

CURRICULUM VITAE

Carlos Navarrete-Benlloch

(July, 2019)

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1.- PERSONAL INFORMATION



Name: Carlos Navarrete-Benlloch

Birth: February 10th, 1983 (Valencia, Spain)

Address: Wilczek Quantum Center
Shanghai Jiao Tong University
Dongchuan Road 800, Minhang District,
Shanghai, China 200240

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Email: derekkorg@gmail.com

Web: www.carlosnb.com

Current state: Associate Professor (tenure track).

Research interests: My research is at the interface between theoretical quantum physics and modern technologies, in a field that has come to be known as *Quantum Optics*, dealing with systems described quantum electrodynamics at low energies under open and nonequilibrium conditions. I am particularly interested in *open* and/or *critical quantum optical systems*. By *open* I mean systems that exchange energy and information with its surrounding environment (e.g., through dissipation). By *critical*, I refer to systems that undergo some kind of phase transition or sudden change of behavior as their parameters are changed. I focus on three aspects of such systems: developing or adapting *mathematical techniques* to describe them, proposing *implementations* of interesting models in modern platforms (nonlinear optics, superconducting circuits, mechanical devices, cold atoms, and exciton polaritons), and seeking for *new phenomena* and *applications* such as quantum state preparation. I also work on and off in quantum simulators, quantum information with continuous variables, and quantum walks.

For further references contact:

J. Ignacio Cirac (postdoc adv. 2012-2016)
Director at the
Max-Planck Institute for Quantum Optics
Email: ignacio.cirac@mpq.mpg.de

Florian Marquardt (adv. since 2016)
Director at the
Max-Planck Institute for the Science of Light
Email: florian.marquardt@mpl.mpg.de

Germán J. de Valcárcel (PhD adv.)
Full Professor at
Valencia University
Email: german.valcarcel@uv.es

Eugenio Roldán (PhD adv.)
Full Professor at
University of Valencia
Email: eugenio.rolدان@uv.es

2.- ACADEMIC TITLES

- *European PhD degree* at the Universitat de València.
Feb 2008 - December 2011.
Summa cum laude (highest honour).
- *Master in Advanced Physics* (specialty on *Theoretical Physics*) at the Universitat de València.
September 2006 - Nov 2007.
Global Mark: 9.2 (over 10).
- *5-year Degree in Physics* (specialty on *Theoretical Physics*) at the Universitat de València.
September 2001 – July 2006.
Global Mark: 9.12 (over 10).

3.- EMPLOYMENT HISTORY

- *Associate professor (tenure track)*
Place: Wilczek Quantum Center, Shanghai Jiao Tong University.
April 2019 - present
- *Research group leader.*
Granted by Florian Marquardt's Theory Division.
Place: Max-Planck Institute for the Science of Light.
November 2017 – March 2019
- *Senior postdoctoral research associate.*
Granted by the Max-Planck Society.
Place: Max-Planck Institute for the Science of Light.
November 2016 – October 2017
- *Senior postdoctoral research associate.*
Granted within the ERC starting grant "Theory of optomechanical circuits".
Place: Friedrich-Alexander Erlangen-Nürnberg Universität.
February 2016 – October 2016
- *Senior postdoctoral research associate.*
Granted by the Max-Planck Society.
Place: Max-Planck Institute for Quantum Optics, J. Ignacio Cirac's Theory Division.
February 2015 – January 2016
- *Alexander von Humboldt society fellowship for postdoctoral researchers.*
Granted by the Alexander von Humboldt society.
Place: Max-Planck Institute for Quantum Optics, J. Ignacio Cirac's Theory Division.
February 2013 – January 2015
- *Postdoctoral research associate.*
Granted by the Max-Planck Society under the European Commission FP7 Project: 265522.
Place: Max-Planck Institute for Quantum Optics, J. Ignacio Cirac's Theory Division.
February 2012 – January 2013
- *Beca de formación del profesorado universitario (FPU - Ph.D. grant).*
Granted by the Spanish Education and Science.
Topic: *Squeezing in Nonlinear Optical Systems.*
Place: Optics department at Universitat de València.
May 2007 – April 2011.
- *Becas CSIC de introducción a la investigación para estudiantes de Últimos Cursos.*
Granted by the Spanish Research Council (CSIC).
Topic: *Quantum Information and Quantum Optics.*
Place: IFIC (Particle Physics Institute) - Universitat de València.
September – December, 2006.
July and September, 2005.
- *Beca de colaboración para estudiantes de Último Curso.*
Granted by the Spanish Ministry of Education and Science.
Topic: *Study of methods for the design of biological systems with given optical functionalities.*
Place: Optics Department (Universidad de Valencia).
January – June, 2006.

4.- Publications

4.1.- Published articles

1. E. Roldán, J. Kofler, and C. Navarrete-Benlloch.
Light polarization measurements in tests of macrorealism.
Phys. Rev. A **97**, 062117 (2018).
2. J. Ruiz-Rivas, G. J. de Valcárcel, and C. Navarrete-Benlloch.
Active locking and entanglement in type II optical parametric oscillators.
New J. Phys. **20**, 023004 (2018).
3. C. Navarrete-Benlloch, G. Patera, and G. J. de Valcárcel.
Noncritical generation of nonclassical frequency combs via spontaneous rotational symmetry breaking.
Phys. Rev. A **96**, 043801 (2017).
4. C. Navarrete-Benlloch, T. Weiss, S. Walter, and G. J. de Valcárcel.
General linearized theory of quantum fluctuations around arbitrary limit cycles.
Phys. Rev. Lett. **119**, 133601 (2017).
5. Y. Chang, C. Sánchez Muñoz, C. Navarrete-Benlloch*, A. González-Tudela, and T. Shi.
Deterministic down-converter and continuous photon-pair source within the bad cavity limit.
Phys. Rev. Lett. **117**, 203602 (2016).
*All authors contributed equally, so all authors are to be considered first author.
6. M. Abdi, P. Degenfeld-Schonburg, M. Sameti, C. Navarrete-Benlloch, and M. J. Hartmann.
Dissipative optomechanical preparation of macroscopic quantum superposition states.
Phys. Rev. Lett. **116**, 233604 (2016).
7. J. Ruiz-Rivas, C. Navarrete-Benlloch, G. Patera, E. Roldán, and G. J. De Valcárcel.
Dissipative structures in optomechanical cavities.
Phys. Rev. A **93**, 033850 (2016).
8. S. Pina-Otey, F. Jiménez, P. Degenfeld-Schonburg, and C. Navarrete-Benlloch.
Classical and quantum-linearized descriptions of degenerate optomechanical parametric oscillators.
Phys. Rev. A **93**, 033835 (2016).
9. M. Benito, C. Sánchez Muñoz, and C. Navarrete-Benlloch.
Degenerate parametric oscillation in quantum membrane optomechanics.
Phys. Rev. A **93**, 023846 (2016).
10. P. Degenfeld-Schonburg, M. Abdi, M. J. Hartmann, and C. Navarrete-Benlloch.
Degenerate optomechanical parametric oscillators: cooling in the vicinity of a critical point.
Phys. Rev. A **93**, 023819 (2016).
11. P. Degenfeld-Schonburg, C. Navarrete-Benlloch, and M. J. Hartmann.
Self-consistent projection operator theory in nonlinear quantum systems: A case study on degenerate optical parametric oscillators.
Phys. Rev. A **91**, 053850 (2015).
12. C. Navarrete-Benlloch, J. J. García-Ripoll, and D. Porras.
Nonclassical lasing in circuit quantum electrodynamics.
Physical Review Letters **113**, 193601 (2014).
13. C. Navarrete-Benlloch, E. Roldán, Y. Chang, and T. Shi.
Regularized linearization for quantum nonlinear cavities: application to degenerate optical parametric oscillators.
Optics Express **22**, 24010 (2014)
14. C. Navarrete-Benlloch and G. J. de Valcárcel.
Impact of anisotropy in the noncritical squeezing properties of two-transverse-mode optical parametric oscillators.
Physical Review A **87**, 065802 (2013).
15. C. Navarrete-Benlloch, R. García-Patrón, J. H. Shapiro, and N. J. Cerf.
Enhancing entanglement by photon addition and subtraction.
Physical Review A **86**, 012328 (2012).

16. G. Patera, C. Navarrete-Benlloch, G. J. de Valcárcel, and C. Fabre.
Quantum coherent control of highly-multipartite continuous-variable entangled states by tailoring parametric interactions.
European Physical Journal D **66**, 241 (2012).
17. R. García-Patrón, C. Navarrete-Benlloch, S. Lloyd, J. H. Shapiro, and N. J. Cerf.
Majorization theory approach to the Gaussian channel minimum entropy conjecture.
Physical Review Letters **108**, 110505 (2012).
18. C. Navarrete-Benlloch, E. Roldán, and G. J. de Valcárcel.
Squeezing properties of a two-transverse-mode degenerate optical parametric oscillator with an injected signal.
Physical Review A **83**, 043812 (2011).
19. C. Navarrete-Benlloch, I. de Vega, D. Porras, and J. I. Cirac.
Simulating quantum-optical phenomena with cold atoms in optical lattices.
New Journal of Physics **13**, 023024 (2011).
20. F. V. Garcia-Ferrer, C. Navarrete-Benlloch, G. J. de Valcárcel, and E. Roldán.
Noncritical quadrature squeezing through spontaneous polarization symmetry breaking.
Optics Letters **35**, 2194 (2010).
21. C. Navarrete-Benlloch, A. Romanelli, E. Roldán, and G. J. de Valcárcel.
Noncritical quadrature squeezing in two-transverse-mode optical parametric oscillators.
Physical Review A **81**, 043829 (2010).
22. F. V. Garcia-Ferrer, C. Navarrete-Benlloch, G. J. de Valcárcel, and E. Roldán.
Squeezing via spontaneous rotational symmetry breaking in a four-wave mixing cavity.
IEEE Journal of Quantum Electronics **45**, 1404 (2009).
23. C. Navarrete-Benlloch, G. J. de Valcárcel, and E. Roldán.
Generating highly squeezed Hybrid Laguerre-Gauss modes in large-Fresnel-number degenerate optical parametric oscillators.
Physical Review A **79**, 043820 (2009).
24. C. Navarrete-Benlloch, E. Roldán, and G. J. de Valcárcel.
Noncritically squeezed light via spontaneous rotational symmetry breaking.
Physical Review Letters **100**, 203601 (2008).
25. C. Navarrete-Benlloch, A. Pérez, and Eugenio Roldán.
Non-linear optical Galton board.
Physical Review A **75**, 062333 (2007).
26. M.C. Bañuls, C. Navarrete, A. Pérez, Eugenio Roldán, and J.C. Soriano.
Quantum walk with a time-dependent coin.
Physical Review A **73**, 062304 (2006).

4.2.- Preprints

27. J. Ruiz-Rivas, C. Navarrete-Benlloch, E. Roldán, and G. J. de Valcárcel.
Dissipative structures in an optomechanical cavity model with a microstructured oscillating end mirror.
arXiv:1609.07405.
28. N. Mohseni, S. Saeidian, J. P. Dowling, C. Navarrete-Benlloch.
Deterministic generation of hybrid high-N00N states with Rydberg ions trapped in microwave cavities.
arXiv: 1809.09835.

4.3.- Books and lecture notes

1. *An introduction to the formalism of quantum information with continuous variables.*
Morgan and Claypool Publishers – Institute of Physics Publishing
December, 2015; Concise Physics series.
2. *Open systems dynamics: simulating master equations in the computer.*
arXiv: 1504.05266.
3. *An introduction to open quantum optical systems.*
Morgan and Claypool Publishers – Institute of Physics Publishing
In preparation.

5.- TEACHING ACTIVITY

- *Open quantum optical systems*
Friedrich-Alexander University (Erlangen, Germany).
2017/2018 Winter Semester. Elective Bachelor, Master, PhD course, 5 ECTS credits (3 hours/week).
- *A primer on quantum optics and open systems*
Max-Planck Institute for the Science of Light (Erlangen, Germany).
OMT Marie-Curie Training Network Summer School.
July 5th – 7th, 3.5 hours.
- *An introduction to the formalism of quantum information with continuous variables*
Universitat de València (Burjassot, Spain).
November-December, 2011. 10-hour seminar for the PhD program.
- *San José de Calasanz High School (Valencia).*
January 23th – 25th, 2006.
Physics and Mathematics to 4 groups in the last 3 high-school grades.
- *Individual Teaching of Physics and Mathematics.*
More than 20 students along the period 1998 – 2003 (*all high-school levels*).

6.- SUPERVISED THESES AND MENTORING

- Current students and postdocs: Naeimeh Mohseni (Postdoc), Emmanouil Grigoriu (PhD), and Benjamin Löckler (MSc).
- Akash nag Oruganti, Master Thesis (*2.7 - Satisfactory*)
Quantum theory of actively-phase-locked optical parametric oscillators subject to limit-cycle motion.
Max-Planck Institute for the Science of Light
and Friedrich-Alexander Erlangen-Nuremberg University (Germany).
- Benjamin Löckler, Bachelor Thesis (*1.0, highest honour*)
Study of many-body bosonic Hamiltonians under the action of particle non-conserving processes .
Max-Planck Institute for the Science of Light
and Friedrich-Alexander Erlangen-Nuremberg University (Germany).
- Naeimeh Mohseni, PhD Thesis (*Excelent, highest honour*)
Quantum Optical Proposals with Application to Quantum Computation, Simulation, and Metrology.
December 2019, Institute for Advanced Studies in Basic Sciences (Zanjan, Iran).
- Emmanouil Grigoriu, Master Thesis (*La plus haute distinction, highest honour*).
Study of autonomous quantum thermodynamical machines.
September 2018, Free University of Brussels (Belgium).
- Mentor of the 2016/2017 and 2017/2018 *International Mentor Program* of the International Mentoring Foundation for the Advancement of Higher Education (www.imfahe.org).
- Joaquín Ruiz-Rivas, PhD Thesis (*Summa cum laude, highest honour*).
Contributions to three models related to cavity quantum optics.
July 2015, Universitat de València (Valencia, Spain).
- Sebastian Pina-Otey, Bachelor's Thesis (*Extraordinary prize for theses defended in 2015*).
Classical and quantum linearized descriptions of degenerate optomechanical parametric oscillators.
July 2015, Universitat Autònoma de Barcelona (Barcelona, Spain).

7.- PARTICIPATION IN RESEARCH PROJECTS

- *Quantum fluctuations and dynamics of optical cavities.*
Spanish National Project: FIS2011-60715-P
Full time researcher; scientist in charge: Eugenio Roldán Serrano.
January 2014 – December 2017.
- *Light-Matter interaction in absence of cavities (MALICIA).*
European Commission FP7 Project (Information and Communication Technologies): 265522
Full time researcher; scientist in charge of the MPG node: J. Ignacio Cirac
February 2012 – January 2013.
- *Classical and quantum dynamics of multimode optical systems.*
Spanish National Project: FIS2011-26960
Full time researcher; scientist in charge: Germán J. De Valcárcel.
January 2012 – December 2014.
- *Spatio-temporal dynamics and quantum fluctuations in optical cavities.*
Spanish National Project: FIS2008-06024-C03-01
Full time researcher; scientist in charge: Eugenio Roldán.
January 2009 – December 2011.
- *Valencian iGEM¹ team.*
January 2006 – November 2006.
Project: * *Characterization of E.Coli as a pH sensor using the signal transduction system EnvZ-OmpR.*
* *Design and synthesis of a vanillin-binding periplasmic protein.*
* *Design and synthesis of a genetic network inside E.Coli being able to detect three different levels of an external stimulus.*
- *Collaboration with the Quantum and Non Linear Optics Group* belonging to the Optics department at the Universitat de València from April 2005 to May 2007.
Work topics: *Quantum Walks* and *Squeezed States of Light from Nonlinear Optical Cavities.*

8.- PRIZES AWARDED

- Extraordinary PhD prize of the University of Valencia, for theses defended between 2011 and 2013.
- 2nd Prize at the *Certamen Arquímedes para jóvenes investigadores²* for the work *Non Linear Quantum Walk* (December 1st, 2006).
- 1st place on the local phase (Valencia, Spain) of the XIII *Physics Olympiad* (February 20th, 2001).

¹ iGEM stands for *international Genetically Engineered Machine* competition, a non-lucrative contest promoted by the Massachusetts Institute of Technology (MIT) devised to promote research in Synthetic Biology.

To this aim, the participating teams have to develop a project with the following characteristics:

- Design of a metabolic or/and genetic network with an interesting function inside a cell.
- Mathematical simulation of that network.
- Experimental implementation of the network in a cell (typically, the bacterium *E.Coli*).

Finally, teams from all over the world meet at MIT in order to show and discuss their results.

² This is a competition organized by both the Spanish Science Ministry and the Spanish Research Council where undergraduate students can present original, non-published research work. There are two first prizes (science and humanities) of 9.200 €, a second prize of 6.000 €, a third prize of 4000 € and two consolation prizes of 3.000 €.

9.- SEMINARS AND COURSES ATTENDED

- *Quantum Information Processing and Communication 2011 school.*
Included courses: *Superconducting circuits (A. Blais),
Quantum computing (D. DiVincenzo),
Cold atoms (J. Home),
Opto-mechanical systems (F. Marquardt),
Quantum information theory (R. Renner),
Charges and spins (S. Tarucha) and
Quantum information with photons (I. Walmsley).*
Berghaus Diavolezza, Pontresina (Switzerland).
September 2nd – 4th, 2011.
- *Lindau Nobel Meeting³ 2008*, as a young researcher.
Lectures and scientific discussions with Nobel Laureates:
*W. Arber, N. Bloembergen, J. Deisenhofer, M. Eigen, R. Giacconi, I. Giaever,
D.A. Glasser, R.J. Glauber, D. Gross, P. Grünberg, J.L. Hall, T.W. Hänsch,
G. 't Hooft, R. Huber, B.D. Josephson, K. von Klitzing, H. Michel, C. Rubbia,
D.D. Osheroff, W.D. Phillips, R.C. Richardson, J.R. Schrieffer, G.F. Smoot,
J. Steinberger, and M.J.G. Veltman.*
Lindau, Germany.
June 29th – July 4th, 2008.
- *Winter school in Optical Sciences*, as a granted student.
Included courses: *Quantum Gases and Atom Optics (T. Esslinger),
Nonlinear Optical Microscopy in Life Sciences (F. Helmchen),
Quantum Optics of Mesoscopic Systems (A. Imamoglu),
Ultrafast Laser Physics (U. Keller) and
Light-Matter Interaction at the Nanometre Scale (V. Sandoghdar).*
ETH University, Zurich.
February 25th – March 2nd, 2007.
- *Introduction to Synthetic Biology.*
Included courses: *Cellular, Genetic and Molecular Biology (both Theory and Lab Work),
Mathematical Models for Cellular Metabolism and Genetic Networks,
Control Theory, Bioinformatics.*
Universidad Politécnica de Valencia - Universidad de Valencia.
February – June, 2006.

³ This is a unique meeting where young researchers from all over the world spend an entire week interacting with Nobel Laureates. In the year I participated in the meeting more than 25000 researchers applied, and 551 were finally selected (14 Spanish). Visit www.lindau-nobel.de for more details.

10.- COMMUNICATIONS PRESENTED AT CONGRESSES AND WORKSHOPS

- *Many-body models in quantum simulators subject to particle non-conserving processes*
Workshop on quantum simulations and quantum devices – Beijing (China)
Invited talk.
November 18th – 22nd, 2019
- *Opportunities in quantum simulators subject to particle non-conserving processes.*
International conference on optical communications and networks – Huangshan (China)
Invited talk.
August 5th – 8th, 2019
- *Many-body models in quantum simulators subject to particle non-conserving processes.*
Conference of the Royal Spanish Physical Society – Zaragoza (Spain).
Invited talk.
July 15th – 18th, 2019
- *Spontaneous symmetry breaking of time translational invariance in open quantum systems*
Quantum Topology and Time Workshop – Stockholm (Sweden).
Invited talk.
June 25th – 29th, 2018.
- *General linearized theory of quantum fluctuations around arbitrary limit cycles.*
APS March Meeting – Los Angeles (USA).
Contributed talk.
March 4th – 9th, 2018.
- *General linearized theory of quantum fluctuations around arbitrary limit cycles.*
GRC on Mechanical Systems in the Quantum Regime– Ventura (USA).
Poster communication.
February 25th – March 2nd, 2018.
- *Dissipative optomechanical preparation of macroscopic spatial superpositions.*
Central European Workshop in Quantum Optics – Copenhagen (Denmark).
Poster communication.
June 26th – 30th, 2017.
- *Dissipative optomechanical preparation of macroscopic quantum spatial superpositions.*
APS March Meeting – New Orleans (USA).
Contributed talk.
March 13th – 17th, 2017.
- *Degenerate parametric oscillation in membrane cavity quantum optomechanics.*
QIPC – Leeds (UK).
Contributed talk.
September 13th – 18th, 2015.
- *Degenerate parametric oscillation in membrane cavity quantum optomechanics.*
QIPC – Leeds (UK).
Contributed talk.
September 13th – 18th, 2015.
- *Degenerate parametric oscillation in membrane cavity quantum optomechanics.*
CEWQO – Warsaw (Poland).
Contributed talk.
July 6th – 10th, 2015.
- *Degenerate parametric oscillation in membrane cavity quantum optomechanics.*
ICSSUR – Gdańsk (Poland).
Contributed talk.
June 29th – July 3rd, 2015.
- *Degenerate parametric oscillation in membrane cavity quantum optomechanics.*
CQSD – Cartagena (Spain).
Poster communication.
May 25th – 29th, 2015.

- *Generation of nonclassical microwave fields through cooling and lasing in circuit QED.*
23rd International Commission of Optics conference – Santiago de Compostela (Spain).
Invited talk.
August 26th – 29th, 2014.
- *Regularized linearization for nonlinear optical cavities.*
23rd International Commission of Optics conference – Santiago de Compostela (Spain).
Invited talk.
August 26th – 29th, 2014.
- *Nonclassical lasing in circuit quantum electrodynamics.*
Conference on Resonator QED – Munich (Germany).
Poster communication.
September 9th – 13th, 2013.
- *Dissipative structures in cavity optomechanics.*
Reunión bienal de la Real Sociedad Española de Física – Valencia (Spain).
Contributed talk.
July 15th – July 19th, 2013.
- *Nonclassical lasing in circuit quantum electrodynamics.*
Reunión bienal de la Real Sociedad Española de Física – Valencia (Spain).
Poster communication.
July 15th – 19th, 2013.
- *Nonclassical lasing in circuit quantum electrodynamics.*
Quantum Information Processing and Communication international conference – Florence (Italy).
Contributed talk.
June 30th – July 5th, 2013.
- *Nonclassical lasing in circuit quantum electrodynamics.*
Central European Workshop in Quantum Optics – KTH, Stockholm (Sweden).
Contributed talk.
June 16th – 20th, 2013.
- *Quantum coherent control of Gaussian multipartite entanglement.*
CLEO/EQEC – Munich (Germany).
Contributed talk.
May 12th – 16th, 2013.
- *Dissipative structures in cavity optomechanics.*
CLEO/EQEC – Munich (Germany).
Poster communication.
May 12th – 16th, 2013.
- *Nonclassical lasing in circuit quantum electrodynamics.*
CLEO/EQEC – Munich (Germany).
Poster communication.
May 12th – 16th, 2013.
- *Simulating quantum-optical phenomena with cold atoms in optical lattices.*
Quantum Information Processing and Communication international conference – ETH University, Zurich (Switzerland).
Contributed talk.
September 5th – 9th, 2011.
- *Simulating quantum-optical phenomena with optical lattices.*
CLEO/EQEC – Munich (Germany).
Contributed talk.
May 22th – 26th, 2011.
- *Generation of squeezed light by spontaneous polarization symmetry breaking.*
Meeting of the Quantum Optics and Nonlinear Optics committee of SEDOPTICA – Valladolid (Spain).
Contributed talk.
February 10th – 11th, 2011.

- *Generation of squeezed light via spontaneous symmetry breaking.*
Central European Workshop on Quantum Optics – St. Andrews (Scotland).
Poster communication.
June 7th – 11th, 2010.
- *Superradiance and subradiance of collective states of atoms in lattices.*
Quantum Information Workshop *an der Donau* – Ulm University (Germany).
Invited talk.
May 19th, 2010.
- *Spontaneous symmetry breaking as a resource for perfect non-critically squeezed light.*
SPIE Photonics Europe – Brussels (Belgium).
Contributed talk.
April 12th – 16th, 2010.
- *Utilizando la ruptura espontánea de simetrías espaciales para generar luz comprimida.*
IX Reunión Nacional de Óptica – Ourense (Spain).
Contributed talk.
September 14th – 17th, 2009.
- *Generation of squeezed states of light via spontaneous rotational symmetry breaking.*
18th International Laser Physics Workshop 2009 – Barcelona (Spain).
Poster communication.
July 13th – 17th, 2009.
- *Creating Highly Squeezed Vacua in Hybrid Laguerre-Gauss Modes.*
CLEO/EQEC 2009 – Munich (Germany).
Poster communication.
June 14th – 19th, 2009.
- *Squeezing induced by rotational symmetry breaking.*
CLEO/EQEC 2009 – Munich (Germany).
Poster communication.
June 14th – 19th, 2009.
- *Reducción de Ruido en Cavidades Ópticas por Ruptura Espontánea de Simetría Rotacional.*
No Lineal 2008 – Universitat Politècnica de Catalunya, Barcelona (Spain).
Contributed talk.
June 16th – 19th, 2008.
- *Type I Optical Parametric Oscillators above threshold are perfect squeezers for empty Gauss-Hermite modes at any pumping level.*
9th Coherence and Quantum Optics conference – University of Rochester, Rochester (New York, USA).
Poster communication.
June 10th – 13th, 2007.
- *Tablero de Galton Óptico No Lineal.*
No Lineal 2007 – Universidad de Castilla-La Mancha, Ciudad Real (Spain).
Contributed talk.
June 6th – 9th, 2007.
- *Valencia iGEM'06 project: Making E.Coli sense Flavours.*
iGEM 2006 jamboree – Massachusetts Institute of Technology, Cambridge (Massachusetts, USA).
Contributed talk and Poster communication.
November 4th and 5th, 2006.
- *Valencia iGEM'06 project: Modular sensing system.*
XXIX Congress of the *Sociedad Española de Bioquímica y Biología Molecular* – Universidad Miguel Hernández, Elche (Spain).
Poster communication.
September 8th – 10th, 2006.

11.- PUBLIC TALKS

- *Quantum physics and modern technologies*
Bétera Science and Technology Foundation.
December 22nd, 2017; Bétera, Spain.
- *Quantum technologies*
Valencia Foundation for Advanced Studies.
October 20th, 2016; Valencia, Spain.
- *Modern quantum technologies*
A Pint for Science series.
June 22nd, 2016; Valencia, Spain.

12.- VISITS TO RESEARCH INSTITUTIONS AND UNIVERSITIES

- *Wilczek Quantum Center.*
Shanghai, China.
October 24th–29th, 2018.
Invited by *Frank Wilczek* and *Vincent Liu*.
- *Université Libre de Bruxelles.*
Brussels, Belgium.
April 16th–20th; June 18th–19th; September 4th–7th, 2018.
Invited by *Nicolas Cerf* at the *Centre for Quantum Information and Communication*.
- *Chinese Academy of Sciences.*
Beijing, China.
March 14th – 16th, 2018
Invited by *Tao Shi* at the *Institute of Theoretical Physics*.
- *University of California.*
Berkeley, CA, USA.
May 11th – 12th, 2015
Invited by *Irfan Siddiqi*.
- *UC San Diego.*
La Jolla, CA, USA.
May 3rd – 15th, 2015
Invited by *Julio T. Barreiro*.
- *Beijing Computational Science Research Center.*
Beijing, China.
June 26th – July 8th, 2014
Invited by *ChangPu Sun*.
- *University of Sussex.*
Brighton, United Kingdom.
April 13th – 19th, 2014
Invited by *Diego Porrás* at the *Department of Physics and Astronomy*.
- *Université Lille 1.*
Lille, France.
June 5th – 8th, 2014
Invited by *Giuseppe Patera* at the *Laboratoire de Physique des Lasers, Atomes et Molecules*.
- *Institute for Quantum Optics and Quantum Information.*
Innsbruck, Austria.
October 21th – 25th, 2013; June 11th – 12th, 2013; April 2nd – 5th, 2013; January 25th – 27^h, 2013;
September 5th, 2012;
Invited by *Peter Zoller* at the *Quantum Optics and Quantum Information group*.

- *Max-Planck Institut for the Science of Light.*
Erlangen, Germany.
September 25th – 26^h, 2013.
Invited by *Gerd Leuchs and Christoph Marquardt* at the *Quantum Information Processing group*.
- *Instituto de Física Fundamental - CSIC.*
Madrid, Spain.
February 25th – 27th, 2013.
Invited by *Juan José García-Ripoll* at the *Quantum Information and Foundations group*.
- *Texas A&M University at Qatar.*
Doha, Qatar.
April 8th – 24th, 2012.
Invited by *Hyunchul Nha* at the *Physics department*.
- *Université Libre de Bruxelles.*
Brussels, Belgium.
February 12th – 27th, 2011.
Invited by *Nicolas Cerf* at the *Centre for Quantum Information and Communication*.
- *Massachusetts Institute of Technology.*
Cambridge, United States of America.
September 20th – December 20th, 2010.
Supervised by *Jeffrey H. Shapiro* at the *Research Laboratory of Electronics*.
- *Ulm University.*
Ulm, Germany.
May 17th – 21st, 2010.
Invited by *Susana Huelga* and *Inés de Vega* at the *Institute of Theoretical Physics*.
- *Universidad Complutense de Madrid.*
Madrid, Spain.
March 29th – 31st, 2010; July 11th – 15th, 2011; December 21th – 23th, 2012.
Invited by *Diego Porras* at the *Theoretical Physics I department*.
- *Swinburne University of Technology.*
Melbourne, Australia.
September 26th – December 11th, 2009.
Supervised by *Peter D. Drummond* at the *Theory Division* of the *ACQAO group*.
- *Universidad Complutense de Madrid.*
Madrid, Spain.
September 16th – 18th, 2009.
Invited by *Diego Porras* at the *Theoretical Physics I department*.
- *Max Planck institute for Quantum Optics.*
Garching, Germany.
July 16th – 31th 2009 and March 21st – 27th 2010.
Invited by *Juan Ignacio Cirac* and *Inés de Vega* at the *Theory Division*.
- *Max Planck institute for Quantum Optics.*
Garching, Germany.
September 21th – December 21th, 2008.
Supervised by *Juan Ignacio Cirac* at the *Theory Division*.
- *Laboratoire Kastler Brossel.*
Paris, France.
April 14th – 19th, 2008.
Invited by *Claude Fabre* at the *Multimode Quantum Optics Group*.

13.- OTHER MERITS

- Referee of *Physical Review A* (since July, 2008), *Physical Review Letters* (June, 2010), *International Journal of Theoretical Physics* (April, 2012), *Optics Communications* (December, 2012), *European Physical Journal D* (November, 2013), and *Physical Review E* (since July 2015).
- Founding member of the Progressive-Jazz band *Versus Five*.
Find us at www.youtube.com/vs5creativesounds.
- *Elite sportsman* (greatest Spanish honour for a young sportsman) in the period 1997-1998.