
Andrea Alberti, Dr.

PERSONAL INFORMATION

Date of birth: 21.04.1982
Nationality: Italian & German
Researcher ID: ORCID [0000-0002-1698-3895](https://orcid.org/0000-0002-1698-3895)



CONTACT

Max Planck Institute of Quantum Optics
Hans-Kopfermann-Straße 1 – 85748 Garching, Germany
Phone: +49 (0) 89 32905793
Email: andrea.alberti@mpq.mpg.de
Website: <http://quantum-technologies.iap.uni-bonn.de/alberti/>

SCIENTIFIC CAREER & POSITIONS

- 2022 – Senior scientist at the Centre for Quantum Computing and Quantum Technologies, Munich Quantum Valley & Max Planck Institute of Quantum Optics
- 2016 – 2021 Senior scientist and principal investigator, Institute of Applied Physics, University of Bonn
- 2012 – 2015 Junior group leader, Institute of Applied Physics, University of Bonn
- 2011 – 2013 Alexander von Humboldt research fellow. Host: Prof. Dieter Meschede, Institute of Applied Physics, University of Bonn
- 2010 Postdoctoral position. Host: Prof. Dieter Meschede, Institute of Applied Physics, University of Bonn

ABILITAZIONE SCIENTIFICA NAZIONALE

- 2022 Abilitato alla funzione di professore universitario di prima e seconda fascia, settore concorsuale 02/B1, Fisica Sperimentale della Materia

SCIENTIFIC EDUCATION

- 2007 – 2010 PhD, European Laboratory for Non-Linear Spectroscopy, Università di Firenze, Supervisor: Prof. Guglielmo Tino. Subject: “Coherent transport in driven optical lattices and applications to force measurements” defended on 19 Feb. 2010. Mark: not applicable.
- 2002 – 2006 “Diploma di Licenza” in Physics, Scuola Normale Superiore di Pisa, Supervisor: Prof. Guglielmo Tino. Subject: “Induced Wannier-Stark transitions with ultra-cold ^{88}Sr atoms in vertical optical lattices” defended on 27 Nov. 2007. Mark: 70/70 *con lode*.
- 2005 – 2006 M.Sc. in Physics, Università di Pisa, Supervisor: Prof. Ennio Arimondo, Co-supervisor: Prof. Christophe Salomon. Subject: “Contributions to new generation ultra-cold Lithium experiments” defended on 26 Oct. 2006. Mark: 110/110 *con lode*.
- 2006 Study abroad, École Normale Supérieure, Paris.
- 2002 – 2004 B.Sc. in Physics, Università di Pisa, Supervisor: Prof. Ennio Arimondo. Subject: “Evaporative cooling of an admixture of ^{87}Rb – ^{133}Cs atoms” defended on 26 Jul. 2004. Mark: 110/110 *con lode*.
- 1997 – 2001 Scientific lyceum “Liceo Scientifico G.P. Vieusseux” in Imperia, Mark: 100/100 *con lode*.

PRIZES & FELLOWSHIPS

- 2018 Awarded the [Rudolf Kaiser Prize 2017](#).

- 2018 – 2021 Member of the Young Academy ([Junges Kolleg](#)) of the [North Rhine-Westphalian Academy of Sciences and the Arts](#).
- 2011 – 2013 Awarded two-year [Alexander von Humboldt Research Fellowship](#).
- 2006 Awarded 10-month research stipend by [QUEDDIS](#) of the European Science Foundation.
- 2002 – 2006 Five-year honor scholarship by [Scuola Normale Superiore di Pisa](#).

FUNCTIONS & SERVICES

- 2016 – 2020 Member of steering committee of [OSCAR SFB/TR 185](#) initiative.
- 2009 – Referee for: *Physical Review Letters*, *Physical Review A*, *Physical Review X*, *New Journal of Physics*, *Optics Letters*, *Review Scientific Instruments*, *Europhysics Letters*, *Journal of Modern Optics*, *International Journal of Modern Physics B*, *Applied Physics B*, *Quantum Information Processing*, *Annals of Physics*, *Scientific Reports*, *Physics Letters A*. More information about my review work can be found at <https://publons.com/researcher/1290461/andrea-alberti/peer-review/>.

THIRD-PARTY RESEARCH FUNDING

- 2019 Funded project “Fast Atom Transport for Quantum Technologies” in collaboration with Technion – Israel Institute of Technology. Funding from “RBNI-Würzburg seed money program,” grant number 1017132.
- 2016 – 2020 Funded project “Topological phases in discrete-time quantum walks” within the [OSCAR SFB/TR 185](#) initiative.
- 2012 – 2014 Funded junior research group (*Nachwuchsforschergruppe*) by the [MIWF](#) of North Rhine-Westphalia.

MEDIA COVERAGE & OUTREACH

- 2021 Several [science media](#) covered our research on fundamental quantum speed limits; see the [press release](#) from the University of Bonn. Scientific publication: [Sci. Adv. 7 eabj9119 \(2021\)](#).
- 2021 Our new method to image laser beams in vacuum was covered by several [science media](#); see the [press release](#) from the University of Bonn. Scientific publication: [Phys. Rev. Appl. 16, 024041 \(2021\)](#).
- 2021 The “quantum brachistochrone experiment” was featured in a *Focus* article, “*An Atom Pushed to Its Speed Limit*” [Physics 14, 26 \(2021\)](#); see also the [press release](#) from the University of Bonn. Scientific publication: [Phys. Rev. X 11, 011035 \(2021\)](#).
- 2018 The Rudolf Kaiser Prize was covered by the daily newspaper “General Anzeiger Bonn” with an [interviewed](#) appeared on May 8th, 2018; see also the press releases by the [Deutsches Stiftungszentrum](#) and by the [University of Bonn](#), and the related article on the [Forsch](#), issue 2/2018, p. 20.
- 2017 The proposal about revealing quantum statistics with two distant atoms was covered in the magazine *APS Physics*; see also the [press release](#) from the University of Bonn. Scientific publication: [Phys. Rev. Lett. 119, 160401 \(2017\)](#).
- 2017 An interview with *Forschung aktuell* of *Deutschlandfunk* entitled “Sortiergerät für Atome: Forscher präparieren Quantenregister im Rekordtempo,” was broadcast on [March 9th, 2017](#). The “sorting machine for atoms” was also featured in a press release [press release](#) and in the general science magazine of the University of Bonn, [Forsch](#), issue 1/2017, p. 13. Scientific publication: [Phys. Rev. Lett. 118, 065302 \(2017\)](#).
- 2015 The “Leggett-Garg violation experiment” was featured in a *Viewpoint* article by G. Knee, “*Do Quantum Superpositions Have a Size Limit?*” [Physics 8, 6 \(2015\)](#), as well as in a *Brennpunkt* article by K. Hornberger, “*Cäsium mag es unrealistisch*” [Physik Journal 14, 24 \(2015\)](#); see also the [press release](#) from the University of Bonn. Scientific publication: [Phys. Rev. X 5, 011003 \(2015\)](#).

- 2015 The “electric quantum walk” experiment were featured in *La Recherche*—a popular science magazine well known in France. Reference: P. Arrighi and S. Perdrix, “*La décohérence, une alliée pour la simulation*,” *La Recherche* **501**, 66 (2015). Scientific publication: *Phys. Rev. Lett.* **110**, 190601 (2013).
- 2012 The “digital single atom interferometer” was featured in the general science magazine of the University of Bonn; see also the [press release](#) from the University of Bonn. Scientific publication: *PNAS* **109**, 9770 (2012).

SCIENTIFIC PUBLICATIONS

All my manuscripts can be downloaded in PDF format from <http://quantum-technologies.iap.uni-bonn.de/alberti/>.

Recent submissions to the arXiv

- [AXV1] C. Robens, I. Arrazola, W. Alt, D. Meschede, L. Lamata, E. Solano, and A. Alberti, “*Boson Sampling with Ultracold Atoms*,” arXiv (2022), arXiv:2208.12253 [[quant-ph](#)].

Publications in peer-reviewed journals [P1–P33]

- [P1] G. Ness, A. Alberti, and Y. Sagi, “*Quantum Speed Limit for States with a Bounded Energy Spectrum*,” *Phys. Rev. Lett.* **129**, 140403 (2022).
- [P2] F.-R. Winkelmann, C. Weidner, G. Ramola, W. Alt, D. Meschede, and A. Alberti, “*Direct measurement of the Wigner function of atoms in an optical trap*,” *J. Phys. B: At. Mol. Opt. Phys.* (2022).
- [P3] G. Ramola, R. Winkelmann, K. Chandrashekhara, W. Alt, X. Peng, D. Meschede, and A. Alberti, “*Ramsey imaging of optical traps*,” *Phys. Rev. Appl.* **16**, 024041 (2021).
- [P4] G. Ness, M. R. Lam, W. Alt, D. Meschede, Y. Sagi, and A. Alberti, “*Observing crossover between quantum speed limits*,” *Sci. Adv.* **7**, eabj9119 (2021).
- [P5] M. R. Lam, N. Peter, T. Groh, W. Alt, C. Robens, D. Meschede, A. Negretti, S. Montangero, T. Calarco, and A. Alberti, “*Demonstration of Quantum Brachistochrones between Distant States of an Atom*,” *Phys. Rev. X* **11**, 011035 (2021), covered in *PhysiCS* ([link](#)).
- [P6] M. Sajid, J. K. Asbóth, D. Meschede, R. F. Werner, and A. Alberti, “*Creating anomalous Floquet Chern insulators with magnetic quantum walks*,” *Phys. Rev. B* **99**, 214303 (2019), .
- [P7] C. Robens, S. Brakhane, W. Alt, D. Meschede, J. Zopes, and A. Alberti, “*Fast, High-Precision Optical Polarization Synthesizer for Ultracold-Atom Experiments*,” *Phys. Rev. Applied* **9**, 034016 (2018), .
- [P8] F. Bleckmann, Z. Cherpakova, S. Linden, and A. Alberti, “*Spectral imaging of topological edge states in plasmonic waveguide arrays*,” *Phys. Rev. B* **96**, 045417 (2017).
- [P9] C. F. Roos, A. Alberti, D. Meschede, P. Hauke, and H. Häffner, “*Revealing quantum statistics with a pair of distant atoms*,” *Phys. Rev. Lett.* **119**, 160401 (2017), covered in *PhysiCS* ([link](#)), .
- [P10] A. Alberti and S. Wimberger, “*Quantum walk of a Bose–Einstein condensate in the Brillouin zone*,” *Phys. Rev. A* **96**, 023620 (2017), .
- [P11] J. K. Asbóth and A. Alberti, “*Spectral flow and global topology of the Hofstadter butterfly*,” *Phys. Rev. Lett.* **118**, 216801 (2017).
- [P12] T. Rakovszky, J. Asbóth, and A. Alberti, “*Detecting topological invariants in chiral symmetric insulators via losses*,” *Phys. Rev. B* **95**, 201407(R) (2017).
- [P13] C. Robens, J. Zopes, W. Alt, S. Brakhane, D. Meschede, and A. Alberti, “*Low-entropy states of neutral atoms in polarization-synthesized optical lattices*,” *Phys. Rev. Lett.* **118**, 065302 (2017).
- [P14] C. Robens, S. Brakhane, W. Alt, F. Kleiβler, D. Meschede, G. Moon, and A. Alberti, “*High numerical aperture ($NA = 0.92$) objective lens for imaging and addressing of cold atoms*,” *Opt. Lett.* **42**, 1043 (2017).

- [P15] C. Robens, W. Alt, C. Emary, D. Meschede, and [A. Alberti](#), “Atomic ‘bomb testing’: the Elitzur-Vaidman experiment violates the Leggett-Garg inequality,” *Appl. Phys. B* **123**, 12 (2017).
- [P16] T. Groh, S. Brakhane, W. Alt, D. Meschede, J. K. Asbóth, and [A. Alberti](#), “Robustness of topologically protected edge states in quantum walk experiments with neutral atoms,” *Phys. Rev. A* **94**, 013620 (2016), .
- [P17] [A. Alberti](#), C. Robens, W. Alt, S. Brakhane, M. Karski, R. Reimann, A. Widera, and D. Meschede, “Super-resolution microscopy of single atoms in optical lattices,” *New J. Phys.* **18**, 053010 (2016).
- [P18] S. Brakhane, W. Alt, D. Meschede, C. Robens, and [A. Alberti](#), “Note: Ultra-low birefringence dodecagonal vacuum glass cell,” *Rev. Sci. Instrum.* **86**, 126108 (2015).
- [P19] C. Robens, W. Alt, D. Meschede, C. Emary, and [A. Alberti](#), “Ideal Negative Measurements in Quantum Walks Disprove Theories Based on Classical Trajectories,” *Phys. Rev. X* **5**, 011003 (2015), covered in [PhySICS](#) ([link](#)).
- [P20] [A. Alberti](#), W. Alt, R. Werner, and D. Meschede, “Decoherence models for discrete-time quantum walks and their application to neutral atom experiments,” *New J. Phys.* **16**, 123052 (2014).
- [P21] A. Steffen, W. Alt, M. Genske, D. Meschede, C. Robens, and [A. Alberti](#), “Note: In-situ measurement of vacuum window birefringence by atomic spectroscopy,” *Rev. Sci. Instrum.* **84**, 126103 (2013).
- [P22] C. Cedzich, T. Rybár, A. H. Werner, [A. Alberti](#), M. Genske, and R. F. Werner, “Propagation of Quantum Walks in Electric Fields,” *Phys. Rev. Lett.* **111**, 160601 (2013).
- [P23] M. Genske, W. Alt, A. Steffen, A. H. Werner, R. F. Werner, D. Meschede, and [A. Alberti](#), “Electric Quantum Walks with Individual Atoms,” *Phys. Rev. Lett.* **110**, 190601 (2013).
- [P24] N. Belmechri, L. Förster, W. Alt, A. Widera, D. Meschede, and [A. Alberti](#), “Microwave control of atomic motional states in a spin-dependent optical lattice,” *J. Phys. B: At. Mol. Phys.* **46**, 104006 (2013).
- [P25] A. Ahlbrecht, [A. Alberti](#), D. Meschede, V. B. Scholz, A. H. Werner, and R. F. Werner, “Molecular binding in interacting quantum walks,” *New J. Phys.* **14**, 073050 (2012).
- [P26] A. Steffen, [A. Alberti](#), W. Alt, N. Belmechri, S. Hild, M. Karski, A. Widera, and D. Meschede, “Digital atom interferometer with single particle control on a discretized space-time geometry,” *Proc. Natl. Acad. Sci. U.S.A.* **109**, 9770 (2012).
- [P27] M. G. Tarallo, [A. Alberti](#), N. Poli, M. L. Chiofalo, F.-Y. Wang, and G. M. Tino, “Delocalization-enhanced Bloch oscillations and driven resonant tunneling in optical lattices for precision force measurements,” *Phys. Rev. A* **86**, 033615 (2012).
- [P28] M. Karski, L. Förster, J.-M. Choi, [A. Alberti](#), W. Alt, A. Widera, and D. Meschede, “Direct Observation and Analysis of Spin-Dependent Transport of Single Atoms in a 1D Optical Lattice,” *J. Korean Phys.Soc.* **59**, 2947 (2011).
- [P29] N. Poli, F.-Y. Wang, M. G. Tarallo, [A. Alberti](#), M. Prevedelli, and G. M. Tino, “Precision Measurement of Gravity with Cold Atoms in an Optical Lattice and Comparison with a Classical Gravimeter,” *Phys. Rev. Lett.* **106**, 038501 (2011), covered in [PhySICS](#) ([link](#)).
- [P30] [A. Alberti](#), G. Ferrari, V. V. Ivanov, M. L. Chiofalo, and G. M. Tino, “Atomic wave packets in amplitude-modulated vertical optical lattices,” *New J. Phys.* **12**, 065037 (2010).
- [P31] [A. Alberti](#), V. V. Ivanov, G. M. Tino, and G. Ferrari, “Engineering the quantum transport of atomic wavefunctions over macroscopic distances,” *Nature Phys.* **5**, 547 (2009).
- [P32] F. Sorrentino, [A. Alberti](#), G. Ferrari, V. V. Ivanov, N. Poli, M. Schioppo, and G. M. Tino, “Quantum sensor for atom-surface interactions below 10 μm ,” *Phys. Rev. A* **79**, 013409 (2009).
- [P33] V. V. Ivanov, [A. Alberti](#), M. Schioppo, G. Ferrari, M. Artoni, M. L. Chiofalo, and G. M. Tino, “Coherent Delocalization of Atomic Wave Packets in Driven Lattice Potentials,” *Phys. Rev. Lett.* **100**, 043602 (2008).

Patents [[PAT1](#), [PAT2](#)] test

- [PAT1] C. Robens, S. Brakhane, and [A. Alberti](#), “Vorrichtung und Verfahren zur präzisen Erhaltung der linearen Polarisation elektromagnetischer Wellen in hochdoppelbrechenden optischen Fasern unter Einfluss von Umgebungsstörungen,” *Patented*, DE 102018131820 (Germany), Dec. 2018.

[PAT2] S. Brakhane, W. Alt, D. Meschede, C. Robens, and A. Alberti, “Polarisationserhaltende Vakuum-Zelle zur Anwendung oder Messung elektromagnetischer Wellen im Vakuum,” [Patented, DE 102015013026](#) (Germany), Oct. 2015.

Proceedings

- [PR1] C. Robens, S. Brakhane, D. Meschede, and A. Alberti, “Quantum Walks With Neutral Atoms: Quantum Interference Effects of One and Two Particles,” in [Proceedings of the XXII International Conference ICOLS 2015](#), 2016, p. 1, arXiv:1511.03569 [quant-ph].
- [PR2] G. M. Tino, A. Alberti, A. Bertoldi, L. Cacciapuoti, M. de Angelis, G. Ferrari, A. Giorgini, V. Ivanov, G. Lamporesi, N. Poli, M. Prevedelli, and F. Sorrentino, “Precision Gravity Tests by Atom Interferometry,” in [Proceedings of the XVIII International Conference ICOLS 2007](#), 2008, p. 89.

ORGANIZATION OF WORKSHOPS

- 2017 Minisymposium “Discrete quantum simulators,” 22–23 Mar. 2017, Bonn, Germany
- 2014 Heraeus workshop “Discrete and Analogue Quantum Simulators,” 10–12 Feb. 2014, <http://www.weh553.iap.uni-bonn.de/>, Bad Honnef, Germany
- 2012 Symposium “Quantum Walks, Quantum Simulators, and Quantum Networks,” 30–31 Jul. 2012, <http://for635.iap.uni-bonn.de/workshop2012/workshop2012.html>, Bonn, Germany

SCIENTIFIC COLLABORATIONS

- ▶ Prof. Yoav Sagi (Technion): experimental test of quantum speed limit. Ref. [P1,P4].
- ▶ Prof. Enrique Solano (University of the Basque Country): boson sampling with ultracold atoms. Ref. [AXV1]
- ▶ Dr. Christian Roos (University of Innsbruck), Prof. Hartmut Häffner (UC Berkeley), and Prof. Philipp Hauke (Trento University): revealing quantum statistics with a pair of distant atoms. Ref. [P9].
- ▶ Prof. Stefan Linden (University of Bonn): experimental study of topologically protected edge states with surface plasmon polaritons in waveguide arrays. Ref. [P8].
- ▶ Prof. Janos K. Asbóth (Wigner Research Center, Budapest): topological phases in discrete-time quantum walks Refs. [P6,P11,P12,P16].
- ▶ Prof. Simone Montangero (Padua University), Dr. Antonio Negretti (University of Hamburg), and Prof. Tommaso Calarco (Jülich Research Centre): application of optimal control theory to quantum walks. Ref. [P5].
- ▶ Prof. Reinhard Werner, University of Hannover: discrete-time quantum walks and artificial gauge fields. Refs. [P6,P20,P22,P23,P25].
- ▶ Prof. Clive Emary, University of Hull, UK: experimental tests of the superposition principle of massive particles by means of the Leggett-Garg inequality. Refs. [P15,P19].

LIST OF INVITED ACADEMIC TALKS

Workshops and symposia:

1. Workshop “Taiwanese–German Young Researchers Forum on Quantum Information Science,” National Cheng Kung University, Tainan, Taiwan (Feb. 2023)
2. Workshop “Quantum Transport with ultracold atoms,” MPIPKS Dresden (Aug. 2022)
3. Heraeus Workshop “Lattice-based quantum simulation,” Bad Honnef, Germany (Nov. 2021)
4. Workshop “Atomtronics@AbuDhabi2021,” Abu Dhabi, United Arab Emirates (Jun. 2021)
5. Heraeus Workshop “Frontiers of Quantum Gas Microscopy,” Bad Honnef, Germany (Aug. 2020, cancelled)
6. Batsheva de Rothschild Symposium “Quantum Simulations Using Photons, Atoms, and Molecules,” Tze’elim, Israel, (Feb. 2020)
7. Symposium “Quantum walks and quantum information”, Valencia, Spain (Dec. 2019)

8. DPG Spring Meeting, SAMOP division, Invited talk, Rostock, Germany (Mar. 2019)
9. Workshop "Workshop on Foundations of Quantum Mechanics" within ICNFP 2018, Kolymbari, Crete, Greece (Jul. 2018)
10. Heraeus Workshop "Search and problem solving by random walks," Bad Honnef, Germany (May 2018)
11. German-French-Russian Laser Symposium 2018, Kazan, Russia (Apr. 2018)
12. Symposium "Quantum Information and Quantum Simulation," Université Pierre et Marie Curie, Paris, France (Sep. 2017)
13. Workshop "Workshop on Foundations of Quantum Mechanics" within ICNFP 2017, Kolymbari, Crete, Greece (Aug. 2017)
14. Workshop "Quantum Simulation Models Workshop," Marseille, France (Jun. 2017)
15. IBM-Heraeus Workshop "Scalable Architectures for Quantum Simulation," Bad Honnef, Germany (Jan. 2017), [[view slides](#)]
16. Workshop "Quantum Simulation and Quantum Walks 2016," Prague, Czech Republic (Nov. 2016), [[view slides](#)]
17. Heraeus Workshop "Microwaves Go Quantum," Bad Honnef, Germany (Nov. 2015)
18. Camel11 Workshop 2015 "Control of Quantum Dynamics of Atoms, Molecules and Ensembles by Light," Nesebar, Bulgaria (Jun. 2015)
19. Workshop "Quantum Simulations and Quantum Walks," Centro de Giorgi, Scuola Normale Superiore, Pisa, Italy (Nov. 2013)
20. Invited speaker, "23rd FoQuS SFB meeting," Vienna, Austria (Dec. 2013)
21. Heraeus Workshop "Classical and Quantum Transport in Complex Networks," Bad Honnef, Germany (Aug. 2013)
22. Symposium "Photons, atoms, and beyond," Pisa, Italy (Sep. 2012)
23. Workshop "Dynamics and asymptotics in the Dicke model and quantum networks," Mátraháza, Hungary (May 2012)
24. Quantum Control and Simulation with Distributed Neutral Atom Systems Workshop, MPQ Garching, Germany (Nov. 2011)
25. German-French-Russian Laser Symposium 2011, Erlangen, Germany (Apr. 2011)
26. Workshop "Modern Problems of Laser Metrology," Lercici, Italy (Oct. 2009)

Conferences:

1. Conference, "Quantum Control in Quantum Technologies," Obergurgl University Centre, Austria (Oct. 2021)
2. Conference, "Quantum interfacing light and matter, new concepts and developments and applications in modern quantum technologies," Oxford, United Kingdom (Sep. 2021), [[view slides](#)]
3. SPIE conference "Photonics West 2020," San Francisco, USA (Feb. 2020)
4. Humboldt Kolleg "Controlling quantum matter: From ultracold atoms to solids," Vilnius, Lithuania (Jul. 2018)
5. Conference "Is quantum theory exact? The quest for the spin-statistics connection violation and related items," Rome, Italy (Jul. 2018)
6. International Conference on Quantum Optics and Quantum Information, Minsk, Belarus (Nov. 2017)
7. COST conference "Fundamental Problems in Quantum Physics," Erice, Italy (Mar. 2015)
8. ICOLS 2015, "22nd International Conference on Laser Spectroscopy," Singapore (Jun. 2015)
9. von Humboldt Award Winners' Forum: "Frontiers in Quantum Optics," Bonn, Germany (Oct. 2013)

Seminars and colloquia:

1. Colloquium, Technion - Israel Institute of Technology, Haifa, Israel, (Nov. 2022)
2. Seminar, Max Planck Institute of Quantum Optics, Garching, Germany (Nov. 2021)
3. Colloquium, University of Ashoka, Haryana, India, (Nov. 2021)
4. Colloquium, Technology Innovation Institute (TII), Abu Dhabi, United Arab Emirates, (Sep. 2021)
5. Seminar, Institute for Applied Physics, Technical University of Dresden, Germany (June. 2020)

6. Seminar, Institute for Experimental Physics, Innsbruck, Austria (Mar. 2020)
7. Seminar, Technical University of Kaiserslautern, Germany (Feb. 2020)
8. Colloquium, North Rhine-Westphalian Academy of Sciences, Humanities and the Arts, (Nov. 2019)
9. Seminar, Budapest University of Technology and Economics, Hungary (Sep. 2019)
10. Wigner SZFI Seminar, Wigner Research Center, Budapest, Hungary (Sep. 2019)
11. Seminar, University of the Basque Country, Bilbao, Spain (Nov. 2018)
12. Quantum optics colloquium, ZOQ & Institute of Laser Physics, Hamburg, Germany (Jun. 2018)
13. Seminar, Okinawa Institute of Science and Technology, Okinawa, Japan (Feb. 2018)
14. Seminar, University of Vienna, Austria (Feb. 2018)
15. Seminar, University of Nottingham, Nottingham, United Kingdom (Jan. 2018)
16. Seminar, National Institute of Physics, University of the Philippines Diliman, Philippines (Dec. 2017)
17. Seminar, LMU Munich, Germany (May 2017)
18. Seminar, University of the Basque Country, Bilbao, Spain (Apr. 2017)
19. Seminar, Universität Ulm, Germany (Mar. 2017)
20. Public lecture on "Twisted quantum states: From the Möbius strip to dissipationless currents" at kick-off meeting of SFB/TR 185 OSCAR, Bonn, Germany (Jul. 2016), [\[view slides\]](#)
21. Seminar Universität Siegen, Germany (Mar. 2016)
22. ICFO Seminar, Barcelona, Spain (Mar. 2016)
23. Colloquium ENS Lyon, France (Feb. 2016)
24. Quantum Seminar, Universität Mainz, Germany (Nov. 2015)
25. Wigner SZFI Seminar, Wigner Research Center, Budapest, Hungary (Jan. 2015)
26. Physics Colloquium, Universität Bonn, Germany (Oct. 2015)
27. Seminar Imperial College, London, United Kingdom (Oct. 2015)
28. LKB Seminar, Collège de France, Paris, France (Oct. 2014)
29. Fritz Haber Institute seminar, Berlin, Germany (Nov. 2013)
30. Seminar, Freiburg Institute for Advanced Studies, Universität Freiburg, Germany (May 2013)
31. LENS Seminar, European Laboratory for Nonlinear Spectroscopy, Sesto Fiorentino, Italy (Sep. 2012)
32. Seminar "R. G. Herb Condensed Matter," University of Wisconsin, Madison USA (Feb. 2010)
33. Seminar, Columbia University, New York, USA (Feb. 2010)
34. Seminar, Institut d'Optique, Orsay, France (Feb. 2010)
35. Optics and Condensed Matter Seminar, Institut für Angewandte Physik, Bonn, Germany (Jan. 2010)
36. Seminar, Universidad Complutense de Madrid, Madrid, Spain (Dec. 2009)

Physics schools:

1. Summer school "Shortcuts to Adiabaticity," University College Cork, Ireland (Jul. 2016)
2. "New trends in many-particle quantum transport," Universität Freiburg, Germany (Feb. 2015)

TEACHING ACTIVITIES

University courses:

2017 SS – Intensive Week Course: "[Introduction to topological insulators and their implementations in artificial matter setups](#)" (Universität Bonn, Master)

2016 WS – Advanced Topics in Quantum Optics (Universität Bonn, Master)

Exercise classes, and other teaching experiences:

Since 2010, I have been regularly involved in preparing exercise sheets, written examinations, and holding several hours of lectures per semester in university courses of the University of Bonn. These include at the Master's level "Photonics," "Advanced Atomic, Molecular and Optical Physics," "Quantum optics," "Laser Physics and Nonlinear Optics," "Cold atoms and many particle physics," "Seminar on Quantum Technology," and at the Bachelor's level "Atome, Moleküle, Kondensierte Materie."

SUPERVISION OF GRADUATE STUDENTS & POSTDOCTORAL FELLOWS

2010 – 2021 10 PhD students, 1 Postdoc, 21 Master students, and 8 Bachelor students at the Institute of Applied Physics, University of Bonn

2007 – 2008 1 Master Student, European Laboratory for Non-Linear Spectroscopy, Firenze

COMPUTER SKILLS

- Programming languages: Mathematica, MATLAB, Python, C, C++, Objective-C, AppleScript, Assembly, Ruby, Bash, PHP, JavaScript, Latex/TeX, MYSQL.
- Scientific software: OSLO, ZEMAX, Inventor, SolidWorks, EAGLE, LT Spice, COMSOL.

LANGUAGES

Fluent in English, German, French, Italian.

OTHER ACTIVITIES

- 2010 Design and creation of the website <http://quantum-technologies.iap.uni-bonn.de/>
- Indoor bouldering; Endurance sports (running, swimming): best time in 10-km run: 38:10 (Summer 2014)