

Dr Carlos Gonzalez Ballestero

Curriculum Vitae

(Last update: March 9, 2024)

Personal Information

Date of birth 24 March 1988
Place of birth Sevilla (Spain)
Affiliation Institute for Theoretical Physics
Vienna University of Technology
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[ORCID](#) (identifier 0000-0002-7639-0856).



Photo: M. R. Knabl

Professional experience

10/2023–Present **Tenure-track Assistant Professor.**
Vienna University of Technology (Austria)

4/2022–10/2023 **Junior group leader (sponsored).**
University of Innsbruck (Austria)
Group sponsored by the Quantum Nanophysics, Optics and Information group.

4/2020–4/2022 **Senior Postdoctoral researcher.**
Quantum Nanophysics, Optics and Information group.
Institute for Theoretical Physics, University of Innsbruck (Austria)

4/2018– 4/2020 **Marie Curie Postdoctoral fellow.**
Quantum Nanophysics, Optics and Information group.
Institute for Quantum Optics and Quantum Information of the Austrian Academy of Science in Innsbruck (Austria)

2/2017– 4/2018 **Postdoctoral researcher.**
Quantum Nanophysics, Optics and Information group.
Institute for Quantum Optics and Quantum Information of the Austrian Academy of Science in Innsbruck (Austria)

Education

2012–2017 **Ph.D. in Condensed Matter Physics and Nanotechnology.**

- Universidad Autónoma de Madrid.
 Ph.D. Thesis: *Coupling Quantum Emitters to Nanophotonic Structures*
 Awarded with distinction *Cum Laude*
 Supervisors: Prof. Francisco José García-Vidal and Prof. Esteban Moreno Soriano.
- 2011–2012 **M.S. in Condensed Matter Physics and Nanotechnology.**
 Universidad Autónoma de Madrid.
 Master thesis: *Negative Conductivity of Optically Pumped Graphene*
 Supervisors: Dr. Jorge Bravo and Prof. F. J. García-Vidal.
 Master thesis published by Universidad Autónoma de Madrid (ISBN 978-84-8344-452-8).
- 2006–2011 **B.S. in Physics.**
 Universidad Autónoma de Madrid.

List of Publications

1. *Magnetic anisotropy and GGG substrate stray field in YIG films down to millikelvin temperatures*
 Rostyslav O. Serha, Andrey A. Voronov, David Schmoll, Roman Verba, Khrystyna O. Levchenko, Sabri Koraltan, Kristýna Davídková, Barbora Budinska, Qi Wang, Oleksandr V. Dobrovolskiy, Michal Urbánek, Morris Lindner, Timmy Reimann, Carsten Dubs, **Carlos Gonzalez-Ballester**, Claas Abert, Dieter Suess, Dmytro A. Bozhko, Sebastian Knauer, Andrii V. Chumak
[arXiv: 2402.12112 \(2024\)](#)
2. *Tutorial: Projector Approach to Open Quantum Systems*
C. Gonzalez-Ballester
[arXiv:2305.19704 \(2023\)](#)
3. *Numerical Simulation of Large-Scale Nonlinear Open Quantum Mechanics*
 M. Roda-Llodes, D. Candoli, P. T. Grochowski, A. Riera-Campeny, T. Agrenius, J. J. García-Ripoll, **C. Gonzalez-Ballester**, O. Romero-Isart,
[Phys. Rev. Research **6**, 013262 \(2024\)](#)
4. *Cavity-mediated long-range interactions in levitated optomechanics*
 J. Vijayan, J. Piotrowski, **C. Gonzalez-Ballester**, K. Weber, O. Romero-Isart, L. Novotny
[Nature Physics \(2024\)](#)
5. *Strongly Coupled Spin Waves and Surface Acoustic Waves at Room Temperature*
 Y. Hwang, J. Puebla, K. Kondou, **C. Gonzalez-Ballester**, H. Ishiki, C. Sánchez Muñoz, L. Liao, F. Chen, W. Luo, S. Maekawa, Y. Otani
[Phys. Rev. Lett **132**, 056704 \(2024\)](#)
6. *Quantum Electrodynamics with a Nonmoving Dielectric Sphere: Quantizing Mie Scattering*
 P. Maurer, **C. Gonzalez-Ballester**, O. Romero-Isart
[J. Opt. Soc. Am. B **40**, 3137 \(2023\)](#)
7. *Quantum theory of light interaction with a Lorenz-Mie particle: Optical detection and three-dimensional ground-state cooling*
 P. Maurer, **C. Gonzalez-Ballester**, O. Romero-Isart,
[Phys. Rev. A **108**, 033714 \(2023\)](#)
8. *Suppressing Recoil Heating in Levitated Optomechanics using Squeezed Light*
C. Gonzalez-Ballester, J. Zielińska, M. Rossi, A. Militarú, M. Frimmer, L. Novotny, P. Maurer, O. Romero-Isart
[PRX Quantum **4**, 030331 \(2023\)](#)

9. *Generation of Spin-Wave Pulses by Inverse Design*
S. Casulleras, S. Knauer, Q. Wang, O. Romero-Isart, A. V. Chumak, **C. Gonzalez-Ballester**
[Phys. Rev. Applied **19**, 064085 \(2023\)](#)
10. *Simultaneous ground-state cooling of two mechanical modes of a levitated nanoparticle*
J. Piotrowski, D. Windey, J. Vijayan, **C. Gonzalez-Ballester**, A. de los Ríos Sommer, N. Meyer,
R. Quidant, O. Romero-Isart, R. Reimann, L. Novotny,
[Nature Physics \(2023\)](#)
11. *Interaction Between an Optically Levitated Nanoparticle and Its Thermal Image: Internal Thermometry via Displacement Sensing*
T. Agrenius, **C. Gonzalez-Ballester**, P. Maurer, O. Romero-Isart
[Phys. Rev. Lett **130**,093601 \(2023\)](#)
12. *Quantum Interfaces between magnons and paramagnetic spins*
C. Gonzalez-Ballester, O. Romero-Isart
In *Roadmap on Spin-Wave Computing*, A. Chumak et al, [IEEE Trans. Magn. **58**, 1 \(2022\)](#)
13. *Towards a quantum interface between spin waves and paramagnetic spin baths*
C. Gonzalez-Ballester, T. van der Sar, O. Romero-Isart
[Phys. Rev. B **105**, 075410 \(2022\)](#) (Selected as Editor's Suggestion)
14. *Mechanical squeezing via unstable dynamics in a microcavity*
K. Kustura, **C. Gonzalez-Ballester**, A. de los Ríos Sommer, N. Meyer, R. Quidant, O.
Romero-Isart
[Phys. Rev. Lett **128**, 143601 \(2022\)](#)
15. *Levitodynamics: levitation and control of microscopic objects in vacuum*
C. Gonzalez-Ballester, M. Aspelmeyer, L. Novotny, R. Quidant, O. Romero-Isart
[Science **374**, abg3027 \(2021\)](#)
16. *Non-Markovian Effects of Two-Level Systems in a Niobium Coaxial Resonator with a Single-Photon Lifetime of 10 milliseconds*
P. Heidler, C. M. F. Schneider, K. Kustura, **C. Gonzalez-Ballester**, O. Romero-Isart, G.
Kirchmair
[Phys. Rev. Applied **16**, 034024 \(2021\)](#)
17. *Quantum Size Effects in the Magnetic Susceptibility of a Metallic Nanoparticle*
M. Roda-Llodes, **C. Gonzalez-Ballester**, A. E. Rubio López, M. J. Martínez-Pérez, F. Luis, O.
Romero-Isart
[Phys. Rev. B **104**, L100407 \(2021\)](#)
18. *Effective quantum dynamics induced by a driven two-level system bath*
K. Kustura, O. Romero-Isart, **C. Gonzalez-Ballester**
[Phys. Rev. A **103**, 053709 \(2021\)](#)
19. *Remote Sub-Wavelength Addressing of Quantum Emitters with Chirped Pulses*
S. Casulleras, **C. Gonzalez-Ballester**, P. Maurer, J. J. Garcia-Ripoll, O. Romero-Isart
[Phys. Rev. Lett. **126**, 103602 \(2021\)](#)
20. *Theory of waveguide QED with moving emitters*
E. Sánchez Burillo, A. Gonzalez-Tudela, **C. Gonzalez-Ballester**
[Phys. Rev. A **102**, 013726 \(2020\)](#) (Selected as Editor's suggestion)

21. *Single-spin Magnetomechanics with Levitated Micromagnets*
Jan Gieseler, A. Kabcenell, E. Rosenfeld, J. D. Schaefer, A. Safira, M. J. A. Schuetz, **Carlos Gonzalez-Ballester**, C. C. Rusconi, O. Romero-Isart, M. D. Lukin
[Phys. Rev. Lett. **124**, 163604 \(2020\)](#)
Paper [Featured in Physics](#)
22. *Theory of Quantum Acoustomechanics and Acoustomechanics with a Micromagnet*
C. Gonzalez-Ballester, D. Hümmer, J. Gieseler, O. Romero-Isart
[Phys. Rev. B **101**, 125404 \(2020\)](#) (Selected as Editor's suggestion)
23. *Acoustic and Optical Properties of a Fast Spinning Dielectric Nanoparticle*
D. Hümmer, R. Lampert, K. Kustura, P. Maurer, **C. Gonzalez-Ballester**, O. Romero-Isart
[Phys. Rev. B **101**, 205461 \(2020\)](#)
24. *Quantum Acoustomechanics with a micromagnet*
C. Gonzalez-Ballester, Jan Gieseler, Oriol Romero-Isart
[Phys. Rev. Lett. **124**, 093602 \(2020\)](#)
25. *Theory for Cavity Cooling of Levitated Nanoparticles via Coherent Scattering: Master Equation Approach*
C. Gonzalez-Ballester, P. Maurer, D. Windey, L. Novotny, R. Reimann, O. Romero-Isart
[Phys. Rev. A **100**, 013805 \(2019\)](#)
26. *Cavity-Based 3D Cooling of a Levitated Nanoparticle via Coherent Scattering*
D. Windey, **C. Gonzalez-Ballester**, P. Maurer, L. Novotny, O. Romero-Isart, R. Reimann
[Phys. Rev. Lett. **122**, 123601 \(2019\)](#)
Paper selected for Editor's Suggestion and [Featured in Physics](#).
27. *Internal Quantum Dynamics of a Nanoparticle in a Thermal Electromagnetic Field: a Minimal Model*
A. E. Rubio Lopez, **C. Gonzalez-Ballester**^{*}, O. Romero-Isart.
[Phys. Rev. B **98**, 155405 \(2018\)](#)
^{*} First authorship shared between AERL and CGB.
28. *Uncovering nonperturbative dynamics of the biased sub-Ohmic spin-boson model with variational matrix product states*
C. Gonzalez-Ballester, Florian A. Y. N. Schröder, and Alex W. Chin.
[Phys. Rev. B **96**, 115427 \(2017\)](#)
29. *Non-reciprocal few-photon routing schemes based on chiral waveguide-emitter couplings*
C. Gonzalez-Ballester, E. Moreno, F. J. Garcia-Vidal, A. Gonzalez-Tudela.
[Phys. Rev. A **94**, 063817 \(2016\)](#)
30. *Uncoupled dark states can inherit polaritonic properties*
C. Gonzalez-Ballester, J. Feist, E. Gonzalo-Badia, E. Moreno, F. J. Garcia-Vidal.
[Phys. Rev. Lett. **117**, 156402 \(2016\)](#)
31. *Chiral route to spontaneous entanglement generation*
C. Gonzalez-Ballester, A. Gonzalez-Tudela, F. J. Garcia-Vidal, E. Moreno.
[Phys. Rev. B **92**, 155304 \(2015\)](#).
32. *Harvesting excitons through plasmonic strong coupling*
C. Gonzalez-Ballester, J. Feist, E. Moreno, F. J. Garcia-Vidal.
[Phys. Rev. B **92**, 121402\(R\) \(2015\)](#).

33. *Coupling of individual quantum emitters to channel plasmons*
E. Bermúdez-Ureña, **C. Gonzalez-Ballester**, M. Geiselmann, R. Marty, I. P. Radko, T. Holmgaard, Y. Alaverdyan, E. Moreno, F. J. García-Vidal, S. I. Bozhevolnyi, R. Quidant.
[Nature Commun. 6, 7783 \(2015\)](#).
Highlighted paper in Nature Materials 14, 962 (2015).
34. *Generation, manipulation, and detection of two-qubit entanglement in waveguide QED*
C. Gonzalez-Ballester, E Moreno, and F. J. Garcia-Vidal.
[Phys. Rev. A 89, 042328 \(2014\)](#).
35. *Non-Markovian effects in waveguide-mediated entanglement*
C. Gonzalez-Ballester, F. J. Garcia-Vidal and Esteban Moreno.
[New J. Phys. 15, 073015 \(2013\)](#).
36. *Superradiance mediated by graphene surface plasmons*
P. A. Huidobro, A. Y. Nikitin, **C. González-Ballester**, L. Martín-Moreno, and F. J. García-Vidal.
[Phys. Rev. B 85, 155438 \(2012\)](#).
37. *Numeric and symbolic evaluation of the pfaffian of general skew-symmetric matrices*
C. Gonzalez-Ballester, L. M. Robledo, and G. F. Bertsch.
[Comp. Phys. Comm. 182, 2213-2218 \(2011\)](#).

Invited talks

2024

1. *Generation of Spin-Wave Pulses by Inverse Design*
18 – 20 Feb 2024.
WPI & MMM workshop on "Inverse-design magnonics", Vienna (Austria)

2023

2. *Suppressing recoil heating in levitated optomechanics using squeezed light*
4 – 8 Sept 2023.
WE Heraeus Seminar "Exploiting Levitated Particles in the Quantum Regime", Bad Honnef (Germany)
3. *Analog light-matter interfaces with spin waves*
15 June 2023.
"Quantum Spinoptics", Mainz (Germany)
4. *Quantum Light-Matter Interaction with a Dielectric Sphere: Theory and Applications*
5 May 2023.
"Quantum Science Generation", Trento (Italy)
5. *Quantum Light-Matter Interaction with a Dielectric Sphere: Theory and Applications*
14 March 2023.
"Quantum Nanophotonics", Benasque (Spain)

2022

6. *Toward quantum magnonic devices: a flexible tool for quantum technology (*)*
7 – 9 Dec 2022.
Spin Cavitronics IV, Erlangen (Germany)

(*) Talk cancelled due to health reasons

2020

7. *Quantum acoustomechanics with a micromagnet*
12 Feb 2020.
Micromechanics Obergurgl (Austria)

2019

8. *Levitating nanoparticles: toward ground state cooling and beyond*
15 May 2019.
ICQOQI19 Conference, Minsk (Belarus)
9. *New regimes of light-matter interaction in levitated nanoparticles.*
21 March 2019.
Quantum Nanophotonics Conference, Benasque (Spain)

2018

10. *Few-photon quantum protocols and devices based on chiral waveguide-emitter couplings.*
7 June 2018.
First Workshop on Waveguide QED ([WQED18](#)), Mazara del Vallo (Italy)

Conference contributions**2024**

1. Vienna (Austria), 18 – 20 Feb:
WPI & MMM workshop on “Inverse-design magnonics”
Oral contribution: “Generation of Spin-Wave Pulses by Inverse Design ”

2023

2. Mainz (Germany), 13 – 15 June:
“Quantum Spinoptics” Conference
Oral contribution: “Toward coherent quantum control of propagating spin waves ”
3. Trento (Italy), 2 – 5 May:
“Quantum Science Generation” Conference
Oral contribution: “Quantum Light-Matter Interaction with a Dielectric Sphere: Theory and Applications ”
4. Benasque (Spain), 12 – 18 March:
“Quantum Nanophotonics” Conference
Oral contribution: “Quantum Light-Matter Interaction with a Dielectric Sphere: Theory and Applications ”

2022

5. Oxnard (California), 31 July – 04 Aug:
7th Workshop on Magnonics
Oral contribution: “Nanophotonics-inspired magnonics ”
6. Benasque (Spain), 22 – 29 July:
Quantum Science: Implementations Workshop.
7. San Sebastián (Spain), 27 June – 01 July:
Solskymag conference
Oral contribution: “Nanophotonics-inspired magnonics ”

8. Ventura (California), 19 – 24 June:
Gordon Research Conference: Mechanical Systems in the Quantum Regime
Poster contribution: “Free-space optical levitodynamics with squeezed light ”
 9. Benasque (Spain), 24 – 30 April:
Quantum Engineering of Levitated Systems
Oral contribution: “Ultra-coherent levitodynamics with squeezed light ”
 10. Munich (Germany), 28 Feb – 2 Mar:
QUENOCOBA Workshop 2022
Oral contribution: “Analog light-matter interfaces with spin waves ”
 11. Obergurgl (Austria), 20 – 26 Feb:
[Quantum Optics Obergurgl 2022](#)
Poster contribution: “Quantum optics with spin waves”
- 2021**
12. Cefalú (Italy) [Online], 6 – 10 Sept:
Trends in MAGnetism 2020
Oral contribution: “Spin-steered magnonics”
 13. San Sebastián (Spain) [Online], 21 –24 Jun:
International Conference on Magnetism and Spintronics (Sol-SkyMag 2021)
Oral contribution: “Spin-steered magnonics”
 14. Online, 10 Jun:
Online International Conference on Spintronics, Photonics, Phononics and Magneto-Optics (SPPM2021)
Oral contribution: “Spin-steered magnonics”
 15. Online, 15 – 19 Mar:
American Physical Society March Meeting
Oral contribution: “Towards a quantum interface between spin waves and paramagnetic spin baths”
 16. Benasque (Spain) [Online], 1 – 5 Mar:
Quantum Nanophotonics Conference
Oral contribution: “Towards a quantum interface between spin waves and paramagnetic spin baths”
- 2020**
17. Obergurgl (Austria), 10 – 14 Feb:
Micromechanics Obergurgl conference
Oral contribution: “Quantum Acoustomechanics with a Micromagnet”
- 2019**
18. Madrid (Spain), 6 – 8 Nov:
[Joint IFF-IQOQI workshop](#)
Oral contribution: “Quantum Acoustomechanics with a Micromagnet”
 19. Monte Verità (Switzerland), 1 – 6 Sept:
Conference on Nanophotonics: Foundations and Applications
Poster contribution: “Ground-state cooling of levitated nanoparticles”
 20. Bad Honnef (Germany), 29 Jul – 1 Aug:
699 WE-Heraeus Seminar on Levitated Optomechanics
Poster contribution: “Quantum acoustomechanics with a micromagnet”

21. Minsk (Belarus), 13 – 17 May:
International Conference in Quantum Optics and Quantum Information (ICQOQI19)
Oral contribution: “Levitating nanoparticles: toward ground state cooling and beyond”
22. Venice (Italy), 9 – 12 April:
New Trends in Complex Quantum Systems Dynamics Conference (CQS19)
Oral contribution: “Levitated nanoparticles: toward ground state cooling and beyond”
23. Benasque (Spain), 18 – 22 March:
Quantum Nanophotonics Conference
Oral contribution: “New regimes of light-matter interaction in levitated nanoparticles”
24. Innsbruck (Austria), 4 – 8 February:
SFB-FoQuS International Conference
Poster contribution: “New regimes of light-matter interaction in levitated nanoparticles”
25. Seefeld in Tirol (Austria), 3 – 6 January:
7th International Topical Meeting on Nanophotonics and Metamaterials (NANOMETA2019)
Oral contribution: “New regimes of light-matter interaction in levitated nanoparticles”

2018

26. Benasque (Spain), 2 – 13 July:
Quantum Science: Implementations Workshop.
27. Mazara del Vallo (Italy), 4 – 8 June:
[First Workshop on Waveguide QED \(WQED18\)](#)
Oral contribution: “Few-photon quantum protocols and devices based on chiral waveguide-emitter couplings.”
28. Ventura (United States), 25 – 2 March:
Gordon Research Conference: Mechanical systems in the quantum regime.
Poster contribution: “Levitated quantum acoustomagnonics in the strong coupling regime”
29. Ventura (United States), 24 – 25 February:
Gordon Research Seminar: Mechanical systems in the quantum regime.
Poster contribution: “Levitated quantum acoustomagnonics in the strong coupling regime”

2017

30. Benasque (Spain), 26 February–3 March: Quantum Nanophotonics.
Poster contribution: “Uncoupled dark states can inherit photonic properties.”

2016

31. Miraflores (Spain), 16 December: Young Researchers meeting organized by Instituto Nicolas Cabrera.
Poster contribution: “Harvesting Excitons Through Plasmonic Strong Coupling.”
32. San Sebastian (Spain), 11–14 July: Nanophotonics meets Quantum Information (Summer School)
Poster contribution: “Quantum applications of chiral light-matter coupling.”
33. Benasque (Spain), 6 –11 March: Nanolight 2016.
Poster contribution: “Harvesting Excitons Through Plasmonic Strong Coupling.”
Poster contribution: “Chiral route to spontaneous entanglement generation.”

2015

34. Miraflores (Spain), 18 December: Young Researchers meeting organized by Instituto Nicolas Cabrera.
Poster contribution: “Harvesting Excitons Through Plasmonic Strong Coupling.”

35. Jerusalem (Israel), 31 May–5 June: 7th International Conference in Surface Plasmon Photonics (SPP7).

Oral contribution: “Harvesting Excitons Through Plasmonic Strong Coupling.”

36. Benasque (Spain), 8–14 March: Quantum Plasmonics.

Poster contribution: “Harvesting Excitons Through Plasmonic Strong Coupling”

2014

37. Shanghai (China), 11–15 May: The 11th International Symposium on Photonic and Electromagnetic Crystal Structures (PECS-XI).

Poster contribution: “Generation, manipulation and detection of two-qubit entanglement in waveguide QED.”

38. Benasque (Spain), 2–8 March: Nanolight.

Poster contribution: “Generation, manipulation and detection of two-qubit entanglement in waveguide QED”

2013

39. Miraflores (Spain), 19 December: Young Scientists Meeting.

Poster contribution: “Generation, manipulation and detection of two-qubit entanglement in waveguide QED.”

40. Sevilla (Spain), 9–13 September: Trends in Nanotechnology (TNT).

Poster contribution: “Non-Markovian effects in waveguide-mediated entanglement between qubits.”

41. Florence (Italy), 30 June–5 July: Quantum Information Processing and Communication (QIPC).

Poster contribution: “Non-Markovian effects in waveguide-mediated entanglement between qubits.”

42. Ottawa (Canada), 26–31 May: 6th International Conference in Surface Plasmon Photonics (SPP6).

Poster contribution: “Non-Markovian dynamics in qubit-qubit entanglement mediated by surface plasmons.”

2012

43. Bad Honnef (Germany), 25–28 November: 519 Heraeus Seminar in Hybrid Quantum Systems.

Poster contribution: “Superradiance mediated by graphene surface plasmons.”

Seminars and Colloquia

1. *Laser noise suppression in levitated optomechanics using squeezed light*
20 November 2023.
(Invited) Internal seminar at the Aspelmeyer group, University of Vienna (Austria).
2. *Laser noise suppression in levitated optomechanics using squeezed light*
16 November 2023.
(Invited) ETH Quantum Seminar, ETH Zürich (Switzerland).
3. *Quantum light-matter interaction with a dielectric sphere: theory and applications*
2 March 2023.
First joint Innsbruck-Ulm workshop, Innsbruck (Austria).

4. *Quantum light-matter interaction with a dielectric sphere: theory and applications*
22 Feb 2023.
Joint group retreat of the Institute for Theoretical Physics of the University of Innsbruck. Obergurgl (Austria).
5. *Suppressing Recoil Heating in Levitated Optomechanics using Squeezed Light*
30 Nov 2022.
(Invited) IFIMAC seminar, Universidad Autónoma de Madrid.
6. *Suppressing Recoil Heating in Levitated Optomechanics using Squeezed Light*
11 Nov 2022.
(Invited) Online talk for the Theoretical Quantum Physics Group, University of Duisburg-Essen, Germany.
7. *Quantum magnonic devices: a flexible tool for quantum technology*
2 Nov 2022.
(Invited) Online talk for the Spanish PhD & Young Scientists in Quantum Technologies Network (PYSQT).
8. *Levitodynamics: toward new regimes of quantum physics*
11 May 2022.
(Invited) INO-CNR BEC Center, University of Trento.
9. *Levitodynamics: state of the art*
5 May 2022.
(Invited) Non-Hermitian Physics and Complex Scattering group, Technical University of Vienna (TU Wien).
10. *Nanophotonics-inspired magnonics*
26 November 2021.
(Invited) Nanomagnetism and Magnonics group, University of Vienna.
11. *Spin-steered magnonics*
13 July 2021.
(Invited) Quantum Optics Theory group, Technical University of Vienna (TU Wien).
12. *Spin-steered magnonics*
30 March 2021.
(Invited) Online Quantum Optics seminar Many-body Quantum Optics group, IQOQI Innsbruck
13. *Quantum acoustomechanics with a micromagnet*
19 March 2021.
(Invited) Online seminar University of Vienna, Austria
14. *Quantum acoustomechanics with a micromagnet*
1 April 2020.
(Invited) Online seminar for the Levitated Nanophysics Group, King's College London (UK)
15. *Quantum acoustomechanics with a micromagnet.*
6 March 2020.
(Invited) QOLS seminar, Imperial College, UK.
16. *Introduction to magnetization waves.*
29 October 2019.
ICFO-ETH meeting on nanoparticle trapping, Barcelona, Spain.

17. *Ground-state cavity cooling: it's all about noise.*
14 April 2019.
ICFO-ETH meeting on nanoparticle trapping, Zürich, Switzerland.
18. *New results in levitodynamics: a tale of two temperatures.*
15 March 2019.
(Invited) Seminar in Instituto de Física Fundamental, Madrid, Spain.
19. *Theory of cavity cooling via coherent scattering.*
23 October 2018.
ICFO-ETH meeting on nanoparticle trapping, Barcelona, Spain.
20. *Theoretical challenges in levitated nanomechanics: the case of magnon-phonon interaction.*
10 May 2018. (Invited) IFIMAC seminar, IFIMAC, Madrid, Spain.
21. *Thermalization dynamics of levitated nanoparticles.*
27 March 2018.
ICFO-ETH meeting on nanoparticle trapping, Innsbruck, Austria.
22. *Elastic phonons in nanoparticles.*
23 October 2017.
ICFO-ETH meeting on nanoparticle trapping, Feldberg, Germany.
23. *Delocalization of uncoupled dark states induced by photonic modes.*
17 October 2016.
(Invited) IQOQI Innsbruck.
24. *Delocalization of uncoupled dark states induced by photonic modes.*
13 October 2016.
(Invited) Max Planck Institute of Quantum Optics (MPQ), Garching.
25. *Quantum operations on light and matter in waveguide QED.*
10 October 2016.
(Invited) Niels Bohr Institute, Copenhagen.
26. *Exciton harvesting and dark-state delocalization in plasmonic strong coupling.*
7 October 2016.
(Invited) FOM Institute AMOLF, Amsterdam.
27. *Matrix Product States, or why DMRG works.*
10 February 2016.
Condensed Matter Physics Department, Universidad Autónoma de Madrid.
28. *Generation, manipulation and detection of two-qubit entanglement in waveguide QED.*
21 January 2015.
Condensed Matter Physics Department, Universidad Autónoma de Madrid.

Research visits

1. Quantum Optics Group, University of Vienna. 20 Nov 2023
2. Photonics Laboratory, ETH Zürich. 13-15 Nov 2023
3. Theoretical Condensed Matter Physics Department, Universidad Autónoma de Madrid. 30 Nov 2022
4. Instituto de Ciencia Molecular, Universidad de Valencia. 24 Oct 2022

5. INO-CNR BEC Center, University of Trento. 11 May 2022
6. Nanomagnetism and Magnonics group, University of Vienna. 6 May 2022
7. Non-Hermitian Physics and Complex Scattering group, Technical University of Vienna (TU Wien). 5 May 2021
8. Quantum Optics Theory group, Technical University of Vienna (TU Wien). 13 –15 July 2021
9. Quantum Optics and Laser Science group, Imperial College London. 6 March 2020
10. Quantum Information and Foundations group, Instituto de Física Fundamental, CSIC, Madrid. 15 March 2019
11. Photonics Laboratory, ETH Zürich. 20–21 December 2018
12. Applied Quantum Physics group, Technische Universität Wien. 25 – 26 April 2017
13. Quantum Nanophysics, Optics and Information group, Institute for quantum optics and quantum information (IQOQI), Innsbruck. 17 – 21 Oct 2016
14. Theory Division, Max Planck Institute of Quantum Optics (MPQ), Garching. 13 – 14 Oct 2016
15. Quantum Optics and Photonics group, Niels Bohr Institute, Copenhagen. 10 Oct 2016
16. Photonic forces group, FOM Institute AMOLF, Amsterdam. 7 Oct 2016
17. Cavendish Laboratory, University of Cambridge, UK. Sept-Dec 2015

Supervision experience

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|-----------------|--|
| 10/2023–Present | Co-supervision of Master Student Lorenz Fischer.
Institute for Theoretical Physics, Vienna University of Technology, Austria |
| 01/2023–Present | Supervision of PhD Student Marco Brühlmann.
Institute for Theoretical Physics, University of Innsbruck, Austria |
| 09/2021–09/2023 | Supervision of Master Student Judith Senn.
Institute for Theoretical Physics, University of Innsbruck, Austria |
| 04/2021–7/2021 | Co-supervision of Bachelor Student Judith Senn.
Institute of Quantum Optics and Quantum Information. Innsbruck, Austria |
| 11/2019–9/2021 | Co-supervision of Master Student Valentina Zeni.
Institute of Quantum Optics and Quantum Information. Innsbruck, Austria |
| 9/2018–Present | Co-supervision of PhD Student Sílvia Casulleras.
Institute of Quantum Optics and Quantum Information. Innsbruck, Austria |
| 9/2017–Present | Co-supervision of PhD Student Marc Rodà Llordés.
Institute of Quantum Optics and Quantum Information. Innsbruck, Austria |
| 9/2017–6/2018 | Co-supervision of Master Student Sílvia Casulleras Guàrdia.
Institute of Quantum Optics and Quantum Information. Innsbruck, Austria |
| 7/2017 – 8/2017 | Supervision of Summer Student Víctor Martínez Lahuerta.
Institute of Quantum Optics and Quantum Information. Innsbruck, Austria |

Organization of workshops and meetings

- 6–8 Nov 2019 Co-organizer, [Joint IFF-IQOQI workshop](#). Madrid, Spain.
(Involving two groups from IQOQI Innsbruck and the Quantum Information and Foundations Group from CSIC).
- 25–27 Mar 2018 Co-organizer, levitodynamics meeting. Mühlbachl, Austria.
(Involving groups from IQOQI Innsbruck, Innsbruck University, ETH Zürich, ICFO Barcelona, and University of Vienna).
- 26–28 May 2018 Co-organizer, scientific Group Retreat. Navis valley, Austria.
(Quantum Nanophysics, Optics and Information group of IQOQI Innsbruck).
- 4–6 Oct 2017 Co-organizer, scientific Group Retreat. Navis valley, Austria.
(Quantum Nanophysics, Optics and Information group of IQOQI Innsbruck).

PI-led projects

- INSPIREQMAG1 – Nanophotonics-inspired Quantum Magnonics. 03/2024 – 03/2026
FWF Principal Investigator [PAT 1177623](#)
Funding Agency: FWF (Austrian Science Fund)
- PWAQUTEC – Phononic Waveguides for Quantum Technologies. 04/2018 - 04/2020
Marie Skłodowska Curie Individual Fellowship [796725](#)
Funding Agency: European Commission

Teaching Experience

- 2022/2023 Lecturer.
Theoretical Physics 3 Proseminar (Electrodynamics).
University of Innsbruck.
- 2018/2019 Internal Seminars from Quantum Nanophysics, Optics, and Information group.
Teaching: Quantum Theory of Many-Particle Systems.
IQOQI Innsbruck.
- 2015/2016 Teaching fellow.
Physics Laboratory for first year Physics students.
Universidad Autónoma de Madrid.
- 2014/2015 Teaching assistant.
Physics Laboratory for first year Chemistry students.
Universidad Autónoma de Madrid.
- 2012/2013 Teaching assistant.
Physics Laboratory for first year Chemistry students.
Universidad Autónoma de Madrid.

Fellowships and Academic Experience

- 4/2018-4/2020 **Marie Skłodowska Curie Fellow**.
Fellowship awarded by the European Commission.

- 9/2015-12/2015 **Visiting PhD student.**
Cavendish Laboratory, Physics Department, University of Cambridge.
Supervisor: Dr. Alex Chin.
- 2014–2017 **FPU Fellow.**
Postgraduate fellowship awarded by Spanish Ministry of Education for Ph.D. studies (FPU program).
- 2011–2012 **M. S. Scholarship.**
Postgraduate fellowship awarded by Universidad Autónoma de Madrid for Master studies.
- 7/2011–9/2011 **Research Scholarship.**
Undergraduate research scholarship awarded by the Deutsches Elektronen Synchrotron (DESY), Hamburg. Supervisor: Prof. Henry Chapman.
- 2010–2011 **Academic Excellence Scholarship.**
Academic Excellence scholarship awarded by the Comunidad Autónoma de Madrid.
- 7/2010–9/2010 **JAЕ INTRO Research Scholarship.**
Undergraduate scholarship awarded by the Spanish Ministry of Education, for research at ICMB, Barcelona. Supervisor: Prof. José Luis García-Muñoz.
- 2009–2010 **Academic Excellence Scholarship.**
Academic Excellence scholarship awarded by the Comunidad Autónoma de Madrid.
- 2006–2007 **Academic Excellence Scholarship.**
Academic Excellence scholarship awarded by the Comunidad Autónoma de Madrid.

Dissemination, Outreach & Popular Science

1. Public online video-lectures in YouTube:
 - [Projection operator techniques in Open Quantum Systems](#)
 - [Toward a quantum interface between spin waves and paramagnetic spin baths](#)
2. Participation in [Campus Open Days at Innsbruck University](#)
Popular science presentation and demonstration of magnetic levitation for the general public.
26-27/04/2019
3. *Grafeno: una revolución en la electrónica*
C Gonzalez-Ballester
[Article in UAM Gazzette](#), 09/02/2012

Other Merits

- Participant of the PhD student Mentorship Program at the Vienna Doctoral School in Physics (mentee: David Schmoll)
- Member of the Royal Spanish Academy of Physics.
- Experience with Finite element Method software (Comsol Multiphysics) and with simulations in large clusters (cluster of prof. F. J. Garcia Vidal's group, Cavendish Laboratory TCM's cluster, and University of Innsbruck ITP cluster).

- Referee of Optics Express, APS, and IOP Journals.
- Second place in the contest *X Certamen Universitario Arquimedes* for undergraduate researchers, awarded by the spanish ministry of education and Science (2011).
- Spoken languages: Spanish (mother tongue), English (fluent), Italian (fluent), German (beginner, B1 level), French (basic).