Gabriel Teixeira Landi

Quantum Thermodynamics and Quantum Transport (QT2)
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I am currently a professor of theoretical physics at the University of São Paulo, where I head the Quantum Thermodynamics and Quantum Transport group. My main research interest is in the foundations of thermodynamics in the quantum regime. This includes questions such as how irreversibility emerges in microscopic systems and how one may employ genuinely quantum effects, such as quantum coherence, to perform thermodynamic tasks that would not be possible in the classical domain. To tackle these problems we employ in our group tools from open quantum systems, statistical mechanics and quantum information theory. I currently supervise 3 PhD and 5 master students, as well as 2 post-doctoral fellows. I have 3 active research grants with the São Paulo funding agency FAPESP and currently hold a productivity award level 2 from CNPq. Teaching-wise, I have taught both graduate as well as undergraduate courses. At the graduate level, courses include Quantum Information, Statistical Mechanics and Solid State Physics. At the undergraduate level, I have taught classical, quantum and statistical mechanics as well as first year introductory physics.

Current position: Professor doctor (assistant professor).

Affiliation: Instituto de Física da Universidade de São Paulo (IFUSP).

Place of birth: São Paulo, SP - Brasil

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Academic trajectory

(2003-2007): Bachelor in physics from the University of São Paulo.

(2007-2009): Master in Physics from the University of São Paulo, under the supervision of Prof. Dr. Antonio Domingues dos Santos, in the area of nanomagnetism.

(2009-2012): PhD in physics from the University of São Paulo, under the supervision of Prof. Dr. Antonio Domingues dos Santos, in the area of theoretical magnetism and stochastic processes.

(2012-2013): Post-doc in the University of São Paulo, under the supervision of Prof. Dr. Mario José de Oliveira, in the area of non-equilibrium statistical mechanics.

(2013-2016): Adjoint professor at the Universidade Federal do ABC.

Most relevant publications

Here are the top 10 most important publications of my career. The complete list can be found here.

[1] Gabriel T. Landi and Mauro Paternostro, **"Irreversible entropy production, from quantum to classical"**. *To appear in Review of Modern Physics.* (2021). arXiv 2009.07668.

[2] Gabriel T. Landi, Gernot Schaller and Dario Poletti, **"Non-equilibrium properties of boundary driven quantum systems"**. *To appear in Review of Modern Physics.* (2021).

[3] André M. Timpanaro, Jader P. Santos and Gabriel T. Landi, **"Landauer's Principle at Zero Temperature"**, *Phys. Rev. Lett.*, **124**, 240601 (2020).

[4] K. Micadei, J. P. S. Peterson, A. M. Souza, R. S. Sarthour, I. S. Oliveira, G. T. Landi, T. B. Batalhão, R. M. Serra, E. Lutz, **"Reversing the direction of heat flow using quantum correlations"**. *Nature Communications*, **10**, 2456 (2019).

[5] F. L. S. Rodrigues, G. De Chiara, M. Paternostro and G. T. Landi, **"Thermodynamics of weakly coherent collisional models"**, *Phys. Rev. Lett.*, **123**, 140601 (2019).

[6] S. Seah, S. Nimmrichter, D. Grimmer, J. P. Santos, V. Scarani and Gabriel T. Landi, **"Collisional quantum thermometry"**, *Phys. Rev. Lett.*, **123**, 180602 (2019)

[7] A. M. Timpanaro, G. Guarnieri, J. Goold, G. T. Landi, **"Thermodynamic uncertainty relations from exchange fluctuation theorems"**, *Phys. Rev. Lett.*, **123**, 090604 (2019)

[8] J P. Santos, L C. Céleri, G T. Landi, M. Paternostro, **"The role of quantum coherence in non-equilibrium entropy production"**, *Nature Quantum Information*, **5**, 23 (2019).

[9] Kaonan Micadei, Gabriel T. Landi, Eric Lutz, **"Quantum fluctuation theorems beyond two-point measurements"**, *Phys. Rev. Lett.*, **124**, 090602 (2020).

[10] M. Rossi, L. Mancino, G. T. Landi, M. Paternostro, A. Schliesser, A. Belenchia, **"Experimental assessment of entropy production in a continuously measured mechanical resonator"**, *Phys. Rev. Lett.* **125**, 080601 (2020).

Quantitative indicators

Published papers (including preprints):	78
Number of citations (Google Citations):	1693
h-index:	24

Papers by year:	Including preprints	Excluding preprints
2021	4	1
2020	24	18
2019	10	10
2018	10	9
2017	5	5
2016	6	6
2015	2	2
2014	4	4
2013	3	3
2012	8	8
2010	2	2
Total	78	68

Relevant links

- Google Scholar.
- ORCID.
- arXiv page.
- Personal URL.
- Researcher ID.

Ongoing research grants

- CNPq productivity grant, level 2.
- FAPESP Sprint collaboration with Queen's University in Belfast (2017/50304-7).
- FAPESP collaboration with the Universities of Nottingham and Birmingham (2017/07973-5).
- FAPESP regular research grant (2018/12813-0).
- CNPq National Institute for Quantum Information Sciences (INCT-IQ).
- FAPESP-ERC Collaboration between myself and Prof. John Goold, from Trinity College, Dublin.

Ongoing PhD and master supervision

- PhD: Rodolfo Reis Soldati. Start: 04/2019. Project: *Autonomous quantum absorption refrigerators using ultra-cold atoms in an optical cavity*.
- PhD: Naim Elias Comar. Start: 02/2019. Project: *Non-Markovianity in graph-correlated collisional models*.
- MSc: Mariana Afeche Cipolla. Start: 02/2019. Project: *Quantum thermometry using generalized spin-boson models.*
- MSc: Marcelo Pereira. Start: 01/2018. Project: *Intrinsic rectification and out-of-time order correlators.*
- MSc: Gabriel Oliveira Alves. Start: 08/2020. Project: *Stroboscopic quantum metrology.*

Previous students

- MSc.: Otavio Molitor. Start: 02/2019. Project: *Finite-time quantum heat engines and implementations using trapped ions.*
- MSc: Rolando Ramirez Camasca. Start: 08/2017. Project: *Non-Markovianity in Gaussian collisional models.*
- MSc: Artur Machado Lacerda. Start: 08/2017. Project: *Information transport in aperiodic quantum spin chains.*
- MSc: Bruno Ortega Goes. Start: 03/2017. Project: *Irreversibility in dissipative quantum phase transitions.*

- MSc.: Heitor Peres Casagrande. Start: 08/2017. Project: *The renormalization group applied to open quantum systems.*
- MSc: Pedro Vinicius Portugal. Start: 03/2017. Project: *Irreversibility and information flow in non-Markovian open quantum systems.*
- MSc: Franklin Luis dos Santos Rodrigues Jr. Start: 03/2017. Project: *Refrigeration through the conversion of quantum resources.*
- MSc: William Tiago Batista Malouf. Start: 03/2017. Project: *Thermodynamics and information in linear quantum networks.*
- MSc: Wellington Ribeiro dos Santos. Start: 08/2015. Project: *Heat transport and fluctuation theorems in fermionic chains under non-local dephasing.*

Teaching

Here is a list of subjects I have though in the University of São Paulo in the last 3 years. All courses have a dedicated website where I make available detailed sets of lecture notes for the students.

- 2020: Mathematical Physics I.
- 2020: Physics 1 (freshmen).
- 2019: Statistical mechanics (graduate).
- 2019: Quantum Information (graduate).
- 2018: Statistical mechanics (graduate).
- 2018: Quantum Information (graduate).
- 2017: Statistical mechanics.
- 2017: Solid state physics II (graduate).

Organizer of scientific meetings

- 2019: Lead organizer of the workshop *"Emergent platforms for quantum information processing"*. 50 participants, 3 days. Held at the Physics Institute of the University of São Paulo.
- 2019: At the University of São Paulo I organized the *Quantum Discussions* seminar series, which focused on the "tri-border" between condensed matter physics, quantum information and high-energy physics.
- 2020: Organizer of the workshop *Heating up quantum thermodynamics across the equator* to be held in Feb. 2021 at the International Institute of Physics, in Natal, Brazil.

Commissions of trust

Scientific Referee for Physical Review Letters, Physical Review X, Nature Communications, American Journal of Physics, Physical Review A, B, E and Research. Scientific advisor for the São Paulo Funding Agency FAPESP and the Brazilian funding agency CNPq.