

# Curriculum Vitae

## Anton Zeilinger

Born on May 20th, 1945 in Ried/Innkreis, Austria

Present addresses: Institute for Quantum Optics and Quantum Information  
Austrian Academy of Sciences  
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### EDUCATION

1979 Habilitation, Vienna University of Technology  
1971 Ph.D., University of Vienna, thesis on "Neutron Depolarization in Dysprosium Single Crystals" under Prof. H. Rauch  
1963-1971 Study of Physics and Mathematics, University of Vienna  
1963 Matura (School Leaving Examination),  
Bundesgymnasium Wien 13, Fichtnergasse 15, Vienna

### PROFESSIONAL CAREER

2013-present Professor Emeritus, University of Vienna  
2004-present Senior Scientist, IQOQI Vienna, Institute for Quantum Optics and Quantum Information, Austrian Academy of Sciences  
2013-2022 President, Austrian Academy of Sciences  
2004-2013 Founding Director, IQOQI Vienna, Institute for Quantum Optics and Quantum Information, Austrian Academy of Sciences  
1999-2013 Professor of Experimental Physics, University of Vienna  
1990-1999 Professor of Experimental Physics, University of Innsbruck  
1988-1989 Professor of Physics (Lehrstuhlvertretung),  
Technical University Munich  
1983-1990 Associate Professor, Vienna University of Technology  
1981-1983 Associate Professor of Physics, M.I.T. (Visiting)  
1979-1983 Assistant Professor, Atominstytut Vienna  
1977-1978 Research Associate (Fulbright Fellow) at M.I.T. in the Neutron Diffraction Laboratory under Prof. C.G. Shull (Nobel Laureate 1994)  
1972-1979 Research Assistant, Atominstytut Vienna  
with Professor Helmut Rauch

### VISITING RESEARCH AFFILIATIONS

2016 Einstein Visiting Professor, University of Science and Technology of China  
2010 Visiting Researcher, Part-Time, Merton College, Oxford  
2001-2004 Senior Humboldt Foundation Fellow, Humboldt University, Berlin

1998	Visiting Research Fellow, Merton College, Oxford University, UK
1995	Chaire Internationale, Collège de France, Paris, France
1986-1989	Adjunct Professor, part-time, Hampshire College, Amherst, USA
1983-1990	Regular summer research appointments at M.I.T., USA
1974-1989	Guest Researcher (part-time), Institut Laue-Langevin, Grenoble, France

## MOST IMPORTANT RESEARCH ACHIEVEMENTS

- Matter wave interferometry with neutrons, atoms, buckyball molecules
- Discovery of three-particle entanglement as an extreme demonstration of quantum nonlocality. The so-called GHZ-states (Greenberger-Horne-Zeilinger) and their generalizations have become a cornerstone in the development of quantum information science and quantum computation
- Experimental realization of quantum teleportation of a single independent photon
- Theoretical concept of entanglement swapping and its first experimental verification. This is a fundamental ingredient for future quantum repeaters
- Long-distance realizations of quantum communication and of loophole-free tests of Bell's Inequality
- Experimental realization of entanglement-based quantum cryptography
- Realization of many gates and procedures for optical quantum computation

## PROFESSIONAL INITIATIVES BEYOND PHYSICS

2006	Creation of the Institute of Science and Technology Austria (IST Austria). Primary idea, first concepts and important first steps in the political process
2009	Creation of "Internationale Akademie Traunkirchen". This is a small student academy to motivate and excite young students from primary school to high school for the sciences, mathematics, and engineering.
2016	Initiative for the project "Exile and Excellence" by the Austrian Academy of Sciences. In that film by Frederick Baker, émigrés from Austria were interviewed about their personal experiences when they had to flee from Nazi Austria

## DISTINGUISHED LECTURES

2024	Juhannus Distinguished Lecture in Physics, Tampere University, Finland
2023	J.C. Kapteyn Lecture, University of Groningen, the Netherlands
2022	Nobel Lecture, Nobel Foundation & Stockholm University, Sweden
2022	Nobel Lecture, Lund University, Sweden
2021	S.N. Bose Memorial Lecture, S.N. Bose National Centre for Basic Sciences, India
2021	Golden Webinar, Pontificia Universidad Catolica, Chile
2019	David M. Lee Historical Lecture in Physics, Harvard University, USA

2016 Einstein Chair Professorship Lecture, University of Science and Technology of China  
 2016 Bethe Lectures, Cornell University, USA  
 2016 Zhongshan Lecture, Nanjing University, China  
 2015 Hofstadter Lecture, Stanford University, USA  
 2014 Montroll Memorial Lecture, University of Rochester, USA  
 2012 Herzberg Memorial Lecture, Canadian Association of Physicists  
 2012 Racah Lecture, Hebrew University, Jerusalem, Israel  
 2012 Cherwell-Simon Lecture, Oxford University, UK  
 2012 Festkolloquium, 500. WE-Heraeus Seminar, Bad Honnef, Germany  
 2011 Vice Chancellors Lecture, University of Cape Town, South Africa  
 2011 Mark W. Zemansky Lecture, City College of New York, USA  
 2011 Festvortrag, 75th Annual Meeting, German Physical Society, Dresden  
 2011 Van Vleck Lecture, University of Minnesota, USA  
 2011 Festkolloquium f. P. Becker, Physikalisch-Techn. Bundesanstalt, Germany  
 2010 Frontiers in Physics Lecture, City College of New York, USA  
 2010 Ockham Lecture, Merton College, Oxford University, UK  
 2010 Dvorak Memorial Lecture, University of Prague, Czech Republic  
 2010 Celsius Lecture, Uppsala University, Sweden  
 2009 Carl Friedrich von Weizsäcker Lectures, University of Hamburg, Germany  
 2009 Festvortrag, 150th birthday of Max Planck, Max Planck Society, German Physical Society, Berlin-Brandenburg Academy of Sciences, Humboldt University Berlin, Germany  
 2009 Inaugural Kavli Colloquium at Kavli Institute of Nanoscience, Delft University of Technology, The Netherlands  
 2009 PITP Lecture on Quantum Phenomena, Pacific Institute of Theoretical Physics, Vancouver, Canada  
 2008 Newton Prize Lecture, Institute of Physics, London, UK  
 2008 Asher Perez Memorial Lecture, Technion, Haifa, Israel  
 2007 Wolfgang-Paul Lecture, Bonn University, Germany  
 2006 Barut Memorial Lect., Bogazici University, Istanbul, Turkey  
 2006 Rosenthal Lecture, Yale University, USA  
 2006 Johannes Gutenberg Lecture, Mainz University, Germany  
 2004 Fujitsu Lecture, University of Cambridge, UK  
 2004 Colloquium Ehrenfestii, Leiden University, Netherlands  
 2003 Angstrom Lecture, Uppsala University, Stockholm, Sweden  
 2003 Amos de-Shalit Memorial Lecture, Weizmann Institute, Rehovot, Israel  
 2003 Solly Cohen and Shimon Ofer Memorial Lecture, Racah Institute of Physics, Hebrew University of Jerusalem, Israel  
 2003 Schrödinger Lecture, Imperial College, London, UK  
 2003 Niels Bohr Lecture, Copenhagen University, Denmark  
 2002 Chemerda Lecture, Pennsylvania State University, USA  
 1999 Schrödinger Lecture, Trinity College, Dublin, Ireland  
 1997 H.L. Welsh Lecture in Physics, University of Toronto, Canada  
 1996 Colloquium Ehrenfestii, Leiden University, Netherlands  
 1984 Sir Thomas Lyle Lecture, University of Melbourne, Australia

## DISTINGUISHED MEMBERSHIPS

- 2024 Honorary Member, European Physical Society (EPS)
- 2023 Corresponding Member, Slovenian Academy of Sciences and Arts (SASA)
- 2022 Honorary Member, Austrian Physical Society (ÖPG)
- 2021 Foreign Member, National Academy of Sciences of Ukraine
- 2020 Fellow, Optical Society of America (OSA)
- 2019 Foreign Member, Chinese Academy of Sciences (CAS)
- 2018 IEEE Honorary Membership, U.S.A.
- 2016 Foreign Member, Russian Academy of Sciences
- 2016 Foreign Honorary Member, Romanian Academy of Sciences
- 2015 Socio Corrispondente Straniero, Accademia Galileiana, Padova
- 2014 Fellow, The World Academy of Sciences (TWAS)
- 2014 Foreign Associate, National Academy of Sciences of Belarus
- 2014 Foreign Member, U.S. National Academy of Sciences
- 2012 Fellow, American Assoc. for the Advancement of Science (AAAS)
- 2011 Member, Academia Europaea
- 2009 Foreign Member, Académie des Sciences, Institut de France
- 2006 Foreign Member, Serbian Academy of Sciences and Arts
- 2005 Honorary Member, Slovak Academy of Sciences
- 2005 Member, German National Academy of Sciences Leopoldina
- 2002 Member, Berlin-Brandenburg Academy of Sciences
- 2000 Member, Academia Scientiarum et Artium Europaea
- 1999 Fellow, American Physical Society (APS)
- 1998 Full Member, Austrian Academy of Sciences
- 1994 Corresponding Member, Austrian Academy of Sciences

## HONORARY DOCTORATES AND PROFESSORSHIPS

- 2024 Honorary Doctor, Linköping University, Sweden
- 2024 Honorary Doctor, University of Eastern Finland (UEF), Finland
- 2023 Honorary Doctor, Leopold-Franzens-University Innsbruck, Austria
- 2022 Honorary Doctor, Okinawa Institute of Science and Technology Graduate University (OIST), Japan
- 2022 Honorary Doctor, Technion - Israel Institute of Technology, Israel
- 2019 Honorary Professor, Xi'an Jiaotong University, China
- 2016 Honorary Professor, Nanjing University, China
- 2015 Honorary Doctor, National Academy of Sciences of Ukraine
- 2006 Honorary Doctor, Gdansk University, Poland
- 2005 Honorary Doctor, Humboldt University Berlin, Germany
- 1996 Honorary Professor, University of Science and Technology of China

## INTERNATIONAL PRIZES AND AWARDS

- 2023 Israel Friendship Award
- 2022 Nobel Prize® in Physics
- 2022 Heisenberg-Medal, Heisenberg Society, Germany
- 2021 Chinese Government Friendship Award, China
- 2021 Gold Medal V. Vernadsky, National Academy of Sciences of Ukraine
- 2019 Micius Quantum Prize of the Micius Quantum Foundation, China

- 2019 Cozzarelli Prize of the Proceedings of the National Academy of Sciences
- 2017 John Stewart Bell Prize for Research on Fundamental Issues in Quantum Mechanics and their Applications
- 2017 Medal of the Senate of the Czech Republic
- 2016 Einstein Chair Professorship, University of Science and Technology of China
- 2016 Willis E. Lamb Award for Laser Science and Quantum Optics
- 2015 Medal of The World Academy of Sciences (TWAS Medal)
- 2015 Academy Medal of the Heidelberg Academy of Sciences
- 2015 Medaille du Collège de France
- 2014 Medal of the National Academy of Sciences of Belarus
- 2013 Urania Medal, Urania Berlin
- 2012 Finalist, World Technology Award for Communications Technology
- 2010 Ben Gurion Medal
- 2010 Wolf-Prize in Physics, Wolf Foundation, Israel
- 2009 Great Cross of Merit with Star of the Federal Republic of Germany
- 2008 ERC Advanced Grant, European Research Council
- 2008 Quantum Communication Award, Tamagawa University, Japan
- 2008 Inaugural Isaac Newton Medal, Institute of Physics, UK
- 2007 Quantum Electronics Prize, European Physical Society
- 2005 King Faisal Prize, King Faisal Foundation, Saudi Arabia
- 2005 Descartes Prize, European Commission
- 2004 Lorenz-Oken-Medal, Society of German Researchers and Physicians
- 2004 Klopsteg Award, American Association of Physics Teachers, USA
- 2003 Sartorius Prize, Göttingen Academy of Sciences, Germany
- 2001 Order Pour le Mérite for Sciences and Arts, Germany
- 2000 Senior Humboldt Fellow Prize, Alexander von Humboldt-Stiftung
- 1997 European Optics Prize, European Optical Society
- 1996 European Lecturer, European Physical Society
- 1995 Prix Vinci d'Excellence, Fondation LVMH, Paris, France

## AUSTRIAN PRIZES AND AWARDS

- 2024 Honorary Citizen of the City of Vienna, Austria
- 2024 Grand Decoration of Honor in Gold on Ribbon for Services to the Republic of Austria
- 2023 Grand Decoration in Gold, Federal State of Upper Austria
- 2022 Grand Decoration of Honour in Silver with Star for Services to the Republic of Austria
- 2018 Grand Decoration of Honour in Gold for Services to the City of Vienna
- 2015 Grand Decoration of Honour in Gold for Services to the Republic of Austria
- 2013 Großer Tiroler Adler Orden, Federal State of Tyrol
- 2006 Grand Gold Decoration, City of Vienna
- 2005 Wilhelm-Exner-Medal, Austrian Association of Enterprises
- 2002 Johannes Kepler-Prize, Science Prize of Upper Austria
- 2001 Decoration of Sciences and Arts (Austrian equivalent to the Order of Merit)
- 2001 Visionary of the Year in Science
- 2000 Science Prize, City of Vienna
- 1997 Kardinal Innitzer Würdigungspreis, Vienna
- 1996 Austrian Scientist of the Year
- 1980 Junior Prize of the Theodor Körner Foundation, Vienna

1979 Prize for Junior Scientists, Kardinal Innitzer Foundation, Vienna  
1975 Prize of the City of Vienna for the Encouragement of Young Scientists

## ADMINISTRATION AND SERVICES

2013-2022	President, Austrian Academy of Sciences
2009-2022	Founding President, Student Academy Traunkirchen, Austria
2008-2009	Member, Planning and Strategy Committee of the Austrian Academy of Sciences
2006-2016	Vice Chair, Board of Trustees, Institute of Science and Technology of Austria
2006-2012	Member, Executive Board, Institute of Science and Technology of Austria
2006-2009	Dean of the Faculty of Physics, University of Vienna
2004-2013	Scientific Director, Institute of Quantum Optics and Quantum Information Vienna, Austrian Academy of Sciences
2002-2003	Member, Founding Convent, University of Vienna, Austria
2002	Initiator of a new Postgraduate Research Institution which has been implemented as Institute of Science and Technology in Austria
1997-1998	President, Austrian Physical Society
1994-2000	Member, Editorial Board, Physical Review A
Since 1988	Member, Editorial Board, Foundations of Physics
2006 – 2008	Member, Editorial Board, New Journal of Physics

## RESEARCH INTERESTS

Fundamental Phenomena in Quantum Mechanics (experiment and theory) and their Applications in Quantum Information Science and Technology

- Tests of quantum mechanics
- Entanglement and quantum nonlocality
- Matter wave interferometry
- Quantum cryptography
- Quantum communication
- Quantum computation
- Quantum teleportation
- Quantum imaging

## SCIENTIFIC PUBLICATIONS<sup>1</sup>

More than 550 scientific publications, among these, more than 520 in peer reviewed, ISI ranked journals. 12 publications are ranked as “highly cited papers”, which places them in the top 1% of the academic field of physics based on a highly cited threshold for the field and publication year. One paper has been cited more than 4,000 times, two others over 2,000 times, another seven over 1,000 times, another 17 over 500 times and another 45 over 200 times (ISI Web of Science).

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<sup>1</sup> Last updated on 23 July 2024

Thomson-Reuters Highly Cited Researcher in the field of Physics in the years of 2013, 2014, 2015, 2016, 2018, 2019, 2020, 2021, 2022 and 2023.

Some papers have become science citation classics. To date, the paper "Experimental Quantum Teleportation" (Nature 390, 1997) was cited 4,160 times and the article "Entanglement of the orbital angular momentum states of photons" (Nature 412, 2001) was cited 2,535 times. The publication "New High-Intensity Source of Polarization-Entangled Photon Pairs" (PRL 75, 1995) was cited 2,430 times and the article "Bell Theorem Without Inequalities" (Am. J. Phys 58, 1990) was cited 11,893 times (Web of Science).

More than 1,100 invited talks at conferences and seminars, 47 of them distinguished lectures.

## BOOKS

### **Edited Collections and Conference Proceedings**

#### *Frontiers of Neutron Scattering*

In honour of Clifford G. Shull on the occasion of his 70<sup>th</sup> birthday

Editors: R. J. Birgenau, D. E. Moncton, A. Zeilinger

Elsevier Science / North-Holland Publishing Division 1986

#### *New Techniques and Ideas in Quantum Measurement Theory*

Annals of the New York Academy of Sciences, Vol. 480

Editors: D. M. Greenberger, A. Zeilinger

New York Academy of Sciences 1987

#### *Matter Wave Interferometry*

At the occasion of the 100th anniversary of E. Schrödinger's birth

Editors: G. Badurek, H. Rauch, A. Zeilinger

Elsevier Science / North-Holland Publishing Division 1988

#### *Fundamental Problems in Quantum Theory*

In Honor of Professor John A. Wheeler

Annals of the New York Academy of Sciences, V. 755

Editors: D. M. Greenberger, A. Zeilinger

New York Academy of Sciences 1995

#### *Epistemological and Experimental Perspectives on Quantum Physics*

Vienna Circle Institute Yearbook, Volume 7

Editors: D. Greenberger, W. L. Reiter, A. Zeilinger

Kluwer Academic Publishers 1999

#### *The Physics of Quantum Information*

*Quantum Cryptography, Quantum Teleportation, Quantum Computation*

Editors: D. Bouwmeester, A. Ekert, A. Zeilinger

Springer 2000

*Quantum Information*

*An Introduction to Basic Theoretical Concepts and Experiments*

Springer Tracts in Modern Physics, Volume 173

Editors: G. Alber, T. Beth, M. Horodecki, P. Horodecki, R. Horodecki, M. Rötteler, H. Weinfurter, R. Werner, A. Zeilinger

Springer 2001

*Quantum Computation and Quantum Information Theory*

Editors: C. Macchiavello, G.M. Palma, A. Zeilinger

World Scientific Publishing 2001

*Quantum [Un]speakables, From Bell to Quantum Information*

Editors: R. A. Bertlmann, A. Zeilinger

Springer 2002

*Quantum [Un]Speakables II. Half a Century of Bell's Theorem*

Editors: R. A. Bertlmann, A. Zeilinger

Springer 2017

**Popular Science Books**

*Einsteins Schleier*

A. Zeilinger

C.H. Beck 2003

*Einsteins Spuk*

A. Zeilinger

Bertelsmann 2005

Goldmann 2022

Pantheon 2024

*Dance of the Photons*

A. Zeilinger

Farrar, Straus and Giroux 2010

Penguin 2023

Translations into other languages have appeared, some of which are listed below:

*Le bal des photons. D'Einstein à la téléportation quantique, les mystères de l'intrication*

A. Zeilinger

Flammarion 2023

*Il velo di Einstein: Il nuovo mondo della fisica quantistica*

A. Zeilinger

Einaudi 2022