg University (each 2 SWS, from WS 2007/08 to WS 2013/14)

#### **Tutoring and mentoring**

- Problem classes for *General Physics 1* (2 SWS, SS 2017, 2018, 2019)
- Problem classes for *Theoretical Physics* (2 SWS, WS 2016/17, 2017/18, 2018/19, 2019/20)
- Problem classes for *Quantum Mechanics*, Parma University (2 SWS, WS 2015/16)
- Problem classes for *Advanced Quantum Theory*, Heidelberg University (3 SWS, SS 2013)
- Problem classes for *Quantum Chaos*, Heidelberg University (2 SWS, SS 2012)
- Problem classes for *Nonlinear Dynamics and Quantum Chaos*, Heidelberg University (2 SWS, SS 2008)
- Experimental physics II, Heidelberg University (3 SWS, SS 2011, SS 2008)
- Experimental physics I, Heidelberg University (3 SWS, WS 2007/8)

#### **Supervised Ph.D. theses**

- (1) Giulio Amato, preliminary project title: *Many-body Quantum Transport*, binational Ph.D. at Freiburg University and Parma University
- (2) Francesco Petiziol, preliminary project title: *Quantum Control of few-level systems*, Parma University

- (3) Georgios Kordas, *Beyond Mean-Field Dynamics in Closed and Open Bosonic Systems*, binational Ph.D. at Heidelberg University and National University of Athens (2013)
- (4) Carlos Parra-Murillo, *Many-body Dynamics of Ultracold Atoms in Optical Lattices*, Heidelberg University (2013)
- (5) Ghazal Tayebirad, *Engineering Landau-Zener Tunneling of Ultracold Atoms in Tilted Potentials*, Heidelberg University (2011)
- (6) Patrick Plötz, *Complex Dynamics of Ultracold Atoms*, Heidelberg University (2010)
- (7) Mark Sadgrove, *Resonant Quantum Transport for Kicked Atoms*, University of Auckland (2005); co-supervised, main advisor: Prof. Rainer Leonhardt

### **Supervised Master theses**

- (8) Tim Zimmermann, preliminary project title: *Numerical Simulation of the Evolution of Cold Dark Matter*, Heidelberg University (2020)
- (9) Michele Delvecchio, *Quantum Search for Realistic Quantum Walks*, Parma University (2019)
- (10) Caspar Groiseau, *Discrete-Time Quantum Walks in Momentum Space*, Heidelberg University (2017)
- (11) Marcus Theissen, *Approximate Adiabatic Driving of Few-level Quantum Systems*, Heidelberg University (2017)
- (12) Samy Mailoud Sekkouri, *Mean-field Transport of Ultracold Atoms through Engineered Potentials*, Parma University (2016)
- (13) Emanuele Galiffi, International Master Thesis, *Quantum Reflection in Two Dimensions*, Imperial College London and Heidelberg University (2015)
- (14) Anton Ivanov, *Bosonic Transport across Dot Structures*, Heidelberg University (2012)
- (15) Julia Link, *Many-body Tunnelling in an Optical Lattice*, Heidelberg University (2012)
- (16) Matthias Kraft, *Noise effects on Landau-Zener tunneling of Bose-Einstein condensates*, International Master Thesis, Imperial College London and Heidelberg University (2012)
- (17) Stephan Burkhardt, *Noise-assisted Interband Transitions in the Wannier-Stark Problem*, Heidelberg University (2012)
- (18) Benedikt Probst, *The Pendulum Approximation for Fidelity in Quantum Kicked Rotor Systems*, Heidelberg University (2010)
- (19) Niels Lörch, *A Study of Open Quantum Systems*, Heidelberg University (2010)
- (20) Conrad Albrecht, *Induced Delocalization by Correlation and Interaction in the 1D Anderson Model*, Heidelberg University (2010)
- (21) Michael Lubasch, *Quantum Chaos and Entanglement in the Bose-Hubbard Model*, Heidelberg University (2009)
- (22) Martina Abb, *Fidelity for Kicked Atoms at nearly Resonant Driving*, Heidelberg University (2009)
- (23) Anas Rana, *Fractal Quantum Transport in the Presence of Underlying Mixed Classical Phase Space*, International Master Thesis, Imperial College London and Heidelberg University (2008)
- (24) Andrea Tomadin, *Quantum Chaos with Ultracold Atoms in Optical Lattices*, Pisa University (2006), co-supervised, main advisor: Prof. Riccardo Mannella

### **Supervised Bachelor theses & undergraduate projects**

- (25) Guillaume Grolleron, Internship project, *Inflation models and Cold Dark Matter*, Université Paris Sud (2019)
- (26) Alexander Wagner, *Topology in 1D Quantum Walks*, Heidelberg University (2018)
- (27) Jonathan Klos, *Examining Numerical Accuracy of Cosmological Simulations based on the Schrödinger-Poisson System*, Heidelberg University (2018)
- (28) Aurelien Cordonnier, Internship project, *Numerical Simulations of Cold Dark Matter*, Université Paris Sud (2018)
- (29) Tim Zimmermann, *A Simple Model for the Temporal Evolution of Cold Dark Matter*, Heidelberg University (2018)
- (30) Alexander Gresch, *The Quasi-momentum in an Experimentally Implemented Quantum Walk*, Heidelberg University (2017)
- (31) Zakari Denis, Internship project, *Open Bose-Hubbard chains and Green functions*, Université Paris Sud (2017)

- (32) Darius Hoffmann, *The Transition to Chaos in the Two-dimensional Bose-Hubbard Model*, Heidelberg University (2015)
- (33) David Fischer, *Analysis of a 2-D-Bose-Hubbard Model*, Heidelberg University (2015)
- (34) Caspar Groiseau, *Steering Random Walks for Detunings from Quantum Resonance*, Heidelberg University (2015)
- (35) Christoph Sünderhauf, *Quantum Reflection in Time and Space*, Heidelberg University (2014)
- (36) Marcel Weiss, *Steering Random Walks through Quantum Resonance*, Heidelberg University (2014)
- (37) Fabiana Cescatti, *Anderson Localization vs. Classical Diffusion in the Quantum Kicked Rotor Model*, Parma University (2014)
- (38) Fabian Brock, *Theory for all-Optics Realisation of the Quantum Kicked Rotor*, Heidelberg University (2013)
- (39) Steffen Wolf, *Analysis of Dissipative Processes in a Three-site Bose-Hubbard Model*, Heidelberg University (2013)
- (40) Marius Blaesing, *Methods for Explaining Quantum Dynamics of Kicked Atoms*, Heidelberg University (2013)
- (41) Felix Ziegler, *Kicked-rotor Dynamics in Optical Fibers*, Heidelberg University (2012)
- (42) Benedikt Herwerth, *Dynamics of Quantum Reflection in Atom-surface Interactions*, Heidelberg University (2011)
- (43) Torben Schell, *A Perturbation Series for the Quantum Kicked Rotor*, Heidelberg University (2011)
- (44) Anton Ivanov, *Mean-Field-Transport eines Bose-Einstein-Kondensats in periodischen Potentialen*, Heidelberg University (2010)

#### **Public dissemination of scientific results**

- (1) Press article in *Passauer Neue Presse* (Germany, 2 January 2004): Hauzenberger erforscht das Quantenchaos
- (2) Press article in *Passauer Neue Presse* (Germany, 19 October 2007): Sandro Wimberger: Erfolgreicher Hauzenberger macht seinen Weg
- (3) Press release Heidelberg University 2007: Werbung für die Nachwuchsgruppe, available online: <https://www.uni-heidelberg.de/presse/news07/2709wimb.html>
- (4) Press article in *Passauer Neue Presse* (Germany, 11 November 2009): In der Kälte liegt die Ruhe: So sind zwei Forscher den Atomen auf der Spur
- (5) Press release Heidelberg University 2010: Zwei Forscher der Ruperto Carola ausgezeichnet. Heidelberger Akademie der Wissenschaften vergab Preise zur Nachwuchsförderung, available online: [https://www.uni-heidelberg.de/presse/meldungen/2010/m20100608\\_akademiepreis.html](https://www.uni-heidelberg.de/presse/meldungen/2010/m20100608_akademiepreis.html)
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