

# Johannes M. Fink

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## Career

Assistant Professor, Institute of Science and Technology Austria, 2016 – present  
Visiting Associate Faculty, California Institute of Technology, 2016 – 2017  
Senior Staff Scientist, Thomas J. Watson, Sr., Laboratory of Applied Physics, Caltech, 2015 – 2016  
Postdoctoral Research Scholar, Institute for Quantum Information and Matter, Caltech, 2012 – 2015  
Postdoctoral Research Fellow, Department of Physics, ETH Zurich, 2011 – 2012  
Research Associate and Teaching Assistant, Department of Physics, ETH Zurich, 2006 – 2010  
Mechanical Engineer, Liebherr Aerospace and Doppelmayr, accumulated 8.5 months

## Education

Ph.D. Physics, ETH Zurich, 2010, awarded with the ETH Medal  
Thesis: *Quantum Nonlinearities in Strong Coupling Circuit QED*  
Advisor / Examiner: Prof. Andreas Wallraff / Prof. Ataç Imamoglu  
M.S. Physics, University of Vienna, 2007, with distinction  
Thesis: *Single Qubit Control and Observation of Berry's Phase in a Superconducting Quantum Circuit*  
Advisor / Examiner: Prof. Andreas Wallraff / Prof. Anton Zeilinger  
Matura, HTL Bregenz – School of Engineering, 2001  
Thesis: *Heat-dissipation by Convection at Cylindrical Bodies* with Liebherr Aerospace

## Research Topics

Superconducting Quantum Circuits, Quantum Electro- and Optomechanics, Nanophotonics and Nonlinear Optics, Precision Measurements and Metrology

## Selected Distinctions

2018 - Fritz Kohlrausch prize  
2017 - ERC Starting grant  
2012 - IQIM fellowship  
2010 - ETH Medal  
2009 - CSF award  
2004 - Joint Study fellowship

## Professional Service

- Initiator and organizer of the conference: ‘Frontiers of Circuit QED and Optomechanics 2018’ with 20 invited talks and a total of 105 conference attendees at IST Austria, Klosterneuburg, 2018.
- External PhD thesis referee for 1) Jared Lolli, Topic: *Quantum Measurement and Feedback Control of highly nonclassical Photonic States* (2017), Advisor: Cristiano Ciuti, Université Paris Diderot, France. 2) Jason Hoelsch-Obermaier, Topic: *Generation and Detection of Quantum Entanglement in Optomechanical Systems* (2017), Advisor: Markus Aspelmeyer, University of Vienna. 3) Laszlo Daniel Toth, Topic: *Reservoir Engineering in Circuit Optomechanics* (2018), Advisor: Tobias Kippenberg, EPFL, Lausanne. 4) Ralf Riedinger, Topic: *Single Phonon Quantum Optics* (2018), Advisor: Markus Aspelmeyer, University of Vienna.
- Reviewer for Physical Review Letters, Physical Review X, Nature Communications, Physical Review A, Applied Physics Letters, Journal of Low Temperature Physics and The New Journal of Physics, 2011 – present
- Program coordination for the international conference on Quantum Information Processing and Communication (QIPC), 2011

## Institutional Responsibilities

Member of the Planning Group IST Nanofabrication Facility, 2015 – 2017. Member of the Interdisciplinary Projects Committee, 2016 – 2017. Member of the Experimental Nanoscience Faculty Search Committee, 2017 – 2018. Member of the ISTplus Selection Committee, Member of the Equipment Investment Committee, 2017 – present. Faculty member, Graduate Student Advisor, 2016 – present.

## Memberships

- Project partner of BeyondC: Quantum Information Systems Beyond Classical Capabilities, Special research programme of the Austrian Science Fund, 2019 – present
- Cooperation partner ML4Q: Matter and Light for Quantum Computing, Cluster of Excellence of the German Research Foundation, 2019 – present
- Science board partner of OpenSuperQ: A Quantum Computer for Europe, FET Flagship Project of the European Union, 2019 – present
- Associated Faculty Member, The Vienna Doctoral Program on Complex Quantum Systems (CoQuS), Vienna, AT, 2016 – present
- Member of the Austrian Physical Society, 2018 – present
- Member of the American Physical Society, 2013 – present
- Member of the German Physical Society, 2007 – present

## Active Grants

- BeyondC: Quantum Information Systems Beyond Classical Capabilities, a special research program (SFB) funded by the Austrian Science Fund (FWF).
- QUNNECT: A Fiber Optic Transceiver For Superconducting Qubits, ERC Starting Grant 2017.
- Hybrid Semiconductor – Superconductor Quantum Devices, NOMIS Foundation research grant 2017

together with Giorgos Katsaros.

- HOT: Hybrid Opto-mechanical Technologies, EC Horizon 2020 FET Proactive, 2017 –2020.

## Major Collaborations

- Yoichi Ando, Matter and Light for Quantum Computing (ML4Q), University of Cologne, DE, 2018 –
- Stefan Rotter, Collective States of Superconducting Qubit Ensembles in Cavity and Waveguide QED, TU Vienna, AT, 2018 –
- Georgios Katsaros, Hybrid Semiconductor – Superconductor Quantum Devices, IST Austria, AT, 2017 –
- Fabian Hassler, Mesoscopic physics of ultra-high impedance circuits, RWTH Aachen, DE, 2016 –
- Peter Domokos, Quantum Optics Theory, Wigner, HU, 2015 –, Result: First observation the photon blockade breakdown quantum phase transition.
- Harald Schwefel, WGM Resonators, University of Otago, NZ, 2014 –, Result: World record in nonlinear optics based microwave to optical conversion efficiency.
- Oskar Painter, Nanophotonics and Nanofabrication, Caltech, USA, 2016 – 2017, Result: Fabrication of SOI qubit prototypes and tuneable high impedance superconducting resonators.
- Kartik Srinivasan, Nanofabrication and Material Growth, NIST Gaithersburg, USA, 2013 – 2016, Result: First electromechanical ground state cooling of a dielectric mechanical oscillator.
- Jonathan Keeling, Condensed Matter Theory, University of St. Andrews, UK, 2012 – 2013, Result: Improved understanding of collective dissipative effects in multi-qubit circuit QED.

## Teaching

- Teaching Assistant at ETH Zurich, 2007 – 2012: 3x Physics I (classical mechanics and electrodynamics), 1x Physics III (optics, quantum mechanics, statistical mechanics and atomic physics), 3x Physics IV (quantum mechanics), 1x Advanced Solid State Physics.
- Lectures and Seminars at IST Austria: Physics track core course (Spring 2018), Superconducting Microwave Resonators: Modeling, Fabrication and Characterization (Spring 2017), Physics track core course (Spring 2017), Microwave Quantum Circuits (Spring 2018)

## Current Supervision of Students and Postdocs

- 5 Postdocs: Alfredo Rueda (Electrooptics), William Hease (Electrooptics), Martin Zemlicka (Circuit QED), Shabir Barzanjeh (Electromechanics), Matthias Wulf (Optomechanics).
- 4 PhD students: Farid Hassani (Circuit QED), Georg Arnold (Optomechanics), Elena Redchenko (Circuit QED), Matilda Peruzzo (High Impedance Circuits).

## Former Group Members

16. Mariia Labendik (MA Moscow Institute of Physics and Technology), *JPC amplifier characterization*, Summer Research Intern, 2018. 15. Alex McKeehan (BA Stanford), *Tunable dipole coupling of transmon qubits*, Summer Research Intern, 2018. 14. Alfredo Rueda (PhD MPL/Erlangen), *Efficient Microwave to Optical Conversion with Lithium Niobate WGM Resonators*, Visiting PhD Student, 2016 – 2018. 13. Moritz Laber (BA

KIT), *Design of a slotted nanobeam cavity and simulation of fiber-to-waveguide coupling*, Research Intern, 2018. 12. Andrea Trioni (BA Politecnico di Milano), *Fabrication and Characterization of geometric Superinductors*, Master Student, 2017 – 2018. 11. Joshua Milem (BA Michigan State University), *Digital Downconversion and Spectroscopy with VIP*, Rotation Student, 2018. 10. Dylan Lewis (MA Oxford University), *Microwave quantum state tomography with VIP*, Research Intern, 2017. 9. William Hughes (MA University of Cambridge), *Modelling of geometric fluxonium and phase slip qubits*, Summer Research Intern, 2017. 8. Donald Swen (double BA, Willamette University, Oregon and Columbia University, New York City), *Designing Slotted Photonic Nanobeams with High Quality Factors and High Optomechanical Coupling using MATLAB/COMSOL LiveLink Scripting*, Summer Research Intern, 2017. 7. Nikolaj Kuntner (PhD, German Aerospace Center), *QuantumIDs' Python virtual instrument panel (VIP)*, Software Developer, 2016-2017. 6. Mike Hennessey-Wesen (BA McDaniel College, Maryland), *Determination of Noise Temperature and Gain in Cryostats*, IST Rotation Student, 2017. 5. Jason Jung (MA TU Vienna), *Implementation of a Dual-Channel Waveform Digitizer for Time-Resolved Superconducting Qubit Measurements*, IST Rotation Student, 2017. 4. Tobias Bilgeri (MA UPMC Paris), *Design and testing of an automated microwave carrier cancellation board*, Summer Research Intern, 2016. 3. Pradyumna Paranjape (MA LMU Munich), *Finite element design and optimization of acoustic and photonic devices*, Summer Research Intern, 2016. 2. Andreas Butler (BA University of Virginia), *IQ Upconversion and Downconversion for Control and Measurement of a Superconducting Qubit*, Summer Research Intern, 2016. 1. Matias Iglesias (MA Universidad de Buenos Aires), *Compact Circuit QED on Silicon*, Summer Research Intern, 2015

## Previously Co-Supervised Students and Theses

17. Mahmoud Kalae, PhD thesis, Caltech, 2018. 16. Paul Dieterle, senior thesis, Caltech, 2017. 15. Alex Anferov: *Development and Testing of a Josephson Parametric Amplifier for the Study of Near Ground State Quantum Systems*, SURF, Caltech, 2015. 14. Matias Iglesias: *Design and testing of a ultra-compact circuit QED system*, Summer research, Caltech and IST Austria, 2015. 13. Thomas Parton: *Optimization of the design of a mechanical cavity for an electro-optomechanical wavelength converter*, SURF, Caltech, 2014. 12. Richard Norte: *On-Chip Optical Levitation, Atom-Trapping, and Superconducting Quantum Circuits*, PhD Thesis, Caltech, 2014. 11. Michele Collodo: *Opto-Mechanics and Electro-Optics in Whispering Gallery Resonators*, Master Thesis, University of Erlangen-Nürnberg, 2014. 10. Lukas Heinzle: *Microwave Cavity Optomechanics on SiN Membranes*, Master Thesis, Caltech and ETH Zurich, 2013. 9. Daniel Kong: *Electromechanical Coupling in a 1-D Phononic Crystal Cavity Using a Triangular Nanobeam Design*, SURF, Caltech, 2013. 8. Lev Krayzman: *Constructing a High Bandwidth Microwave Photon to Phonon Coherent Converter*, SURF, Caltech, 2013. 7. Kristin Juliusson: *High-Q development and qubit manipulations in a 3D circuit QED architecture*, Master Thesis, ETH Zurich, 2012. 6. David-Dominik Jarausch: *Concepts and realization of a 3D tunable microwave cavity*, Semester Thesis, ETH Zurich, 2012. 5. Christian Bolesch: *Ultra low noise amplifiers and their DC wiring*, Semester Thesis, ETH Zurich, 2008. 4. Simon Michels: *Quantum-to-Classical Transition in Circuit Quantum Electrodynamics*, Semester Thesis, ETH Zurich, 2008. 3. Priska Studer: *Vacuum Rabi Splitting at High Drive Powers and Elevated Temperatures*, Master Thesis, Yale University and ETH Zurich, 2008. 2. Lars Steffen: *Spin echo measurements in a superconducting qubit*, Semester Thesis, ETH Zurich, 2007. 1. Peter Maurer: *Tomography on Superconducting Qubit States*, Semester Thesis, ETH Zurich, 2007.

## Selected Invited Talks

19. *Transduction and entanglement with silicon nanobeam oscillators* (conference talk), J. M. Fink. Conference on Hybrid Optomechanical Technologies (HOT), Monte Verita, CH, July 7-11, 2019
18. *Mechanical generation of stationary entangled radiation* (conference talk), J. M. Fink. 16th International Workshop of Nanomechanical Sensors (NMC2019), EPFL, Lausanne, June 19-21, 2019
17. *Circuit Quantum Electromechanics with Silicon Nanobeams* (conference talk), J. M. Fink. IMPRS–CoQuS workshop, Max Planck Institute for Quantum Optics, Garching, Germany, December 2-4, 2018
16. *Controlling Microwave Photons with Nanomechanical Oscillators* (conference talk), J. M. Fink. 2018 Annual Meeting of the Austrian Physical Society, Graz, Austria, September 13, 2018
15. *Stationary Entangled Radiation from Micromechanical Motion* (conference talk), J. M. Fink. Current trends in open and nonequilibrium quantum optical systems, Max Planck Institute for the Physics of Light, Erlangen, Germany, July 16-18, 2018
14. *Stopping and Routing Microwave Photons On-Chip* (conference talk), J. M. Fink. APS March Meeting, Microwave Photonics with Superconducting Circuits, Los Angeles, USA, March 5-9, 2018
13. *Dielectric mechanical oscillators as a tool for analog (quantum) signal processing* (conference talk), J. M. Fink. EQUs Annual Workshop, Hunter Valley, Australia, September 25-27, 2017
12. *Quantum electro-mechanics with dielectric oscillators* (conference talk) Quantum Interfaces with Nano-opto-electro-mechanical devices: Applications and Fundamental Physics, Erice, Italy, July 31 – August 5, 2016
11. *Integrated quantum electro-opto-mechanics on dielectric nanomembranes* (conference talk) Gordon Research Conference, Mechanical Quantum Systems: From Fundamental Physics to Real World Applications, Ventura, USA, March 6 – 11, 2016
10. *Optomechanical crystals for cavity opto- and electromechanics* (lecture series) Quantum Optomechanics and Nanomechanics Summer School, Les Houches, France, August, 2015
9. *Superconducting electromechanics on silicon nitride nanomembranes* (seminar talk) RWTH Aachen, Aachen, Germany, July 3, 2015
8. *Integrating acoustic, nanophotonic and superconducting quantum devices* (seminar talk) Harvard, School of Engineering and Applied Science, USA, May 2, 2014
7. *Integrating acoustic, nanophotonic and superconducting quantum circuits* (talk) Symposium: Selected Topics in Science and Technology, TU Munich, Germany, February 18, 2014
6. *Linear and nonlinear electromechanical coupling of narrow-gapped photonic and phononic crystal cavities* (conference talk) Frontiers of Opto- and Electro-mechanics workshop, Fai della Paganella, Italy, January 27 – 30, 2014
5. *Cavity QED with Microwave Photons and Superconducting Electronic Circuits* (seminar talk) Kavli Nanoscience Institute, Caltech, Pasadena, USA, January 17, 2012
4. *Quantum nonlinearities in strong coupling circuit QED* (seminar talk) Max Planck Institute for the Science of Light, Erlangen, Germany, July 21, 2011
3. *Quantum Optics Experiments with Multiple Qubits and Multiple Photons in Superconducting Electronic Circuits* (seminar talk) TCM seminar, Cavendish Laboratory, University of Cambridge, UK, December 04, 2009
2. *Quantum Optics Experiments with Multiple Qubits and Multiple Photons in Superconducting Electronic Circuits* (conference talk) MIDAS midterm research workshop, Capri, Villa Orlandi, Italy, September 30 – October 2, 2009
1. *Multi-Photon Cavity QED with Superconducting Circuits* (conference talk) Quantum Engineering, Centro Stefano Franscini, Monte Verita, TI, Switzerland, June 14 – 19, 2009

# Publication List

Total number of citations: 3805/2430, h-index: 27/25

Data from Google Scholar / Thomson Reuters (C-1919-2008) on March 27<sup>th</sup> 2019

## Peer Reviewed Journal Publications

33. *Quantum electromechanics of a hypersonic crystal*. Mahmoud Kalaei, Mohammad Mirhosseni, Paul B. Dieterle, Matilda Peruzzo, **J. M. Fink** and Oskar Painter. *Nature nanotechnology* DOI: 10.1038/s41565-019-0377-2 (2019)
32. *Mechanical On-Chip Microwave Circulator*. S. Barzanjeh, M. Wulf, M. Peruzzo, M. Kalaei, P. B. Dieterle, O. Painter, **J. M. Fink**. *Nature Communications* **9**, 953 (2017)
31. Al transmon qubits on silicon-on-insulator for quantum device integration. Andrew J. Keller, Paul B. Dieterle, Michael Fang, Brett Berger, **Johannes M. Fink**, Oskar Painter. *Applied Physics Letters* **111**, 042603 (2017)
30. *Observation of the photon-blockade breakdown phase transition*. **J. M. Fink**, A. Dombi, A. Vukics, A. Wallraff, and P. Domokos. *Physical Review X* **7**, 011012 (2017)
29. *Quantum electromechanics on silicon nitride nanomembranes*. **J. M. Fink**, M. Kalaei, A. Pitanti, R. Norte, L. Heinzle, M. Davanço, K. Srinivasan, and O. Painter. *Nature Communications* **7**, 12396 (2016)
28. *Superconducting Cavity Electromechanics on a Silicon-On-Insulator Platform*. Paul B. Dieterle, Mahmoud Kalaei, **Johannes M. Fink**, and Oskar Painter. *Physical Review Applied* **6**, 014013 (2016)
27. *Efficient microwave to optical photon conversion: an electro-optical realization*. Alfredo Rueda, Florian Sedlmeir, Michele C. Colloido, Ulrich Vogl, Birgit Stiller, Gerhard Schunk, Dmitry V. Strekalov, Christoph Marquardt, **Johannes M. Fink**, Oskar Painter, Gerd Leuchs, and Harald G. L. Schwefel. *Optica* **3**, 597 (2016)
26. *Strong opto-electro-mechanical coupling in a silicon photonic crystal cavity*. Alessandro Pitanti, **Johannes M. Fink**, Amir H. Safavi-Naeini, Chan U. Lei, Jeff T. Hill, Alessandro Tredicucci, Oskar Painter. *Optics Express* **23**, 3196 (2015)
25. *Collective Suppression of Linewidths in Circuit QED*. Felix Nissen, **Johannes M. Fink**, Jonas A. Mlynek, Andreas Wallraff, and Jonathan Keeling. *Physical Review Letters* **110**, 203602 (2013)
24. *Correlations, indistinguishability and entanglement in Hong-Ou-Mandel experiments at microwave frequencies*. C. Lang, C. Eichler, L. Steffen, **J. M. Fink**, M. J. Woolley, A. Blais, and A. Wallraff. *Nature Physics* **9**, 345 (2013)
23. *Experimental realization of non-Abelian non-adiabatic geometric gates*. A. A. Abdumalikov Jr, **J. M. Fink**, K. Juliusson, M. Pechal, S. Berger, A. Wallraff, and S. Filipp. *Nature* **496**, 482 (2013)
22. *Observation of Entanglement between Itinerant Microwave Photons and a Superconducting Qubit*. C. Eichler, C. Lang, **J. M. Fink**, J. Govenius, S. Filipp, and A. Wallraff. *Physical Review Letters* **109**, 240501 (2012)
21. *Demonstrating W-type entanglement of Dicke states in resonant cavity quantum electrodynamics*. J. A. Mlynek, A. A. Abdumalikov, **J. M. Fink**, L. Steffen, M. Baur, C. Lang, A. F. van Loo, and A. Wallraff. *Physical Review A* **86**, 053838 (2012)
20. *Geometric Phase and Nonadiabatic Effects in an Electronic Harmonic Oscillator*. M. Pechal, S. Berger, A. A. Abdumalikov, Jr., **J. M. Fink**, J. A. Mlynek, L. Steffen, A. Wallraff, and S. Filipp. *Physical Review*

- Letters* **108**, 170401 (2012)
19. *Observation of two-mode squeezing in the microwave frequency domain.* C. Eichler, D. Bozyigit, C. Lang, M. Baur, L. Steffen, J. M. Fink, S. Filipp, and A. Wallraff. *Physical Review Letters* **107**, 113601 (2011)
  18. *Multimode mediated qubit-qubit coupling and dark-state symmetries in circuit quantum electrodynamics* S. Filipp, M. Göppl, **J. M. Fink**, M. Baur, R. Bianchetti, L. Steffen, and A. Wallraff. *Physical Review A* **83**, 063827 (2011)
  17. *Observation of Resonant Photon Blockade at Microwave Frequencies using Correlation Function Measurements.* C. Lang, D. Bozyigit, C. Eichler, L. Steffen, **J. M. Fink**, A. A. Abdumalikov Jr., M. Baur, S. Filipp, M. P. da Silva, A. Blais, A. Wallraff. *Physical Review Letters* **106**, 243601 (2011)
  16. *Experimental State Tomography of Itinerant Single Microwave Photons.* C. Eichler, D. Bozyigit, C. Lang, L. Steffen, **J. M. Fink** and A. Wallraff. *Physical Review Letters* **106**, 220503 (2011)
  15. *Antibunching of Microwave Frequency Photons observed in Correlation Measurements using Linear Detectors.* D. Bozyigit, C. Lang, L. Steffen, **J. M. Fink**, C. Eichler, M. Baur, R. Bianchetti, P. J. Leek, S. Filipp, M. P. da Silva, A. Blais, and A. Wallraff. *Nature Physics* **7**, 154 (2011)
  14. *Correlation Measurements of Individual Microwave Photons Emitted from a Symmetric Cavity.* D. Bozyigit, C. Lang, L. Steffen, **J. M. Fink**, C. Eichler, M. Baur, R. Bianchetti, P. J. Leek, S. Filipp, M. P. da Silva, A. Blais, and A. Wallraff. *Journal of Physics: Conference Series* **264**, 012024 (2011)
  13. *Control and Tomography of a Three Level Superconducting Artificial Atom.* R. Bianchetti, S. Filipp, M. Baur, J. M. Fink, C. Lang, L. Steffen, M. Boissonneault, A. Blais, A. Wallraff. *Physical Review Letters* **105**, 223601 (2010)
  12. *Quantum-to-classical transition in cavity quantum electrodynamics.* **J. M. Fink**, L. Steffen, P. Studer, Lev S. Bishop, M. Baur, R. Bianchetti, D. Bozyigit, C. Lang, S. Filipp, P. J. Leek, and A. Wallraff. *Physical Review Letters* **105**, 163601 (2010)
  11. *Cavity QED with separate photon storage and qubit readout modes.* P. J. Leek, M. Baur, **J. M. Fink**, R. Bianchetti, L. Steffen, S. Filipp, A. Wallraff. *Physical Review Letters* **104**, 100504 (2010)
  10. *Thermal excitation of multi-photon dressed states in circuit quantum electrodynamics.* J. M. Fink, M. Baur, R. Bianchetti, S. Filipp, M. Göppl, P. J. Leek, L. Steffen, A. Blais and A. Wallraff. *Physica Scripta* **T137**, 014013 (2009). Proceedings of the Nobel Physics Symposium on Qubits for Future Quantum Computers, Gothenburg, Sweden, 2009.
  9. *Dynamics of dispersive single qubit read-out in circuit quantum electrodynamics.* R. Bianchetti, S. Filipp, M. Baur, **J. M. Fink**, M. Göppl, P. J. Leek, L. Steffen, A. Blais, and A. Wallraff. *Physical Review A* **80**, 043840 (2009)
  8. *Dressed collective qubit states and the Tavis-Cummings model in circuit QED.* **J. M. Fink**, R. Bianchetti, M. Baur, M. Göppl, L. Steffen, S. Filipp, P. J. Leek, A. Blais, A. Wallraff. *Physical Review Letters* **103**, 083601 (2009)
  7. *Measurement of Autler-Townes and Mollow transitions in a strongly driven superconducting qubit.* M. Baur, S. Filipp, R. Bianchetti, **J. M. Fink**, M. Göppl, L. Steffen, P. J. Leek, A. Blais, A. Wallraff. *Physical Review Letters* **102**, 243602 (2009)
  6. *Using sideband transitions for two-qubit operations in superconducting circuits.* P. J. Leek, S. Filipp, P. Maurer, M. Baur, R. Bianchetti, **J. M. Fink**, M. Göppl, L. Steffen, A. Wallraff. *Physical Review B (Rapid Communications)* **79**, 180511(R) (2009)
  5. *Two-qubit state tomography using a joint dispersive read-out.* S. Filipp, P. Maurer, P. J. Leek, M. Baur, R. Bianchetti, **J. M. Fink**, M. Göppl, L. Steffen, J. M. Gambetta, A. Blais, A. Wallraff. *Physical Review Letters* **102**, 200402 (2009)

4. *Resolving Vacuum Fluctuations in an Electrical Circuit by Measuring the Lamb Shift.* A. Fragner, M. Göppl, **J. M. Fink**, M. Baur, R. Bianchetti, P. J. Leek, A. Blais and A. Wallraff. *Science* **322**, 1357 (2008)
3. *Coplanar waveguide resonators for circuit quantum electrodynamics.* M. Göppl, A. Fragner, M. Baur, R. Bianchetti, S. Filipp, **J. M. Fink**, P. J. Leek, G. Puebla, L. Steffen, A. Wallraff. *Journal of Applied Physics*, **104**, 113904 (2008)
2. *Climbing the Jaynes-Cummings ladder and observing its square root of  $n$  nonlinearity in a cavity QED system.* **J. M. Fink**, M. Göppl, M. Baur, R. Bianchetti, P. J. Leek, A. Blais and A. Wallraff. *Nature* **454**, 315-318 (2008)
1. *Observation of Berry's Phase in a Solid State Qubit.* P. J. Leek, **J. M. Fink**, A. Blais, R. Bianchetti, M. Göppl, J. M. Gambetta, D. I. Schuster, L. Frunzio, R. J. Schoelkopf, and A. Wallraff. *Science* **318**, 1889 (2007)

## Books and Book Chapters

2. *Tomography schemes for characterizing itinerant microwave photon fields*  
C. Eichler, D. Bozyigit, C. Lang, L. Steffen, **J. Fink**, and A. Wallraff. *Quantum Machines: Measurement and Control of Engineered Quantum Systems, Les Houches 2011*, Oxford University Press, ISBN 978-0-19-968118-1 (2014)
1. *Quantum Nonlinearities in Strong Coupling Circuit QED: On-Chip Quantum Optics with Microwave Photons and Superconducting Electronic Circuits.* **Johannes M. Fink**. LAP LAMBERT Academic Publishing, ISBN 978-3-8454-1971-8 (2011)

## Theses

3. *Quantum Nonlinearities in Strong Coupling Circuit QED*  
**Johannes M. Fink**, ETH Zurich (2010)
2. *Single Qubit Control and Observation of Berry's Phase in a Superconducting Quantum Circuit*  
**Johannes M. Fink**, University of Vienna & ETH Zurich (2007)
1. *Heat dissipation by convection at cylindrical bodies*  
Wolfram Steurer, **Johannes Fink** and Sebastian Gerber, HTL Bregenz & Liebherr Aerospace (2001)

## Invited Commentary

2. Viewpoint: *Microwave Quantum States Beat the Heat.* **Johannes M. Fink**. *Physics* **10**, 32 (2017)
1. Treffpunkt Forschung: *Photonenblockade Aufgelöst.* **Johannes Fink**, *Physik in Unserer Zeit* **48**, 111 (2017)