
Cecilia Cormick - Curriculum Vitae

January 2025

Contact

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Current positions

- **Full-time Professor.**
College of Engineering, University of the Republic (Uruguay).
Since August 2024.
 - **CONICET Independent Researcher.**
Physics Institute Enrique Gaviola (Argentina).
Since November 2019, on leave since August 2024.
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Main current scientific interests

- Open quantum systems.
 - Systems of composite bosons.
 - Quantum information and quantum simulations with trapped ions.
 - Quantum optics.
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Personal statement

Rather than having just one topic of expertise, my research work is curiosity-driven and involves collaborations in different subfields with several groups. Apart from my research, I commit very actively to teaching, and I have taken many teacher training courses. I contributed to the formation of the Gender Committee of the Argentinian Physical Society, of which I was a member for three years. I have promoted the consolidation of the community working on quantum science in Argentina as division coordinator in the Argentinian Physical Society, organizer of specialized scientific meetings, and member of an assessment committee for the National Ministry of Science, Innovation and Technology.

Education

- **Ph.D. in Physics** (Doctora en Ciencias Físicas).
University of Buenos Aires (Argentina). December 2005 - December 2009.
Thesis Title: "Decoherence and quantum simulations of dynamic environments".
 - **Master in Physics** (Licenciada en Ciencias Físicas).
University of Buenos Aires (Argentina). March 2000 - September 2005.
Master's Thesis: "Discrete Wigner functions and stabilizer states in quantum computation".
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Previous research positions

- **Professor and CONICET Researcher (tenured).**
National University of Córdoba (Argentina).
Condensed Matter Theory Group, FAMAF.
April 2015 to July 2024.
- **Postdoctoral researcher (CONICET Return Fellowship).**
National University of Córdoba (Argentina).
Condensed Matter Theory Group, FAMAF.
October 2014 to March 2015.
- **Postdoctoral researcher.**
Ulm University (Germany).
Quantum Controlled Dynamics Group (head: Prof. Martin Plenio).
October 2012 to September 2014.
- **Postdoctoral researcher.**
Saarland University (Germany).
Theoretical Quantum Physics Group (head: Prof. Giovanna Morigi).
February 2010 to August 2012.

Research papers

38. N. Nuñez Barreto, M. Bonetto, M. Luda, [C. Cormick](#) and C. T. Schmiegelow, *Observation of Space-Dependent Rotational Doppler Shifts with a Single Ion Probe*. **Phys. Rev. Lett.** **133**, 183601 (2024).
37. A. Kahan and [C. Cormick](#), *Entanglement across the sliding-pinned transition of ion chains in optical cavities*. **Phys. Rev. A** **110**, 012461 (2024).
36. N. A. Nuñez Barreto, M. Bonetto, M. Luda, [C. Cormick](#) and C. T. Schmiegelow, *Dark resonance spectra of trapped ions under the influence of micromotion*. **Front. Quantum Sci. Technol.** **3**, 1381117 (2024).
35. [C. Cormick](#) and L. Ermann, *Ground state of composite bosons in low-dimensional graphs*. **Phys. Rev. A** **107**, 043324 (2023).
34. A. Kahan, L. Ermann, M. Saraceno and [C. Cormick](#), *Fokker-Planck treatment of nonlinearities in the dispersive coupling of an ion and an optical cavity*. **Phys. Rev. A** **107**, 033712 (2023).
33. M. D. Jiménez, E. Cuestas, Ana P. Majtey and [C. Cormick](#), *Composite-boson formalism applied to strongly bound fermion pairs in a one-dimensional trap*. **SciPost Phys. Core** **6**, 012 (2023).
32. E. Cuestas and [C. Cormick](#), *Strongly bound fermion pairs on a ring: A composite-boson approach*, **Phys. Rev. A** **105**, 013302 (2022).
31. A. Kahan, L. Ermann, and [C. Cormick](#), *Trapped ion in an optical cavity: Numerical study of an optomechanical transition in the few-photon regime*, **Phys. Rev. A** **104**, 043705 (2021).
30. A. D. Varizi, A. P. Vieira, [C. Cormick](#), R. C. Drumond, and G. T. Landi, *Quantum coherence and criticality in irreversible work*, **Phys. Rev. Research** **2**, 033279 (2020).
29. C. Arenz, D. I. Bondar, D. Burgarth, [C. Cormick](#), y H. Rabitz, *Amplification of quadratic Hamiltonians*, **Quantum** **4**, 271 (2020). Comentado por W. Ge en **Quantum Views** **4**, 41 (2020).
28. H. Landa, [C. Cormick](#) and G. Morigi, *Static kinks in chains of interacting atoms*, **Cond. Matter** **5**, 35 (2020).

27. A. Ramos and C. Cormick, *Feasibility of the ion-trap simulation of a class of non-equilibrium phase transitions*, **Eur. Phys. J. D** **73**, 237 (2019).
26. P. Céspedes, E. Rufeil-Fiori, P. A. Bouvrie, A. P. Majtey and C. Cormick, *On the description of composite bosons in discrete models*, **Phys. Rev. A** **100**, 012309 (2019).
25. L. Himbert, C. Cormick, R. Kraus, S. Sharma and G. Morigi, *Mean-field phase diagram of the extended Bose-Hubbard model of many-body cavity quantum electrodynamics*. **Phys. Rev. A** **99**, 043633 (2019).
24. A. Lemmer, C. Cormick, D. Tamascelli, T. Schaetz, S. F. Huelga, and M. B. Plenio. *A trapped-ion simulator for spin-boson models with structured environments*. **New J. Phys.** **20**, 073002 (2018).
23. S. Wald, A. Timpanaro, C. Cormick and G. T. Landi, *Energy barriers of metastable states in first order quantum phase transitions*. **Phys. Rev. A** **97**, 023608 (2018).
22. M. Saraceno, L. Ermann and C. Cormick, *Phase-space representations of SIC-POVM fiducial states*. **Phys. Rev. A** **95**, 032102 (2017).
21. C. Cormick and C. T. Schmiegelow, *Noise-induced transport in the motion of trapped ions*, **Phys. Rev. A** **94**, 053406 (2016).
20. T. Fogarty, H. Landa, C. Cormick and G. Morigi, *Optomechanical many-body cooling to the ground state using frustration*, **Phys. Rev. A** **94**, 023844 (2016). Editor's suggestion.
19. T. Fogarty, C. Cormick, H. Landa, V. M. Stojanović, E. Demler and G. Morigi, *Nano-friction in cavity quantum electrodynamics*, **Phys. Rev. Lett.** **115**, 233602 (2015).
18. G. Morigi, J. Eschner, C. Cormick, Y. Lin, D. Leibfried and D. J. Wineland, *Dissipative quantum control of a spin chain*, **Phys. Rev. Lett.** **115**, 200502 (2015).
17. A. Lemmer, C. Cormick, C. T. Schmiegelow, F. Schmidt-Kaler and M. B. Plenio, *Two-dimensional spectroscopy for the study of ion Coulomb crystals*, **Phys. Rev. Lett.** **114**, 073001 (2015).
16. C. Arenz, C. Cormick, D. Vitali and G. Morigi, *Generation of two-mode entangled states by quantum reservoir engineering*. **J. Phys. B** **46**, 224001 (2013).
15. C. Cormick, A. Bermudez, S. F. Huelga and M. B. Plenio. *Preparation of the ground state of a spin chain by dissipation in a structured environment*. **New J. Phys.** **15**, 073027 (2013).
14. J. D. Baltrusch, C. Cormick and G. Morigi. *Quantum quenches of ion Coulomb crystals across structural instabilities II: Thermal effects*. **Phys. Rev. A** **87**, 032116 (2013).
13. C. Cormick and G. Morigi. *Ion chains in high-finesse cavities*. **Phys. Rev. A** **87**, 013829 (2013).
12. F. Cartarius, C. Cormick and G. Morigi. *Stability and dynamics of ion rings in linear multipole traps*. **Phys. Rev. A** **87**, 013425 (2013).
11. R. Dorner, J. Goold, C. Cormick, M. Paternostro and V. Vedral. *Emergent thermodynamics in a quenched quantum many-body system*. **Phys. Rev. Lett.** **109**, 160601 (2012).
10. J. D. Baltrusch, C. Cormick and G. Morigi. *Quantum quenches of ion Coulomb crystals across structural instabilities*. **Phys. Rev. A** **86**, 032104 (2012).
9. C. Cormick and G. Morigi. *Structural transitions of ion strings in a quantum potential*. **Phys. Rev. Lett.** **109**, 053003 (2012).
8. J. D. Baltrusch, C. Cormick, G. De Chiara, T. Calarco and G. Morigi. *Quantum superpositions of crystalline structures*. **Phys. Rev. A** **84**, 063821 (2011).
7. J. Li, T. Fogarty, C. Cormick, J. Goold, Th. Busch and M. Paternostro. *Tripartite nonlocality and continuous-variable entanglement in thermal states of trapped ions*. **Phys. Rev. A** **84**, 022321 (2011).
6. C. Cormick, T. Schaetz and G. Morigi. *Trapping ions with lasers*. **New J. Phys.** **13**, 043019 (2011).

5. [C. Cormick](#) and J. P. Paz. *Observing different phases for the dynamics of entanglement in an ion trap.* **Phys. Rev. A** **81**, 022306 (2010).
4. [C. Cormick](#) and J. P. Paz. *Decoherence of Bell states by local interactions with a dynamic spin environment.* **Phys. Rev. A** **78**, 012357 (2008).
3. [C. Cormick](#) and J. P. Paz. *Decoherence induced by a dynamic spin environment: the universal regime.* **Phys. Rev. A** **77**, 022317 (2008).
2. [C. Cormick](#) and J. P. Paz. *Interference in discrete Wigner functions.* **Phys. Rev. A** **74**, 062315 (2006).
1. [C. Cormick](#), [E. Galvão](#), [D. Gottesman](#), [J. P. Paz](#) and [A. Pittenger](#). *Classicality in discrete Wigner functions.* **Phys. Rev. A** **73**, 012301 (2006).

Invited talks in scientific meetings (selected)

- **Quantum Optics X.**
December 9-13, 2024. Puerto Varas (Chile).
Observation of Space-Dependent Rotational Doppler Shifts with a Single Ion Probe.
- **Conference and Advanced School on Low-Dimensional Quantum Systems.**
March 13-24, 2023. Santiago (Chile).
Composite-boson formalism for one-dimensional models.
- **Quantum Thermodynamics Conference.**
October 4-8, 2021. Online - organized by the University of Geneva (Switzerland).
Ion chains as quantum simulators.
- **Humboldt Kolleg: Frontiers in Physical Sciences.**
November 14-18, 2016. Buenos Aires (Argentina).
Ion chains in optical cavities.
- **New Frontiers of Quantum Information Theory.**
July 7-11, 2014. Ascoli Piceno (Italy).
Vibrational structures and long-lasting coherence in photosynthetic complexes.

Supervision of research activities

- **University of Buenos Aires (Argentina)** - cosupervised with Prof. Christian Schmiegelow
 - Carolina Vlatko (PhD student, since August 2024). Topic: vibrational control in ion traps.
 - Muriel Bonetto (PhD student, since April 2022). Topic: Thermometry of trapped ions.
- **National University of Córdoba (Argentina)**
 - Alan Kahan (PhD student, April 2019 to October 2023). Topic: Optomechanical systems of ultracold ions in cavities.
 - Alan Kahan (Master student, year 2017). Topic: Non-invasive monitoring of trapped ions in cavities.
 - Dr. Alba Ramos (postdoctoral researcher, years 2016-2017). Topic: Dynamical transitions in open quantum systems.
- **Ulm University (Germany)** - cosupervised with Prof. Martin Plenio
 - Andreas Lemmer (PhD student, years 2013-2014). Topic: 2D spectroscopy for trapped ions.

- **Saarland University (Germany)** - cosupervised with Prof. Giovanna Morigi
 - Christian Arenz (undergraduate student, year 2012). Topic: Dissipative preparation of entangled states.
 - Jens Baltrusch (PhD student, years 2011-2012). Topic: Quantum superpositions in ion chains.
 - Florian Cartarius (undergraduate student, year 2011). Topic: Ion crystals in multipolar traps.
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Fellowships, grants and awards (selected)

- **PIP Grant 2022-2024 (CONICET - Argentina).**
Amount equivalent to 10,000 USD. November 2022.
 - **PICT Grant for Recently Formed Groups - ANPCyT (Argentina).**
Amount equivalent to 17,000 USD. February 2022.
 - **Sponsorship of Renewed Research Stay in Germany by the Humboldt Foundation (Germany).**
Funding for a three-week visit to Saarland University (amount: 2,464 euros).
June 23 to July 14, 2016.
 - **Selected participant in the 62nd Lindau Nobel Laureate Meeting (Germany).**
Meeting dedicated to Physics; participation cost awarded by the Humboldt Foundation.
July 1-6, 2012.
 - **Postdoctoral Fellowship of the Alexander von Humboldt Foundation (Germany).**
Host: Prof. Giovanna Morigi, Saarland University.
September 2010 to August 2012.
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Teaching

Teaching Experience

- **Professor. University of the Republic (Uruguay).**
Since August 2024. 20 hours per week.
- **Visiting Professor. University of Buenos Aires (Argentina).**
October-November 2024. Total 40 hours.
- **Professor. National University of Córdoba (Argentina).**
November 2019 to July 2024. 10 hours per week.
- **Visiting Professor. University of São Paulo (Brazil).**
February 2019. Total 12 hours.
- **Assistant Professor. National University of Córdoba (Argentina).**
April 2015 to October 2019. 10 hours per week.
- **Visiting Professor. University of Buenos Aires (Argentina).**
May to June 2015. Total 32 hours.
- **Teaching assistant. Ulm University (Germany).**
April to August 2013. 10 hours per week.
- **Teaching assistant. Saarland University (Germany).**
April to August 2011. 6 hours per week.

- **Teaching assistant. University of Buenos Aires (Argentina).**
April 2003 to February 2010. 10 hours per week.
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Teacher Training Courses

- **Gender awareness:**
Virtual Campus UNC (Argentina). Year 2020.
Teacher training in gender awareness and gender-related violence.
 - **Physics Teacher Training Courses:**
CEFIEC, University of Buenos Aires (Argentina). Years 2006-2008.
General Didactics; Psychology and Learning; Educational Issues; History of Science (each a one-semester course, 6 hours per week; best grade obtained in all of the courses).
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Evaluation of scientific activities

- **Reviewer for physics journals** (only listing those with active referrals in the last three years).
 - **Physical Review Research**, since February 2022.
 - **Physical Review X Quantum**, since October 2021.
 - **Physical Review Letters**, since October 2011.
 - **Physical Review A**, since February 2010.
 - **Thesis examiner**
I have been reviewer for three MSc and four PhD theses, at the University of Buenos Aires, the National University of Córdoba, and the National University of San Martín (Argentina) and at the University of the Republic (Uruguay).
 - **External Reviewer for CONICET grants, selection of new CONICET researchers and promotion of CONICET researchers (Argentina)**
Several calls from years between 2015 and 2021.
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Service

- **Committee Member for CONICET PhD and Postdoctoral Fellowships.**
July 2023 to June 2024.
 - **Member of Assessment Committee on Quantum Science and Technologies.**
National Ministry of Science, Innovation and Technology (Argentina), June 2022 to November 2023.
 - **Member of the Gender Committee of the Argentinian Physical Society.**
October 2017 to 2020, and January to December 2022.
 - **Coordinator of the Division “Quantum Foundations and Information” of the Argentinian Physical Society.**
February 2015 - September 2017.
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