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. 2020/2021 - "Python Programming and Quantum Physics" - PhD Course - Unipa
A.Y. 2021/2022 - "Gauge Theory and Standard Model" - Graduate course - Unipa
A.Y. 2021/2022 - "Fisica I", Undergraduate course - Unipa
A.Y. 2021/2022 - "Fisica I", Undergraduate course - Unipa
A.Y. 2020/2021 - "Gauge Theory and Standard Model" - Graduate course - Unipa
A.Y. 2020/2021 - "Fisica I", Undergraduate course - Unipa
A.Y. 2020/2021 - "Fisica I", Undergraduate course - Unipa
A.Y. 2019/2020 - "Quantum Mechanics" (one modulus) - Graduate course - Unipa
A.Y. 2019/2020 - "Fisica I", Undergraduate course - Unipa
A.Y. 2019/2020 - "Fisica I", Undergraduate course - Unipa
A.Y. 2016/2017 - "Fisica II", Undergraduate course - Unipa

Research

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

approach: analytical and/or numerical

Research Projects

o PRIN 2010/11 - Fenomeni quantistici collettivi: dai sistemi fortemente correlati ai simulatori quantistici

o TherMiQ - Thermodynamics of Mesoscopic Quantum Systems
Seventh Framework Programme of the European Union 2007-2013

o QuProCS - Quantum Probes for Complex Systems
FET proactive "quantum simulations", Horizon 2020 Programme of the European Union.

Publications

o [35] F. Ciccarello, **S. Lorenzo**, V. Giovannetti, and G. M. Palma
Phys. Rep. **954**, 1 (2022)
Quantum collision models: open system dynamics dynamics from repeated interactions

o [34] D. Cilluffo, G. Buonaiuto, I. Lesanovsky, A. Carollo, **S. Lorenzo**, G. M. Palma, F. Ciccarello, and F. Carollo
Quantum Sci. Technol. **6**, 045011 (2021)
Microscopic biasing of discrete-time quantum trajectories

o [33] F. Roccati, **S. Lorenzo**, G.M. Palma, G.T. Landi, M. Brunelli, F.Ciccarello
Quantum Sci. Technol. **6**, 025005 (2021)
Quantum correlations in PT symmetric systems

o [32] D. Cilluffo, A. Carollo, **S. Lorenzo**, J. A. Gross, G. M. Palma, and F. Ciccarello
Phys. Rev. R, **2**, 043070 (2020)
Collisional picture of quantum optics with giant emitters

o [31] D. Cilluffo, G. Buonaiuto, **S. Lorenzo**, G. M. Palma, F. Ciccarello, F. Carollo, I. Lesanovsky
Phys. Rev. R, **2**, 023078 (2020)
Witnessing non-classicality through large deviations in quantum optics

o [30] G. L. Giorgi, **S. Lorenzo**, Longhi S.
Photonics, **7**, 18 (2020)
Topological protection and control of quantum Markovianity

- [29] T.J.G. Apollaro, C. Sanavio, W.J. Chetcuti, **S. Lorenzo**
  Physics Letters A, **384**, 126306 (2020)
  Multipartite entanglement transfer in spin chains
- [28] W.J. Chetcuti, C. Sanavio, **S. Lorenzo**, T.J.G. Apollaro
  New Journal of Physics, **22**, (2020)
  Perturbative many-body transfer
- [27] **S. Lorenzo**, M. Paternostro, G.M. Palma
  Phys. Rev. R, **2**, 013164 (2020)
  Anti-Zeno-based dynamical control of the unfolding of quantum Darwinism.
- [26] **S. Lorenzo**, M. Paternostro, G.M. Palma
  Open Systems & Information Dynamics **26**, 1950023 (2019)
  Reading a Qubit Quantum State with a Quantum Meter:
  Time Unfolding of Quantum Darwinism and Quantum Information Flux
- [25] D. Ciluffo, **S. Lorenzo**, G.M. Palma, F. Ciccarello
  Journal of Statistical Mechanics **10**, 104004 (2019)
  Quantum jump statistics with a shifted jump operator in a chiral waveguide
- [24] T.J.G. Apollaro, G.M.A. Almeida, **S. Lorenzo**, A. Ferraro, S. Paganelli
  Phys. Rev. A **100**, 052308 (2019)
  Spin chains for two-qubit teleportation
- [23] N. Milazzo, **S. Lorenzo**, G.M. Palma, M. Paternostro
  Phys. Rev. A **100**, 012101 (2019)
  Role of information backflow in the emergence of quantum Darwinism
- [22] **S. Lorenzo**, T. Apollaro, G. M. Palma, R. Nandkishore, A. Silva, J. Marino
  Phys. Rev. B **98**, 054302 (2018)
  Remnants of Anderson localization in pre-thermalization induced by white noise
- [21] **S. Lorenzo**, T.J.G. Apollaro
  IQIS 2018 -Proceedings (2018)
  Coexistence of different scaling laws for the entanglement entropy in a periodically driven system
- [20] **S. Lorenzo**, F. Ciccarello, G.M. Palma and B. Vacchini
  Open Systems & Information Dynamics **24**-4, 1740011 (2017)
  Quantum non Markovian piecewise dynamics from collision models
- [19] **S. Lorenzo**, F. Ciccarello and G.M. Palma
  Int. J. Quantum Inform. **15**, 1740026 (2017)
  Non Markovian dynamics from band edge effects and static disorder
- [18] **S. Lorenzo**, T. J. G. Apollaro, A. Trombettoni, S. Paganelli
  Int. J. Quantum Inform. **15**, 1750037 (2017)
  2-qubit quantum state transfer in spin chains and cold atoms with weak links
- [17] **S. Lorenzo**, J. Marino, F. Plastina, G. M. Palma, T. J. G. Apollaro
  Scientific Reports **7**, 5672 (2017)
  Quantum Critical Scaling under Periodic Driving
- [16] **S. Lorenzo**, F. Ciccarello, G. M. Palma
  Phys. Rev. A **96**, 032107 (2017)
  Composite quantum collision models
- [15] **S. Lorenzo**, F. Lombardo, F. Ciccarello, G.M Palma
  Scientific Reports **7**, 42729 (2017)
  Quantum non-Markovianity induced by Anderson localization
- [14] **S. Lorenzo**, F. Ciccarello, G. M. Palma
  Phys. Rev. A **93**, 052111 (2016)
  Class of exact memory-kernel master equations
- [13] **S. Lorenzo**, A. Farace, F. Ciccarello, G.M. Palma, V. Giovannetti
  Phys. Rev. A **91**, 022121, (2015)
  Heat flux dynamics in dissipative cascaded systems
- [12] **S. Lorenzo**, T. J. G. Apollaro, S. Paganelli, G. M. Palma, F. Plastina
  Phys. Rev. A **91**, 042321 (2015)
  Transfer of arbitrary two qubit states via a spin chain
- [11] **S. Lorenzo**, R. McCloskey, F. Ciccarello, M. Paternostro, G. M. Palma
  Phys. Rev. Lett. **115**, 120403 (2015)
  Landauer's principle in multipartite open quantum system dynamics

- [10] T. J. G. Apollaro, **S. Lorenzo**, A. Sindona, S. Paganelli, G. L. Giorgi, F. Plastina
  Physica Scripta, Volume 2015, Number T165 (2015)
  Many-qubit quantum state transfer via spin chains
- [9] T.J.G. Apollaro, **S. Lorenzo**, C. Di Franco, F. Plastina and M. Paternostro
  Phys. Rev. A **90**, 012310 (2014)
  Competition between memory-keeping and memory-erasing decoherence channels
- [8] A. Sindona, J. Goold, N. Lo Gullo, **S. Lorenzo** and F. Plastina
  Open Syst. Inf. Dyn. **20**, 1340005 (2013)
  Decoherence in a fermion environment: Non-Markovianity and Orthogonality Catastrophe
- [7] **S. Lorenzo**, F. Plastina and M. Paternostro
  Phys. Rev. A **88**, 020102(R) (2013)
  Geometrical characterization of non-Markovianity
- [6] S. Paganelli, **S. Lorenzo**, T. J. G. Apollaro, F. Plastina and G. Giorgi
  Phys. Rev. A **87**, 062309 (2013)
  Routing quantum information in spin chains
- [5] A. Sindona, J. Goold, N. Lo Gullo, **S. Lorenzo** and F. Plastina
  Phys. Rev. Lett. **111**, 165303 (2013)
  Orthogonality catastrophe and decoherence in a trapped-Fermion environment
- [4] **S. Lorenzo**, T.J.G. Apollaro, A. Sindona and F. Plastina
  Phys. Rev. A **87**, 042313 (2013)
  Quantum-state transfer via resonant tunnelling through local field induced barriers
- [3] **S. Lorenzo**, F. Plastina, M. Paternostro
  Phys. Rev. A **87**, 022317 (2013)
  Tuning non-Markovianity by spin-dynamics control
- [2] T.J.G. Apollaro, **S. Lorenzo** and F. Plastina
  International Journal of Modern Physics B Vol. **27**, 1345035 (2013)
  Transport of Quantum Correlations across a spin chain
- [1] **S. Lorenzo**, F. Plastina and M. Paternostro
  Phys. Rev. A **84**, 032124 (2011)
  Role of environmental correlations in the non-Markovian dynamics of a spin system

Collaborations

- Visiting Researcher Associate in the school of Mathematics and Physics
  (Queen's University of Belfast) (01/03/2011 - 31/8/2011)
- Visiting Professor at Institute for Cross-Disciplinary Physics (IFISC)
  (University of Balearic Islands) (29/08/2019 - 29/10/2019)

Organization of International Conferences and Workshops

- 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
- 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
- IQIS 2022
  Homepage: under construction
  Palermo, Italy, 12-16 September 2022

Invited Talks at International Conferences and Workshops

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

International Conferences and Schools

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

Editorial Board Membership for International Journals

o Plos one
o Heliyon

Referral Activity for International Journals

o NPJ Quantum Information
o Physical Review A
o Physical Review B
o Physical Review E
o Physics Letter A

Computer Skills

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

Languages

o **Italian**: Native tongue
o **English**

Signature