

Rodrigo Moreira

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🌐 <https://rodrigoirm.github.io>

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About me

I am a Brazilian researcher in quantum information theory (QIT) and quantum foundations, having recently completed an M.Sc. in Physics. My master's project focused on the similarities and differences between quantum theory and other non-classical theories within the framework of generalized probabilistic theories.

My current interests include the following:

- Bell nonlocality and entanglement theory;
- Higher-order quantum theory;
- Generalized probabilistic theories;
- Computationally-constrained quantum information theory.

Education

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| 2019 – 2023 | 📖 B.Sc. in Physics, University of São Paulo
Grade: 8.1/10.
Conclusion: 07/2023 |
| 2023 – 2026 | 📖 M.Sc. in Physics, University of Campinas
Grade: 3.33/4.0.
Thesis title: <i>Information protocols and Bell nonlocality in probabilistic theories</i> (access)
Conclusion: 07/2026 |

Research Experience

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| Bell Nonlocality: | 📖 I investigated whether a different composition rule for quantum systems could affect genuine multipartite Bell nonlocality, being primarily interested in violations of Tsirelson's bounds. |
| Higher-Order Quantum Theory: | 📖 I am investigating how to extend the quantum state marginal problem to process matrices and what role indefinite causal order can play in such an extension. |
| Generalized Probabilistic Theories: | 📖 I investigated how to formulate a dual version of the no-broadcasting theorem and attempted to generalize a finite version of de Finetti's theorem. |

Poster Presentations

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| 06.2025 | 📖 Does symmetry imply independence in generic probabilistic theories? , Solstice of Foundations, Zürich, Switzerland. |
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Poster Presentations (continued)

- 07.2025  **A finite de Finetti's theorem in generalized probabilistic theories**, 22nd European Conference on Foundations of Physics, Gdańsk, Poland.
- 02.2026  **Stronger-than-quantum correlations due to a different composition rule**, Quantum at the Dunes Summer School and Workshop, Natal, Brazil.

Skills

- Programming Skills  Mathematica, Python (numpy, cvxpy and PennyLane), $\LaTeX$
- Optimization  Linear programming, semidefinite programming

Miscellaneous

Teaching

- 03.2023 - 07.2023  Undergraduate teaching assistant in **Physics I**. University of São Paulo.
Description: this was a one-semester course on Newtonian mechanics. My role was to support students with tutorial sessions, where I would either solve a pre-established problem set or any exercises requested by the students.

Grants & Awards

- 08.2023 - 09.2024  Full-time scholarship by Brazilian Federal Agency for Support and Evaluation of Graduate Education (CAPES).
- 10.2024 - 07.2025  Full-time scholarship by National Council for Scientific and Technological Development (CNPq).
- 2025  **Best paper** in the 2nd Quantum Networks Workshop for the collaborative work "A New Perspective on Key Expansion for QKD BB84: The RanA Model". This workshop was part of the Brazilian Symposium on Computer Networks and Distributed Systems.

References available to contact

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