RESUME

JUAN IGNACIO CIRAC

Personal Data

PLACE AND DATE OF BIRTH:	Manresa (Spain), October 11, 1965
NATIONALITY:	Spanish
ADDRESS:	Max-Planck-Institut für Quantenoptik Hans-Kopfermann-Str. 1 D-85748 Garching
TELEPHONE:	+49 89 32905 705 / 736
FAX:	+49 89 32905 336
E-MAIL:	Ignacio.Cirac@mpq.mpg.de
ORCID:	0000-0003-3359-1743

Education

July 1991	Ph. D. in Physics, Universidad Complutense de Madrid
June 1988	Licenciado (graduate) in Theoretical Physics, Universidad Complutense de Madrid

Fields of Specialization

Theoretical Quantum Optics, Quantum Information, Atomic Physics, Quantum Many-Body Physics.

Professional Experience

2022 – 2024	Managing Director, Max-Planck-Institut für Quantenoptik
Since 2019	Co-Spokesman of the Munich Center for Quantum Science and Technology (MCQST)
Since 2016	Spokesman of the International Max-Planck Research School Quantum Science and Technology
2014 – 2015	Managing Director, Max-Planck-Institut für Quantenoptik
2005 – 2007	Managing Director, Max-Planck-Institut für Quantenoptik
Since 2002	“Honorarprofessor”, Technical University of Munich (Department of Physics).
Since 2001	Director of the Theory Division, Max-Planck-Institut für Quantenoptik, and member of the Max Planck Society.
1996 – 2001	Professor, Institut für Theoretische Physik, Leopold Franzens Universität Innsbruck.
1993 – 1994	Research Associate, Joint Institute for Laboratory Astrophysics, University of Colorado
1991 – 1996	"Profesor Titular de Universidad", Departamento de Física Aplicada, Universidad de Castilla-La Mancha.
1989 – 1991	Fellow "Formación del Personal Investigador" (Prog. General), Departamento de Óptica, Universidad Complutense de Madrid

Other Activities

Since 2023	Member of the Telcrypt Advisory Board
Since 2022	Member of the Advisory Board of Telefonica TECH
2022	Member of the visiting committee at the Physics Department at École Normale Supérieure (ENS), Paris, France
Since 2021	Member of the International advisory committee of Kyoto University, for the grant "Extreme Universe" funded by the Ministry of Education
Since 2021	Member of the external advisory board of the NSF Quantum Leap Challenge Institute for Robust Quantum Simulation at the University of Maryland
Since 2020	Member of the Scientific Committee of Fundació LA CAIXA
Since 2020	Member of the Scientific Advisory Board of Weizmann Institute
Since 2020	Member of the Scientific Advisory Board of Institute of Atomic and Molecular Sciences (IAMS), Academia Sinica
2016 – 2023	Member of the Board of Directors of Telefónica, S.A.
2016 – 2020	Member of the Advisory Board of Fundació LA CAIXA
Since 2015	Member of the Advisory Board of the Institute for Interdisciplinary Information Sciences, Tsinghua University
2012 – 2019	Member of the Advisory Board of the Russian Quantum Center
Since 2012	Member of the Advisory Board of *Annalen der Physik*
Since 2012	Member of the Scientific Advisory Board of the Condensed Matter Physics Center (IFIMAC) at Universidad Autónoma de Madrid
Since 2012	Chair of the Scientific Advisory Board of ICFO
2011 – 2017	Member of the Review Panel, QSIT, Swiss National Science Foundation
Since 2010	Member of the Scientific Committee, Fundación BBVA
2008 – 2010	Member of Consejo Rector, Consejo Superior de Investigaciónes Cientificas
Since 2008	Member of the Advisory Board Centro de Ciencias de Benasque
2007 – 2008	Member of the CIAR Review Panel, Toronto, Canada
2007 – 2009	Member of the xQIT Visiting Committee, MIT
2007 – 2020	Member of the Scientific Advisory Board, Centre of Quantum Technology, NUS, Singapore
2007 – 2010	Member of the Advisory Board ITAMP, Harvard University
2005 – 2011	Associate Editor, Review of Modern Physics
2005 – 2008	Member of the International Advisory Board QIP IRC, EPSRC, United Kingdom
2005 – 2008	Member of the Kuratorium IQOQI, Austrian Academy of Sciences
2002 – 2005	Associate Editor, Revista Española de Física
Since 2001	Founding Managing Editor, Quantum Information and Computation
2000 – 2003	Associate Editor, Physical Review A

Awards

2019	Quantum Computer Prize of the Micius Foundation (China)
2019	John Stuart Bell Prize of the University of Toronto
2018	Max Planck Medal of the German Physical Society
2015	Hamburg Prize for Theoretical Physics
2013	Wolf Prize in Physics
2013	Niels Bohr Institute Medal of Honor
2010	Premi Nacional de Pensament i Cultura Científica
2010	Benjamin Franklin Medal
2009	BBVA Foundation Frontiers of Knowledge Award
2009	Carl Zeiss-Research Award
2009	"Premios de las artes y de la ciencia" - Castellano-Manchegos del Mundo, Junta Castilla-La Mancha
2007	National "Blas Cabrera" Prize for Physical, Material and Earth Sciences
2006	6th International Quantum Communication Award
2006	Prince of Asturias Award for Technical and Scientific Research
2005	Quantum Electronics Prize of the European Physical Society
2002	Medal of the Royal Physical Society of Spain
2001	Felix Kuschenitz Preis of the Austrian Academy of Sciences
1992	Premio Nacional a Investigadores Noveles of the Royal Physical Society of Spain

Other Honors

2023	Prize in the category "Innovation" awarded by "La Vanguardia", Barcelona, Spain
2022	"Doctor Honoris Causa", Universidade Da Coruña, Spain
2021	Falling Walls Breakthrough of the Year 2021 in Physical Sciences
2020	Honorary member of the Col·legi d'Economistes de Catalunya, Spain
2020	Highly Cited Researcher in the field of Physics (2019, 2018 and 2017)
2020	Member of the Bavarian Academy of Sciences, Germany
2019	"Doctor Honoris Causa", Universidad de Buenos Aires, Argentina
2018	Hanna Visiting Professor, Stanford University
2018	Distinguished Member of the Royal Physical Society of Spain (RSEF)
2017	Gran Gresol Prize of the Gresol Foundation, Spain

2017	Member of Leopoldina, National Academy of Sciences, Germany
2016	Full member of the Royal Academy of Exact, Physical and Natural Sciences (RAC), Madrid, Spain
2017	Honorary Embassador of Brands of Spain, Foro de Marcas Renombradas Españolas (FMRE), Madrid, Spain
2016	“Doctor Honoris Causa”, Universidad Europea, Madrid, Spain
2016	Severo Ochoa Distinguished Visitor, Instituto de Física Teórica, Madrid, Spain
2016	Profesor Distinguido, ICMAT, Madrid, Spain
2015	Medal of Honor of the Foundation García Cabrerizo, Madrid, Spain
2015	“Doctor Honoris Causa”, Universitat Politècnica de València, Spain
2015	Corresponding member of the Real Academia de Ciencias de Zaragoza, Spain
2015	“Doctor Honoris Causa”, Universitat de València, Spain
2015	Distinguished Visiting Professor, Institute for Theoretical Physics, CSIC, Spain
2015	World’s Most Influential Scientific Minds (Thomson Reuters) (and in 2014)
2014	Honorary member of the Spanish Optical Society (SEDOPTICA), Madrid, Spain
2014	“Doctor Honoris Causa”, Universidad de Zaragoza, Spain
2014	Visiting Miller Professorship Award, University of California Berkeley, California, USA
2013	Corresponding member of the Real Academia de Ciencias y Artes de Barcelona, Spain
2013	David Ben Gurion Medal, Ben Gurion University of the Negev, Israel
2013	Princeton Center for Theoretical Science Lecturer, Princeton University, NJ, USA
2012	Distinguished Lecturer, Technion, Haifa, Israel
2012	Tsinghua Songjian Turing Lecture, Beijing, China
2012	Erwin Schrödinger Distinguished Lecture, Vienna, Austria
2012	Moore Distinguished Scholar, CALTECH, California, USA
2011	Gran Cruz de la Orden del Dos de Mayo de la Comunidad de Madrid, Spain
2009	Medalla de Honor, Universidad Complutense de Madrid, Spain
2009	Thomson Reuters Citation Laureate in Physics
2009	ISI highly cited scientist
2009	Distinguished Research Chair at Perimeter Institute, Waterloo, Ontario, Canada
2007	"Académico de Honor" de la Academia de Ciencias de la Región de Murcia, Spain
2007	“Doctor Honoris Causa”, Universidad Politecnica de Catalunya (Barcelona), Spain
2005	“Doctor Honoris Causa”, Universidad Castilla-La Mancha, Spain
2003	Distinguished Guest Professor, Institut de Ciències Fotòniques (Barcelona), Spain
2003	Corresponding member of the Austrian Academy of Sciences, Austria

2002	Corresponding member of the Real Academia de Ciencias, Spain
2002	Fellow of the American Physical Society
2001	ISI higly cited scientist

Former students and postdocs

Former master students	Position	Current institution
Azkune, Gorka		University of Deusto, Faculty of Engineering (Spain)
Bender, Julian		Max Planck Institute of Quantum Optics, Garching (Germany)
Bermejo Vega, Juaní		Universidad de Granada (Spain)
Brechtelsbauer, Katharina		University of Stuttgart (Germany)
Coll Vinent Wappenhans, Sandra		EOLOS - Floating lidar solutions, Barcelona (Spain)
Cruz Rico, Esther		Max Planck Institute of Quantum Optics, Garching (Germany)
Dür, Wolfgang	Assoc. Prof.	University of Innsbruck (Austria)
Eckholt, Maria		TUM Technical University of Munich (Germany)
González Cuadra, Daniel		University of Innsbruck (Austria)
Greplova, Eliska	Ass.-Prof.	Kavli Institute of Nanoscience, TU Delft (The Netherlands)
Haag, Daniel		PlanQC, Munich (Germany)
Hackenbroich, Anna		TNG Technology Consulting, Munich (Germany)
Hammerer, Klemens	Prof.	Leibniz Universtity of Hanover (Germany)
Hauke, Philipp	Assoc. Prof	University of Trento (Italy)
Hecht, Theresa		
Horstmann, Birger	Prof.	DLR, Helmholtz Institute Ulm (Germany)
Karanikolaou, Teresa		ICFO-The Institute of Photonic Sciences, Castelldefels (Spain)
Kochanowski, Jan		Institut Mines-Télécom (IMT), Palaiseau (France)
König, J. Lukas		Stockholm University (Sweden)
Kohler, Dominic		Siemens, Munich (Germany)
Kull, Ilya		University of Vienna (Austria)
Kraus, Barbara	Prof.	University of Innsbruck (Austria) & Technical University Munich
Lu, Sirui		Max Planck Institute of Quantum Optics, Garching (Germany)
Luo, Man		Max Planck Institute of Quantum Optics, Garching (Germany)
Lutz, Maximilian		Max Planck Institute of Quantum Optics, Garching (Germany)
Mendl, Christian	Ass.-Prof.	TUM Technical University of Munich (Germany)
Metalidis, Georgo		Carl Zeiss Microscopy GmbH, Oberkochen (Germany)
Molpeceres Mingo, Daniel		TUM Technical University of Munich (Germany)
Murg, Valentin		MTU Aero Engines, Munich (Germany)
Muschik, Christine	Ass.-Prof.	IQC, University of Waterloo (Canada)
Ni, Xiaotong		Alibaba, Shanghai (China)
Nigg, Simon		Circular Capital (Switzerland)
Paulisch, Vanessa		QAware GmbH, Munich (Germany)
Rai, Kshiti Sneh		Leiden Institute of Advanced Computer Science (The Netherlands)
Sala, Pablo		Caltech, Pasadena, CA (USA)
Scalet, Samuel		Cambridge University (UK)
Schiffer, Benjamin		Max Planck Institute of Quantum Optics, Garching (Germany)
Schindler, Paul		Max Planck Institute for the Physics of Complex Systems, Dresden (Germany)
Schwager, Heike		Intel, Munich (Germany)
Scandi, Matteo		ICFO-The Institute of Photonic Sciences, Castelldefels (Spain)
Wangler, Lukas		ICFO-The Institute of Photonic Sciences, Castelldefels (Spain)
Weinfurtner, Silke	Ass.-Prof.	School of Mathematical Sciences, University of Nottingham (UK)
Wei, Zhi-Yuan		Max Planck Institute of Quantum Optics, Garching (Germany)
Yang, Yilun		Max Planck Institute of Quantum Optics, Garching (Germany)
Yu, Xiehang		Max Planck Institute of Quantum Optics, Garching (Germany)

Former PhD students	Position	Current institution

Bender, Julian		Max Planck Institute of Quantum Optics, Garching (Germany)
Bermejo Vega, Juaní		Universidad de Granada (Spain)
Bürschaper, Oliver		TNG Technology Consulting, Munich (Germany)
Çakan, Asli		Technical University of Munich (Germany)
Clemente, Lucas		Google, Zurich (Switzerland)
Christ, Henning		Munich Re (Germany)
Christianen, Arthur		Max Planck Institute of Quantum Optics, Garching (Germany)
Cubitt, Toby	Prof.	University College London (UK) & Co-Director & Founder of Phasecraft Ltd
Deng, Xiaolong		Leibniz Rechenzentrum Garching (Germany)
Dreyer, Henrik		Quantinuum, Munich (Germany)
Dür, Wolfgang	Assoc. Prof.	University of Innsbruck (Austria)
Eckholt, Maria		Technical University of Munich (Germany)
Emonts, Patrick		Leiden Institute of Advanced Computer Science (The Netherlands)
Ge, Yimin		d-fine, Bern (Switzerland)
Giedke, Géza	Prof.	University of the Basque Country, Bilbao (Spain)
Glasser, Ivan		Cosmo Tech, Lyon (France)
Giudice, Giacomo		PlanQC, Munich (Germany)
Guaita, Tommaso		Freie Universität Berlin (Germany)
Guth Jarkovský, Jiří		IQM Munich (Germany)
Hammerer, Klemens	Prof.	Leibniz Universtity of Hanover (Germany)
Herwerth, Benedikt		Swiss Re, Zurich (Switzerland)
Horstmann, Birger	Prof.	DLR, Helmholtz Institut Ulm (Germany)
Keilmann, Tassilo		Wellness Heaven Ressort & Hotel Guide, Munich (Germany)
Kessler, Eric		Amazon Web Services, New York (USA)
Knörzer, Johannes		Eidgenössische Techn. Hochschule Zurich (ETHZ) (Switzerland)
Kuehn, Stefan		DESY, Zeuthen (Germany)
Kraus, Barbara	Prof.	University of Innsbruck (Austria) and Technical University of Munich (Germany)
Kraus, Christina		Leinweber & Zimmermann (patent lawyer), Munich (Germany)
Lubasch, Michael		Quantinuum, London (UK)
Mazza, Leonardo	Ass.-Prof.	LPTMS Université Paris-Sud (France)
Molnár, András		University of Vienna (Austria)
Murg, Valentin		MTU Aero Engines, Munich (Germany)
Muschik, Christine	Ass.-Prof.	IQC, University of Waterloo (Canada)
Ni, Xiaotong		Alibaba Quantum Laboratory, Hangzhou, Zhejiang (China)
Pancotti, Nicola		Amazon Web Services, Pasadena (USA)
Pastawski, Fernando		Psi Quantum, Palo Alto (USA)
Paulisch, Vanessa		QAware GmbH, Munich (Germany)
Perseguers, Sébastien		Gradiom Sarl, Fribourg (Switzerland)
Pflanzer, Anika		Mc Kinsey, Munich (Germany)
Popp, Marcus		Munich Re, Munich (Germany)
Poyatos Adeva, Juan Fernando	Prof.	Spanish National Biotechnology Centre (CNB-CSIC), Madrid (Spain)
Sanz Ruiz, Mikel		University of the Basque Country, Bilbao (Spain)
Schwager, Heike		Infineon Technologies, Munich (Germany)
Schön, Christian		BMW Group, Munich (Germany)
Schuch, Norbert	Prof.	University of Vienna (Austria)
Schuetz, Martin		Amazon Web Services, New York (USA)
Sünderhauf, Christoph		Riverlane, Cambridge (UK)
Wahl, Thorsten		University of Cambridge (UK)

Fomer Post docs	Position	Current institution
Aguado, Miguel		European Patent Office, Munich (Germany)
Briegel, Hans	Prof.	University of Innsbruck (Austria)
Burrello, Michele	Assoc. Prof.	Niels Bohr Institute, Copenhagen (Denmark)
Chang, Yue	Assoc. Prof.	Beijing automation control equipment institute, Beijing (China)
Cui, Jian	Assoc. Prof.	Beihang University, Beijing (China)
De les Coves, Gemma	Ass.-Prof.	University of Innsbruck (Austria)
de Vega, Ines		IQM Quantum Computers, Munich (Germany)

Dunjko, Vedran	Ass. Prof.	Leiden Institute of Advanced Computer Science (The Netherlands)
Endres, Manuel	Prof.	California Institute of Technology, Pasadena (USA)
Farace, Alessandro		Machine Learning Reply DE, Munich (Germany)
Fröhling, Nina		d-fine, Duesseldorf (Germany)
Jonsson, Robert		Nordita, Stockhom (Sweden)
Garcia-Patron Sanchez, Raul	Assoc. Prof.	School of Informatics, University of Edingburgh (UK)
García-Ripoll, Juan José	Prof.	CSIC-IFF Insitute of Fundamental Physics, Madrid (Spain)
Giedke, Géza	Prof.	University of the Basque Country, Bilbao (Spain)
Gong, Zongping	Assoc. Prof.	Department of Applied Physics, University of Tokyo (Japan)
González Tudela, Alejandro	Assoc. Prof.	Institute of Fundamental Physics, CSIC Madrid (Spain)
Grosshans, Frédéric	Prof.	CNRS, Paris (France)
Hackl, Lucas		University of Melbourne (Australia)
Hubig, Claudius		Maven Securities Holdings Ltd, London (UK)
Kay, Alistair	Prof.	Royal Holloway, University of London (UK)
Kofler, Johannes		Institute for Machine Learning, Johannes Kepler Univ. Linz (Austria)
Kukuljan, Ivan		Helmholtz, Munich (Germany)
Kunst, Flore		Max Planck Institute for the Physics of Light, Erlangen (Germany)
Lamata, Lucas	Assoc. Prof.	University of Sevilla (Spain)
Malz, Daniel	Ass. Prof.	University of Copenhagen (Denmark)
Martín Alhambra, Álvaro		Institute of Theoretical Physics, UAM-CSIC, Madrid (Spain)
Mezzacapo, Fabio	Assoc. Prof.	Institut de Physique, CNRS, ENS Lyon (France)
Möckel, Michael	Assoc. Prof.	University of Applied Sciences, Aschaffenburg (Germany)
Navarrete-Benlloch, Carlos	Assoc. Prof.	Wilczek Quantum Center, Shanghai Jiao Tong University (China)
Nemes Salgueiro, Andrea		SAP AG, Heidelberg (Germany)
Nielsen, Anne Ersbak Bang	Assoc. Prof.	Aarhus University (Denmark)
Orús Lacort, Román	Prof.	University of the Basque Country, Bilbao (Spain)
Paredes Ariza, Belén	Assoc. Prof.	Instituto de Física Teórica, Universidad Autónoma de Madrid (Spain)
Perarnau Llobet, Martí		University of Geneva (Switzerland)
Pérez-Garcia, David	Prof.	Universidad Complutense de Madrid (Spain)
Piroli, Lorenzo	Ass. Prof.	Università di Bologna (Italy)
Porras Torre, Diego	Prof.	Institute of Fundamental Physics, CSIC Madrid (Spain)
Rizzi, Matteo	Assoc. Prof.	Institute for Theoretical Physics, University of Cologne (Germany)
Robaina Fernández, Daniel		Dentsply Sirona, Zurich (Switzerland)
Rodriguez Sassarego, Ivan Diego		appliedAI Initiative - UnternehmerTUM, Garching (Germany)
Romero-Isart, Oriol	Prof.	IQOQI, University of Innsbruck (Austria)
Roncaglia, Marco		G. Ferraris High School, Turin (Italy)
Roscilde, Tommaso	Prof.	Ecole Normale Supérieure de Lyon (France)
Rusconi, Cosimo		Columbia University, New York (USA)
Sánchez-Burillo, Eduardo		PredictLand, Zaragoza (Spain)
Schmied, Roman		Viewpointsystem GmbH, Vienna (Austria)
Shi, Tao	Ass. Prof.	Chinese Academy of Sciences (CAS), Beijing (China)
Solano, Enrique	Prof.	University of the Basque Country, Bilbao (Spain)
Tilloy, Antoine	Prof.	MINES ParisTech (France)
Tóth, Géza	Prof.	University of the Basque Country, Bilbao (Spain)
Trivedi, Rahul	Ass. Prof.	University of Washington, Seattle (USA)
Tu, Hong-Hao	Ass. Prof.	Technical University of Dresden (Germany)
Tura i Bruguès, Jordi	Ass. Prof.	Leiden Institute of Advanced Computer Science (The Netherlands)
Turzillo, Alexander		Perimeter Institute, Waterloo (Canada)
van den Nest, Maarten		Patent Lawyer, Munich (Germany)
van Enk, Steven	Prof.	University of Oregon (USA)
Verstraete, Frank	Prof.	Ghent University (Belgium) & University of Cambridge (UK)
Vidal, Guifre		Google Quantum AI, Los Altos (USA)
Vollbrecht, Karl Gerd		Federal Authority, Bonn (Germany)
Wolf, Michael	Prof.	Technical University of Munich (Germany)
Wu, Yinghai	Assoc. Prof.	Huazhong University of Science and Technology, Wuhan (China)
Yang, Shuo	Ass. Prof.	Tsinghua University, Beijing (China)
Zohar, Erez	Assoc. Prof.	Hebrew University of Jerusalem (Israel)

Research Visits

1. Institute for Theoretical Physics, University of Innsbruck, 2 September to 23 November 1990.
2. Joint Institute for Laboratory Astrophysics, University of Colorado, 18 July to 30 September 1991.
3. Joint Institute for Laboratory Astrophysics, University of Colorado, 1 July to 18 September 1992.
4. Institute for Laser Physics, University of Hamburg, 30 November to 10 December 1992.
5. Joint Institute for Laboratory Astrophysics, Unversity. of Colorado, 15 June 1993 to 1 February 1994.
6. Joint Institute for Laboratory Astrophysics, University of Colorado, 25 June to 15 August 1994.
7. Institute for Theoretical Atomic and Molecular Physics, Harvard Univ., 15 August to 15 September 1994.
8. Institute for Theoretical Physics, University of Innsbruck, 10 October 1994 to 5 February 1995.
9. Centre d' Études Nucléaires de Saclay, 7 July 1995 to 7 August 1995.
10. Institut für Theoretische Physik, University of Innsbruck, 1 October to 23 December 1995.
11. Victoria University, Wellington, 27 January 1996 to 17 February 1996.
12. Institute for Theoretical Physics, University of Innsbruck, 20 March to 25 March 1996.
13. Centre d' Études Nucléaires de Saclay, 7 April to 14 April 1996.
14. Institute for Theoretical Physics, University of California in Santa Barbara, 1 October to 31 October 1996.
15. Clarendon Laboratory, Oxford University, 9 September to 15 September 1997.
16. Institute for Theoretical Physics, University of California in Santa Barbara, 2 February to 26 February 1998.
17. Clarendon Laboratory, Oxford University, 10 November to 15 November 1998.
18. Benasque Center for Physics, 9 July to 23 July 1999.
19. University Autónoma of Madrid, 26 August to 9 September 1999.
20. University of Hannover, 11 February to 27 February 2000.
21. University of Bristol, 20 May to 26 May 2000.
22. National Institute Standards and Technology (Gaithesburg), 3 March to 10 March 2001.
23. Institute for Theoretical Atomic and Molecular Physics, Harvard Univ., 10 March to 17 March 2001.
24. Joint Institute for Laboratory Astrophysics, University of Colorado, 6 February to 10 February 2002.
25. California Institute of Technology, 24 May to 28 May 2002.
26. University of Paris, Orsay, 15 December to 20 December 2003.
27. Harvard University and MIT, 3 April to 7 April 2004.
28. Institute for Theoretical Physics, University of California in Santa Barbara, 5 May to 28 May 2004.
29. Harvard University, 7 February to 10 February 2005.
30. Institut de Ciències Fotòniques, 23 April to 30 April 2006.
31. Institut de Ciències Fotòniques, 17 July to 21 July 2006.

32. Institut de Ciències Fotòniques, 04 December to 10 December 2006.
33. Institut de Ciències Fotòniques, 05 March to 09 March 2007.
34. Institut de Ciències Fotòniques, 18 July to 22 July 2007.
35. Eidgenössische Technische Hochschule (ETH), 10 January to 11 January 2008.
36. Erwin Schrödinger Institute, 16 January to 18 January 2008.
37. Institut de Ciències Fotòniques, 09 March to 16 March 2008.
38. University of Vienna, 18 December to 19 December 2008.
39. University of Toronto, 1 February to 8 February 2009.
40. 77Universidad Complutense de Madrid, 23 February to 27 February 2009.
41. Institut de Ciències Fotòniques, 6 March to 14 March 2009.
42. Perimeter Institute, Waterloo/Ontario, 3 October to 23 October 2009.
43. Institut de Ciències Fotòniques, 2 November to 6 November 2009.
44. Kavli Institute for Theoretical Physics, University of California in Santa Barbara, 30 Nov. to 10 Dec. 2009.
45. Institut de Ciències Fotòniques, 15 March to 19 March 2010.
46. Perimeter Institute, 24 May to 29 May 2010.
47. Kavli Institute for Theoretical Physics, University of California in Santa Barbara, 22 Nov. to 10 Dec. 2010.
48. Harvard University, 31 January to 11 February 2011.
49. Perimeter Institute, 04 April to 21 April 2011.
50. Institut de Ciènces Fotòniques, 16 January to 20 January 2012.
51. California Institute of Technology (CALTECH), 25 January to 23 March 2012.
52. Institut de Ciènces Fotòniques, 16 April to 20 April 2012.
53. Institut de Ciències Fotòniques, 9 to 11 October 2012.
54. Institute for Interdisciplinary Information Services (IIIS), Tsinghua University, Beijing
    20 October to 26 October 2012.
55. Israel Institute of Technology, Technion, Haifa, 3 December to 7 December 2012.
56. California Institute of Technology (CALTECH), 3 February to 3 March 2013.
57. Princeton Center for Theoretical Science, Princeton University, 3 to 8 March 2013.
58. Institut de Ciències Fotòniques, 23 to 26 April 2013.
59. Institut de Ciències Fotòniques, 21 to 26 May 2013.
60. Institut de Ciències Fotòniques, 9 to 12 September 2013.
61. MIT/Harvard, Cambridge, Massachusetts, 3 to 7 November 2013.
62. Perimeter Institute, Waterloo/Ontario, 7 to 22 November 2013.

63. Institut de Ciències Fotòniques, 2 to 10 February 2014.
64. University of California, Berkeley, 2 to 20 March 2014.
65. University of California, Berkeley, 1 to 11 April 2014 .
66. University of California, Berkeley, 20 April to 2 May 2014.
67. Institut de Ciències Fotòniques, 8 July to 15 July 2014.
68. Institut de Ciències Fotòniques, 23 to 27 February 2015.
69. Kavli Institute for Theoretical Physics, Santa Barbara, 19 April to 14 May 2015.
70. Institut de Ciències Fotòniques, 20 to 23 July 2015.
71. Instituto Balseiro, San Carlos de Bariloche, 15 to21 November 2015.
72. Joint Institute for Laboratory Astrophysics, University of Colorado, 7 to 12 March 2016.
73. Instituto de Física Teórica, Universidad Autónoma de Madrid (IFT, UAM-CSIC), 18 to 22 April 2016.
74. Institute for Laser Physics, University of Hamburg, 30 May to 3 June 2016.
75. Kavli Institute for Theoretical Physics, Santa Barbara, 9 October to 21 October 2016.
76. Kavli Institute for Theoretical Physics, Santa Barbara, 4 December to 10 December 2016.
77. ICMAT Instituto de Ciencias Matemáticas, Madrid, 2 May to 19 May 2017.
78. Hanna Visiting Professor, Stanford University, Palo Alto, 29 October to 10 November 2017.
79. Department of Physics, Harvard University, Cambridge, 15 April to 19 April 2018.
80. Hanna Visiting Professor, Stanford University, Palo Alto, 2 May to 15 May 2018.
81. ICMAT Instituto de Ciencias Matemáticas, Madrid, 25 October to 1 November 2018.
82. ICMAT Instituto de Ciencias Matemáticas, Madrid, 19 November to 30 November 2018.
83. ICMAT Instituto de Ciencias Matemáticas, Madrid, 23 September to 30 September 2019.
84. IAS Institute of Advanced Studies, Princeton, October 3 to October 8, 2021.
85. IAS Institute of Advanced Studies, Princeton, July 7 to July 22, 2022.
86. IAS Institute of Advanced Studies, Princeton, December 5 to December 9, 2022.
87. ICMAT Instituto de Ciencias Matemáticas, Madrid, 6 March to 15 March 2023.
88. ICMAT Instituto de Ciencias Matemáticas, Madrid, 27 March to 31 March 2023.
89. QFARM visiting faculty, Stanford, May 15 to May 19, 2023.
90. IAS Institute of Advanced Studies, Princeton, July 10 to July 20, 2023.

Invited Presentations at Conferences and Workshops

1. *Non-classical states of motion in an ion trap,* Workshop on Fundamentals of Quantum Optics III, Innsbruck (Austria), March 1993.

2. *Squeezed states of motion in an ion trap*, Optical Society of America Annual Meeting 93, Toronto (Canada), October 1993.

3. *Quantum statistical properties of a laser cooled ideal gas*, Workshop on Quantum field theory of cold atoms, Boulder (Colorado), July 1994.

4. *Qubits and ions*, Workshop on Quantum Computation, Torino (Italy), October 1994.

5. *Quantum statistics of a laser cooled ideal gas*, Workshop on Theoretical Quantum Optics, Munich (Germany), November 1994.

6. *Quantum Computations with cold trapped ions*, Dynamics of simple quantum systems, atoms, molecules and heterostructures, Sandbjerg (Denmark), May 1995.

7. *Quantum Computations with cold trapped ions*, Workshop on Quantum Computation and Quantum Optics, Pisa (Italy), June 1995.

8. *Quantum Computations with cold trapped ions*, Workshop on Quantum Computation, Torino (Italy), June 1995.

9. *Quantum computations with cold trapped ions*, XXXI Reincontres Moriond, Les Arcs (France), January 1996.

10. *Quantum mechanics with trapped ions*, Quantum Optics satellite meeting, Queensland (Australia), July 1996.

11. *Quantum computing and error correction schemes*, International Conference on Quantum Electronics, Sydney (Australia), July 1996.

12. *Quantum mechanics with trapped ions*, Fundamental Problems in Quantum Mechanics, Oviedo (Spain), July 1996.

13. *Quantum computing with trapped ions*, European Physical Society meeting, Sevilla (Spain), September 1996.

14. *Quantum Computers and Quantum Networks*, V International Conference on Squeezed States and Uncertainty Relations (Plenary), Balatonfured (Hungary), May 1997.

15. *Communication in a quantum network: a quantum optical implementation*, Workshop on Quantum Optics and Quantum Computation, Pisa (Italy), June 1997.

16. *Quantum communication between distant nodes in a quantum network*, Gordon Conference on Atomic Physics, New Hampshire (USA), June 1997.

17. *Manipulation of condensates with lasers*, Bose Einstein Condensation, Castelvecchio (Italy), July 1997.

18. *Transmission of quantum information in a quantum network: a quantum optical implementation*, Fundamental Problems in Quantum Theory Workshop, Baltimore (USA), August 1997.

19. *Quantum Computations with "hot" trapped ions*, Experimental Realizations of Quantum Logic, Cambridge (USA), August 1997.

20. *Quantum Communication and Computation*, V Reunión Nacional de Optica, Valencia (Spain), September 1997.

21. *Quantum Communication and Computation*, Física Estadística 97, Madrid (Spain), September 1997.

22. *Quantum Computations with Trapped Ions I: Theory*, Tutorial Workshop on Quantum Information, Almagro (Spain), October 1997.

23. *Creation of Dark Solitions and Vortices in BECs*, Workshop on Quantum Gases, Konstanz (Germany), June 1998.

24. *Quantum Communication and Computation*, XVI International Conference on Atomic Physics, Windsor (Canada), August 1998.

25. *Error Correction and Fault Tolerant Quantum Computing*, Quantum Computing Pathfinder Conference, Helsinki (Finland), September 1998.

26. *Quantum Information and Communication*, Physikertagung der deutschen physikalischen Gesellschaft 1999, Heidelberg (Germany), March 1999.

27. *Quantum computing with trapped atoms*, American Physical Society Centennial Meeting, Atlanta (USA), March 1999.

28. *Quantum optical implementations for quantum information*, 14th International Conference on Laser Spectroscopy, Innsbruck (Austria), June 1999.

29. *Quantum computation and communication*, International Conference of the EGAS 31, Marseille (France), July 1999.

30. *Quantum Information Processing with Quantum Optical Systems*, 49. Jahrestagung der Österreichischen Physikalischen Gesellschaft, Innsbruck (Austria), September 1999.

31. *Quantum information processing with quantum optical systems*, Quantum Optics X, Palma de Mallorca (Spain), October 1999.

32. *Entanglement of Gaussian optical beams*, Workshop on Quantum Control and Information, Nof Genossar (Israel), November 1999.

33. *Quantum Communication and Computation*, 100 years of Quantum Mechanics, Museo de la Ciencia de Barcelona (Spain), March 2000.

34. *Multi-atom entangled states*, TMR-Network "The physics of quantum information" meeting, Vienna (Austria) September 2000.

35. *Quantum information processing with multi-level systems*, International workshop on mysteries, puzzles, and paradoxes in Quantum Mechanics, Gargano in Garda (Italy), September 2000.

36. *El futuro de la computación cuántica*, International conference “la ciencia y la tecnología ante el nuevo milenio”, CSIC Madrid (Spain), November 2000.

37. *Multiparticle entanglement,* Workshop of the A2 Konsortium, Hannover (Germany), February 2001.

38. *Multiparticle entanglement with Bose-Einstein condensates*, Workshop on solid state quantum computing, Warsaw (Poland), April 2001.

39. *Recent developments in quantum information theory*, 4th Annual Workshop on Resonances and Time Asymmetric Quantum Theory, Jaca (Spain), May 2001.

40. *Quantum repeaters with atomic ensembles*, International conference on Quantum Information, Rochester (USA), June 2001.

41. *Quantum repeaters with atomic ensembles,* Quantum Optics V, Zakopane (Poland), June 2001.

42. *Quantum repeaters with atomic ensembles,* Workshop on Quantum Computers and Quantum Chaos, Como (Italy), June 2001.

43. *Separability and distillability properties of Gaussian states*, Second ESF QIT Conference Quantum Information: Theory, Experiment, and Perspectives, Gdansk (Poland), July 2001.

44. *Separability and distillability properties of Gaussian states,* ESF Worshop on Quantum Information and Spacetime Structure, Madrid (Spain), September 2001.

45. *Separability and distillability*, Workshop on Quantum Challenges 2001, Essen (Germany), September 2001.

46. *Quantum Entanglement: Theory and Applications*, XXVIII Reunion Bienal de la RSEF, Sevilla (Spain), September 2001.

47. *Multiparticle Entanglement*, Quantum Optics XII, San Feliu de Guixols (Spain), October 2001.

48. *Quantum repeaters based on atomic ensembles*, QIPC Workshop, Torino (Italy), October 2001.

49. *Towards quantum information processing with quantum optical systems I and II*, Workshop on Quantum Computation, Seoul (Korea), November 2001.

50. *Towards quantum information processing with quantum optical system*, International Workshop on Quantum Computation and Quantum Optics, Pohang (Korea), November 2001.

51. *Quantum repeaters with atomic ensembles,* XII Solvay Conference in Physics, Delphi (Greece), November 2001.

52. *Strongly correlated systems and BEC,* Ringberg Meeting, Ringberg Schloss (Germany), December 2001.

53. *Entanglement in quantum optical systems,* Workshop on the future of quantum information, École Normal Supérieur, Paris (France), December 2001.

54. *Entanglement with atomic systems,* Kolloquium DFG Schwerpunkt Quanteninformationsverarbeitung, Bad Honnef (Germany), January 2002.

55. *General overview of entanglement with quantum optical systems,* 2002 Winter Conference on Condensed Matter Physics, Aspen (USA), February 2002.

56. *Entanglement and distillation in quantum optical systems,* IV Adriatico research conference on quantum interferometry, Trieste (Italy), March 2002.

57. *Recent results in quantum information theory,* European research conference on Quantum Information, San Feliu de Guixols (Spain), March 2002.

58. *Entanglement of states and operations*, Workshop on Decoherence, Durham (UK), April 2002.

59. *Entanglement in Quantum Optical Systems,* Quantum Electronics and Laser Conference, Long Beach (USA), May 2002.

60. *Advances in Quantum Information and Computation*, 2002 Meeting of the American Physical Society DAMOP, Williamsburg (USA), May 2002.

61. *Gaussian operations and states,* A2 Meeting, Braunschweig (Germany), June 2002.

62. *Entanglement of states and physical operations,* International conference on Quantum Communication, Measurement and Computing, Boston (USA), July 2002.

63. *Entangling atomic ensembles,* EPS 12 Trends in Physics, Budapest (Hungary), August 2002.

64. *Quantum Information Processing and Communication with Quantum Optical Systems,* Trends in Nanotechnology (TNT) 2002, Santiago de Compostela (Spain), September 2002.

65. *Quantum Information Processing and Communication,* COSMOCAIXA 2002, Madrid (Spain), September 2002.

66. *Entanglement in Multiparticle systems,* Symposium on Quantum Information, Uppsala (Sweden), October 2002.

67. *Entanglement properties of Gaussian states,* Workshop on Quantum Information, Cryptography, and Error Correction, MSRI, Berkeley (USA), November 2002.

68. *Quantum Information Processing with Quantum Optical Systems,* Meeting of the Royal Society, London (UK), November 2002.

69. *Quantum information processing in optical lattices*, Symposium 'Cold atoms and quantum information', Collège de France, Paris (France), February 2003.

70. *Quantum Information processing with quantum optical systems,* SQUINT 5th Annual Meeting, Santa Fe (USA), February 2003.

71. *Entanglement creation in multiparticle systems,* Obergurgl Meeting 2003, Obergurgl (Austria), February 2003.

72. *Quantum information and quantum optical systems*, DPG Frühjahrstagung, Hannover (Germany), March 2003.

73. *Entanglement of Formation of Gaussian States,* Continuous Variable Quantum Information Processing Workshop, Aix en Provence (France), April 2003.

74. *Limits on Gates with trapped ions,* Simons Conference on Quantum and Reversible Computation, Stony Brook (USA), May 2003.

75. *Quantum Information with quantum optical systems,* Gordon Research Conference on Atomic Physics, Tilton School (USA), June 2003.

76. *Strong correlation effects in cold atomic gases,* ICOLS 03, Palm Cove (Australia), July 2003.

77. *Entanglement of Gaussian states and spin systems*, Workshop on Quantum Measurements and Quantum Stochastics, Aarhus (Denmark), August 2003.

78. *Entanglement in spin and harmonic oscillator lattices*, Quantum Challenges II, Warsaw (Poland), September 2003.

79. *Entanglement and strong correlation effects in optical lattices*, Euresco conference BEC 2003, San Feliu de Guixols (Spain), September 2003.

80. *Entanglement in Atomic Systems*, 304. WE-Heraeus-Seminar, Bad Honnef (Germany), October 2003.

81. *Quantum cryptography,* Meeting of the Spanish Mathematical Society, Barcelona (Spain), November 2003.

82. *Entanglement and correlations in spin and quantum optical systems*, Lorentz Center Workshop Fundamentals of Solid State Quantum Information Processing, Leiden (Netherlands), December 2003.

83. *Entanglement in spin systems,* Gordon Conference on Quantum Information, Ventura (USA), February 2004.

84. *Quantum Information with Quantum Optical Systems,* LATSIS Symposium, Lausanne (Switzerland), March 2004.

85. *Boson and Fermions in Optical Lattices,* Workshop on Cold Fermions, Levico (Italy), March 2004.

86. *Studying strong correlation effects in optical lattices,* KITP Conference on Frontiers in Quantum Gases, Santa Barbara (USA), May 2004.

87. *Fast gates and quantum simulations with trapped ions,* "Ion Trap Quantum Computing" workshop on the development of the trapped ion quantum computer, University of Michigan, Ann Arbor (USA), May 2004.

88. *Fast Quantum Gates and Coherent Control with Trapped Ions,* CLEO/IQEC 2004, San Francisco (USA), May 2004.

89. *Quantum spin systems: entanglement and implementations,* ICAP 2004, Rio de Janeiro (Brasil), July 2004.

90. *Multiparticle entangled states*, Workshop on Quantum Entanglement, Decoherence, Information and Geometrical Phases in Complex Systems, Trieste (Italy), November 2004.

91. *Teoría cuántica de la información: conceptos básicos y aplicaciones,* Encuentro Física Fundamental "Alberto Galindo" November 2004.

92. *Projected-pair entangled states: properties and applications,* Workshop on Entanglement and Quantum Information, Pisa (Italy), December, 2004.

93. *PEPS: properties and applications,* Workshop on Entanglement and Quantum Information, Oberwolfach (Germany), January 2005.

94. *BEC with ions and scalable quantum computation with neutral atoms,* Banff Cold Atom Meeting, Calgary (Canada), February 2005.

95. *Quantum Information processing and simulations with quantum optical systems,* Gordon Conference on Quantum Information Science, Ventura (USA), February / March 2005.

96. *Ordenadores y dispositivos cuánticos: nuevos retos para el siglo XXI,* Jornadas Ciencia y sociedad IX: Españoles en la vanguardia de la ciencia, Madrid (Spain), March 2005.

97. *Quantum Information Processing with Quantum Optical Systems,* ESF-JSPS Frontier Science Conference Series for Young Researchers: Quantum information and Quantum Physics, Tokyo (Japan), March 2005.

98. *Quantum information, Quantum Optics and Spin Systems,* Physics 2005: a century after Einstein, Warwick (UK), April 2005.

99. *Quantum computations and simulations,* Frontiers in Quantum Physics, Madrid (Spain), April 2005.

100. *Entanglement in complex quantum systems,* Conference on Quantum Computation and Information, Crete (Greece), May 2005.

101. *Nuevos estados de la material,* Centenario del "annus mirabilis" de Einstein (1905-2005), Madrid (Spain), May 2005.

102. *Simulating quantum many-body systems,* International Conference on Laser, Applications and Technologies (LAT), St. Petersburg (Russia), May 2005.

103. *Información cuántica,* Las fronteras de física, Valencia (Spain), May 2005.

104. *Basic concepts in Quantum Information Theory,* Quantum Physics of Nature: Theory, Application and Interpretation, Vienna (Austria), May 2005.

105. *Simulating quantum Systems,* CMS/CSHPM Summer Meeting 2005.

106. *Quantum Information Processing with quantum Optical Systems,* Control and Manipulation of quantum Systems, Ascona (Switzerland), July 2005.

107. *Quantum Information Theory: Challenges and Perspectives,* Albert Einstein Annus Mirabilis 2005, San Sebastian (Spain), September 2005.

108. *Simulating quantum many-body systems,* Bose-Einstein Conference, San Feliu de Guixols (Spain), September 2005.

109. *Información Cuántica: nuevos retos y perspectives,* Bienal de Física, Ourense (Spain), September 2005.

110. *Quantum information,* Amazing Light Conference, Berkeley (USA), October 2005.

111. *Imaging the quantum world,* International Symposium: Scientific Imaging: Seeing the Invisible, Madrid (Spain), November 2005.

112. *Simulation of quantum many-body systems,* 13. International Conference on recent Progress in Many Body Physics, Buenos Aires (Argentina), December 2005.

113. *Simulating Quantum Many-Body Systems,* Workshop on Bose-Einstein Condensation and Quantum information, Vienna (Austria), December 2005.

114. *Entanglement with cold ions and atoms,* Quantum information Processing Meeting, Paris (France), January 2006.

115. *Ion Traps and cold atoms for quantum computers,* Annual APS March Meeting 2006, Baltimore (USA), March 2006.

116. *Quantum Simulations in Many-Body Systems,* Cold Atoms Meet condensed Matter (CATCOM), Dresden (Germany), March 2006.

117. *Many-body phenomena in ion traps,* Workshop: Correlated and Many-body Phenomena in Dipolar Systems, Dresden (Germany), May 2006.

118. *Sistemas cuánticos de comunicación y computación,* Seminario de Algorítmica y Criptografía cuántica, Madrid (Spain), June 2006.

119. *Simulating quantum many-body systems,* Workshop: Time in Quantum Mechanics, Tenerife (Spain), June 2006.

120. *Quantum simulations and phase transitions with trapped ions,* 20th International Conference on Atomic Physics (ICAP) Satellite Meeting "Atomic Physics with Trapped Ions", Innsbruck (Austria), July 2006.

121. *Quantum Simulations: Classical and quantum computational methods,* International Conference on Quantum Foundation and Technology (ICQFT) '06, Hangzhou (China), July 2006.

122. *Ions in Traps,* Workshop: Quantum Computation and Information, Universität Regensburg (Germany), November 2006.

123. *Efficient simulation of quantum systems,* QIP Workshop Brisbane (Australia), January 2007.

124. *Quantum Information,* Workshop on Quantum Information and Many-Body Quantum Systems, Pisa (Italy), March 2007.

125. *Quantum simulations with classical and quantum systems,* Workshop on Quantum Engineering with Neutral Atoms and Light, Herrsching (Germany), June 2007.

126. *La física cuántica en la sociedad de la información,* OPTOEL 07 Conference Bilbao (Spain), July 2007.

127. *New algorithms to simulate many-body quantum systems,* PAQ 07 Conference London (UK), September 2007.

128. *Quantum Simualtions with Classical and Quantum Systems,* Seminar on Time Dependent Phenomena Blaubeuren (Germany), September 2007.

129. *Quantum Simulations: classical and quantum approaches,* DPG Physics School Quantum Informations and Quantum Simulation, Bad Honnef (Germany), September 2007.

130. *Quantum Information Processing: Present Status and Perspectives,* Symposium in Honor of CN Yan, (Singapore), November 2007.

131. *Quantum State Generation in Many-Body Quantum Optical Systems,* QAO Downunder Workshop Wollongong (Australia), December 2007.

132. *Quantum Simulations,* TQC - University of Tokyo (Japan), February 2008.

133. *Simulation of many-body quantum systems: a quantum information perspective,* Aspen Conference, Aspen (USA), February 2008.

134. *Computación cuántica: Retos y Perspectivas,* Universidad Autónoma de Barcelona (Spain), May 2008.

135. *Quantum Information Theory: Applications and challenges,* 5th European Congress of Mathematics, Amsterdam (Netherlands), July 2008.

136. *Quantum computing and state engineering via dissipation,* Gordon Research Conference Big Sky Montana (USA), September 2008.

137. *Efficient description of many-body quantum system,* Quantum Fluids and Strongly Correlated Systems Conference, Paris (France), September 2008.

138. *Quantum computation, quantum state engineering and quantum phase transitions driven by dissipation,* QICS Workshop Obergurgl (Austria), September 2008.

139. *Quantum Theory of Condensed Matter*, 24th Solvay Conference in Physics, Brussel (Belgium), October 2008.

140. *Difficult Problems in Quantum Information Theory,* 2008 xQIT Conference at MIT, Cambridge (USA), November 2008.

141. *Open Quantum Systems: Decoherence and Control,* ITAMP Workshop Cambridge (USA), November 2008.

142. *Creation of entangled photons out of entangeld atoms,* SFB Conference at Innsbruck (Austria), January 2009.

143. *Scientific Symposium in honour of Prof. Ertmer,* Leibniz Universität Hannover (Germany), February 2009.

144. *Quantum computation, state engineering and phase transitions driven by dissipation,* SCALA Meeting at Cortina d'Ampezzo (Italy), February 2009.

145. *Bloch Oscillations and Landau-Zener Tunneling: From Hot Electrons to Ultracold Atoms – BOLTZ 2009,* Max Planck Institute for Physics of Complex Systems, Dresden (Germany), May 2009 .

146. *Cooling & Calculating, Quantum Walks & Feedback,* Bonn (Germany), July 2009.

147. *Seminar on Physics of Cold Trapped Atoms* – LPHYS Workshop, Barcelona (Spain), July 2009.

148. *Quantum Theory and Symmetries 6,* Department of Physics&Astronomy, University of Kentucky, Lexington (USA), July 2009.

149. *Collective effects in the interaction of light and atoms,* Bose-Einstein Condensation 2009 Frontiers in Quantum Gases*,* San Feliu de Guixols Costa Brava, (Spain), September 2009.

150. *Átomos frios: un nuevo laboratorio para estudiar sistemas cuánticos de muchas partículas"* XXXII Edición de la Reunión de la Real Sociedad Española de Física*,* Ciudad Real (Spain), September 2009.

151. *Classical and Quantum simulations,* (QIPC) International Conference, Rome, (Italy), September 2009.

152. *Protected Entangled-Pair and Plaquette States* , CTS/Cecam/QSIT Workshop*,* Zurich (Switzerland), November 2009.

153. *Simulation of Qantum Many-Body Systems: A Quantum Information Perspective*, Conference on Computational Physics (CCP*),* Kaohsiung (Taiwan), December 2009.

154. *Efficient description of many-body systems with projected entangled-pair states,* Workshop on Quantum Information Science and Many-body Physics, Tainan (Taiwan), December 2009.

155. *Classical simulation of many-body quantum systems,* QIP Workshop, Zurich (Switzerland), January 2010.

156. *Quantum simulations: Experimental and Theoretical advances,* VI Encuentro Franco-Español de Química y Física del Estado Sólido, Tarragona (Spain), March 2010.

157. *Quantum optical technologies: from atomic ensembles to microscopic dielectric objects,* ISPQT - Tokyo (Japan), April 2010.

158. *Description of many-body systems using MPS,PEPS and other families of states,* Emergence&Entanglement Workshop , Waterloo, Ontario (Canada), May 2010.

159. *Quantum information: Theory, Applications and Challenges,* 10^{th} European Conference on Atoms, Molecules and Photons, Salamanca (Spain), July 2010.

160. *A new view of Nature and much more,* DONOSTIA-Passion of Knowledge Workshop, San Sebastian (Spain), September 2010.

161. *Dissipation: a new tool for quantum information processing,* International Conference on Quantum Information and Computation, Stockholm (Sweden), October 2010.

162. *Theoretical methods for many-body quantum systems,* Conference on research frontiers in ultra-cold atoms and molecular gases, Goa (India), January 2011.

163. *Time-dependent methods for many body quantum systems,* Autumn College on Nano-Equilibrium Quantums Systems, Buenos Aires (Argentina), April / May 2011.

164. *Efficient description of quantum many-body systems,* 12th ICSSUR & 5th FEYNFEST, Foz de Iguazu (Brasil), May 2011.

165. *Tensor network approach to many-body quantum systems,* Strongly correlated systems, cooperativity and valencebond theory Workshop, La Coruña (Spain), July 2011.

166. *Engineered dissipation and quantum information,* QIPC2011 Conference, Zurich (Switzerland), September 2011.

167. *Quantum Computing and Simulation with Atoms and Photons,* 25th Solvay Conference on Physics "The Theory of the Quantum World", Brussels (Belgium), October 2011.

168. *Tecnologías cuánticas para el siglo XXI,* Jornada Información Cuantica, Fundación Ramon Areces, Madrid (Spain), November 2011.

169. *Creating and detecting strongly correlated states in 1 dimension,* Symposium "Frontiers in Quantum Photon Science", University of Hamburg (Germany), November 2011.

170. *Quantum Information Theory: Applications and Challenges,* AAAS Annual Meeting at Vancouver Convention Centre (Canada), February 2012.

171. *An order parameter for symmetry-protected phases in one dimension,* Conference "New quantum states of matter in and out of equilibrium"at Galileo Galilei Institute (GGI) for Theoretical Physics, Florence (Italy), May 2012.

172. *Projected entangled pair states and many-body quantum systems,* Quantum Information Workshop, Seefeld (Austria), July 2012.

173. *Is science useful?* Culture Takes Centre Stage - Event, Palacio Euskalduna, Bilbao (Spain), July 2012.

174. *Quantum Memories for few Qubits: Design and Applications,* 11th International Conference on Quantum Communication, Measurement and Computing (QCMC), Vienna (Austria), August, 2012.

175. *Quantum information theory & many body system* - Discussion leader, Gordon Research Conference, Stonehill College, Easton (USA), August 2012.

176. *Bulk-Boundary correspondence in Many-Body Quantum Systems,* 2nd Conference on "Quantum Information meets Statistical Mechanics" (QISM2012), Innsbruck (Austria), September 2012.

177. *Bulk-Boundary Correspondence in Spin Lattices,* International Workshop on Entanglement Spectra in Complex Wavefunctions (ESICQW12), Max Planck Institute for the Physics of Complex Systems, Dresden (Germany), November 2012.

178. *Bulk-Boundary Correspondence in Spin Lattices at zero temperature,* Workshop "Entangle This: Strings, Fields and Atoms", Instituto de Física Teória (IFT), University of Madrid (Spain), November 2012.

179. *Self-Organization structures of Atoms in 1D*, 519th WE Heräus seminar "Hybrid Quantum Systems", Bad Honnef (Germany), November 2012.

180. *PEPS, Boundary Theories and Renormalization Group*, Workshop on Quantum Hamiltonian Complexity, Simons Institute for the Theory of Computing, University of California, Berkeley, California (USA), February 2013.

181. *What will the computers of the future look like?* invited talk at the Conference "Fysica 2013, Technical University of Delft (The Netherlands), April 2013.

182. *Quantum information and simulation with atomic systems*, Workshop on Quantum Simulations and Related Topics, Technion, Haifa (Israel), May 2013.

183. *Frontiers in Quantum Computing and Simulation*, MPQ-ICFO workshop, Barcelona (Spain), May, 2013.

184. *Física Cuántica: Del gato Schrödinger al ordenador del future*, Bienal de Física, Valencia (Spain), July 2013.

185. *Fractional quantum Hall states in lattices: Local models and physical implementation,* 2nd International Conference on Quantum Technologies (ICQT) 2013, Moscow (Russia), July 2013.

186. *Quantum simulation of High energy models with cold atoms,* 3rd QCD-TNT, Trento (Italy), September 2013.

187. *Los superordenadores del futuro,* Passion for knowledge - quantum 13, Donostia-San Sebastian (Spain), September 2013.

188. *Atomic Ensembles at Room Temperature: Theory and Experiments,* Frontiers in Optics Meeting, University of Copenhagen (Denmark), October 2013.

189. *Simulation of quantum many-body systems,* The Quantum Century: 100 years of the Bohr Atom, University of Copenhagen (Denmark), October 2013.

190. *Bulk-boundary correspondence and Tensor Network States,* COST action MP1006 Conference, Weizmann Institute, Rehovot (Israel), March 2014.

191. *Many-body localization from a quantum information perspective,* Workshop "Many-Body Localization and Associated Theory", Princeton Center for Theoretical Science (USA), March 2014.

192. *Quantum optics with atoms and dielectric materials,* The Quantum Optics Frontier Symposium, Caltech (USA), April 2014.

193. *Symmetries and boundary theories for chiral Projected Entangled Pair State*, Workshop on "Quantum Matter", Benasque (Spain), June 2014.

194. *Bulk-boundary theories from a quantum information theory perspective*, 2º workshop ICE-1 "Información Cuántica en España 1", Zaragoza (Spain), June 2014.

195. *Bulk-boundary correspondences with Projected Entangled Pair State*, "2nd Seefeld workshop on Quantum Information", Seefeld i. Tirol (Austria), June 2014.

196. *Symmetries and boundary theories for chiral Projected Entangled Pair State*, Workshop on "Topology and Entanglement in correlated Quantum Systems", MPI for Physics of Complex Systems, Dresden (Germany), July 2014.

197. *New Platforms for Quantum Simulations with Cold Atoms*, Gordon Research Conference on "Quantum Science", Stonehill College, Easton, MA (USA), July 2014.

198. *Tensor Networks and efficient description of many-body quantum systems,* Quantum Technologies Conference V, Krakow (Poland), September 2014.

199. *Quantum Physics and Computation*, XI International Ontology Congress, San Sebastian (Spain), October 2014.

200. *Chiral projected entangled-pair state with topological order*, workshop "Entangle This!",Instituto de la Física Teórica UAM/CSIC Madrid (Spain), February 2015.

201. *Quantum simulations with atoms in nano-structures*, conference "ImagineNano", Bilbao (Spain), March 2015.

202. *Tensor network states with chiral topological order*, KITP Program "Entanglement in Strongly-Correlated Quantum Matter", Santa Barbara (USA), April 2015.

203. *Area Laws in Many-Body Systems and Tensor Networks,* KITP Program "Entanglement in Strongly-Correlated Quantum Matter", Director's black board lunch, Santa Barbara (USA) May 2015.

204. *Efficient descriptions of many-body systems and tensor networks*, workshop "Quantum Hardness", Dresden (Germany), June 2015.

205. *Quantum simulations with atoms in nano-structures*, 3rd International Conference on Quantum Technologies (ICQT) 2015, Moscow (Russia), July 2015.

206. *Quantum simulations of high-energy physics models*, conference "Bose-Einstein Condensation 2015 – Frontiers in Quantum Gases", San Feliu de Guixols (Spain), September 2015.

207. *Quantum information and Tensor Network techniques to describe many-body localization*, workshop 'The Non-Equilibrium Quantum Frontier', Princeton Center for Theoretical Science (USA), September 2015.

208. *New Frontiers in Quantum Optics and Many-Body Physics*, International Symposium 2015, University of Hamburg, CUI The Hamburg Centre for Ultrafast Imaging (Germany), November 2015.

209. *Tensor Network Techniques and systems out of equilibrium*, workshop "Quantum Integrable Models out of Equilibrium", Cambridge (UK), January 2016.

210. *Quantum simulation and quantum optics in photonic crystals*, Solvay Conference on Quantum Simulation with Cold Matter and Photons 2016, Université Libre de Bruxelles (Belgium), February 2016.

211. *Tensor Networks and Applications*, workshop "Entanglement in Strongly Correlated Systems", CCBPP Benasque (Spain), February 2016.

212. *Quantum Optics and Lattice Gauge Systems*, Symposium on Effective Field Theories and Lattice Gauge Theory, Technical University of Munich (Germany), May 2016.

213. *Tensor Network Techniques and systems out of equilibrium*, workshop on "Theoretical Challenges: Simulating Materials out of Equilibrium", CFEL / Max Planck Institute for Structure and Dynamics of Matter, Hamburg (Germany), June 2016.

214. *Bulk-boundary correspondence for gauge theories*, YKIS 2016 Conference on "Quantum Matter, Spacetime and Information", Kyoto (Japan), June 2016.

215. *Renormalization flows in matrix product operators*, 3rd Seefeld workshop on Quantum Information, Seefeld i. T. (Austria), June 2016.

216. *Quantum simulation of high-energy physics models with cold atoms*, Humboldt Kolleg on Particle Physics, Kitzbühel (Austria), July 2016.

217. *On the difficulty of simulating complex quantum systems*, International Symposium "Julio Palacios, Universidade da Coruña (Spain), July 2016.

218. *Quantum Information Processing and Dissipation*, Gordon Research Conference on "Quantum Science", Stonehill College, Easton, MA (USA), July 2016.

219. *Tensor Network Techniques and systems out of equilibrium*, Workshop on Many-Body Dynamics and Open Quantum Systems DOQS 2016, Glasgow (UK), September 2016.

220. *Many-body physics and quantum information, Symposium "Perspectives of Quantum Optics",* Warsaw (Poland), September 2016.

221. *Symmetries in tensor networks, Synthetic Quantum Matter program at Kavli Institute for Theoretical Physics,* Santa Barbara (USA), December 2016.

222. *Quantum simulations,* Symposium on interdisciplinary Information Sciences at Tsinghua University, Beijing (China), December 2016.

223. *A quantum information perspective to Quantum Many-Body Physics,* conference "90 years of Quantum Mechanics at Nanyang Technological University, Singapore, January 2017.

224. *Tensor Networks: A quantum information perspective to many-body physics*, Joint IMPRS workshop on Condensed Matter, Quantum Technology and Quantum Materials (CONQUA17), Max Planck Institute for the Physics of Complex Systems, Dresden (Germany), April 2017.

225. *Quantum Simulations of High Energy Physics Models*, 35th International Symposium on Lattice Field Theory (Lattice 2017), Universidad de Granada (Spain), June 2017.

226. *Quantum simulation with classical and quantum computers*, CQT10 conference, National University of Singapore, December 2017.

227. *Quantum algorithms for quantum simulation*, Workshop on "Quantum Simulation and Computation, University of the Basque Country, Bilbao (Spain), February 2018.

228. *Quantum Optics with emitters and dielectric materials*, International Conference on "Quantum Optics 2018", Obergurgl (Austria), February 2018.

229. *New theoretical challenges in quantum optics and quantum information*, 82. Annual meeting of the German Physical Society (DPG), Erlangen (Germany), March 2018.

230. *Tensor Network Techniques and Dynamical Systmes*, Spring meeting of the German Physical Society (DPG), Berlin (Germany), March 2018.

231. *Tensor networks: Fundamental theorems and applications*, conference on "Quantum Paths in Low Dimensions: Theory and experiments", Erwin Schrödinger Institute, Vienna (Austria), April 2018.

232. *A quantum information approach to many-body quantum system"*, workshop "Statistical Mechanics Out of Equilibrium", Princeton Center for Theoretical Science (USA), April 2018.

233. *Los ordenadores cuánticos y la seguridad de las redes*, VI Conferencia Internacional "Inteligenica artificial y economia del dato", Universidad Privada CEU San Pablo, Madrid (Spain), June 2018.

234. *Quantum information and many-body systems*, 4th Seefeld workshop on Quantum Information, Seefeld i. T. (Austria), July 2018.

235. *Solving quantum problems with quantum computers,* 18th Asian Quantum Information Science Conference (AQIS18), Nagoya University (Japan), 9 September 2018.

236. *Neural-Network and String-Bond States: From Chiral Topological Order to Image Recognition*, APS workshop: "Physics: What's next?", Riverhead, NY (USA), October 2018.

237. *Tensor Networks in Low and High Energy Physics*, Theoretical Physics Symposium 2018, Hamburg (Germany), November 2018.

238. *Solving quantum problems with quantum computers,* International Symposium on Quantum Technologies, Fundación Ramón Areces, Madrid (Spain), November 2018.

239. *Quantum revolution*, academic session at "FWO Kennismakers 2018" commemorating the 90th anniversary of the FWO (Research Foundation Flanders), Antwerp (Belgium), December 2018.

240. *Quantum optics in structured reservoirs: From exotic emission to quantum chemistry simulation*, SFB-FoQuS International Conference, Innsbruck (Austria), February 2019.

241. *Quantum optics in structured baths,* Solvay Workshop on "Quantum Simulation 2019", International Solvay Institutes, Brussels (Belgium), February 2019.

242. *Discrete and Continuous Tensor Networks and Lattice Gauge Theories*, Workshop "Tensor networks: From simulations to holography (GQFI III)", Max Planck Institute for Gravitational Physics, Golm (Germany), March 2019.

243. *Quantum optics in structured reservoirs: From exotic emission to quantum chemistry simulation*, joint ICFO-IMPRS workshop on Quantum Technologies, ICFO, Castelldefels (Spain), March 2019.

244. *Quantum algorithms for classical and quantum problems*, workshop "Quantum Computing – From Algorithms to Applications", Obergurgl, University of Innsbruck (Austria), April 2019.

245. *Quantum Information Theory*, workshop on Quantum Science and Technology, Max Planck Institute of Quantum Optics, Garching (Germany), May 2019.

246. *Symmetries, entanglement and state transformations with tensor networks*, 1st International symposium on "Quantum resources and their application", ICTQT – KCIK, Gdańsk (Poland), May 2019.

247. *La Teoría Cuántica de la Información: éxitos y desafíos*, symposium "Latorrefest", Collegi Sant Jordi, Barcelona (Spain), May 2019.

248. *Tensor Networks for High-Energy Physics*, workshop on "High-energy physics at ultra-cold temperatures", ECT*, Trento (Italy), June 2019.

249. *Simulation of quantum many-body systems*, Conference on Quantum Information and Quantum Control-VIII, Fields Institute, Toronto (Canada), August 2019.

250. *Tensor Networks: Fundamental theorems and applications*, 20th International Conference on Recent Progress in Many-Body Theories, Toulouse (France), September 2019.

251. *Quantum Simulations in Low and High Energy Systems*, International Conference on Emerging Quantum Technology (ICEQT2019), Hefei (China), September 2019.

252. *Tensor networks: From the discrete to the continuum*, Franqui Symposium on "Wave functions and entanglement in field theory", Franqui Foundation, Brussels (Belgium), October 2019.

253. *Symmetries and State Transformation with Tensor Networks*, Austrian Quantum Information Conference (AQIC) 2019, University of Vienna (Austria), October 2019.

254. *Quantum Simulation of High Energy Physics*, workshop "Quantum Gravity in the Lab", Google X The Moonshot Factory, Mountainview (USA), November 2019.

255. *Non-Gaussian States and applications*, workshop on Quantum Simulations and Quantum Devices (QSQD) 2019, Institute of Theoretical Physics, Chinese Academy of Sciences, Beijing (China), November 2019.

256. *Simulation of Quantum Many-Body Systems*, MCQST-Technion Symposium, Max Planck Institute of Quantum Optics, Garching (Germany), November 2019.

257. *Glauber Dynamics: From statistics to quantum information*, Roy Glauber Memorial Workshop, Harvard University, Cambridge (USA), January 2020.

258. *Analog Quantum Simulation: from physics to chemistry,* International Conference on Quantum Optics in Obergurgl, University of Innsbruck (Austria), February 2020.

259. *Quantum Algorithms for Finite Energies and Temperatures,* keynote at the virtual OSA Quantum 2.0 Conference, Washington, D.C. (USA), September 2020.

260. *Quantum simulation,* keynote at the Third World Laureate Forum Shanghai (China), October 2020.

261. *Quantum Cellular Automata, Tensor Networks, and Area Laws*, online workshop "Tensor Networks: from Simulations to Holography III", Perimeter Institute, Waterloo (Canada), November 2020.

262. *Quantum algorithms for finite energies and temperatures*, online Keynote speech at „Lustrum" Science Week: Celebrating five years of QSoft, Amsterdam (The Netherlands), December 2020.

263. *Quantum computers and many-body systems*, online colloquium at ICTP South American Institute for Fundamental Research (ICTP-SAIFR), São Paulo (Brazil), February 2021.

264. *Solving quantum many-body problems with quantum computers*, virtual workshop "Helmholtz Quantum: Roadmap to the Future", February 2021.

265. *Quantum simulation of quantum many-body systems*, online workshop "Quantum Nanophotonics", Centro de Ciencias de Benasque Pedro Pascual, Benasque (Spain), March 2021.
266. *Quantum computers and many-body systems*, online ICFO-IMPRS Joint workshop, March 2021.

267. *Quantum simulations and difficulty of solving many-body problems*, online COPAC workshop on "Parallel Computing Quantum Devices", March 2021.

268. *Simulations with analog and digital quantumcomputers*, CMTC Virtual Conference on "Quantum", University of Maryland, MD (USA), May 2021.

269. *Computación Cuántica: ¿Una nueva revolución tecnológica?*, International Congress on Logic, Epistemology and Methodology (online), organized by the Universidad de Costa Rica (Costa Rica), June 2021.

270. *Tensor Networks and Quantum Field Theories*, workshop "Entanglement in Quantum fields" in person and online, Heidelberg (Germany), June 2021.

271. *Fermionic lattice systems with permutation symmetry*, International Symposium on Correlated Electrons (SymCorrel21), online, Munich (Germany), October 2021.

272. *Quantum Computing and Simulation*, symposium "60th Anniversary of the Max Planck Computing & Data Facility", Garching (Germany), October 2021.

273. *Overview of quantum technologies in Europe and in the world,* keynote speech at the 2021 BIST Conference, Barcelona (Spain), November 2021.

274. *Non-Gaussian variational methods in many-body quantum physics*, Hamburg Theoretical Physics Symposium 2021, Wolfgang-Pauli-Centre, Hamburg (Germany), November 2021.

275. *Quantum computers and many-body systems*, plenary talk at QUANTUM2021 within the congress "Imaginenano", Bilbao (Spain), November 2021.

276. *Quantum Simulation: Algorithms for finite energies and temperatures*, online talk at the 726th Wilhelm and Else Heraeus seminar on Lattice-based Quantum Simulation, Bad Honnef (Germany), November 2021.

277. *How quantum simulations can help solving quantum many-body problems?* Online conference on "Quantum computing and simulation", Institute for Theoretical Physics, Paris-Saclay (France), November 2021.
278. *Error propagation in NISQ12 devices and optimization problems,* satellite workshop at the Instituto de Física Teórica, UAM-CSIC, campus de Cantoblanco, Madrid, May 2022.

279. *Infinite matrix product states on drawing pad,* workshop "Prime Matters", at the Instituto de Física Teórica, UAM-CSIC, campus de Cantoblanco, Madrid, May 2022.

280. Chair "*Many Body Entanglement*" session at the 28th Solvay Conference on Physics: "The Physics of Quantum Information", Brussels, May 2022.

281. *Quantum Circuits, Cellular Automata and Tensor Networks*, online talk at the Informational Architecture of Spacetime Workshop, Okinawa Institute of Science and Technology (Japan), June 2022.

282. *Quantum computing and quantum information theory*, Corunna Innovate Summit organized by DataSpartan, Fundación Barrié, A Coruña (Spain), June 2022.

283. *Quantum computing with noisy devices*, 5th Seefeld workshop on Quantum Information, Seefeld i. T. (Austria), June 2022.

284. *Quantum Information Theory and Manybody Physics*, Nobel Symposium NS166 on "Emerging quantum technologies", Malmö (Sweden), August 2022.

285. *Quantum computing and many-body systems*, at the conference "Measurement-based quantum computation, learning, and agency", Obergurgl (Austria), August 2022.

286. *Quantum Circuits, Cellular Automata and Tensor Networks*, online talk at the YITP workshop "Quantum extreme universe from quantum information", Kyoto (Japan), September 2022.

287. *Quantum Information meets many-body quantum physics*, at the workshop "Frontiers of Atomic Physics and Quantum Information", Barcelona (Spain), October 2022.

288. *Quantum Computing and Simulation with Errors*, Symposium on "Quantum Information, Complexity, and the Physical World", Princeton University (NJ, USA), December 2022.

289. *Quantum computing in the presence of errors*, Quantum for Life Workshop at the University of Copenhagen (Denmark), April 2023.

290. *Quantum computing in the presence of errors*, Workshop "Fermionic Quantum Simulation: From Fundamental Science to Applications" held at the Monastery Obermarchtal (Germany), July 2023.

291. *Analog Quantum Simulation: from many to few body problems*, BEC 2023 conference, Sant Feliu de Guixols (Spain), September 2023.

292. *Quantum Technologies: from Schrödinger's cat to a new era in computing*, science festival "Passion 4 Knowledge", San Sebastián (Spain), 3 October 2023.

293. *Quantum computing and simulation under symmetries,* online talk during the Yukawa Intitute for Theoretical Physics' Long-Term Workshop "Quantum Information, Quantum Matter, and Quantum Gravity", Kyoto (Japan), 3 October 2023.

294. *Simulating quantum physics with quantum computers,* keynote at the conference "Tecnologías cuánticas en Europa", organized by FECYT Innovation, Madrid (Spain), 22 November 2023.

295. *Quantum Computing and Simulation,* workshop on "Quantum Science and Technology", organized by the Pontifical Academy of Sciences (Vatican), 1 December 2023.

296. *Preparation of Tensor Network states*, Final Plenary Meeting of the International Quantum Tensor Network (IQTN), organized by University College London (UCL) and held at the Technology and Innovation Centre of the University of Strathclyde, Glasgow (United Kingdom), 26 January 2024.

Lectures in Summer Schools and Special Courses

1. *Quantum Communication and Computing*, (4 lectures of 1 hour), European PhD Summer School in Physics, Trento (Italy), 8-20 June 1997.

2. *Quantum Information*, (5 lectures of 1.5 hours), Universidad de Barcelona (Spain), 26-30 January 1998.

3. *Quantum Information*, (4 lectures of 1 hour), International School of Physics Enrico Fermi, Varenna (Italy), 27 June-9 July 2000.

4. *Error correction and physical implementations*, DPG Schule für Physik Quanten-Computing und Information, Physikzentrum Bad Honnef (Germany), 9-13 October 2000.

5. *Quantum Information*, (6 lectures of 1 hour), Summer school on theoretical Physics, Stellenbosch (South Africa), 23 January – 2 February 2001.

6. *The physics of entanglement*, (3 lectures of 1 hour), Seminar of Rhodanien, Dolomieu (France), 26 February-2 March 2001.

7. *Entanglement*, (3 lectures of 1.5 hours), Les Houches school on quantum entanglement, Les Houches (France), 26 - 28 March 2001.

8. *Quantum Information*, (3 lectures of 2 hours), University of Heidelberg, Heidelberg (Germany), 17-19 April 2001.

9. *Quantum Computation*, (2 lectures of 2 hours), Cursos de verano de la Universidad Internacional Menendez Pelayo (Spain), 2-7 July 2001.

10. *Entanglement in Atomic Systems*, (1 lecture of 1 hour), International School of Physics Enrico Fermi, Varenna (Italy), 17-27 July 2001.

11. *Entanglement and distillability*, (3 lectures of 1.5 hours), IX Escuela de Fisica Teorica, Santiago de Compostela (Spain), 3-14 September 2001.

12. *Quantum Information*, (4 lectures of 1 hour), VII Granada Seminar, Granada (Spain), 1-4 September 2002.

13. *Quantum entanglement theory: measurements and manipulation* (2 lectures of 1.5 hours), International School on Quantum Computation and Information, Lisboa (Portugal), 4-7 September 2002.

14. *Entanglement in Atomics Systems I and II* (2 lectures of 1.5 hours), Workshop on Quantum Information and Quantum Computation, Trieste (Italy), 14-25 October 2002.

15. *Separability and entanglement in Quantum Information* (1 lecture of 1 hour), Workshop on Entanglement at the nanoscale, Trieste (Italy), 28 October- 8 November 2002.

16. *Strongly correlated systems with cold atomic gases* (3 lectures of 1.5 hours), School on quantum gases in low dimensions, Les Houches (France), 15-25 April 2003.

17. *Quantum Optics and Quantum Computation Theory* (3 lectures of 1.5 hours), WEH Summer School, Wittenberg (Germany), 28-30 July 2003.

18. *Quantum Information Theory* (20 hours), Curso de Doctorado, University Autónoma of Madrid (Spain), 2-6 February 2004.

19. *Basics of Quantum Information Theory* (3 hours), Summer School on Quantum Optics and Quantum Information, Niels Bohr Institute, Copenhagen (Denmark), 11-13 August 2004.

20. *Entanglement and purification* (4.5 hours), Summer School on the Basics of Quantum Information, Cargesse (France), 22-25 August 2004.

21. *Quantum computations and simulations,* Campus de Excelencia 2005, Tenerife (Spain), June 2005.

22. *Efficient representation of certain many-body quantum states* (3 lectures of 1.5 hours), Summer School on Quantum Information Science, Kochi (Japan), 30 August – 3 September 2005.

23. *Quantum Repeaters & Quantum Computing* (2 Lectures of 1.5 hours), Winter College on Quantum and Classical Aspects of information Optics, Trieste (Italy), 30 January – 10 February 2006.

24. *Fermions and Quantum Information* (2 Lectures of 1.5 hours), International School of Physics "Enrico Fermi"on Ultra-Cold Fermi Gases, Varenna (Italy), 26 June – 28 June 2006.

25. *Quantum Information* (2 Lectures of 1.5 hours), International Conference on Atomic Physics (ICAP) – Summer School, Innsbruck (Austria), 10 July – 11 July 2006.

26. *Computación y Comunicación Cuántica,* Cursos de Verano de la Universidad Complutense de Madrid, San Lorenzo de El Escorial (Spain), 31 July 2006.

27. *Quantum Information* (5 Lectures of 1.5 hours), Pre-Doctoral School on Laser Cooling and Bose Einstein Condensation, Les Houches (France), 18 September – 20 September 2006.

28. *Ensemble-based Quantum Information Processing,* QUROPE Winter School on Quantum Information, Obergurgl (Austria), 18 February – 24 February 2007.

29. *Quantum Computation and Topological Orders,* Cursos de Verano de la Universidad Complutense de Madrid, San Lorenzo de El Escorial (Spain), 16 July – 20 July 2007.

30. *Hacia una nueva sociedad de la información a través de la física cuántica* (1 lecture of 2 hours) ,UIMP Aula de Verano Santander (Spain), 27 August 2007.

31. *Entangled States: theory and applications ,* QUIC 07 Summer School Maynooth (Ireland), 31 August 2007.

32. *Física Cuántica, Informática y Comunicación: una nueva era tecnológica para el siglo XXI* (3 lectures of 1 hour*),* Clases Magistrales Cátedra Madrid (Spain), 12 November 2007.

33. *Condensed Matter Physics and Quantum Information with Cold Atoms* (3 lectures of 1.5 hours) 25th Jerusalem Winter School in Theoretical Physics (Israel), 26 December – 30 December 2007.

34. *Introducción a los simuladores cuánticos,* Summer school Universidad de Oviedo (Spain), 15 September 2009.

35. *A quantum information perspective of quantum many-body systems*, Spring school on transport in nanostructures, Capri (Italy), 12 April – 13 April 2010.

36. *Entanglement in quantum many-body systems: from area laws to tensor networks* (4 lectures of 1.5 hours), summer school on Many-body physics with ultracold gases, Les Houches (France), 28 June to 2 July 2010.

37. *La física cuántica:misterios, paradojas y aplicaciones,* Summer school Universidad Internacional Menéndez Pelayo, Santander (Spain), 8 August – 12 August 2011.

38. *Quantum information, Quantum simulation* (3 lectures of 1.5 hours), ICAP summer school – Ecole Normale Supérieure, Paris (France), 16 July – 19 July 2012.

39. *Quantum Information, Condensed Matter, Quantum Theory* (3 lectures of 1 hour), Israel Institute of Technology, Technion, Haifa (Israel), 3 December – 7 December 2012.

40. *Quantum Many-Body Systems, Quantum Information* (3 lectures of 1 hour), Third Annual PCTS Lecture Series, Princeton Center for Theoretical Science, Princeton University, New Jersey (USA), 4 March – 8 March 2013.

41. *Tensor networks for the efficient descriptions on many body quantum system* (2 lectures of 1.5 hours), 1st RQC summer school, Moscow (Russia), 15 July – 18 July 2013.

42. *Tensor network methods* (2 lectures of 1.5 hours), ICFO summer school 2013 "Frontiers of Quantum Physics and Quantum Information", Barcelona (Spain), 25 July – 27 July 2013.

43. *Tensor networks* (3 lectures of 1.5 hours), CECAM school at SISSA, Trieste (Italy), 16 – 17 September 2013.

44. *Física Cuántica e informacion*, Summer school at Universidad Internacional Menéndez Pelayo, Santander (Spain), 25 August – 29 August 2014.

45. *Quantum optics with atoms close to dielectric materials*, ICFO summer fellow program 2016, Castelldefels (Spain), 5 July 2016.

46. *Quantum Information and Quantum Simulation* (2 lectures of 1 ¾ hours), summer school "Nanotechnology meets Quantum Information (NanoQI), Donostia-San Sebastian (Spain), 11 – 12 July 2016.

47. *Quantum Optics with emitters in waveguides* (1 lecture of 1 ¾ hours), summer school "Nanotechnology meets Quantum Information (NanoQI), Donostia-San Sebastian (Spain), 28 July 2017.

48. *Quantum Computing and quantum simulation* (2 lectures of 1½ hours), ICAP2018 summer school, Barcelona (Spain), 16 – 17 July 2018.

49. *Quantum Information Science* (1 lecture of 1 ½ hours and 1 interactive session of 1 ½ hours), DK ALM Summer school 2018, Obergurgl (Austria), 19 September 2018.

50. *Quantum Simulation and Many-Body Physics* (3 lectures of 1 ¼ hours), XXI Giambiagi Winter School, Buenos Aires (Argentina), 17 – 19 July 2019.

51. *Quantum optics in structured reservoirs: from exotic emission to quantum chemistry simulation* (1 lecture of ¾ hour), summer school "Nanotechnology meets Quantum Information", San Sebastián (Spain), 23 July 2019.

52. *Matrix Product States and Tensor Networks* (1 lecture of 1 ½ hours), School on "Quantum simulations and quantum devices 2019", Beijing (China), 18 – 20 November 2019.

53. *Quantum Information Theory* (2 tutorials of 1 ½ hours), MCQST summer student program (online), Munich (Germany), 12 July 2021.

54. *Solving quantum many-body problems with classical and quantum computers* (3 lectures of 1 ½ hours), XII series of Majorana Lectures, Naples (Italy), 19 – 20 January 2023.

55. *Quantum simulation* (2 tutorials of 1 ½ hours, part 1 and part 2), Quantum Information Processing (QIP) 2023 conference, Ghent University (Belgium), 4 February 2023.

Seminars and Colloquia

1. *Cooling a trapped ion with a standing wave*, Joint Institute for Laboratory Astrophysics, Boulder (USA), 12 September 1991.

2. *Preparation of Fock states by observation of quantum jumps in ion traps*, National Institute for Standards and Technology, Gaithersburg (USA), 9 September 1992.

3. *Generation of nonclassical motional states in ion traps*, University of Hamburg (Germany), 8 December 1992.

4. *Non-classical states of motion in ion traps*, Joint Institute for Laboratory Astrophysics, Boulder (USA), 17 September 1993.

5. *Quantum statistical properties of a laser cooled ideal gas*, National Institute of Standards and Technology, Gaithersburg (USA), 19 November 1993.

6. *Schemes for atomic state teleportation*, National Institute of Standards and Technology, Gaithersburg (USA), 19 August 1994.

7. *The boser: a theoretical description for the atom laser*, Harvard University, Cambridge (USA), 17 August 1994.

8. *Cooling with external fields: the elevator cooling*, Massachusetts Institute of Technology, Cambridge (USA), 10 September 1994.

9. *Teleportation,* University of Innsbruck (Austria), 17 November 1994.

10. *Quantum computations with trapped ions*, University Konstanz (Germany), 25 November 1994.

11. *Quantum computations with cold trapped ions*, École Normal Supérieure, Paris (France), 11 July 1995.

12. *Ion traps*, University of Ulm (Germany), 27 November 1995.

13. *Ion traps,* University of Innsbruck (Austria), 11 December 1995.

14. *Trapped ions in the strong excitation regime: ion interferometry and non-classical states*, Joint Institute for Laboratory Astrophysics, Boulder (USA), 17 October 1995.

15. *Trapped ions in the strong excitation regime: ion interferometry and non-classical states*, Los Alamos National Laboratory (USA), 20 October 1995.

16. *Error correction in Quantum Computing*, California Institute for Technology, Pasadena (USA), 30 January 1996.

17. *Quantum Reservoir Engineering*, University of Auckland (New Zealand), 2 February 1996.

18. *Computación Cuántica*, University of Granada (Spain), 29 April 1996.

19. *Quantum mechanics with trapped ions*, Max Plank Institute for Quantum Optics, Garching (Germany), 11 June 1996.

20. *Quantum reservoir engineering*, Institute for Theoretical Physics, Santa Barbara (USA), 18 October 1996.

21. *Schrödinger lions made out of bosons*, University of Trento (Italy), 13 February 1997.

22. *Quantum Communication and Computation*, University Autónoma of Madrid (Spain), 22 September 1997.

23. *Quantum Communication and Computation*, University Complutense of Madrid (Spain), 23 September 1997.

24. *Creation of Solitons and Vortices in Bose-Einstein-Condensates*, Institute for Theoretical Physics, Santa Barbara (USA), 11 February 1998.

25. *Communicacion cuantica en presencia de ruido*, University of Salamanca (Spain), 19 November 1998.

26. *Black holes with Bose-Einstein condensates*, Benasque Center for Science (Spain), 24 July 1999.

27. *Quantum Information Processing*, AMOLF, Amsterdam (Netherlands), 6 December 1999.

28. *Quantum Communication and Computation*, University Autónoma of Madrid (Spain), 17 December 1999.

29. *Quantum Computing with arrays of microtraps*, Max Planck Institute of Quantum Optics, Garching (Germany), 17 February 2000.

30. *Separability and distillability of mixed states*, University Autónoma of Madrid (Spain), 22 May 2000.

31. *Separability and distillability of mixed states*, Laboratory Kastler, École Normal Supérieur, Paris (France), 7 June 2000.

32. *Quantum optical approach to Bose-Einstein condensation and quantum information process*, Max--Plank Institute for Quantum Optics, Garching (Germany), 1 September 2000.

33. *Multiatom entanglement with Bose-Einstein condensates*, Erwin Schrödinger Institute, Vienna (Austria), 4 December 2000.

34. *Irreversibilidad en la manipulación asymptotical de entanglement,* Universidad de Cantabria, Santander (Spain), 9 February 2001.

35. *Progress on Bose-Einstein condensation and quantum information,* University of Hannover (Germany), 14 February 2001.

36. *Anyons in Bose-Einstein condensates*, NIST, Gaithersburg (USA), 7 March 2001.

37. *Anyons in Bose-Einstein condensates*, ITAMP, Cambridge (USA), 12 March 2001.

38. *Entanglement in Bose-Einstein condensates*, University of Kaiserslautern (Germany), 7 May 2001.

39. *Separability and distillability in quantum information*, Technische Universität Munich (Germany), 30 May 2001.

40. *Quantum Entanglement: Theory and Applications*, University of Castilla-La Mancha, Ciudad Real (Spain), 26 September 2001.

41. *Anyons in Bose-Einstein condensates,* Ludwig-Maximilian Universität, Munich (Germany), 9 January 2002.

42. *Anyons in Bose-Einstein condensates,* Joint Institute for Laboratory Astrophysics, Boulder (USA), 7 February 2002.

43. *Quantum information processing with quantum optical systems,* Max-Planck-Institut für Quantenoptik, Garching (Germany), 26 February 2002.

44. *Some mathematical problems in Quantum Information Theory*, École Normal Supérieur, Paris (France), 2 April 2002.

45. *Strongly correlated systems and BEC,* LENS, Florence (Italy), 10 May 2002.

46. *Physical operations with Gaussian states,* CALTECH, Pasadena (USA), 24 May 2002.

47. *Quantum information in quantum optical systems*, University of Regensburg (Germany), 17 November 2003.

48. *Quantum information in quantum optical systems*, ETH Zürich (Switzerland), 12 November 2003.

49. *Entanglement and correlations in spin systems*, University of Augsburg (Germany), 2 December 2003.

50. *Quantum Information: basic concepts and applications,* Orsay (France), 16 December 2003.

51. *Quantum Information processing with quantum optical systems,* Orsay (France), 18 December 2003.

52. *Quantum Information and Quantum Optical Systems,* University of Geneva (Switzerland), 23 January 2004.

53. *Quantum Information and Quantum Optical Systems,* University of Freiburg (Germany), 9 February 2004.

54. *Localizable entanglement and projected entangled pair states*, MIT (USA), 5 April 2004.

55. *Quantum Behaviour in ion traps and optical lattices*, University of Harvard (USA), 6 April 2004.

56. *Quantum Information and Quantum Optical systems,* University of Tübingen (Germany), 20 April 2004.

57. *Quantum information processing and quantum optical systems,* University of Karlsruhe, 11 June 2004.

58. *Projected entangled-pair states: properties and applications,* University Toronto (Canada), 19 November 2004.

59. *BEC and strong correlation behavior in trapped-ion systems,* University Toronto (Canada), 19 November 2004.

60. *BEC with ions and scalable quantum computation with neutral atoms,* Harvard University (USA), 9 February 2005.

61. *Entangled-Pair Protected States: Properties and Applications,* CALTECH, Pasadena (USA), 22 February 2005.

62. *Simulation of quantum many-body systems,* Max-Planck-Institut für Physik komplexer Systeme, Dresden (Germany), 25 April 2005.

63. *Renormalization algorithms for the simulation of many-body quantum systems,* Universita La Sapienza, Roma (Italy), 17 May 2005.

64. *Quantum information Processing with Quantum Optical Systems,* Max-Planck-Institut für Physik komplexer Systeme, Dresden (Germany), 23 May 2005.

65. *Challenges and Perspectives,* Instituto Nacional de Técnica Aerospacial, Madrid (Spain), 11 November 2005.

66. *Quantum Simulations in Many-Body Systems,* Universität Kaiserslautern (Germany), 31 January 2006.

67. *Trapped ions for quantum simulations and computations,* Universität Ulm (Germany), 02 February 2006.

68. *PEPS: theory and applications,* University of Cambridge (UK), 01 March 2006.

69. *Quantum simulations in many-body systems,* Center of Logic and Computation, Intituto Superior Técnico, Lissabon (Portugal), 16 May 2006.

70. *Quantum Many-Body Systems: A quantum information perspective,* Universität Marburg (Germany), 22 May 2006.

71. *Quantum Simulations with Trapped Ions,* SFB Herrsching (Germany), 25 May 2006.

72. *Quantum Simulations,* Universidad Autónoma de Barcelona (Spain), 14 September 2006.

73. *Many-body physics: a quantum information perspective*, Universidad de Zaragoza (Spain), 24 October 2006.

74. *Computación y Simulación cuántica,* Universidad de Valencia (Spain), 11 January 2007.

75. *Informática y comunicación a través de la física cuántica,* Imaginatica 07 Sevilla (Spain), 07 February 2007.

76. *Quantum Many-Body Systems: Simulations and beyond,* University of Maryland (USA), 16 April 2007.

77. *Tecnologías cuánticas para la información,* Universidad Complutense de Madrid (Spain), 26 April 2007.

78. *Conferencia de Clausura*, El área europea del conocimiento, Universidad Complutense de Madrid (Spain), 11 March 2007.

79. *Quantum many-body systems: simulations and beyond,* DIPC, San Sebastian (Spain), 04 May 2007.

80. *Efficient descriptions of many-body systems: Simulations and beyond,* Universität Köln (Germany), 11 May 2007.

81. *Quantum Entanglement and it's measures,* Institut Henri Poincaré Paris (France), 16 May 2007.

82. *Quantum many-body systems: simulations and beyond,* UPV Bilbao (Spain), 10 July 2007

83. *Efficient descriptions of many-body systems: Simulations and beyond,* PSI Villigen (Switzerland), 7 September 2007.

84. *A quantum information perspective of many-body physics,* Physikalisches Kolloquium der Universität Bayreuth (Germany), 8 Januar 2008.

85. *A quantum information perspective of many-body physics,* University of Conneticut (USA), 11 February 2008.

86. *Quantum State Generation in Many-Body Quantum Optical System,* University of Conneticut (USA), 12 February 2008.

87. *Tecnologías cuánticas para el siglo XXI,* CSIC Jornadas Madrid (Spain), 19 February- 20 February 2008.

88. *Quantum simulations using classical and quantum computers,* MATHQCI Workshop Madrid (Spain), 26 May – 30 May 2008.

89. *Classical and quantum simulation of quantum many-body systems,* Physikalisches Kolloquium Universität Ulm (Germany) 23 June 2008.

90. *Simulation of quantum many-body systems: a quantum information perspective,* UAB-Instituti Física Teórica Barcelona (Spain), 14 October 2008.

91. *Theoretical aspects of tensor network states,* Universidad Complutense de Madrid (Spain), 15 October 2008.

92. *Quantum Computational models for quantum optical systems,* ICFO Barcelona (Spain), 20 October 2008.

93. *Inauguration – Caixa Manresa Event,* ICFO Barcelona (Spain), 23 October 2008.

94. *Tensor networks, many-body systems and quantum information*, Harvard University Cambridge (USA), 24 November 2008.

95. *Superradiance, photon processing and anyon braiding with cold atoms,* CUA at MIT Cambridge (USA), 25 November 2008.

96. *Quantum computers and communication systems,* IRST Povo/Trento (Italy), 18 May – 19 May 2009.

97. *Quantum information: Theory & Experiments,* Facultad de Ciencias (UAM) Madrid, 13 January 2010.

98. *Efficient description of many-body systems: simulations and beyond,* Universität Duisburg-Essen (Germany), 20 January 2010.

99. *Many-body quantum systems: a quantum information perspective,* Universität Stuttgart (Germany), 26 January 2010.

100. *Informática y Física Cuántica,* Jornada von Neumann at Facultat de Matemátiques, Barcelona (Spain), 24 February 2010.

101. *Dissipation: A New tool in Quantum Information Science,* ETH Zurich (Switzerland), 28 October 2010.

102. *Efficient descriptions of quantum many-body systems,* ETH Zurich (Switzerland), 29 October 2010.

103. *Dissipation: a new tool in quantum information science,* KITP, University of California, Santa Barbara (USA), 23 November 2010.

104. *Efficient descriptions of quantum many-body systems,* Berkeley University, San Francisco (USA), 29 November 2010.

105. *Efficient descriptions of quantum many-body system,* Niels-Bohr Institute, Copenhagen (Denmark), 19 January 2011.

106. *Dissipation: A New tool in Quantum Information Science,* Instituto Ciencia de Materiales de Madrid (Spain), 15 February 2011.

107. *Dissipation: A New tool in Quantum Information processing,* Collège de France, Paris (France), 21 February 2011.

108. *Quantum Physics an Information,* ICREA Colloquium, Barcelona (Spain), 22 March 2011.

109. *Quantum Information: theory application and challenges,* Departement of Physics&Astronomy, University of Aarhus (Denmark), 1 June 2011.

110. *Dissipation: A new tool in quantum information Science,* Fakultät für Mathematik & Physik, Leibniz University of Hanover (Germany), 8 November 2011.

111. *Quantum simulations of many-body systems,* University of Girona (Spain), 18 November 2011.

112. *Dissipation: A new tool in quantum information science,* Stanford University, California (USA), 7 February 2012.

113. *Dissipation: A new tool in quantum information science,* Joint Quantum Institute - University of Maryland (USA), 20 February 2012.

114. *Dissipation: A new tool in quantum information science,* Institut de Ciència de Materials de Barcelona (ICMAB), Bellaterra (Spain), 16 April 2012.

115. *Computers in the 21st century and beyond,* Centro Nacional de Biotecnologia (CBN), Madrid (Spain), 28 September 2012.

116. *Quantum memories: Design and Applications,* Institute for Interdisciplinary Information Sciences (IIIS), Tsinghua University (China), 25 October 2012.

117. *A new tool in Quantum Information Science*, Rheinisch-Westfälische Technische Hochschule (RWTH) Aachen (Germany), 5 November 2012.

118. *Quantum memories: design and applications*, Quantum Information Science Center, Racah Institute, Hebrew University, Jerusalem (Israel), 6 May 2013.

119. *Quantum simulations with atoms and ions*, Ben Gurion University, Be'er Sheva (Israel), 7 May 2013.

120. *Simulation of HEP models with cold atoms*, EFT seminar, Technical University of Munich (TUM), Garching, (Germany), 12 June 2013.

121. *Simulation of high-energy physics models with cold atoms*, Ludwig-Maximilians-Universität (LMU), Munich, (Germany), 18 June 2013.

122. *¿Como serán los superordenadores del futuro?,* III Jornadas Doctorales de la UCLM, Albacete (Spain), 22 October 2013.

123. *Quantum simulations of high energy physics models*, Harvard-MIT CUA seminar, Cambridge, MA, (USA) 5 November 2013.

124. *Bulk-boundary correspondence in PEPS*, Perimeter Institute for Theoretical Physics, Waterloo, ON, (Canada), 13 November 2013.

125. *Quantum simulations of high-energy physics*, Centre for Mathematical Sciences, University of Cambrigde (UK), 22 January 2014.

126. *Quantum simulation of high-energy physics models with cold atoms*, Instituut Lorentz for Theoretical Physics, University of Leiden (The Netherlands), 26 February 2014.

127. *Bulk-boundary correspondences in tensor networks*, Stanford University, Palo Alto (USA), 14 March 2014.

128. *Why are Many-Body Problems in Physics so difficult? A Quantum Information Perspective*, Simons Institute, Berkeley (USA), 2 May 2014.

129. *Quantum simulations of high energy physics models*, Summer Fellows Lectures at ICFO, Castelldefels (Spain), 9 July 2014.

130. *New Platforms for Quantum Simulations with Cold Atoms*, University College Cork, Physics Department, (Ireland) 13 October 2014.

131. *Efficient descriptions of many-body quantum systems with tensor networks*, National University of Ireland Maynooth (Ireland), 14 October 2014.

132. *Quantum simulations with cold atoms: From condensed matter to high-energy models*, Queen's University Belfast, Centre for Theoretical Atomic, Molecular and Optical Physics, Belfast (Ireland), 15 October 2014.

133. *Quantum Physics: From the Schrödinger cat to the most powerful computers*, CNIO Distinguished Seminars, Centro Nacional de Investigaciones Oncológicas, Madrid (Spain), 23 January 2015.

134. *Simuladores Cuánticos*, Encuentros de Excelencia Internacional, Universitat de Valencia (Spain), 29 January 2015.

135. *Quantum Simulations*, Universitat de Barcelona, Facultat Física/Química, Institut d'estudis Espacials de Catalunya (Spain), 26 February 2015.

136. *Quantum Simulations of high energy physics models*, Instituto de la Física Teórica UAM/CSIC Madrid (Spain), 6 March 2015.

137. *Quantum simulations of high energy physics*, University of Ulm (Germany), 1 June 2015.

138. *Quantum simulations with atoms in nano-structures,* MPL Distinguished Lecturer Series, Max Planck Institut for the Physics of Light, Erlangen (Germany), 5 November 2015.

139. *Quantum simulation of high energy physics models*, Instituto Balseiro, San Carlos de Bariloche (Argentina), 16 November 2015.

140. *Collective phenomena with atoms in nano-structures*, Instituto Balseiro, San Carlos de Bariloche (Argentina), 18 November 2015.

141. *Bulk-boundary correspondence and tensor network states*, Instituto Balseiro, San Carlos de Bariloche (Argentina), 19 November 2015.

142. *Simulaciones cuánticas y la dificultad de resolver problemas complejos*, Colloquium, Instituto Balseiro, San Carlos de Bariloche (Argentina), 20 November 2015.

143. *Quantum simulations of high energy physics models*, Colloquium at Deutsches Elektronen-Synchrotron (DESY), Zeuthen (Germany), 20 January 2016.

144. *Quantum Optics and Simulations with Atoms and Photonic Crystals*, Colloquium, Institute for Quantum Optics and Quantum Information (IQOQI), Innsbruck (Austria), 17 February 2016.

145. *Quantum optics with emitters in waveguides*, Colloquium at Yale Quantum Institue, New Haven (USA), 4 March 2016.

146. *Quantum simulations: From condensed matter to high energy models*, Physics Dept. Colloquium at JILA, Boulder (USA), 9 March 2016.

147. *Tensor networks for quantum many-body systems*, CTQM Seminar at JILA, Boulder (USA), 11 March 2016.

148. *Quantum optics with emitters in waveguides*, Colloquium at the Departament of Condensed Matter Physics, Faculty of Sciences (IFIMAC-UAM), Madrid (Spain), 18 April 2016.

149. *Tensor Networks for symmetry protected phases*, Journal Club, Institute of Theoretical Physics (IFT, UAM-CSIC), Madrid (Spain), 19 April 2016.

150. *Quantum Optics with emitters in waveguides*, Wiener Physik Kolloquium, University of Vienna (Austria), 9 May 2016.

151. *Simulación cuántica de problemas complejos*, Conference commemorating the 100th anniversary of the Royal Academy of Sciences of Zaragoza (Spain), 16 May 2016.

152. *Quantum Optics close to dielectric materials*, SFB/ZOQ seminar at the Institute of Laser Physics, University of Hamburg (Germany), 1 June 2016.

153. *Quantum Simulations of low and high energy physics models using cold atoms*, Physikalisches Kolloquium, University of Augsburg (Germany), 6 June 2016.

154. *Quantum Simulations: From Low to High Energy*, Summer Fellows Lectures at ICFO, Castelldefels (Spain), 5 July 2016.

155. *Frontiers in Quantum Computing*, IV Jornada de Supercomputación de la UAM – Cátedra UAM-Fujitsu, Madrid (Spain), 23 September 2016.

156. *Tensor Networks: A Quantum Information Perspective to Many-Body Physics*, Physics colloquium at Harvard University (USA), 24 October 2016.

157. *Tensor Networks: A Quantum Information Perspective to Many-Body Physics*, Theory colloquium at Rudolf Peierls Centre for Theoretical Physics, University of Oxford (UK), 11 November 2016.

158. *Quantum simulations: From condensed matter to high energy models*, Colloquium at Physics Department of Ecole Supérieure Normale (ENS), Paris (France), 17 November 2016.

159. *Tecnologías Cuánticas*, talk in the series "Hablemos de física" at Universidad Complutense de Madrid (Spain), 29 November 2016.

160. *Tecnologías Cuánticas,* BBVA Innovation Center, Madrid (Spain), 20 January 2017.

161. *A Quantum-Information Perspective to Many-Body Physics*, seminar at MPI of Quantum Optics, Garching (Germany), 30 January 2017.

162. *Quantum simulations: From condensed matter to high energy models*, AlbaNova Colloquium, Royal Institute of Technology and Stockholm University (Sweden), 2 February 2017.

163. *Quantum Optics with emitters in waveguides*, Joint Quantum Institute seminar, University of Maryland, College Park, MD (USA), 6 March 2017.

164. *Tensor Networks: A Quantum information perspective to many-body physics*, Physics Colloquium, University of Maryland, College Park, MD (USA), 7 March 2017.

165. *Quantum simulations: From condensed matter to high energy models*, Physics Colloquium, École Polytechnique Féderale de Lausanne (Switzerland), 14 March 2017.

166. *Quantum Science and Technology*, IAC Colloquium Programme, Instituto de Astrofísica de Canarias, La Laguna, Tenerife (Spain), 20 April 2017.

167. *Quantum simulations: From condensed matter to high energy models*, Physics Colloquium, California Institute of Technology (CALTECH), Pasadena, CA (USA), 27 April 2017.

168. *Tensor Networks: A new mathematical tool in quantum many body systems*, Joint colloquium ICMAT-IFT, Instituto de Ciencias Mátematicas & Instituto de Física Teórica, Universidad Autónoma de Madrid, Cantoblanco (Spain), 19 May 2017.

169. *Quantum optics with emitters in waveguides*, Colloquium at ICFO – The Institute of Photonic Sciences, Castelldefels (Spain), 22 May 2017.

170. *Quantum simulations: From condensed matter to high energy models*, Physics Colloquium, Insitute of Nuclear Physics, Johannes-Gutenberg University, Mainz (Germany), 30 May 2017.

171. *Tecnologías Cuánticas*, 35th International Symposium on Lattice Field Theory (Lattice 2017), Universidad de Granada (Spain), 20 June 2017.

172. *Tensor Networks - A quantum information approach to many-body problems*, Max Planck Institute for Gravitational Physics, Potsdam (Germany), 14 September 2017.

173. *Tecnologías cuánticas de la información*, Conferencia Santaló, Universidad Autónoma de Madrid (Spain), 26 October 2017.

174. *Quantum simulations and tensor networks in condensed matter and high-energy physics*, Stanford University, Palo Alto, CA (USA), 31 October 2017.

175. *Quantum simulations and tensor networks in condensed matter and high energy physics*, IFIC, Universitat de València (Spain), 30 November 2017.

176. *Ciencia y Tecnologías Cuánticas de la Información*, IQFR-CSIC, Madrid (Spain), 12 December 2017.

177. *New frontiers in quantum optics and quantum information*, Donostia International Physics Center, San Sebastian (Spain), 25 January 2018.

178. *Quantum optics with emitters in waveguides*, Abbé Center of Photonics, Jena (Germany), 9 February 2018.

179. *Quantum optics in structured waveguides*, MIT-Harvard Center for Ultracold Atoms (CUA), Cambridge, MA (USA), 17 April 2018.

180. *Tensor Networks: Basic results and applications*, Harvard University, Cambridge, MA (USA), 19 April 2018.

181. *Quantum optics in structured waveguides*, ICFO summer fellow program 2018, Castelldefels (Spain), 16 July 2018.

182. *Quantum algorithms for quantum simulation and small devices*, Center for Computational Quantum Physics (CCQ), Flatiron Institute, New York, NY (USA), 4 October 2018.

183. *Quantum emitters in structured reservoirs: Collective effects and quantum simulation*, Chalmers University, Gothenburg (Sweden), 15 November 2018.

184. *Quantum algorithms for quantum simulation and small devices*, Institute of Theoretical Physics, University of Cologne (Germany), 11 December 2018.

185. *Tensor Networks: Basic results and applications*, Royal Academy of Science and the Arts of Belgium (RASAB), Brussels (Belgium), 13 December 2018.

186. *Tensor Network and Quantum Information Theory: Applications in Condensed Matter and High Energy Physics*, Higgs Colloquium, University of Edinburgh (United Kingdom), 15 February 2019.

187. *Quantum algorithms and simulation for quantum many-body systems*, Joint Quantum Seminar, Harvard University (USA), 24 February 2019.

188. *Simulation of quantum many-body systems*, Inauguration Ceremony of the Villum Center at the Niels Bohr Institute, Copenhagen (Denmark), 5 December 2019.

189. *Analog Quantum Simulation: from physics to chemistry*, online colloquium inaugurating the virtual "Quantum Science Seminar" jointly organized by the Universities of Vienna, Innsbruck, Tübingen and the Max Planck Institute of Quantum Optics, 16 April 2020.

190. *Quantum Computing and Simulation*, online colloquium at Max Planck Institute of Plasma Physics (IPP), Garching (Germany), 19 June 2020.

191. *Solving quantum many-body problems with quantum computers*, online colloquium, New York University (USA), 9 October 2020.

192. *Solving quantum lattice gauge theories with quantum computers*, online seminar, „QuantHEP – Quantum Computing Solutions for High-Energy Physics" (QuantERA project 2020-2023), 2 December 2020.

193. *Quantum algorithms for finite energies and temperatures*, online seminar in Quantum information at the Quantum Center, Tel Aviv University (Israel), 2 February 2021.

194. *Quantum simulations and the difficulty of solving many-body problems*, online seminar at the Oxford University Quantum Information Society (United Kingdom), 25 February 2021.

195. *Quantum simulation*, online Quantum colloquium, Simons Institute, UC Berkeley (USA), 13 April 2021.

196. *Quantum Simulations of many-body Systems*, online Quantum seminar lecture at JGU Spring/Summer school 2021, Mainz (Germany), 6 May 2021.

197. *Quantum Simulations with Analog and Digital Quantum Computers*, virtual keynote IICQI-20 seminar series, Sharif University of Technology, Tehran (Iran), 13 May 2021.

198. *Quantum Computing and the Difficulty of Simulating Quantum Many-Body Systems,* online High Energy Theory Seminar, Institute of Advance Study (IAS), Princeton (USA), 7 June 2021.

199. *Quantum Circuits, Cellular Automata and Tensor Networks*, IAS High Energy Theory Seminar, Institute of Advance Study (IAS), Princeton (USA), 4 October 2021.

200. *Preparation and Verification of Tensor Network States*, IAS Physics Group Meeting, Institute of Advance Study (IAS), Princeton (USA), 6 October 2021.

201. *Quantum computing and the difficulty of simulating quantum many-body systems,* online colloquium at Duke University, Durham, NC (USA), 17 November 2021.

202. *Quantum computing and the difficulty of simulating quantum many-body systems*, online SFB colloquium, jointly organized by the University of Hannover and the Physikalisch-Technische Bundesanstalt (PTB) (Germany), 13 January 2022.

203. *Quantum Physics: from Schrödinger cats to quantum computers*, Bavarian Academy of Sciences, Munich (Germany), 25 February 2022.

204. *Quantum Circuits, Cellular Automata and Tensor Networks*, special colloquium at the Instituto de Ciencias Matemáticas (ICMAT), CSIC-UAM-UC3M-UCM, Madrid (Spain), 29 March 2022.

205. *Quantum computing and the second quantum revolution,* online talk at the Quantum computing seminar „La Computación Cuántica: principios y expectativas", Real Academia de Ingeniería, Madrid (Spain), 20 June 2022.

206. *Quo vadis Quantum computing?* Max von Laue Colloquium of the Physical Society at Berlin (PGzB) (Germany), 27 October 2022.

207. *Quantum computers and simulators: do they work in the presence of errors?*, Theoretical Physics Colloquium, University of Oxford (United Kingdom), 11 November 2022.

208. *Quantum computing and simulation in the NISQ era*, Jülich-Saarbrücken Colloquium on Quantum Information, given online on 21 November 2022.

209. *Errors in Quantum computing and simulation*, QUANTUM SCIENCE PERSPECTIVES - Distinguished Lecture Series, Racah Institute of Physics, Hebrew University of Jerusalem (Israel), 9 January 2023.

210. *Quantum Simulation: from many to few body problems*, special colloquium, The Center for Quantum Science and Technology, Weizmann Institute of Science, Rehovot (Israel), 10 January 2023.

211. *Quantum computing in the presence of errors*, colloquium at the Instituto de Ciencias Matemáticas (ICMAT), CSIC-UAM-UC3M-UCM, Madrid (Spain), 9 March 2023.

212. *Quantum computing in the presence of errors*, seminar at the Walther Meißner Institute of the Bavarian Academy of Sciences and Humanities, Garching (Germany), 28 April 2023.

213. *Quantum computing in the presence of errors*, Applied Physics & Physics Colloquium at Stanford University, Palo Alto (USA), 16 May 2023.

214. *Quantum Simulation: from many to few body problems*, Q-FARM seminar at Stanford University, Palo Alto (USA), 17 May 2023.

215. *Quantum Simulation in NiSQ devices*, online Quantum CS theory seminar at Google Quantum AI Venice Beach, California (USA), 5 September 2023.

Outreach

1. *¿Se puede construir un ordenador cuántico?,* Agora de la Ciencia, Residencia de Estudiantes del CSIC, Madrid (Spain), 19 October 2000.

2. *El futuro de la computación cuántica*, University of Zaragoza (Spain), 13 November 2000.

3. *Algo sobre información cuántica,* Universidad de Sevilla (Spain), 22 November 2005.

4. *Computación y comunicación cuántica: Retos y perspectivas,* Real Academia española de Ciencias, Madrid (Spain), 17 May 2006

5. *Computación y comunicación cuántica: Retos y perspectivas,* Cap Aranjuez , Madrid (Spain), 18 May 2006

6. *Computación y comunicación cuántica,* Universidad de La Laguna, Tenerife (Spain), 14 June 2006

7. *La Física cuántica en la sociedad de la información,* Universidad de Zaragoza (Spain), 25 October 2006.

8. *La Física Cuántica en la sociedad de la información,* Universidad de Santiago de Compostela (Spain), 17 November 2006.

9. *La vision del mundo desde la óptica de la física cuantica,* Taller de periodismo científico, Ciudad Real (Spain), 11 December 2006.

10. *Una vision del mundo a través de la Física Cuántica,* Universidad de Murcia (Spain), 09 January 2007.

11. *La visión del mundo desde la perspectiva de la física cuántica,* Ayuntamiento de Manresa (Spain), 15 January 2007.

12. *Una ventana al mundo microscópico,* Academia de Bellas Artes Barcelona (Spain), 16 January 2007.

13. *La física cuántica en la sociedad de información,* Ateneo de Madrid (Spain), 27 April 2007.

14. *El impacto de la física cuántica en la sociedad,* CSIC Jornadas Madrid (Spain), 14 June 2007.

15. *La física cuántica en la sociedad de la información,* CosmoCaixa Set of Talks Barcelona (Spain), 16 October 2007.

16. *Fiscal Cuánitca: de paradojas a nuevas tecnologías de la información,* Conferencía del Colegio Madrid, (Spain), 31 May 2008.

17. *La Física Cuántica: implicaciones filosóficas y technolóicas para el siglo XXI,* Cortes de Aragón, Zaragoza (Spain), 27 October 2008.

18. *Current challenges in the field of quantum technology,* Queen Sofia Spanish Institute New York (USA), 18 November 2008.

19. *Nuevas fases de la materia: Una expedición en busca del frio, C*aixa Manresa Event at the Auditorium of Barcelona (Spain), 10 January 2009.

20. *Computación cuántica: Retos y Perspectivas,* Encuentro sobre Fronteras de la Ciencia – Fundacion de Duques, Salamanca (Spain), 25 February 2009.

21. *Cooperación hispano-aleman en material de investigación,* Foro Hispano Alemán – Palacio de la Bolsa de Madrid (Spain), 13 March 2009.

22. *Computación Cuántica,* Fundación Marcelino Botín, Santander (Spain), 11 March 2010.

23. *Computación Cuántica: nuevas tecnologías para el siglo XXI,* Caixa Forum, Tarragona (Spain), 16 March 2010.

24. *Información cuántica para el siglo XXI,* XXVII Universitat d'Estiu, Andorra, 19 March 2010.

25. *Fisíca Cuantica: de paradojas y ordenadores,* INDITEX, La Coruña (Spain), 3 March 2011.

26. *Gatos, ordenadores y alguna cosa mas,* Residencia d'Investigadors, Barcelona (Spain), 23 March 2011.

27. *De gatos y ordenadores: la Física Cuántica para el Siglo XXI,* Instituto Quimica de Sarria (IQS), Barcelona (Spain), 24 March 2011.

28. *De gatos y ordenadores: la Física Cuántica para el Siglo XXI,* Colegio Miguel de Cervantes de Sao Paolo, (Brasil), 4 May 2011.

29. *Nuevas fases de la material: una expedición en busca del frio*, Donostia International Physics Center (DIPC), San Sebastián (Spain), 2 December 2011.

30. *Quantum Physics: A source of mysteries and applications",* Erwin Schrödinger Lecture at the Austrian Academy of Sciences, Vienna, 27 March 2012.

31. *Estarán los ordenadores del futuro basados en la Física Cuántica?* Universitat Politècnica de Catalunya (UPC), Barcelona (Spain), 19 April 2012.

32. *Ordenadores cuánticos, ACTS Ordenadores cuánticos y Retos Tecnológicos,* Residencia d'Investigadors CSIC-Generalitat de Catalunya, Barcelona (Spain), 20 April 2012.

33. *Simuldores cuánticos con atomos, ions y fotones,* Institut d'Estudis Catalans, Societat Catalana de Física, Barcelona (Spain), 24 April 2013.

34. *Los superordenadores del futuro,* Spanish Embassy, Stockholm (Sweden), 11 June 2013.

35. *Física cuántica y los ordenadores del futuro,* Centro de Estudios Comarcales del Bajo Aragón, Caspe (Spain), 5 July 2013.

36. *Superordenadores para el siglo XXI,* Universitat de Vic (Spain), 5 February 2014.

37. *Conversaciones en la Fundación,* Fundación Juan March, Madrid (Spain), 23 May 2014.

38. *Ciencia para el siglo XXI: Algunos retos cruciales,* "LaCaixa", CaixaForum, Madrid (Spain), 16 June 2014.

39. *Una vision de la ciencia desde Alemania,* Universidade A Coruña (Spain), 19 September 2014.

40. *"De la física cuántica al gato de Schrödinger,* Semana de la Ciencia, Alcoy, Universitat Politècnica de València (Spain), 18 November 2014.

41. *Física cuántica: Del gato Schrödinger al ordenador del futuro,* Universidad de Burgos (Spain), 20 January 2015.

42. *Cuando investigar es una pasión más que una profesión,* Jornada APD, Auditorio BBVA, Madrid (Spain), 22 January 2015.

43. *La Luz y los cuantos,* Inauguration of the International Year of Light in Spain, Barcelona (Spain), 16 February 2015.

44. *Algunos retos de la física para el siglo XXI,* Inauguración Cátedra Julio Palacios, Madrid (Spain), 14 April 2015.

45. *Superordenadores del futuro,* Fundación CEDE, Madrid (Spain), 11 June 2015.

46. *Los retos de la Física para el siglo XXI,* Fundación CEDE, Madrid (Spain), 12 June 2015.

47. *¿Cómo serán los superordenadores del futuro?* Fórum IMPULSA, Girona (Spain), 26 June 2015.

48. *La era del conocimiento: Nuevos modelos de negocio*, round table debate with César Alierta, J. Ignacio Cirac y Carlos Slim at the "XVI Asamblea Annual del Foro Iberoaméricana, Barcelona (Spain), 12-13 October 2015.

49. *La luz, los cuantos, y las nuevas tecnologías*, Fundación Ramón Areces, Madrid (Spain), 3 December 2015.

50. *La luz, los cuantos, y las nuevas tecnologías*, Reial Academia de Ciencies i Arts de Barcelona (Spain), 25 February 2016.

51. *La luz, los cuantos, y las nuevas tecnologías*, Universidad Católica del Norte, Antofagasta (Chile), 8 April 2016.

52. *Computadores cuánticos: ¿Una nueva revolución tecnológica?* Puerto de Ideas, Festival de Ciencia, Antofagasta (Chile), 10 April 2016.

53. *Innovación e impacto en nuestro futuro*, Impact Innovation Talks, Telefónica SA, Madrid (Spain), 21 June 2016.

54. *Adaptar los sistemas de criptografía cuántica a las redes de Telefónica*, Universitas Telefónica, Barcelona (Spain), 21 September 2016.

55. *Física Cuántica en el siglo XXI*, Universidad Autónoma del Estado de Hidalgo, Pachuca de Soto (Mexico), 7 November 2016.

56. *Los supercomputadores del futuro*, Universidad Autónoma del Estado de Hidalgo, Pachuca de Soto (Mexico), 8 November 2016.

57. *Quantum Computing*, Universitas Telefónica, Madrid (Spain), 30 November 2016.

58. *Física y el Desarrollo de la Tecnología*, I Fórum GADEA de la Ciencia, CSIC, Madrid (Spain), 24 October 2017.

59. *Quantum Science and Technology for the 21st century*, Eidgenössische Technische Hochschule (ETH) Zurich (Switzerland), 15 November 2017.

60. *Ordenadores cuánticos y la seguridad de las redes*, Network Innovation Day, Telefónica, Madrid (Spain), 14 June 2018.

61. *Computación Cuántica: Tecnologías para una era digital*, El País RETINA LTD 2018, Madrid (Spain), 25 October 2018.

62. *La Física Cuántica: del gato de Schroedinger al computador cuántico*, Universidad de Buenos Aires (Argentina), 18 July 2019.

63. *Ordenadores cuánticos: cómo, cuándo y para qué*, Fundación Ramón Areces, Madrid (Spain), 26 September 2019.

64. *¿Cómo serán los superordenadores del futuro?*, Festival "Passion for Knowledge" (P4K), San Sebastián (Spain), 1 October 2019.

65. *Ordenadores cuánticos*, Asociación de Científicos Españoles en Bélgica (CEBE), Instituto Cervantes, Brussels (Belgium), 16 October 2019.

66. *Revolución tecnológica y computación cuántica: ¿Hacía dónde vamos?*, conversación con Iñaki Gabilondo en el ciclo "Cuatro conversaciónes de futuro", Fundación César Manrique, Lanzarote (Spain), 11 November 2019.

67. *Quantum computing – impact for business,* panel discussion at "Tomorrow Conference" organized by Mc Kinsey, Berlin (Germany), online on 13 November 2020.

68. *Encuentro con María Blasco y Juan Ignacio Cirac,* Foro Telos 2020, online on 4 December 2020.

69. *Tecnologías Cuánticas: los Cumputadores y Sistemas de Comunicación del Futuro,* conference organized by ARCyTAN, Escuela Técnica Superior de Ingeniería (ETSI) de la Universidad de Sevilla (Spain), online on 14 December 2020.

70. *Quo vadis Quantum Computing?* Munich Quantum Stammtisch, organized by Munich Center for Quantum Science and Technology (MCQST), online on 3 February 2021.

71. *Is the moon there when nobody looks?* Munich Quantum Stammtisch, organized by Munich Center for Quantum Science and Technology (MCQST), online on 18 March 2021.

72. *Bayern 20x20 – Quantum Technology,* organized by the Bavarian Office in Israel, online discussion panel on 20 April 2021.

73. *Leadership in Quantum,* career talk and exchange with students, onlinle event jointly organized by PushQuantum and QuantX on 20 April 2021.

74. *Tecnologías Cuánticas y Ciberseguridad,* jornada on line "Telecomunicaciones y Ciberseguridad Cuántica y Postcuántica" organized by APTIE and BqB on 27 May 2021.

75. *Science in dialogue: Prof. Dr. Juan Ignacio Cirac,* round of discussions organized by the The Embassy of Spain and the Association of SpanishScientists in Germany (CERFA) on 10 June 2021.

76. *Computación cuántica*, opening speech at the online conference "Jornadas de verano", organized by student group of The Royal Spanish Society of Physics (RSEF), Madrid (Spain), 13 July 2021.

77. *Mobius Forum Session*, online round table discussion about Science and Technology for the Common Destiny of Mankind, 4th World Laureate Forum, Shanghai (China), 30 October 2021.

78. *WLA Young Scientists Forum*, online discussion with young scientists at the Astrophysics and Physics Session III, 4th World Laureate Forum, Shanghai (China), 31 October 2021.

79. *Tecnologías Cuánticas,* online, Aula de Extensión Universitaria de los Ingenieros Industriales de Cataluña, Barcelona (Spain), 3 November 2021.

80. *Analog Quantum Simulation: From physics to chemistry,* Symposium on Breakthroughs in Physical Sciences, conference "Falling Walls 2021", Berlin (Germany), 8 November 2021.

81. *Quantum Colloquium – panel on Making Predictions in a Quantum World* (online), featuring S. Aaronson, D. Aharonov, I. Cirac, E. Hazan, Umesh Vazirani, Simons Institute for the Theory of Computing, UC Berkeley, CA (USA), 30 November 2021.

82. *La computación cuántica y su impacto en nuestra sociedad*, online conference as part of the series "Diálogos de Ciencia en Español", organized by The Rafael del Pino Foundation, the Regional Ministry of Education, Universities, Science and Spokesperson of the Community of Madrid, the Spanish Office and the Club de Científicos de la Asociación de Becarios de Excelencia Rafael del Pino, Madrid (Spain), 30 March 2022.

83. *The QT landscape*, virtual keynote speech at the "Quantum Careers Symposium" at La Pedrera, Barcelona (Spain), 8 April 2022.

84. *Diálogos de Futuro*, encounter with José Manuel Nieves, organized by the newspaper Diario ABC and the Foundation La Caixa at the CaixaForum in Madrid (Spain), 20 April 2022.

85. *Quantum Information: from Schrödinger Cats to Quantum Computers*, guest lecture at the PLANCKS2022 competition at Ludwig-Maximilians University (recordings available on YouTube), Munich (Germany), 5 May 2022.

86. *El impacto de la computación cuántica en el siglo XXI*, lecture at the Academia Europea de Leadership, Barcelona (Spain), 1 July 2022.

87. *Trapped i(o)n quantum computing – and what it means to break free*, impulse speech at the 24th summit of TSSI, Elmau Castle (Germany), 16 September 2022.

88. *Computación Cuántica*, discussion panel with Zuberoa Andrés and Ignacio Cirac at Librecon 2022, Bilbao (Spain), 16 November 2022.

89. *La computación cuántica y Machine Learning*, opening talk at The Forum of 'The Silent Revolution of Quantum & AI is coming', organized by The Bankinter Innovation Foundation, Madrid (Spain), 1 December 2022.

90. *Quantum Computing y Machine Learning*, online "#Futuretalk" organized by the Foundation Innovación Bankinter, within the series "The Silent Revolution of Quantum & AI", 2 February 2023.

91. *What is next in Quantum Technologies?* Key dialogue between Ignacio Cirac (MPQ) and Jay Gambetta (IBM Research), conference on "Quantum technologies and future challenges", organized by DIPC and the Basque Government, San Sebastian (Spain), on 24 March 2023.

92. Euronews Debate: *Innovate or be history! How can Europe regain leadership in innovation?*, panel discussion organized in partnership with the European Round Table for Industry (ERT), Brussels (Belgium), on 27 March 2023.

93. Panel discussion about society's future, education and artificial intelligence at the "V Encuentro internacional Rectores Universia" at Valencia on 9 May 2023.

94. *Quantum computer – a dream or reality?*, public talk connected to the conference "Beyond IID in Information Theory 11" at the University of Tübingen (Germany), 31 July 2023.

95. Discussion panel (online) on "*Artificial Intelligence, Human wellbeing, and social development*" at the "I Global Forum on Artificial Intelligence and Sustainability" organized by the University of Sevilla (Spain), 26 September 2023.

96. Discussion panel on "*Innovación Tecnológica y Ciencia*" during the "Encuentro Luso-Españoles" (meeting of the Royal Spanish Academy of Sciences with the National Academy of Sciences of Portugal), 30 September 2023.

97. Background table discussion on *"Securing the Quantum Realm: Challenges and Solutions"* at the conference "Falling Walls" in Berlin (Germany), 8 November 2023.

98. Plenary Table discussion on *"Perspectives and Challenges in Quantum Computing"* at the conference "Falling Walls" in Berlin (Germany), 8 November 2023.

99. Panel discussion on *"The Quantum in Europe"* at the conference "Tecnologías cuánticas en Europa", organized by FECYT Innovation, Madrid (Spain), 22 November 2023.

100. *Tecnologías cuánticas: un sueño o una realidad*, closing talk of the XX. Week of Science, organized by the Universitat Politècnica de València (Spain), 24 November 2023.

101. *Qué interés se esconde tras un ordenador cuántico*, talk at the Colegio Mayor Juan XXIII Roncaglio in Madrid (Spain), 27 November 2023.

102. *Tecnologías cuánticas: un sueño o una realidad*, public talk at the Club Diario de Mallorca, organized by the "Cercle d'Economia de Mallorca", 18 January 2024.

Organization of Conferences and Workshops

1. Benasque Workshop on Quantum Information Science (coorganized with A. Ekert), Benasque (Spain)
   1998: 5 July to 25 July
   2000: 2 July to 21 July
   2003: 22 June to 11 July
   2005: 12 June to 1 July
   2007: 17 June to 29 June
   2009: 07 June to 28 June
   2011: 12 June to 30 June
   2013: 23 June to 12 July
   2015: 21 June to 10 July
   2017: 25 June to 14 July
   2019: 23 June to 12 July
   2023: 18 June to 8 July

2. Euresco Conference on Bose-Einstein Condensation, San Feliu de Guixols (Spain),
   15 September to 20 September 2001.

3. Gordon Research Conference on Quantum Information Science (coorganized with P. Zoller), Il Ciocco (Italy),
   7 May to 12 May 2006.

4. ICTP Workshop on Quantum Phenomena and Information: *From Atomic to Mesoscopic Systems,* Triest (Italy),
   5 May to 16 May 2008.

5. Joint Workshop MPQ/Barcelona Research Centers on Quantum Information, San Benet (Spain),
   3 December to 6 December 2008.

6. Workshop on Quantum Simulation/Computation with Cold Atoms and Molecules, Aspen (USA),
   24 May to 6 June 2009.

7. Políticas para la excelencia científica de España, UIMP, Santander (Spain), 25 Julio to 27 Julio 2011.

8. Joint ICFO-MPQ workshop at ICFO, Barcelona, (Spain), 22 May to 24 May 2013.

9. 2nd Kavli-MPQ workshop, MPQ, Garching (Germany), 12 June - 13 June 2014.

10. Program “Symmetry, Topology, and Quantum Phases of Matter: From Tensor Networks to Physical Realizations” (coorganized with Lukasz Fidkowski, Ashvin Vishwanath, and Cenke Xu), KITP, University of California, Santa Barbara (USA), 26 September – 16 December 2016.

11. Workshop “Challenges in Quantum Computation” (CQC), Simons Institute for the Theory of Computing, UC Berkeley (USA), 11 – 15 June 2018.

12. Workshop “Gravity, Fundamental Symmetries and Information”, Max Planck Institute of Quantum Optics (Germany), 4 November – 6 November 2019.

13. Online Workshop “Quantum Devices: Simulation, Supremacy, and Optimization” (coorganized with David DiVicenzo and Barbara Terhal), within the program “The Quantum Wave in Computing” at the Simons Center, University of California, Berkeley (USA), 4 – 8 May 2020.

14. “Quantum Wave in Computing Reunion/Summer Cluster Workshop” (online), coorganized with Umesh Vazirani, Andrew Childs and Thomas Vidick, Simons Center, University of California, Berkeley (USA), 12 – 16 July 2021.

15. Workshop on “Quantum Emitters in Non-Conventional Baths”, Max-Planck-Institute of Astrophysics, Garching (Germany), 28 February – 2 March 2022. 2023 MIAPbP program “Quantum Computing Methods in High-Energy Physics”, Technical University of Munich (Germany), coorganized with Christian Bauer, Marcello Dalmonte, Zohreh Davoudi, Henry S. Lamm, Michael Spannowsky, 10 April – 5 May 2023

LIST OF PUBLICATIONS

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D. Malz, G. Styliaris, Z.-Y. Wei, J. I. Cirac, Phys. Rev. Lett. **132**, 040404 (2024).

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2. *A variational Monte Carlo algorithm for lattice gauge theories with continuous gauge groups: a study of (2+1)-dimensional compact QED with dynamical fermions at finite density,*
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3. *Simulating prethermalization using near-term quantum computers,*
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4. *Cross-Platform Verification in Quantum Network,*
J. Knörzer, D. Malz, J. I. Cirac, Phys. Rev. A **107**, 062424 (2023).

5. *Efficient adiabatic preparation of tensor network states,*
Z.-Y. Wei, D. Malz, J. I. Cirac, Phys. Rev. Research **5**, L022037 (2023).

6. *Symmetries and field tensor network states,*
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8. *Long-Range Free Fermions: Lieb-Robinson bound, clustering properties, and topological phases,*
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10. *Free-fermion Page Curve: Canonical Typicality and Dynamical Emergence,*
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11. *Transitions in computational complexity of continuous-time local open quantum dynamics,*
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Comments:
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Comments:
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5.- Patents

1. *Long-distance quantum communication*
   Patent numbers: 7317574 & 7532400
   Inventors: Peter Zoller, Luming Duan, Ignacio Cirac, Mikhail D. Lukin

2. *Scalable room temperature quantum information processor*
   Patent number: 9317473
   Inventors: Norman Y. Yao, Liang Jiang, Alexey V Gorshkov, Peter C Maurer, Geza Giedke, Juan Ignacio Cirac, Mikhail D. Lukin

3. *Unforgeable Noise-Tolerant Quantum Tokens*
   Publication number: 20140358793
   Inventors: Fernando Pastawski, J. Ignacio Cirac, Liang Jiang, Mikhail D. Lukin