

# Curriculum Vitae

## Peter Zoller



### Contact

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### Biography

Peter Zoller graduated with a PhD in Theoretical Physics from the University of Innsbruck in 1977 (advisor F. Ehlötzky). In 1978 he received a Max Kade Fellowship to join the group of Peter Lambropoulos, University of Southern California. Returning to Innsbruck, he held an assistant position at the Institute for Theoretical Physics and spent part of 1980 as postdoc in the group of Dan Walls in New Zealand. In 1981 he applied for the Habilitation with a tenured position as Dozent. He spent the academic years 1981 and 1988 as a JILA Fellow at the University of Colorado, and in 1986 he was a guest professor at the University Paris – Sud, Orsay, France. End of 1990, Zoller was appointed as JILA Fellow and tenured full professor at the University of Colorado, and as Co-Director with C. Greene of the NSF Institute for Atomic and Molecular Physics. End of 1994 he was appointed as chair professor for theoretical quantum optics at the Institute for Theoretical Physics at the University of Innsbruck. Since 2003 Zoller also held the position of Scientific Director at the Institute for Quantum Optics and Quantum Information (IQOQI) of the Austrian Academy of Sciences (ÖAW). In 2004 Zoller was Loeb Lecturer at Harvard and held the Yan Jici Chair Professorship at the University of Science and Technology, Hefei, China. In 2005 he was Lorentz-Professor in Leiden, and in 2008 Moore Distinguished Scholar at Caltech. Since 2014 he is external member of the Max Planck Society at the Max Planck Institute for Quantum Optics, Garching, where he spent part of 2012 as Distinguished Fellow. Since 1995, Zoller has been Adjoint Fellow at JILA, University of Colorado. In October 2020, Zoller became Emeritus Chair Professor, and at present holds the position of a Professor for Theoretical Physics at the University of Innsbruck. Peter Zoller is married with three children.

### Scientific Interests

Peter Zoller is a theoretical physicist in quantum optics and atomic physics. He is renowned for his pioneering contributions to the fields of atomic, molecular, and optical physics, as well as quantum information science and quantum many-body physics. In particular, the proposals put forth by P. Zoller in collaboration with J.I. Cirac including quantum computing with trapped ions, quantum simulation with ultracold atoms in optical lattices, and the quantum repeater in quantum communication have played a crucial role in bringing theoretical concepts of quantum information into a laboratory setting. This has inspired and guided novel experimental lines of research, and established quantum optical systems as a leading experimental platform, earning Zoller and Cirac widespread recognition in the field. Additionally, he has made significant contributions to the theory of open quantum systems and quantum noise in quantum optics, mainly in collaboration with C.W. Gardiner as documented in the monograph 'Quantum Noise', and the book series 'The Quantum World'.

## Personal Data

Date of Birth 16 September, 1952  
Nationality Austria

## Professional Experience

09/1994-present o. Univ. Prof. (Chair Professor of Physics with tenure), Institute for Theoretical Physics, University of Innsbruck; em. Prof. since 10/2020, reappointed as Univ. Prof. since 10/2020

11/2003-present Research Director, Institute for Quantum Optics and Quantum Information of the Austrian Academy of Sciences, Innsbruck, Austria; Managing Director 11/2009-1/2012 and 10/2017 – 09/2019

7/2014-present External Member of the Max Planck Society, Max Planck Institute for Quantum Optics, Garching, Germany

1/2012-7/2012 Distinguished Fellow, Max Planck Institute for Quantum Optics, Garching, Germany

8-9/2008; 3/2010 Gordon and Betty Moore Distinguished Scholars at Caltech

3/2007 Distinguished Lecturer, Technion, Haifa

2-3/2006 Guest Professor, Institut Henri Poincaré, Paris

3-6/2005 Lorentz-Professor, Lorentz Institute for Theoretical Physics, Leiden, NL

11/2004 Chair Professor Tsinghua University, Beijing, China; Yan Jici Chair Professorship, The University of Science and Technology, Hefei, China

2/2004;1/2004 Loeb Lecturer, Harvard University, Cambridge, MA

1/1991-8/1994 Professor of Physics with tenure, Department of Physics, University of Colorado, and JILA Fellow, Joint Institute for Laboratory Astrophysics, University of Colorado & NIST, Boulder, CO

1981-1982; 1988 JILA Visiting Fellow, University of Colorado, Boulder, CO

1986 Guest Professor, University Paris-Sud, Orsay, France

1977-1990 Univ. Dozent (Assistant Professor), Institute for Theoretical Physics, University of Innsbruck; Habilitation 1981, tenure since 1981

1978-1979 Max Kade Fellow, University of Southern California (advisor: P Lambropoulos)

## Education

2/1977 PhD thesis in Theoretical Physics, University of Innsbruck (advisor F. Ehlotzky)

1962-1970 Reithmann-Gymnasium Innsbruck, Austria

## Publications

For a list of publications see [scholar.google.com](https://scholar.google.com) or [iqoqi.at](http://iqoqi.at), h-index 163, # of citations > 117000, Average citations per article >134; For a list of invited talks, colloquia and seminars see [iqoqi.at](http://iqoqi.at)

## Books

- *Quantum Noise: a handbook of Markovian and non-Markovian quantum stochastic methods with applications to quantum optics*, Crispin Gardiner, Peter Zoller (2004)
- *The Quantum World of Ultra-Cold Atoms and Light Book I: Foundations of Quantum Optics*, Crispin Gardiner, Peter Zoller (2014)
- *The Quantum World of Ultra-Cold Atoms and Light Book II: The Physics of Quantum-Optical Devices*, Crispin Gardiner, Peter Zoller (2015)

- *The Quantum World of Ultra-Cold Atoms and Light Book III: Ultra-Cold Atoms*, Crispin Gardiner, Peter Zoller (2017)
- *Proceedings of the 28th Solvay Conference on Physics: The Physics of Quantum Information* (2023), Edited by: David Gross, Alexander Sevrin, P. Zoller

### Other Activities (last ten years)

- Member of the Simons Collaboration *Ultra-Quantum Matter* (2016-2023)
- Member of ERC Synergy Grant "Ultracold Quantum Matter" with I. Bloch, E. Altman, J. Dalibard (2013 - 2018)
- External Member QSenSE JILA, NSF Quantum Leap Challenge Institute (2016-present)
- Member of Spezialforschungsbereich SFB F40 (FoQuS) *Foundations and Applications of Quantum Science*, Innsbruck - Vienna (2009-2018)
- Member and Speaker of Spezialforschungsbereich F15 *Control and Measurement of Coherent Quantum Systems*, Innsbruck – Vienna (1999-2008)

### Member of Societies

- 2011 European Academy of Sciences  
 2010 German National Academy of Sciences (Leopoldina)  
 2009 Foreign Associate of the US National Academy of Sciences  
 2008 Foreign Associate of the Royal Spanish Academy of Sciences  
 2008 Foreign Member of the Royal Netherlands Academy of Arts and Sciences  
 2001 Austrian Academy of Sciences, Corresponding Member since 1999  
 1933 Fellow of the American Physical Society  
 1981 Member of the Austrian Physical Society

### Prizes/Awards

- 2023 Order of Merit of the State of Tyrol  
 2022 Austrian Cross of Honor for Science and Art 1st Class  
 2019 Honorary degree Doctor of Science, University of Colorado Boulder  
 2019 The Micius Quantum Prize 2018, The Micius Quantum Foundation, China  
 2019 John Stewart Bell Prize, University of Toronto  
 2018 Norman F. Ramsey Prize, American Physical Society  
 2018 Willis E. Lamb Award for Laser Science and Quantum Optics  
 2016 Herbert-Walther-Preis, Deutsche Physikalische Gesellschaft & Optica  
 2013 Wolf Prize in Physics, Wolf Foundation, Israel.  
 2013 David Ben Gurion Medal, Ben-Gurion University of the Negev, Israel  
 2011 Hamburg Prize for Theoretical Physics, Joachim Herz Stiftung  
 2011 Blaise-Pascal-Medal of the European Academy of Sciences  
 2009 Wissenschaftspreis der Stiftung Südtiroler Sparkasse  
 2008 BBVA Foundation Frontiers of Knowledge Award in Basic Sciences, Spain  
 2006 Dirac Medal, ICTP Trieste  
 2006 6th International Quantum Communication Award  
 2005 Niels Bohr/UNESCO Gold Medal  
 2005 Max Planck Medal, German Physical Society  
 2002 Tyrolean State Prize for Science  
 2001 Kardinal Innitzer Award  
 2000 Senior Humboldt Award, Alexander von Humboldt-Stiftung, Germany  
 1998 Schrödinger Prize of the Austrian Academy of Sciences  
 1998 Max Born Award, Optica

- 1998 Wittgenstein Award, Austrian Science Foundation
- 1983 Ludwig-Boltzmann Award, ÖPG
- 1981 Award of the City of Innsbruck

## Honorary Doctorates

- 2019 Honorary doctorate from University of Colorado, Boulder
- 2012 Honorary doctorate from the University of Amsterdam

## Member of Scientific Advisory Boards and Award Committees (last ten years)

SAB Munich Quantum Valley MQV (2022-present), SAB NSF Challenge Institute for Quantum Computation CIQC (2021-present), Chair SAB Co-design Center for Quantum Advantage C2QA (2021-present), SAB International Centre for Theoretical Physics ICTP Scientific Council (2021-present), Vice Chair of Max Planck Medal Committee (2020-present), Solvay Committee (2011-present), SAB Russian Quantum Center RQC (2011-2022); SAB Institute for Interdisciplinary Information Sciences, Tsinghua University, Beijing (2010-2019); Chair Bell Prize Award Committee (2018)

## Memberships of Editorial Boards of International Journals

Associate Editor for Science Advances (2015-2019); Member of the Editorial Board of Springer Quantum Information Processing (2011-2018); Member of the Editorial Board of Annals of Physics (2011-2018), PNAS Ad hoc Editor (since 2009); Associate Editor of Physical Review A (1998-2003); Associate Editor of Advances of Physics (2006-2009); Editor Reviews of Modern Physics (2001-2004); Divisional Associate Editor Physical Review Letters (1996-1999)

## Organization of International Conferences (last ten years)

- 2022 Solvay conference 2022 - "The Physics of Quantum Information", Cochair with David Gross
- 2015 Frontiers of Quantum Physics 2015, Symposium in honor of the landmark birthdays of Roy Glauber and Maciej Lewenstein, Barcelona, Spain
- 2015 INT Program INT-15-1, "Frontiers in Quantum Simulation with Cold Atoms", Seattle, USA
- 2014 BEC Prize committee associated with the BEC Conference (Sant Feliu, Spain)

## Patents

*Long-distance quantum communication*, P Zoller, LM Duan, I Cirac, M D Lukin, US Patent 7,532,400 (2009)

*Device and method for solving computational problems using a quantum system*, W Lechner, P Hauke, P Zoller, US Patent 10,832,155 (2020)

*Method and System for Comparing Two Quantum States*, A Elben, C Kokail, R Van Bijnen, B Vermersch, P Zoller, US Patent App. 17/782,106 (2023)

*Variationally Optimized Measurement Method and Corresponding Clock Based On a Plurality of Controllable Quantum Systems*, R Kaubruegger, D Vasilyev, P Zoller, K Hammerer, M Schulte, US Patent App. 17/305,476 (2023)