

Salvatore Lorenzo — Curriculum Vitae

Info

Birth: 19 Jan 1979 (Milan)

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Current Position

(01/2022-Present) - Associate Professor

Dipartimento di Fisica e Chimica, University of Palermo, Italy

Education

2011: PhD Course in Physics and Quantum Technologies

Università della Calabria

Supervisor: Francesco Plastina

Thesis title: *Quantum State Transfer and Non-Markovian Dynamics*

2008: Masters degree in Physics

Università della Calabria

Thesis advisors: Giuseppe Nisticó

Thesis title: *Tunnel Effect for nano and sub-nano barriers*

Honors

2021: Italian National Scientific Habilitation (ASN 2017) - Full Professor in Theoretical Matter Physics (02B2)

2020: Italian National Scientific Habilitation (ASN 2017) - Associated Professor in Theoretical Matter Physics (02B2)

2020: Italian National Scientific Habilitation (ASN 2017) - Associated Professor in Theoretical Physics of Fundamental Interactions (02A2)

2015: National Teaching Habilitation of Math and Science for lower secondary school

Università degli Studi di Palermo

Appointments held

(01/2019-01/2022) - Tenured Assistant Professor at Università degli Studi di Palermo

(09/2018-12/2018) - Teacher of math and science at lower secondary school I.C. Pappalardo (Vittoria - RG)

(09/2017-09/2018) - Teacher of math and science at lower secondary school S. Biagio (Vittoria - RG)

(07/2016-06/2017) - Post Doc at Università degli Studi di Milano

(07/2015-06/2016) - Post Doc at Università degli Studi della Calabria

(09/2013-03/2015) - Post Doc at Università degli Studi di Palermo

(05/2012-08/2013) - Post Doc at Università degli Studi della Calabria

Teaching

- A.Y. 2020/present - "Python Programming and Quantum Physics" - PhD Course - Unipa
- A.Y. 2020/present - "Gauge Theories" - Graduate course - Unipa
- A.Y. 2019/present - "Fisica I", Undergraduate course - Unipa
- A.Y. 2019/2020 - "Quantum Mechanics" (one modulus) - Graduate course - Unipa
- A.Y. 2016/2017 - "Fisica II", Undergraduate course - Unipa

Research

- Quantum information processing.
- Quantum State Transfer in spin networks
- Open quantum system, Decoherence and Non-Markovianity
- Simulation of quantum many-body systems
- Quantum statistical physics
- Quantum Thermodynamics

approach: analytical and/or numerical

Research Projects

- PRIN 2022/23 - Quantum Reservoir Computing (QuReCo)
- QuProCS - Quantum Probes for Complex Systems
FET proactive "quantum simulations", Horizon 2020 Programme of the European Union.
- TherMiQ - Thermodynamics of Mesoscopic Quantum Systems
Seventh Framework Programme of the European Union 2007-2013
- PRIN 2010/11 - Fenomeni quantistici collettivi: dai sistemi fortemente correlati ai simulatori quantistici

Organization of International Conferences and Workshops

- IQIS 2022
Homepage: <https://iqis2022.unipa.it>
Palermo, Italy, 12-16 September 2022
- The many facets of non-equilibrium physics 2019
Homepage: <https://sites.google.com/view/mazaranon-equilibrium2019/home>
Mazara del Vallo, Italy, 8-12 July 2019
- The many facets of non-equilibrium physics: from many body theory to quantum thermodynamics
Homepage: <https://sites.google.com/site/nonequilibriummazara17/home>
Mazara del Vallo, Italy, 18-22 September 2017

Invited Talks at International Conferences and Workshops

- NES - 2023
(Erice, Italy) (09/2023)
Talk Title: "Quantum properties reconstruction via QELM"
- IQIS - 2019
(Milano, Italy) (09/2019)
Talk Title: "Graphs Synchronization through chiral coupling"
- TQN - 2016
(Mazara del Vallo, Italy) (09/2016)
Talk Title: "Quantum non-Markovianity induced by Anderson localization"

International Conferences and Schools

- IQIS2023 - 2023
(Trieste) (09/2023)
Talk Title: "On the potential and limitations of quantum extreme learning machines"
- QIM2023 - 2023
(Malta) (06/2023)
Talk Title: "Quantum Collision models"
Talk Title: "State estimation via QELM"
- FISMAT - 2015
(Palermo, Italy) (10/2015)
Talk Title: "Landauer's Principle in multipartite open quantum system dynamics"
- IQIS - 2015
(Bari, Italy) (09/2015)
Talk Title: "Landauer's Principle in multipartite open quantum system dynamics"
- IQIS - 2014
(Salerno, Italy) (09/2014)
Poster Title: "How much does it cost to 'Erase' correlations?"
- CEWQO - 2014
(Brussels, Belgium) (06/2014)
Poster Title: "Heat flux dynamics in dissipative cascaded systems"
- School on new trends of quantum dynamics and entanglement
(The Abdus Salam ITCP, Italy) (02/2011)
- DPG Physics School 2010 "Nanophotonics Meets Quantum Optics"
(Bad Honnef, Germany) (09/2010)
Poster Title: "Information transmission via local modulation in spin chain"
- International School and Conference on Spintronics and Quantum Information
(Cracow, Poland) (07/2009)

Publications

- [1] Claudio Pellitteri, G Massimo Palma, and **SL**. Temperature gradient and asymmetric steady state correlations in dissipatively coupled cascaded optomechanical systems. *Physica Scripta*, 99(1):015108, dec 2023. DOI: 10.1088/1402-4896/ad1238.
- [2] Luca Innocenti, **SL**, Ivan Palmisano, Francesco Albarelli, Alessandro Ferraro, Mauro Paternostro, and G. Massimo Palma. Shadow tomography on general measurement frames. *PRX Quantum*, 4:040328, Nov 2023. DOI: 10.1103/PRXQuantum.4.040328.
- [3] Alessia Suprano, Danilo Zia, Luca Innocenti, **SL**, Valeria Cimini, Taira Giordani, Ivan Palmisano, Emanuele Polino, Nicolò Spagnolo, Fabio Sciarrino, G. Massimo Palma, Alessandro Ferraro, and Mauro Paternostro. Experimental property-reconstruction in a photonic quantum extreme learning machine, August 2023. DOI: 10.48550/arXiv.2308.04543.
- [4] Gabriele Lo Monaco, Luca Innocenti, Dario Cilluffo, Dario A. Chisholm, **SL**, and G. Massimo Palma. Quantum scrambling via accessible tripartite information. *Quantum Science and Technology*, 8(3):035006, July 2023. DOI: 10.1088/2058-9565/accd92.
- [5] Luca Innocenti, **SL**, Ivan Palmisano, Alessandro Ferraro, Mauro Paternostro, and G. Massimo Palma. Potential and limitations of quantum extreme learning machines. *Communications Physics*, 6(1):118, May 2023. DOI: 10.1038/s42005-023-01233-w.
- [6] Federico Amato, Claudio Pellitteri, G. Massimo Palma, **SL**, and Rosario Lo Franco. Heating and cooling processes via phaseonium-driven dynamics of cascade systems, 2023.
- [7] Mirko Consiglio, Jacopo Settino, Andrea Giordano, Carlo Mastroianni, Francesco Plastina, **SL**, Sabrina Maniscalco, John Gould, and Tony J. G. Apollaro. Variational gibbs state preparation on nisq devices, 2023.
- [8] Gabriele Lo Monaco, Luca Innocenti, Dario Cilluffo, Diana A. Chisholm, **SL**, and G. Massimo Palma. An operational definition of quantum information scrambling, 2023.
- [9] Tony J. G. Apollaro, **SL**, Francesco Plastina, Mirko Consiglio, and Karol Życzkowski. Entangled States are Harder to Transfer than Product States. *Entropy. An International and Interdisciplinary Journal of Entropy and Information Studies*, 25(1):46, December 2022. DOI: 10.3390/e25010046.
- [10] T.J.G. Apollaro, **SL**, F. Plastina, M. Consiglio, and K. Życzkowski. Quantum transfer of interacting qubits. *New Journal of Physics*, 24(8), 2022. DOI: 10.1088/1367-2630/ac86e7.

- [11] F. Ciccarello, **SL**, V. Giovannetti, and G.M. Palma. Quantum collision models: Open system dynamics from repeated interactions. *Physics Reports*, 954, 2022. DOI: 10.1016/j.physrep.2022.01.001.
- [12] F. Roccati, **SL**, G. Calajò, G. Massimo Palma, A. Carollo, and F. Ciccarello. Exotic interactions mediated by a non-Hermitian photonic bath. *Optica*, 9(5), 2022. DOI: 10.1364/OPTICA.443955.
- [13] **SL**, B. Militello, A. Napoli, R. Zambrini, and G.M. Palma. Quantum synchronisation and clustering in chiral networks. *New Journal of Physics*, 24(2), 2022. DOI: 10.1088/1367-2630/ac51a9.
- [14] D. Cilluffo, G. Buonaiuto, I. Lesanovsky, A. Carollo, **SL**, G. Palma, F. Ciccarello, and F. Carollo. Microscopic biasing of discrete-time quantum trajectories. *Quantum Science and Technology*, 6(4), 2021. DOI: 10.1088/2058-9565/ac15e2.
- [15] F. Roccati, **SL**, G.M. Palma, G.T. Landi, M. Brunelli, and F. Ciccarello. Quantum correlations in PT-symmetric systems. *Quantum Science and Technology*, 6(2), 2021. DOI: 10.1088/2058-9565/abcfcc.
- [16] **SL**, S. Longhi, A. Cabot, R. Zambrini, and G.L. Giorgi. Intermittent decoherence blockade in a chiral ring environment. *Scientific Reports*, 11(1), 2021. DOI: 10.1038/s41598-021-92288-8.
- [17] T.J.G. Apollaro, C. Sanavio, W.J. Chetcuti, and **SL**. Multipartite entanglement transfer in spin chains. *Physics Letters, Section A: General, Atomic and Solid State Physics*, 384(15), 2020. DOI: 10.1016/j.physleta.2020.126306.
- [18] W.J. Chetcuti, C. Sanavio, **SL**, and T.J.G. Apollaro. Perturbative many-body transfer. *New Journal of Physics*, 22(3), 2020. DOI: 10.1088/1367-2630/ab7a33.
- [19] D. Cilluffo, G. Buonaiuto, **SL**, G.M. Palma, F. Ciccarello, F. Carollo, and I. Lesanovsky. Witnessing nonclassicality through large deviations in quantum optics. *Physical Review Research*, 2(2), 2020. DOI: 10.1103/PhysRevResearch.2.023078.
- [20] D. Cilluffo, A. Carollo, **SL**, J.A. Gross, G.M. Palma, and F. Ciccarello. Collisional picture of quantum optics with giant emitters. *Physical Review Research*, 2(4), 2020. DOI: 10.1103/PhysRevResearch.2.043070.
- [21] G.L. Giorgi, **SL**, and S. Longhi. Topological protection and control of quantum Markovianity. *Photonics*, 7(1), 2020. DOI: 10.3390/photonics7010018.
- [22] **SL**, M. Paternostro, and G.M. Palma. Anti-Zeno-based dynamical control of the unfolding of quantum Darwinism. *Physical Review Research*, 2(1), 2020. DOI: 10.1103/PhysRevResearch.2.013164.
- [23] T.J.G. Apollaro, G.M.A. Almeida, **SL**, A. Ferraro, and S. Paganelli. Spin chains for two-qubit teleportation. *Physical Review A*, 100(5), 2019. DOI: 10.1103/PhysRevA.100.052308.
- [24] D. Cilluffo, **SL**, G. Massimo Palma, and F. Ciccarello. Quantum jump statistics with a shifted jump operator in a chiral waveguide. *Journal of Statistical Mechanics: Theory and Experiment*, 2019(10), 2019. DOI: 10.1088/1742-5468/ab371c.
- [25] N. Milazzo, **SL**, M. Paternostro, and G.M. Palma. Role of information backflow in the emergence of quantum Darwinism. *Physical Review A*, 100(1), 2019. DOI: 10.1103/PhysRevA.100.012101.
- [26] **SL**, M. Paternostro, and G.M. Palma. Reading a qubit quantum state with a quantum meter: Time unfolding of quantum darwinism and quantum information flux. *Open Systems and Information Dynamics*, 26(4), 2019. DOI: 10.1142/S1230161219500239.
- [27] **SL**, T. Apollaro, G.M. Palma, R. Nandkishore, A. Silva, and J. Marino. Remnants of Anderson localization in prethermalization induced by white noise. *Physical Review B*, 98(5), 2018. DOI: 10.1103/PhysRevB.98.054302.
- [28] **SL**, T.J.G. Apollaro, A. Trombettoni, and S. Paganelli. 2-Qubit quantum state transfer in spin chains and cold atoms with weak links. *International Journal of Quantum Information*, 15(5), 2017. DOI: 10.1142/S021974991750037X.
- [29] **SL**, F. Ciccarello, and G.M. Palma. Composite quantum collision models. *Physical Review A*, 96(3), 2017. DOI: 10.1103/PhysRevA.96.032107.
- [30] **SL**, F. Ciccarello, and G.M. Palma. Non-Markovian dynamics from band edge effects and static disorder. *International Journal of Quantum Information*, 15(8), 2017. DOI: 10.1142/S0219749917400263.
- [31] **SL**, F. Ciccarello, G.M. Palma, and B. Vacchini. Quantum non-markovian piecewise dynamics from collision models. *Open Systems and Information Dynamics*, 24(4), 2017. DOI: 10.1142/S123016121740011X.
- [32] **SL**, F. Lombardo, F. Ciccarello, and G.M. Palma. Quantum non-Markovianity induced by Anderson localization. *Scientific Reports*, 7, 2017. DOI: 10.1038/srep42729.
- [33] **SL**, J. Marino, F. Plastina, G.M. Palma, and T.J.G. Apollaro. Quantum critical scaling under periodic driving. *Scientific Reports*, 7(1), 2017. DOI: 10.1038/s41598-017-06025-1.
- [34] **SL**, F. Ciccarello, and G.M. Palma. Class of exact memory-kernel master equations. *Physical Review A*, 93(5), 2016. DOI: 10.1103/PhysRevA.93.052111.

- [35] T.J.G. Apollaro, **SL**, A. Sindona, S. Paganelli, G.L. Giorgi, and F. Plastina. Many-qubit quantum state transfer via spin chains. 2015, 2015. DOI: 10.1088/0031-8949/2015/T165/014036.
- [36] **SL**, T.J.G. Apollaro, S. Paganelli, G.M. Palma, and F. Plastina. Transfer of arbitrary two-qubit states via a spin chain. *Physical Review A - Atomic, Molecular, and Optical Physics*, 91(4), 2015. DOI: 10.1103/PhysRevA.91.042321.
- [37] **SL**, A. Farace, F. Ciccarello, G.M. Palma, and V. Giovannetti. Heat flux and quantum correlations in dissipative cascaded systems. *Physical Review A - Atomic, Molecular, and Optical Physics*, 91(2), 2015. DOI: 10.1103/PhysRevA.91.022121.
- [38] **SL**, R. McCloskey, F. Ciccarello, M. Paternostro, and G. Palma. Landauer's principle in multipartite open quantum system dynamics. *Physical Review Letters*, 115(12), 2015. DOI: 10.1103/PhysRevLett.115.120403.
- [39] T.J.G. Apollaro, **SL**, C. Di Franco, F. Plastina, and M. Paternostro. Competition between memory-keeping and memory-erasing decoherence channels. *Physical Review A - Atomic, Molecular, and Optical Physics*, 90(1), 2014. DOI: 10.1103/PhysRevA.90.012310.
- [40] T.J.G. Apollaro, **SL**, and F. Plastina. Transport of quantum correlations across a spin chain. *International Journal of Modern Physics B*, 27(1-3), 2013. DOI: 10.1142/S0217979213450355.
- [41] S. Paganelli, **SL**, T.J.G. Apollaro, F. Plastina, and G.L. Giorgi. Routing quantum information in spin chains. *Physical Review A - Atomic, Molecular, and Optical Physics*, 87(6), 2013. DOI: 10.1103/PhysRevA.87.062309.
- [42] F. Plastina, A. Sindona, J. Goold, N. Lo Gullo, and **SL**. Decoherence in a fermion environment: Non-markovianity and orthogonality catastrophe. *Open Systems and Information Dynamics*, 20(3), 2013. DOI: 10.1142/S1230161213400052.
- [43] A. Sindona, J. Goold, N. Lo Gullo, **SL**, and F. Plastina. Orthogonality catastrophe and decoherence in a trapped-fermion environment. *Physical Review Letters*, 111(16), 2013. DOI: 10.1103/PhysRevLett.111.165303.
- [44] **SL**, T.J.G. Apollaro, A. Sindona, and F. Plastina. Quantum-state transfer via resonant tunneling through local-field-induced barriers. *Physical Review A - Atomic, Molecular, and Optical Physics*, 87(4), 2013. DOI: 10.1103/PhysRevA.87.042313.
- [45] **SL**, F. Plastina, and M. Paternostro. Geometrical characterization of non-Markovianity. *Physical Review A - Atomic, Molecular, and Optical Physics*, 88(2), 2013. DOI: 10.1103/PhysRevA.88.020102.
- [46] **SL**, F. Plastina, and M. Paternostro. Tuning non-Markovianity by spin-dynamics control. *Physical Review A - Atomic, Molecular, and Optical Physics*, 87(2), 2013. DOI: 10.1103/PhysRevA.87.022317.
- [47] **SL**, F. Plastina, and M. Paternostro. Role of environmental correlations in the non-Markovian dynamics of a spin system. *Physical Review A - Atomic, Molecular, and Optical Physics*, 84(3), 2011. DOI: 10.1103/PhysRevA.84.032124.

Editorial Board Membership for International Journals

- Plos one
- Heliyon

Referral Activity for International Journals

- NPJ Quantum Information
- Physical Review A
- Physical Review B
- Physical Review E
- Physics Letter A
- Physical Review Letters
- Physical Review Research
- New Journal of Physics
- Quantum Information Processing

Computer Skills

- **Operating systems:** Advanced experience with the most flavors of Linux.
Experienced Microsoft Windows and Mac OSX
- **Programming and scripting:** Mathematica, Matlab, Python, \LaTeX (daily), HTML (often), C++, Fortran, Bash (seldom).

Languages

- **Italian:** Native tongue
- **English**

Signature