Giacomo De Palma

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Executive summary

I am Full Professor in Mathematical Physics and coordinator of the research group in Quantum Information Theory at the Department of Mathematics of the University of Bologna (Italy). My research covers all areas of quantum information theory and quantum computing. My main results are the proof of an entropic inequality which was a ten-year longstanding conjecture in quantum communication theory and the proposal of a quantum generalization of optimal mass transport that has led to a proof of the equivalence between the canonical and microcanonical ensembles of quantum statistical mechanics. My current research aims to provide rigorous mathematical foundations to the functioning of quantum neural networks, to determine the limits of quantum algorithms for combinatorial optimization problems and to develop quantum algorithms for nonlinear differential equations.

Employment

Since 10/2024	Full Professor in Mathematical Physics and coordinator of the research group in Quantum Information Theory, University of Bologna (Italy), Department of Mathematics
20/12/2021 – 09/2024	Associate Professor in Mathematical Physics and coordinator of the research group in Quantum Information Theory, University of Bologna (Italy), Department of Mathematics
15/3/2021 – 19/12/2021	Tenure-track Assistant Professor (RTD-B) in Mathematical Physics and co-coordinator of the Quantum Information group, Scuola Normale Superiore
9/2019 – 14/3/2021	Postdoc, Research Laboratory of Electronics, MIT (USA) Supervisor Prof. Seth Lloyd
4/2018 – 8/2019	Marie Curie Fellow, Department of Mathematical Sciences, University of Copenhagen (Denmark), Grant Agreement 792557 Supervisor Prof. Jan Philip Solovej

10/2016 – 3/2018	Postdoc, Department of Mathematical Sciences, University of Copenhagen (Denmark) Supervisors Prof. Matthias Christandl and Prof. Jan Philip Solovej

Education

11/2013 – 9/2016	PhD cum laude in Physics, Scuola Normale Superiore (Italy), thesis "Gaussian optimizers and other topics in quantum information", supervisor Prof. Vittorio Giovannetti
3/2014	"Diploma di licenza" in Physics, Scuola Normale Superiore (Italy), 70/70 cum laude, dissertation "A generalization of the entropy power inequality to bosonic quantum systems", supervisor Prof. Vittorio Giovannetti
7/2013	MSc in Physics, University of Pisa (Italy), 110/110 cum laude, thesis "A window on AdS strings from free String Field Theory", supervisors Prof. Augusto Sagnotti and Dr. Dario Francia
7/2011	BSc in Physics, University of Pisa (Italy), 110/110 cum laude, thesis "Strings and higher spins", supervisor Prof. Augusto Sagnotti
10/2008 – 9/2013	Undergraduate student at the Faculty of Sciences of Scuola Normale Superiore; first place in the admission competition
7-8/2007	Gran Sasso / Princeton physics summer school, Princeton University (USA), 25 Jul - 15 Aug (successfully completed with certificate of merit), funded by Regione Abruzzo

Languages English C2 French B1 Danish A2

Funding

- Head of the unit of the University of Bologna of the project "Quantum Algorithms for Hydrodynamics Equations" (QAHE) in collaboration with Fincantieri S.p.A. funded by the Innovation Grants of the HPC National Centre for HPC, Big Data and Quantum Computing, 1 Mar 2024 – 31 Aug 2025, 52743,64 €
- PI of the project PRIN 2022WHZ5XH – "understanding the LEarning process of QUantum Neural networks (LeQun)", 28 Sep 2023 – 27 Sep 2025, 187486 €
- Member of the spoke 10 "Quantum Computing" of the Italian HPC National Centre for HPC, Big Data and Quantum Computing – Proposal code CN00000013, CUP J33C22001170001, 1 Sep 2022 – 31 Aug 2025
- Leader of the Task 8.2.2 "Foundations of quantum machine learning in the hard sciences" of the Italian national enlarged partnership PE01 - FAIR Future Artificial Intelligence Research – Proposal code PE00000013, CUP J33C22002830006, 2 Jan 2023 – 1 Jan 2026
- Funding from the Faculty of Science of the University of Copenhagen for the QMATH Masterclass "Quantum communication and computation with continuous variables", 17-21 Jun 2019, 70000 DKK (ca 9400€)

- Marie Curie Fellowship GENIUS, Grant Agreement 792557, 200194,80€. Top score (98,8/100) among the 763 submissions in the Physics panel in the 2017 call
- Scientific collaboration with Scuola Normale Superiore on the topic "Gaussian optimizers in quantum information", 20-30 Sep 2016, 785€

Prizes and awards

- Paper "The generalized strong subadditivity of the von Neumann entropy for bosonic quantum Gaussian systems" selected as Editor's Pick by the Journal of Mathematical Physics
- Project "Concentration for quantum computing: an excellent strategy" (CONQUEST) submitted to the FIS 2021 call in the field physical and engineering sciences deemed suitable for funding (4,6% of the submitted projects have been deemed suitable for funding)
- "Best young Italian Researcher in Denmark" (BIRD) prize 2018 awarded by the Italian Embassy in Copenhagen
- Special mention at the 2017 Fubini prize for the PhD thesis awarded by INFN (Istituto Nazionale di Fisica Nucleare)
- Silver medal at the 39th International Physics Olympiad, Hanoi (Vietnam), 20-29 July 2008
- Gold Medal at the XXIV Italian National Mathematics Olympiad, Cesenatico (Italy), 8-11 May 2008

Teaching

- Bachelor
    - Classical mechanics, BSc in Chemical and biochemical engineering, University of Bologna (Italy), 60h, AY 2022/23, 2023/24
    - Foundations of mathematics, probability and statistics, BSc in Biology, University of Bologna (Italy), 22h, AY 2022/23
    - Mathematical Analysis, BSc in Chemistry and Geology and Biology, Scuola Normale Superiore (Italy), 20h, AY 2020/21
- Master
    - Mathematical foundations of quantum computation, MSc in Mathematics, University of Bologna (Italy), AY 2021/22 (48h), 2022/23 (48h), 2023/24 (52h)
    - Introduction to Machine Learning, MSc in Mathematics and Information Science, Physics, Chemistry and Geology and Biology, Scuola Normale Superiore (Italy), 10h, AY 2020/21
- PhD
    - Mathematical foundations of quantum machine learning, Mathematics, University of Bologna (Italy), 16h, AY 2023/24
    - Quantum information with continuous variables, Mathematics, Physics, Nanoscience, Computational Methods and Mathematical Models for Sciences and Finance, Scuola Normale Superiore (Italy), 20h, AY 2021/22
- Teaching Assistant
    - Introduction to Representation Theory (7,5 ECTS), MSc and PhD in Mathematics, Department of Mathematical Sciences, University of Copenhagen (Denmark), AY 2018/19

    - Lie Groups (7,5 ECTS), MSc and PhD in Mathematics, Department of Mathematical Sciences, University of Copenhagen (Denmark), AY 2017/18
- Tutor
    - Classical mechanics and thermodynamics (14 ECTS), BSc in "Mathematics and Information Science", "Physics", Scuola Normale Superiore (Pisa, Italy), AYs 2013/14, 2014/15

- Executive master lectures
    - Executive Master in Quantum Machine Learning, Feb 2023 – Mar 2024, Ca' Foscari Challenge School, "Quantum machine learning: Algorithm complexity" (6h); "Bayesian Optimization and Quantum Computing" (6h)

- PhD school lectures
    - Workshop "Quantum Optimal Transport: Theory and Applications", 1-6 Sep 2024, Cortona (Italy), mini course on "Quantum optimal transport with quantum channels"
    - ESQuisses Summer School, 10-14 Jun 2024, Porquerolles (France), course "The quantum Wasserstein distance of order 1" (planned, 3h)
    - Mathematical foundations of Quantum Machine Learning, 10-14 Jul 2023, University of Trento (Italy), Department of Mathematics, lectures "Introduction to quantum mechanics" (2h) and "Quantum Machine Learning" (6h)
    - SQMS/GGI Summer School on Quantum Simulation of Field Theories, 25-29 Jul 2022, Florence (Italy), lecture "Quantum algorithms"
    - 4th Summer School on Physical Sensing and Processing, 14-20 Jul 2022, Bologna (Italy), lecture "Quantum communication theory"
    - QMATH Masterclass on Quantum Communication and Computation with Continuous Variables (organized by me), 17-21 Jun 2019, Copenhagen (Denmark), lecture "Introduction to quantum Gaussian systems"

Student supervision

- PhD
    - Alessandro Paolo Xavier Tognini, PhD in Physics, Scuola Normale Superiore (Italy), ongoing
- Master
    - Elena Giovannini, MSc thesis in Mathematics, University of Bologna (Italy), ongoing
    - Giacomo Fusco, MSc thesis in Mathematics, University of Bologna (Italy), ongoing
    - Alanna Christina Benn, MSc thesis in Mathematics, University of Bologna (Italy), ongoing
    - Cecilia Marcantognini, MSc thesis in Mathematics, University of Bologna (Italy), in collaboration with Fincantieri SpA, graduated Sep 2024
    - Filippo Girardi, MSc thesis in Physics, University of Pisa and Scuola Normale Superiore (Italy), graduated Sep 2023
    - Alessandro Falco, MSc thesis in Physics, University of Pisa and Scuola Normale Superiore (Italy), graduated Oct 2022

    - Giuseppe Catalano, MSc thesis in Physics, University of Pisa (Italy), graduated Oct 2022
    - Nunzia Cerrato, MSc thesis in Physics, University of Pisa (Italy), graduated May 2022
- Bachelor
    - Gaia Torresani, BSc thesis in Mathematics, University of Bologna,
    - Filippo Girardi, BSc thesis in Physics, University of Pisa and Scuola Normale Superiore (Italy), graduated Jul 2021
- Other supervisions
    - Claudio Tosti, thesis of the Executive Master in Quantum Machine Learning, University of Venice "Ca' Foscari", Mar 2024
    - Cecilia Marcantognini, internship in Fincantieri SpA within the MSc in Mathematics of the University of Bologna, Mar 2024
    - Tristan Klein (ENS Lyon), research internship at the University of Bologna, May - July 2023
    - Muye Yang, Major in Physics and in Mathematics with Computer Science, MIT (USA), supervision of Undergraduate Research Opportunity, Jun – Dec 2020

Postdoc supervision

- Anderson Melchor Hernandez, project "understanding the LEarning process of QUantum Neural networks (LeQun)", Apr 2024 – Mar 2026

Institutional activities

- Deputy for spaces, services and sustainability of the Mathematics Department of the University of Bologna, since May 2024
- Member of the Committee of the Department of Mathematics of the University of Bologna for the Evaluation of the Quality of Research (VQR), since Jun 2024
- Member of the Scientific Council of the Master in High-Performance and Quantum Computing, University of Bologna, since Jun 2024
- Member of the working group for the admission to the PhD in Mathematics of the University of Bologna, May 2024 – Jan 2025
- Board of the PhD in Mathematics of the University of Bologna, since Nov 2022
- Board of the Italian national PhD in Artificial Intelligence, Nov 2021 – Oct 2022
- Member of the program committee of the AlmaQ Center of the University of Bologna, since Feb 2024
- Committees for openings
    - Committee for the postdoc opening in mathematical physics at the University of Bologna of the Innovation Grant project "QAHE", AY 2023/24
    - Committee for the postdoc opening in mathematical physics at the University of Bologna of the PRIN 2022 project "LeQun", AY 2023/24
    - Committee for the PhD openings in Mathematics funded by Next Generation EU, University of Bologna, AY 2022/23
    - Committee for the assignation of the course "Mathematics 2" for the BSc in Chemistry, University of Bologna, AY 2022/23

    - Committee for the admission to the BSc and MSc of Scuola Normale Superiore, AY 2021/22
- Committee for the recognition of foreign PhDs in Mathematics, University of Bologna, Department of Mathematics, since Jul 2023
- Coordinator of the Erasmus+ exchange with the Department of Mathematics of the University of Copenhagen (Denmark), AY 2023/24
- PhD awarding committees
    - PhD in Nanoscience, Scuola Normale Superiore, AY 2020/21
    - PhD in Physics and Astronomy, University of Florence, AY 2022/23
- Degree awarding committees
    - BSc in Mathematics, University of Bologna, AY 2022/2023
- Award committee of the Italian Embassy in Copenhagen for the "Best young Italian Researcher in Denmark" (BIRD) prize 2019

Event organization

- Member of the organizing committee for the application of the University of Bologna to host the 10th Congress of the European Mathematical Society - ECM 2028
- Organizer of the 1st John Hopkins University – University of Bologna workshop "Noncommutativity at the Interface of Topology, Geometry and Analysis", Bologna (Italy), 24-28 Jun 2024
- Organizer of the workshop "Mathematical Physics and Beyond", Bologna Academy of Sciences (Italy), 15 May 2024
- Organizer of the seminar cycle "Topics in Mathematics 2023/2024", Department of Mathematics, University of Bologna (Italy)
- Organizer of the workshop "Frontiers of Machine Learning: Hard-Sciences for Machine learning" within the 3rd Italian National Conference on Artificial Intelligence (Ital-IA), CNR, Pisa (Italy), 30 May 2023
- Organizer of the INdAM workshop "Mathematical physics of complex systems", Cortona (Italy), 12-16 June 2023
- Organizer of the PhD course "Mathematics of quantum spin systems" held by Angelo Lucia (Universidad Complutense de Madrid) at the Department of Mathematics of the University of Bologna within the INdAM 2023 visiting professor program
- Chairman for the XI International Symposium on Quantum Theory and Symmetries, Montréal (Canada), 1-5 Jul 2019
- Organizer of the QMATH Masterclass "Quantum communication and computation with continuous variables", Copenhagen (Denmark), 17-21 Jun 2019
- Chairman for the 12th Conference on the Theory of Quantum Computation, Communication, and Cryptography, Paris (France), 14-16 Jun 2017
- Scientific Secretary for the 51th international school of subnuclear physics, Erice (Italy), 24 Jun - 3 Jul 2013

Press coverage

- “Alla ricerca dei fondamenti dell’intelligenza artificiale”, Unibo Magazine, 1 ago 2023, https://magazine.unibo.it/archivio/2023/08/01/alla-ricerca-dei-fondamenti-dell2019intelligenza-artificiale
- “New Quantum Algorithms Finally Crack Nonlinear Equations”, Quanta Magazine, 5 gen 2021, https://www.quantamagazine.org/new-quantum-algorithms-finally-crack-nonlinear-equations-20210105
- “Vincitori del premio “Best young Italian Researcher in Denmark” (BIRD) 2018”, website of the Italian Embassy in Copenhagen, 8 Jun 2018, https://ambcopenaghen.esteri.it/it/news/dall_ambasciata/2018/06/vincitori-del-premio-best-young/
- “A GENIUS plan for secure communications”, website of the Danish Ministry of Higher Education and Science, 12 Feb 2018, https://ufm.dk/en/research-and-innovation/funding-programmes-for-research-and-innovation/who-has-received-funding/2018/individual-fellowships-grantees
- “Dimostrata la versione quanto-meccanica della “Entropy power inequality””, NormaleNews, 5 Dec 2014, https://normalenews.sns.it/dimostrata-la-versione-quanto-meccanica-della-entropy-power-inequality

Outreach

- 114th university orientation course of Scuola Normale Superiore, Giangiacomo Feltrinelli Foundation, Milan (Italy), 4-8 Jul 2022, talk “A window on quantum technologies”
- “Best young Italian Researcher in Denmark”, organized by the Italian Embassy in Copenhagen, 15 Nov 2018, talk “A quantum plan for secure communication”

Peer review

- Journals: Nature Communications, Communications in Mathematical Physics, Journal of Functional Analysis, Letters in Mathematical Physics, Physical Review Letters, Physical Review X, PRX Quantum, npj Quantum Information, Quantum, Physical Review A, Annales Henri Poincaré, IEEE Transactions on Information Theory, Annals of Physics, New Journal of Physics, Journal of Physics A: Mathematical and Theoretical, Journal of Mathematical Physics, Journal of Statistical Physics, Scientific Reports, International Journal of Quantum Information, SIAM Journal on Matrix Analysis and Applications, Entropy, American Journal of Physics, Physica Scripta, Physics Letters A, Quantum Information Processing, Applied Mathematics and Computation, Neural Networks, Annales - Proceedings of the Academy of Sciences of Bologna, Europhysics Letters
- Conferences: Annual Conference on Quantum Information Processing (QIP), Conference on the Theory of Quantum Computation, Communication and Cryptography (TQC), Conference on Neural Information Processing Systems (NeurIPS), International Conference on Machine Learning (ICML), IEEE International Symposium on Information Theory (ISIT), Annual conference on quantum cryptography (QCrypt), Innovations in Theoretical Computer Science (ITCS)
- Grants:
    - ERC Starting Grant

    - Department of Energy of the United States of America, call 2022 EXPloratory Research for Extreme-Scale Science (EXPRESS)
- Evaluation of Universities: VQR (Evaluation of the Quality of Research) 2015-19 for the Italian National Agency for the Evaluation of Universities and Research Institutes (ANVUR)

Memberships
- Academy of Sciences of Bologna Institute
- International Association of Mathematical Physics (IAMP)
- Istituto Nazionale di Alta Matematica "Francesco Severi", National Group for Mathematical Physics
- Italian Mathematical Union (UMI)

Long visits
- Research Affiliate, MIT (USA), Research Laboratory of Electronics, Prof. Seth Lloyd, 24 Sep – 21 Dec 2018

Short visits
- Dario Trevisan, University of Pisa (Italy), 27-28 May 2024
- Dario Trevisan, University of Pisa (Italy), 14-18 Sep 2020
- Emanuele Caglioti, University “La Sapienza”, Rome (Italy), 7-10 Jan 2020
- Dario Trevisan, University of Pisa (Italy), 1-5 Apr 2019
- Robert Seiringer, Institute of Science and Technology Austria, Klosterneuburg (Austria), 12-15 Feb 2019
- Robert König, Technische Universität München (Germany), 26-30 Nov 2017
- Seth Lloyd, University of Oxford (UK), 13-17 Nov 2017
- Andreas Winter, Universitat Autònoma de Barcelona (Spain), 13-17 Feb 2017
- Jan Philip Solovej and Matthias Christandl, University of Copenhagen (Denmark), 26-28 Jan 2016
- Giuseppe Toscani, University of Pavia (Italy), 9-12 Mar 2015

Invited seminars
1. University of Pisa (Italy), “Quantum neural networks are Gaussian processes”, 27 May 2024
2. University of Bologna (Italy), “Quantum neural networks are Gaussian processes”, 3 May 2024
3. Course “Algebraic Geometry and Quantum Computing”, lecture “Entanglement as a resource theory”, University of Bologna (Italy), 7 Jun 2023
4. Topics in Mathematics 2022/2023, University of Bologna, 5 Dec 2022, “Challenges and perspectives in quantum computing”
5. Mathematical Picture Language Seminar, Harvard University, 4 Oct 2022, “The quantum Wasserstein distance of order 1”
6. Seminar cycle on artificial intelligence and machine learning organized by the “Mathematics for artificial intelligence and machine learning” group of the Italian

Mathematical Union (UMI), 1 Jul 2022, “Optimal mass transport: a new approach to quantum machine learning”
7. CNRS (France), Seed Seminar of Mathematics and Physics, 15 Feb 2022, “The quantum Wasserstein distance of order 1”
8. University of Cambridge (UK), Cavendish Quantum Information Seminars, 28 May 2021, “Quantum advantage for differential equation analysis”
9. Scuola Normale Superiore (Pisa, Italy), 24 Mar 2021, “The quantum Wasserstein distance of order 1”
10. Universitat Autònoma de Barcelona (Spain), 25 Feb 2021, “The quantum Wasserstein distance of order 1”
11. University of Trento (Italy), colloquium for the consortium “Quantum Science and Technology in Trento”, 19 Feb 2021, “Optimal mass transport: a new approach to quantum machine learning”
12. Freie Universität Berlin (Germany), 17 Dec 2020, “Quantum advantage for differential equation analysis”
13. MIT, Cambridge MA (USA), 25 Sep 2020, “The quantum Wasserstein distance of order 1”
14. University of Pisa (Italy), 17 Sep 2020, “Adversarial robustness guarantees for random deep neural networks”
15. Freie Universität Berlin (Germany), 14 May 2020, “Random deep neural networks are biased towards simple functions”
16. University “La Sapienza”, Rome (Italy), 8 Jan 2020, “Quantum optimal transport with quantum channels”
17. MIT, Cambridge MA (USA), 15 Nov 2019, “Quantum optimal transport with quantum channels”
18. University of Pisa (Italy), 4 Apr 2019, “Random deep neural networks are biased towards simple functions”
19. Institute of Science and Technology Austria, Klosterneuburg (Austria), 14 Feb 2019, “The Entropy Power Inequalities with quantum conditioning”
20. Institute of Science and Technology Austria, Klosterneuburg (Austria), 13 Feb 2019, “Deep neural networks are biased towards simple functions”
21. MIT, Cambridge MA (USA), 12 Oct 2018, “The Entropy Power Inequalities with quantum conditioning”
22. Technische Universität München (Germany), 27 Nov 2017, “The quantum conditional Entropy Power Inequality and an uncertainty relation with quantum memory for the Wehrl entropy”
23. University of Pisa (Italy), 19 Sep 2017, “The quantum conditional Entropy Power Inequality”
24. University of Copenhagen (Denmark), 6 Sep 2017, “The Entropy Power Inequality with quantum memory”
25. Universitat Autònoma de Barcelona (Spain), 15 Feb 2017, “Gaussian optimizers in quantum information”
26. Scuola Normale Superiore, Pisa (Italy), 23 Sep 2016, “Gaussian optimizers in quantum information”
27. University of Copenhagen (Denmark), 27 Jan 2016, “Gaussian optimizers in quantum information”

28. Scuola Normale Superiore, Pisa (Italy), 20 Jan 2016, “Necessity of eigenstate thermalization”
29. Scuola Normale Superiore, Pisa (Italy), 2 Dec 2015, “Gaussian optimizers in quantum information”
30. University of Pavia (Italy), 10 Mar 2015, “A generalization of the Entropy Power Inequality to bosonic quantum systems”
31. Scuola Normale Superiore, Pisa (Italy), 26 Feb 2014, “A generalization of the Entropy Power Inequality to bosonic quantum systems”

Invited conference talks

1. Quantum information, SwissMAP Research Station in Les Diablerets (Switzerland), 25 Feb – 1 Mar 2024, “Quantum neural networks as Gaussian processes”
2. Quantum and Dynamical 2023 Christmas, University of Milan (Italy), 19-22 Dec 2023, “The quantum Wasserstein distance of order 1”
3. Workshop on Infinite dimensional quantum Markov semigroups, University of Tübingen (Germany), 4-6 Jul 2023, “The quantum Wasserstein distance of order 1”
4. INdAM workshop “Mathematical Physics of Complex Systems”, Cortona (Italy), 12-16 Jun 2023, “Optimal mass transport: a new approach to quantum machine learning”
5. 3rd Italian National Conference on Artificial Intelligence (Ital-IA), Workshop “Frontiers of Machine Learning: Hard-Sciences for Machine learning”, CNR, Pisa (Italy), 30 May 2023, “Optimal mass transport: a new approach to quantum machine learning”
6. ICMAT research term “Quantum Information Theory 2023”, focus week on Quantum many body systems and quantum information, Instituto de Ciencias Matemáticas, Madrid (Spain), 13-17 Mar 2023, “The quantum Wasserstein distance of order 1”
7. Optimal Transportation and Applications, Centro di Ricerca Matematica Ennio De Giorgi, Pisa (Italy), 24-28 Oct 2022, “The quantum Wasserstein distance of order 1”
8. Optimal Transport on Quantum Structures, Erdős Center - Alfréd Rényi Institute of Mathematics, Budapest (Hungary), 26-30 Sep 2022, “The quantum Wasserstein distance of order 1”
9. Optimal Transport and Uncertainty, Naples (Italy), 6-7 Sep 2022, “The quantum Wasserstein distance of order 1”
10. Entropy Inequalities, Quantum Information and Quantum Physics, University of California, Los Angeles (USA), 8-12 Feb 2021, “The quantum Wasserstein distance of order 1”
11. Mathematical Methods and Models in Machine Learning, University of Bologna (Italy), 27-28 Apr 2020, “Random deep neural networks are biased towards simple functions”
12. XI International Symposium on Quantum Theory and Symmetries (QTS), Montréal (Canada), 1-5 Jul 2019, “New lower bounds to the output entropy of multi-mode quantum Gaussian channels”
13. QMATH Masterclass on Quantum Communication and Computation with Continuous Variables (organized by me), Copenhagen (Denmark), 17-21 Jun 2019, “Gaussian optimizers for entropic inequalities in quantum information”
14. Beyond IID in Information Theory 4 Workshop, Barcelona (Spain), 18-22 Jul 2016, “Entropy Photon-Number Inequality”

15. Santa Clausius Workshop [Thermodynamics, Cavities, Topology], Scuola Normale Superiore, Pisa (Italy), 17-18 Dec 2014, “Why ETH is necessary and we should not worry about that”

Contributed conference talks

1. Beyond IID in Information Theory 9, Nanyang Technological University (Singapore), 27 Sep – 1 Oct 2021, “The generalized strong subadditivity of the von Neumann entropy for bosonic quantum Gaussian systems”
2. Thirty-eighth International Conference on Machine Learning (ICML 2021), online event, 18-24 Jul 2021, “Adversarial Robustness Guarantees for Random Deep Neural Networks”
3. 16th Conference on the Theory of Quantum Computation, Communication and Cryptography (TQC 2021), University of Latvia, 5-8 Jul 2021, “The quantum Wasserstein distance of order 1”
4. 24th Annual Conference on Quantum Information Processing (QIP 2021), Munich Center for Quantum Science and Technology (Germany), 1-5 Feb 2021, “The quantum Wasserstein distance of order 1”
5. Beyond IID in Information Theory 8, Stanford University (USA), 9-13 Nov 2020, “The quantum Wasserstein distance of order 1”
6. Young Italian Quantum Information Science Conference (IQIS) 2020, online event, 28 Sep – 2 Oct 2020, “The quantum Wasserstein distance of order 1”
7. 12th Italian Quantum Information Science Conference (IQIS), Milan (Italy), 9-12 Sep 2019, “New lower bounds to the output entropy of multi-mode quantum Gaussian channels”
8. QMath14: Mathematical Results in Quantum Physics, Aarhus (Denmark), 12-16 Aug 2019, “New lower bounds to the output entropy of multi-mode quantum Gaussian channels”
9. XIX International Congress on Mathematical Physics (ICMP), Montréal (Canada), 23-28 Jul 2018, “The Conditional Entropy Power Inequality for Bosonic Quantum Systems”
10. 32nd International Colloquium on Group Theoretical Methods in Physics, Prague (Czech Republic), 9-13 Jul 2018, “The quantum conditional Entropy Power Inequality and a new uncertainty relation for the conditional Wehrl entropy”
11. Young Italian Quantum Information Science Conference (IQIS), University of Florence (Italy), 11 Sep 2017, “Gaussian states minimize the output entropy of one-mode quantum Gaussian channels”
12. 24th Central European Workshop on Quantum Optics (CEWQO), Technical University of Denmark, Kongens Lyngby (Denmark), 26-30 Jun 2017, “Gaussian states minimize the output entropy of one-mode quantum Gaussian channels”
13. 12th Conference on the Theory of Quantum Computation, Communication, and Cryptography (TQC), Paris (France), 14-16 Jun 2017, “Gaussian states minimize the output entropy of one-mode quantum Gaussian channels”
14. Fifth Quantum Thermodynamics Conference (QTD5), Oxford (UK), 13-17 Mar 2017, “Universal locality of quantum thermal susceptibility”
15. 20th Annual Conference on Quantum Information Processing (QIP 2017), Seattle (WA, USA), 16-20 Jan 2017, “Gaussian optimizers in quantum information”
16. 11th Conference on the Theory of Quantum Computation, Communication, and Cryptography (TQC), Berlin (Germany), 27-29 Sep 2016, “Gaussian States Minimize the Output Entropy of the One-Mode Quantum Attenuator”

17. Quantum Roundabout Conference, Nottingham (UK), 6-8 Jul 2016, “Gaussian optimizers in quantum information”
18. 13th Central European Quantum Information Processing Workshop (CEQIP), Valtice (Czech Republic), 16-19 Jun 2016, “Gaussian optimizers in quantum information”
19. Fourth Quantum Thermodynamics Conference (QTD4), Erice TP (Italy), 8-13 May 2016, “Necessity of eigenstate thermalization”
20. The Time Machine Factory, Turin (Italy), 25-28 Oct 2015, “Experiments testing macroscopic quantum superpositions must be slow”
21. Non Markovian Quantum Dynamics conference, Cortona AR (Italy), 24-28 Aug 2015, “Necessity of eigenstate thermalization”
22. Quantum Roundabout, Nottingham (UK), 29 Jun - 2 Jul 2014, “A generalization of the entropy power inequality to bosonic quantum systems”

Recorded talks and seminars

1. Mathematical foundations of Quantum Machine Learning, 10-14 Jul 2023, University of Trento (Italy), Department of Mathematics, http://datascience.maths.unitn.it/events/qml2023/ (user QML2023; pwd QMLQuantum2023Trento!)
2. Optimal Transportation and Applications, Centro di Ricerca Matematica Ennio De Giorgi, Pisa (Italy), 24-28 Oct 2022, The quantum Wasserstein distance of order 1
3. Optimal Transport on Quantum Structures, Erdős Center - Alfréd Rényi Institute of Mathematics, Budapest (Hungary), 26-30 Sep 2022, The quantum Wasserstein distance of order 1
4. Mathematical Picture Language Seminar, Harvard University (USA), 4 Oct 2022, The quantum Wasserstein distance of order 1
5. SQMS/GGI Summer School on Quantum Simulation of Field Theories, 25-29 Jul 2022, Florence (Italy), lecture Quantum algorithms
6. Seed Seminar of Mathematics and Physics, CNRS (France), 15 Feb 2022, The quantum Wasserstein distance of order 1
7. Beyond IID in Information Theory 9, Nanyang Technological University (Singapore), 27 Sep – 1 Oct 2021, The generalized strong subadditivity of the von Neumann entropy for bosonic quantum Gaussian systems
8. Thirty-eighth International Conference on Machine Learning (ICML 2021), online event, 18-24 Jul 2021, Adversarial Robustness Guarantees for Random Deep Neural Networks
9. 16th Conference on the Theory of Quantum Computation, Communication and Cryptography (TQC 2021), University of Latvia, 5-8 Jul 2021, The quantum Wasserstein distance of order 1
10. University of Cambridge (UK), Cavendish Quantum Information Seminars, 28 May 2021, Quantum advantage for differential equation analysis
11. 24th Annual Conference on Quantum Information Processing (QIP 2021), Munich Center for Quantum Science and Technology (Germany), 1-5 Feb 2021, The quantum Wasserstein distance of order 1
12. Entropy Inequalities, Quantum Information and Quantum Physics, University of California, Los Angeles (USA), 8-12 Feb 2021, The quantum Wasserstein distance of order 1

13. Beyond IID in Information Theory 8, Stanford University (USA), 9-13 Nov 2020, The quantum Wasserstein distance of order 1
14. 20th Annual Conference on Quantum Information Processing (QIP 2017), Seattle (WA, USA), 16-20 Jan 2017, Gaussian optimizers in quantum information

Poster presentations

1. Thirty-eighth International Conference on Machine Learning (ICML 2021), online event, 18-24 Jul 2021, "Adversarial Robustness Guarantees for Random Deep Neural Networks"
2. Thirty-third Conference on Neural Information Processing Systems (NeurIPS 2019), Vancouver (Canada), 10-12 Dec 2019, "Random deep neural networks are biased towards simple functions"
3. International workshop on "Quantum Physics and Geometry", Levico Terme (Trento, Italy), 4-6 Jul 2017, "The Entropy Power Inequality with quantum memory"
4. 23rd Central European Workshop on Quantum Optics (CEWQO), Kolymbari (Crete, Greece), 27 Jun – 1 Jul 2016, "Gaussian optimizers in quantum information"
5. International Summer School on Quantum Information, Computing, and Control, Warwick University (UK), 31 Aug - 4 Sep 2015, "Necessity of eigenstate thermalization"
6. 12th International Workshop on Quantum Physics and Logic (QPL), Oxford (UK), 13-17 Jul 2015, "A generalization of the entropy power inequality to bosonic quantum systems"
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