

Education and professional experience

2022	University Research Chair , University of Waterloo
2019-current	Associate Faculty , Perimeter Institute for Theoretical Physics, Canada
2017-current	Associate Professor , Institute for Quantum Computing & University of Waterloo, Canada
2014-2017	Postdoctoral Fellow , Institute for Quantum Optics & Quantum Information, Austria
2011-2014	Postdoctoral Fellow , The Institute of Photonic Sciences, Spain
2006-2011	Dissertation , Max Planck Institute of Quantum Optics, Germany (highest grade: 1.0, summa cum laude)
2005-2006	Physics masters , Max Planck Institute of Quantum Optics, Germany (highest grade: with honors)

Scholarships, awards, and honors

2022	Ontario Early Researcher Award
2021	President's Research Excellence Award of the University of Waterloo
2020	President's Research Excellence Award of the University of Waterloo
2020	CIFAR Azrieli Global Scholar Fellowship "Research Leaders of Tomorrow" " CIFAR Azrieli Global Scholars are outstanding early-career researchers, recognized as rising stars in their field for their potential as future research leaders". World-wide three scholars were chosen in quantum science in 2020.
2019	Sloan Fellowship for outstanding early career researchers (see " Global Recognition 2019 ", page 16) The Sloan Research Fellowship is awarded yearly to 126 researchers in all fields in the US and Canada, in recognition of "distinguished performance and a unique potential to revolutionize their fields of study".
2018	Emmy Noether Fellowship for faculty-level scientists by Perimeter Institute
2017	Elise Richter Fellowship for senior postdoctoral researchers (declined due to relocation to Canada)
2016	Award of the city of Innsbruck for scientific research
2016	First-author paper [Nature 534, 516-519 (2016)] selected by Physics World as one of the Top 10 breakthroughs in physics 2016
2011-2013	Feodor Lynen Research Fellowship by the Alexander von Humboldt Foundation
2006-2010	Scholarship by the international PhD program of excellence for highly gifted students: quantum computing, control and communication supported by the Elite Network of Bavaria
1995-2005	Bavarian scholarship for highly gifted students ("Bayerische Hochbegabtenförderung")
2003	Finalist, German study award ("Deutscher Studienpreis") with a study on noncommutative geometry
1998-2005	Scholarship by the German Academic Scholarship Foundation ("Studienstiftung des Deutschen Volkes"), awarded to the top 0.5% of students at German universities
1999	Student contest "SUCCESS" by ESA with a project on superconductivity (Finalist, 4th prize in Europe)
1999	Citizen prize for commitment, achievement and innovation ("Bürgerpreis Fürstentfeldbruck")

Publications

[Scopus Field-Weighted Citation Impact](#) (SFWI) of the last three years: 4.67.

SFWCI = 1 means that the output performs just as expected for the global average. SFWCI > 1 corresponds to more citations than expected according to the global average (e.g. 1.48 means 48% more cited than expected)

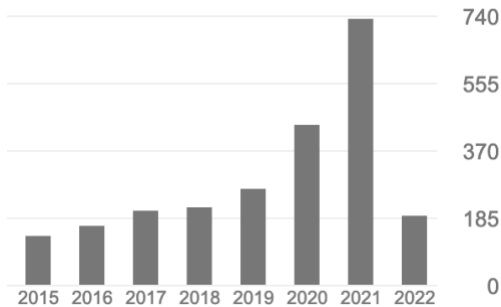
Web of Science author impact: 86th overall [citation percentile](#) median of all publications.

A citation percentile measures the number of citations for an article against a benchmark set of similar papers in terms of field and publication year. An article with no citations has a percentile of 0, and the article with the most citations has a percentile score of 100.

On average 87 citations on Google Scholar (52 on ISI Web of Knowledge) per published article.

For the average number of citations in physics see e.g. [Physics Today 58, 6, 49 \(2005\)](#), or [Statistical Science 24, 1 \(2009\)](#).

Citation development over time on Google Scholar:



Published results include:

- 2 *Nature*
- 2 *Nature Communications*
- 2 *Nature Physics*
- 7 *Physical Review Letters*
- 1 invited *Nature News & Views* commentary

Published articles (citations taken from google scholar):

1. *Entanglement generated by dissipation and steady state entanglement of two macroscopic objects*, H. Krauter, C. Muschik, K. Jensen, W. Wasilewski, J. Petersen, I. Cirac, E. Polzik, **Phys. Rev. Lett.** 107, 080503 (2011). Citations: 565
2. *Real-time dynamics of lattice gauge theories with a few-qubit quantum computer*, E. Martinez, C. Muschik, P. Schindler, D. Nigg, A. Erhard, M. Heyl, P. Hauke, M. Dalmonte, T. Monz, P. Zoller, R. Blatt, **Nature** 534, 516 (2016). Citations: 512
3. *Self-verifying variational quantum simulation of the lattice Schwinger model*, C. Kokail, C. Maier, R. van Bijnen, T. Brydges, M. Joshi, P. Jurcevic, C. Muschik, P. Silvi, R. Blatt, C. Roos, P. Zoller, **Nature** 569, 355 (2019). Citations: 349
4. *Simulating lattice gauge theories within quantum technologies*, M. Bañuls, R. Blatt, J. Catani, A. Celi, I. Cirac, M. Dalmonte, L. Fallani, K. Jansen, M. Lewenstein, S. Montangero, C. Muschik, B. Reznik, E. Rico, L. Tagliacozzo, K. Van Acoleyen, F. Verstraete, U.-J. Wiese, M. Wingate, J. Zakrzewski, P. Zoller, *Eur. Phys. J. D* 74, 165 (2020). Citations: 184
5. *Deterministic quantum teleportation between distant atomic objects*, H. Krauter, D. Salart, C. Muschik, J. Petersen, H. Shen, T. Fernholz, E. Polzik, **Nature Phys.** 9, 400 (2013). Citations: 173
6. *Dissipatively driven entanglement of two macroscopic atomic ensembles*, C. Muschik, E. Polzik, I. Cirac, *Phys. Rev. A* 83, 052312 (2011). Citations: 155
7. *Entanglement distillation by dissipation and continuous quantum repeaters*, K. Vollbrecht, C. Muschik, I. Cirac **Phys. Rev. Lett.** 107, 120502 (2011). Citations: 109
8. *U(1) Wilson lattice gauge theories in digital quantum simulators*, C. Muschik, M. Heyl, E. Martinez, T. Monz, P. Schindler, B. Vogell*, M. Dalmonte, P. Hauke, R. Blatt, P. Zoller, *New J. Phys.* 19, 103020 (2016). Citations: 97
9. *Dissipative quantum error correction and application to quantum sensing with trapped ions*, F. Reiter, A. Sørensen, P. Zoller, C. Muschik, **Nat. Commun.** 8, 1822 (2017). Citations: 90
10. *Efficient quantum memory and entanglement between light and an atomic ensemble using magnetic fields*, C. Muschik, K. Hammerer, E. Polzik, I. Cirac, *Phys. Rev. A* 73, 062329 (2006). Citations: 68
11. *Generation of two-mode squeezed and entangled light in a single temporal and spatial mode*, W. Wasilewski, T. Fernholz, K. Jensen, L. Madsen, H. Krauter, C. Muschik, E. Polzik, *Opt. Express* 17, 14444 (2009). Citations: 56
12. *Harnessing vacuum forces for quantum sensing of graphene motion*, C. Muschik, S. Moulieras, A. Bachtold, F. Koppens, M. Lewenstein, D. Chang, **Phys. Rev. Lett.** 112, 223601 (2014). Citations: 50

13. *A resource efficient approach for quantum and classical simulations of gauge theories in particle physics*, J. Haase, L. Dellantonio, A. Celi, D. Paulson, A. Kan, K. Jansen, C. Muschik, *Quantum* 5, 393 (2021). Citations: 45
14. *Two-dimensional quantum repeaters*, J. Wallnöfer, M. Zwerger, C. Muschik, N. Sangouard, W. Dür, *Phys. Rev. A* 94, 2307 (2016). Citations: 38
15. *Synthetic magnetic fluxes and topological order in one-dimensional spin systems*, T. Graß., C. Muschik, A. Celi, R. Chhajlany, M. Lewenstein, *Phys. Rev. A* 91, 063612 (2015). Citations: 35
16. *Simulating 2D effects in lattice gauge theories on a quantum computer*, D. Paulson, L. Dellantonio, J. Haase, A. Celi, A. Kan, A. Jena, C. Kokail, R. van Bijnen, K. Jansen, P. Zoller, C. Muschik, *PRX Quantum* 2, 030334 (2021). Citations: 30
17. *Robust entanglement generation by reservoir engineering*, C. Muschik, H. Krauter, K. Jensen, J. Petersen, I. Cirac, E. Polzik, *J. Phys. B: At. Mol. Opt. Phys.* 45, 124021 (2012). Citations: 24
18. *Quantum information at the interface of light with mesoscopic objects*, C. Muschik, H. Krauter, K. Hammerer, E. Polzik, *Quantum Inf Process* 10, 839 (2011). Citations: 24
19. *SU(2) hadrons on a quantum computer*, Y. Atas, J. Zhang, R. Lewis, A. Jahanpour, J. Haase, C. Muschik, **Nat. Commun.** 6499 (2021). Citations: 19
20. *Spiral spin textures of bosonic Mott insulator with SU(3) spin-orbit coupling*, T. Graß., R. Chhajlany, C. Muschik, M. Lewenstein, *Phys. Rev. B* 90, 195127, (2014). Citations: 19
21. *Deterministic quantum state transfer between remote qubits in cavities*, B. Vogell, B. Vermersch, B. Lanyon, T. Northup, P. Zoller, C. Muschik, *Quantum Sci. Technol.* 2, 045003 (2017). Citations: 18
22. *Quantum repeaters based on trapped ions with decoherence free subspace encoding*, M. Zwerger, B. Lanyon, T. Northup, C. Muschik, W. Dür, N. Sangouard, *Quantum Sci. Technol.* 2, 044001 (2017). Citations: 15
23. *Scalable repeater architectures for multi-party states*, V. Kuzmin, D. Vasilyev, N. Sangouard, W. Dür, C. Muschik. *Npj Quantum Inf* 5, 115 (2019). Citations: 15
24. *Quantum teleportation of dynamics and effective interactions between remote systems*, C. Muschik, K. Hammerer, E. Polzik, I. Cirac, **Phys. Rev. Lett.** 111, 020501 (2013). Citations: 15
25. *Quantum processing photonic states in optical lattices*, C. Muschik, I. de Vega, D. Porras, I. Cirac, **Phys. Rev. Lett.** 100, 063601 (2008). Citations: 14
26. *Dissipative versus conditional generation of Gaussian entanglement and spin squeezing*, D. Vasilyev, C. Muschik, K. Hammerer, *Phys. Rev. A* 87, 053820 (2013). Citations: 13
27. *Quantum memory assisted probing of dynamical spin correlations*, O. Romero-Isart, M. Rizzi, C. Muschik, E. Polzik, M. Lewenstein, A. Sanpera, **Phys. Rev. Lett.** 108, 065302 (2012). Citations: 12
28. *A measurement-based variational quantum eigensolver*, R. Ferguson, L. Dellantonio, K. Jansen, A. Al Balushi, W. Dür, C. Muschik, **Phys. Rev. Lett.** 126, 220501 (2021). Citations: 12
29. *Quantum state engineering, purification, and number resolved photon detection with high finesse optical cavities*, A. Nielsen, C. Muschik, G. Giedke, K. Vollbrecht, *Phys. Rev. A* 81, 043832 (2010). Citations: 8
30. *Investigating a 3+1D topological θ -Term in the Hamiltonian formulation of lattice gauge theories for quantum and classical simulations*, A. Kan, L. Funcke, S. Kühn, L. Dellantonio, J. Zhang, J. Haase, C. Muschik, K. Jansen, *Phys. Rev. D* 104, 034504 (2021). Citations: 6

Invited commentaries:

1. *Large quantum systems tamed*, C. Muschik, *Nature* 551, 569 (2017).
2. *Dissipative stopwatches*, C. Muschik, *Physics* 6, 29 (2013).

Preprint:

1. *A microwave-based variational quantum eigensolver for simulating gauge theories*, J. Zhang, R. Ferguson, S. Kühn, J. Haase, C. Wilson, K. Jansen, and C. Muschik, arXiv:2108.08248 (2021).

Reports:

1. *Opportunities for Nuclear Physics and Quantum Information Sciences*, I. Cloët et. al., arXiv:1903.05453.
2. *Nuclear Physics and Quantum Information Science*, Report by the NSAC QIS Subcommittee, 2021.

Book chapter:

1. *Quantum processing photonic states in optical lattices*, C. Muschik, I. de Vega, D. Porras, and I. Cirac, *Advances in Information Optics and Photonics*, ICO Book IV, 533, SPIE Press, (2008).

Presentations

Thirty-five invited seminar talks and colloquia since 2008, including the CERN theory colloquium and presentations at Harvard, ETH Zürich, EPFL Lausanne, Collège de France, and at the Niels Bohr Institute.

Forty-seven invited talks since 2009, including workshops at Oxford, MIT, the Kavli Institute, Solvay Institute, the conference of the European Group on Atomic Systems EGAS, the DAMOP Conference of the American Physical Society, and the annual meeting of the Helmholtz Association.

Selected Press Coverage

Scientific American: [In a First, Quantum Computer Simulates High-Energy Physics](#)

Nature News and Views: [Quantum simulation of fundamental physics](#)

Nature News: [Quantum computer makes first high-energy physics simulation](#)

Physics world: [Quantum computer simulates fundamental particle interactions for the first time](#)

Nature news and views: [Quantum teleportation: Getting complicated](#)

Physics World: [Quantum teleportation done between distant large objects](#)

Forbes: [New Technique Could Pave the Way for Quantum Information Networks](#)

Phys.org: [Quantum optical link sets new time records](#)

New Scientist: [How to make a quantum entanglement last](#)

Science news: [Making lemonade with quantum lemons](#)