

# Giacomo De Palma

## Executive summary

I am a Tenure-track Assistant Professor (RTD-B) in Mathematical Physics at Scuola Normale Superiore (Pisa, Italy). I have previously been a postdoc at MIT (Cambridge MA, USA) and a Marie Curie Fellow at the University of Copenhagen (Denmark). My Marie Curie Fellowship has got the highest score (98,8/100) among the 763 submissions in the Physics panel in the 2017 call. My research covers all areas of quantum information theory, and my main result is the proof of an entropic inequality which was a ten-year longstanding conjecture in quantum communication theory. I am currently working in both classical and quantum machine learning, with the goals to improve the theoretical understanding of the properties of deep neural networks and to find new ways for quantum computers to help in machine learning tasks, and I am applying to the latter goal ideas from the theory of optimal mass transport. I have 40 publications (5 single authored) on top journals and conferences, including Nature Photonics, Physical Review Letters, Advances in Neural Information Processing Systems, Communications in Mathematical Physics, Annales Henri Poincaré, and IEEE Transactions on Information theory. I have given 6 invited and 22 contributed talks at prestigious international conferences and 24 invited seminars, and I have organized a masterclass on quantum communication and computation in Copenhagen.

## Employment

15/3/2021 present	-	Tenure-track Assistant Professor (RTD-B) in Mathematical Physics, Scuola Normale Superiore (Pisa, Italy)
9/2019 14/3/2021	-	Postdoc, Research Laboratory of Electronics, MIT (Cambridge MA, USA) Supervisor Prof. Seth Lloyd
4/2018 – 8/2019		Marie Curie Fellow, Department of Mathematical Sciences, University of Copenhagen (Denmark) <sup>1</sup> , Grant Agreement 792557 Supervisors Prof. Jan Philip Solovej and Prof. Matthias Christandl Top score (98,8/100) among the 763 submissions in the Physics panel in the 2017 call
10/2016 – 3/2018		Postdoc, Department of Mathematical Sciences, University of Copenhagen (Denmark) Supervisors Prof. Matthias Christandl and Prof. Jan Philip Solovej

<sup>1</sup> [https://cordis.europa.eu/project/rcn/215070\\_en.html](https://cordis.europa.eu/project/rcn/215070_en.html)

## Education

11/2013 – 9/2016	PhD cum laude in Physics, Scuola Normale Superiore (Pisa, Italy), thesis “Gaussian optimizers and other topics in quantum information”, supervisor Prof. Vittorio Giovannetti
3/2014	“Diploma di licenza” in Physics, Scuola Normale Superiore (Pisa, 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
9/2008	First place in entrance exam to the Faculty of Mathematical and Natural Sciences of Scuola Normale Superiore (Pisa, Italy)
7-8/2007	Gran Sasso / Princeton physics summer school <sup>2</sup> , Princeton University (NJ, USA), 25 Jul - 15 Aug, fully funded by Regione Abruzzo

**Languages**    English C2    French B1    Danish A2

## Funding

- Undergraduate student salary for Undergraduate Research Opportunity, MIT, Jun – Dec 2020
- 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€. Highest 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

- Italian National Scientific Qualification for Associate Professorship in Mathematical Physics (01/A4), 13 Jul 2018
- “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<sup>3</sup>, Hanoi (Vietnam), 20-29 July 2008
- Gold Medal at the XXIV Italian National Mathematics Olympiad, Cesenatico (FC, Italy), 8-11 May 2008
- Certificate of Merit for Successful Completion of the Gran Sasso – Princeton Physics Summer School

## Teaching

- “Introduction to Machine Learning”, MSc in “Mathematics and Information Science”, “Physics”, “Chemistry and Geology” and “Biology”, academic year 2020/21
- Mathematical Analysis, BSc in “Chemistry and Geology” and “Biology”, Scuola Normale Superiore (Pisa, Italy), academic year 2020/21

<sup>2</sup> <http://www.physics.princeton.edu/www/legacy/gransasso2007>

<sup>3</sup> [en.wikipedia.org/wiki/International\\_Physics\\_Olympiad](http://en.wikipedia.org/wiki/International_Physics_Olympiad)

- Lecture “Introduction to quantum Gaussian systems”, QMATH Masterclass on Quantum Communication and Computation with Continuous Variables (organized by me), 17-21 Jun 2019, Copenhagen (Denmark)
- Teaching Assistant, course “Introduction to Representation Theory” (7,5 ECTS), MSc and PhD in Mathematics, Department of Mathematical Sciences, University of Copenhagen (Denmark), academic year 2018/19
- Teaching Assistant, course “Lie Groups” (7,5 ECTS), MSc and PhD in Mathematics, Department of Mathematical Sciences, University of Copenhagen (Denmark), academic year 2017/18
- Tutor, classical mechanics and thermodynamics (14 ECTS), BSc in “Mathematics and Information Science”, “Physics”, Scuola Normale Superiore (Pisa, Italy), academic years 2013/14, 2014/15

### **Student supervision**

- Filippo Girardi, BSc thesis in Physics, University of Pisa and Scuola Normale Superiore (Pisa, Italy), graduated Jul 2021
- Muye Yang, Major in Physics and in Mathematics with Computer Science, MIT (Cambridge MA, USA), supervision of Undergraduate Research Opportunity, Jun – Dec 2020

### **Student co-supervision**

- Giuseppe Catalano, MSc thesis in Physics, University of Pisa (Italy), academic year 2020/21
- Nunzia Cerrato, MSc thesis in Physics, University of Pisa (Italy), academic year 2020/21

### **Contribution to student supervision**

- Bobak Toussi Kiani, PhD student in Electrical Engineering and Computer Science, MIT (Cambridge MA, USA)
- Stefan Huber, PhD student in Mathematics, Technische Universität München (Germany)
- Matteo Rosati, PhD student in Physics, Scuola Normale Superiore (Pisa, Italy)

### **Committee membership**

- Admission to BSc and MSc of Scuola Normale Superiore, AY 2021/22
- PhD committees: Marco Fanizza (Scuola Normale Superiore, Nanoscience, supervisor Prof. Vittorio Giovannetti, Sep 2021), Donato Farina (Scuola Normale Superiore, Nanoscience, supervisors Prof. Vittorio Giovannetti and Prof. Marco Polini, Apr 2021)
- Award committee of the Italian Embassy in Copenhagen for the “Best young Italian Researcher in Denmark” (BIRD) prize 2019

### **Conference organization**

- 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 (TP, Italy), 24 Jun - 3 Jul 2013

### **Press coverage**

- “New Quantum Algorithms Finally Crack Nonlinear Equations”, Quanta Magazine, 5 Jan 2021<sup>4</sup>
- “Vincitori del premio “Best young Italian Researcher in Denmark” (BIRD) 2018”, website of the Italian Embassy in Copenhagen, 8 Jun 2018<sup>5</sup>

<sup>4</sup> <https://www.quantamagazine.org/new-quantum-algorithms-finally-crack-nonlinear-equations-20210105/>

<sup>5</sup> [https://ambcopenaghen.esteri.it/ambasciata\\_copenaghen/it/ambasciata/news/dall\\_ambasciata/vincitori-del-premio-best-young.html](https://ambcopenaghen.esteri.it/ambasciata_copenaghen/it/ambasciata/news/dall_ambasciata/vincitori-del-premio-best-young.html)

- “A GENIUS plan for secure communications”, website of the Danish Ministry of Higher Education and Science, 12 Feb 2018<sup>6</sup>
- “Dimostrata la versione quanto-meccanica della “Entropy power inequality””, NormaleNews, 5 Dec 2014<sup>7</sup>

### Outreach

- “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: Physical Review Letters, Physical Review X, PRX Quantum, npj Quantum Information, 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
- 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)
- Grants: ERC Starting Grant

### Memberships

- International Association of Mathematical Physics (IAMP)

### References

- Prof. Seth Lloyd (MIT, Cambridge MA, USA), [sllloyd@mit.edu](mailto:sllloyd@mit.edu)
- Prof. Vittorio Giovannetti (Scuola Normale Superiore, Pisa, Italy), [vittorio.giovannetti@sns.it](mailto:vittorio.giovannetti@sns.it)
- Prof. Luigi Ambrosio (Scuola Normale Superiore, Pisa, Italy), [luigi.ambrosio@sns.it](mailto:luigi.ambrosio@sns.it)
- Prof. Jan Philip Solovej (University of Copenhagen, Denmark), [solovej@math.ku.dk](mailto:solovej@math.ku.dk)
- Prof. Matthias Christandl (University of Copenhagen, Denmark), [christandl@math.ku.dk](mailto:christandl@math.ku.dk)
- Prof. Alexander Holevo (Steklov Mathematical Institute, Moscow, Russia), [holevo@mi.ras.ru](mailto:holevo@mi.ras.ru)

### Long visits

- Prof. Seth Lloyd, MIT, Cambridge MA (USA), 24 Sep – 21 Dec 2018

### Short visits

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

### Invited seminars

<sup>6</sup> <https://ufm.dk/en/research-and-innovation/funding-programmes-for-research-and-innovation/who-has-received-funding/2018/individual-fellowships-grantees>

<sup>7</sup> <http://normalenews.sns.it/dimostrata-la-versione-quanto-meccanica-della-entropy-power-inequality/>

1. University of Cambridge (UK), Cavendish Quantum Information Seminars, 28 May 2021, "Quantum advantage for differential equation analysis"
2. Scuola Normale Superiore (Pisa, Italy), 24 Mar 2021, "The quantum Wasserstein distance of order 1"
3. Universitat Autònoma de Barcelona (Spain), 25 Feb 2021, "The quantum Wasserstein distance of order 1"
4. 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"
5. Freie Universität Berlin (Germany), 17 Dec 2020, "Quantum advantage for differential equation analysis"
6. MIT, Cambridge MA (USA), 25 Sep 2020, "The quantum Wasserstein distance of order 1"
7. University of Pisa (Italy), 17 Sep 2020, "Adversarial robustness guarantees for random deep neural networks"
8. Freie Universität Berlin (Germany), 14 May 2020, "Random deep neural networks are biased towards simple functions"
9. University "La Sapienza", Rome (Italy), 8 Jan 2020, "Quantum optimal transport with quantum channels"
10. MIT, Cambridge MA (USA), 15 Nov 2019, "Quantum optimal transport with quantum channels"
11. University of Pisa (Italy), 4 Apr 2019, "Random deep neural networks are biased towards simple functions"
12. Institute of Science and Technology Austria, Klosterneuburg (Austria), 14 Feb 2019, "The Entropy Power Inequalities with quantum conditioning"
13. Institute of Science and Technology Austria, Klosterneuburg (Austria), 13 Feb 2019, "Deep neural networks are biased towards simple functions"
14. MIT, Cambridge MA (USA), 12 Oct 2018, "The Entropy Power Inequalities with quantum conditioning"
15. Technische Universität München (Germany), 27 Nov 2017, "The quantum conditional Entropy Power Inequality and an uncertainty relation with quantum memory for the Wehrl entropy"
16. University of Pisa (Italy), 19 Sep 2017, "The quantum conditional Entropy Power Inequality"
17. University of Copenhagen (Denmark), 6 Sep 2017, "The Entropy Power Inequality with quantum memory"
18. Universitat Autònoma de Barcelona (Spain), 15 Feb 2017, "Gaussian optimizers in quantum information"
19. Scuola Normale Superiore, Pisa (Italy), 23 Sep 2016, "Gaussian optimizers in quantum information"
20. University of Copenhagen (Denmark), 27 Jan 2016, "Gaussian optimizers in quantum information"
21. Scuola Normale Superiore, Pisa (Italy), 20 Jan 2016, "Necessity of eigenstate thermalization"
22. Scuola Normale Superiore, Pisa (Italy), 2 Dec 2015, "Gaussian optimizers in quantum information"
23. University of Pavia (Italy), 10 Mar 2015, "A generalization of the Entropy Power Inequality to bosonic quantum systems"
24. Scuola Normale Superiore, Pisa (Italy), 26 Feb 2014, "A generalization of the Entropy Power Inequality to bosonic quantum systems"

#### **Invited conference talks**

1. Entropy Inequalities, Quantum Information and Quantum Physics, online event, 8-12 Feb 2021, "The quantum Wasserstein distance of order 1"
2. Mathematical Methods and Models in Machine Learning, online event, 27-28 Apr 2020, "Random deep neural networks are biased towards simple functions"
3. 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"

4. 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”
5. Beyond IID in Information Theory 4 Workshop, Barcelona (Spain), 18-22 Jul 2016, “Entropy Photon-Number Inequality”
6. 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, online event, 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), online event, “The quantum Wasserstein distance of order 1”
4. 24th Annual Conference on Quantum Information Processing (QIP 2021), online event, 1-5 Feb 2021, “The quantum Wasserstein distance of order 1”
5. Beyond IID in Information Theory 8, online event, 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), 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. 16th Conference on the Theory of Quantum Computation, Communication and Cryptography (TQC 2021), online event, "The quantum Wasserstein distance of order 1", [https://www.youtube.com/watch?v=qmjiR2Csr0p4&ab\\_channel=TQC2021](https://www.youtube.com/watch?v=qmjiR2Csr0p4&ab_channel=TQC2021)
2. University of Cambridge (UK), Cavendish Quantum Information Seminars, 28 May 2021, "Quantum advantage for differential equation analysis", [https://www.youtube.com/watch?v=vKCBwMcER1A&ab\\_channel=CambridgeQuantumInformationGroup](https://www.youtube.com/watch?v=vKCBwMcER1A&ab_channel=CambridgeQuantumInformationGroup)
3. 24th Annual Conference on Quantum Information Processing (QIP 2021), online event, 1-5 Feb 2021, "The quantum Wasserstein distance of order 1", [https://www.youtube.com/watch?v=h08FC6QpkrM&ab\\_channel=MunichCenterforQuantumScience%26Technology](https://www.youtube.com/watch?v=h08FC6QpkrM&ab_channel=MunichCenterforQuantumScience%26Technology)
4. Entropy Inequalities, Quantum Information and Quantum Physics, online event, 8-12 Feb 2021, "The quantum Wasserstein distance of order 1", [https://www.youtube.com/watch?v=8YErP6utLPU&ab\\_channel=InstituteForPure%26AppliedMathematics%28IPAM%29](https://www.youtube.com/watch?v=8YErP6utLPU&ab_channel=InstituteForPure%26AppliedMathematics%28IPAM%29)
5. Beyond IID in Information Theory 8, online event, 9-13 Nov 2020, "The quantum Wasserstein distance of order 1", [https://stanford.zoom.us/rec/play/HfzapqIYTQAF5AocwdX\\_y6ml2OuVP\\_G5ncMPRK0WyZ-GMANCruOIQtFM4L6c5PRmnb-tLpGXRkMCviPz.ifRNK8coFnzhRokL?x\\_zm\\_rhtaid=427&x\\_zm\\_rtaid=V4BpzkTmQjKv5Om4y2bJZA.1605149412144.fabe5a4e2a99a2b760f9cbc6e2cf8944&autoplay=true&continueMode=true&startTime=1605131899000](https://stanford.zoom.us/rec/play/HfzapqIYTQAF5AocwdX_y6ml2OuVP_G5ncMPRK0WyZ-GMANCruOIQtFM4L6c5PRmnb-tLpGXRkMCviPz.ifRNK8coFnzhRokL?x_zm_rhtaid=427&x_zm_rtaid=V4BpzkTmQjKv5Om4y2bJZA.1605149412144.fabe5a4e2a99a2b760f9cbc6e2cf8944&autoplay=true&continueMode=true&startTime=1605131899000)
6. 20th Annual Conference on Quantum Information Processing (QIP), Seattle (WA, USA), 16-20 Jan 2017, "Gaussian optimizers in quantum information", [https://www.youtube.com/watch?v=5HwadffK4TI&ab\\_channel=MicrosoftResearch](https://www.youtube.com/watch?v=5HwadffK4TI&ab_channel=MicrosoftResearch)

### 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"
7. 12th Central European Quantum Information Processing Workshop (CEQIP), Telč (Czech Republic), 18-21 Jun 2015, "Normal form decomposition for Gaussian-to-Gaussian superoperators"
8. New Frontiers of Quantum Information Theory, Ascoli Piceno (Italy), 7-11 Jul 2014, "A generalization of the entropy power inequality to bosonic quantum systems"

9. 46th Symposium on Mathematical Physics, Toruń (Poland), 15-17 Jun 2014, “A generalization of the entropy power inequality to bosonic quantum systems”

### Publication list

Google Scholar <https://scholar.google.com/citations?user=yOzFGI0AAAAJ>

Scopus <https://www.scopus.com/authid/detail.uri?authorId=55781428900>

- [1] Giacomo De Palma, Lucas Hackl, “Linear growth of the entanglement entropy for quadratic Hamiltonians and arbitrary initial states”, preprint arXiv:2107.11064, <https://arxiv.org/abs/2107.11064>
- [2] Cambyse Rouzé, Giacomo De Palma, “Quantum concentration inequalities”, preprint arXiv:2106.15819, <https://arxiv.org/abs/2106.15819>
- [3] Giacomo De Palma, Dario Trevisan, “The generalized strong subadditivity of the von Neumann entropy for bosonic quantum Gaussian systems”, preprint arXiv:2105.05627, <https://arxiv.org/abs/2105.05627>
- [4] Seth Lloyd, Bobak Kiani, David Arvidsson-Shukur, Samuel Bosch, Giacomo De Palma, William Kaminsky, Zi-Wen Liu, Milad Marvian, “Hamiltonian singular value transformation and inverse block encoding”, preprint arXiv:2104.01410, <https://arxiv.org/abs/2104.01410>
- [5] Bobak Kiani, Giacomo De Palma, Milad Marvian, Zi-Wen Liu, Seth Lloyd, “Quantum Earth Mover’s Distance: A New Approach to Learning Quantum Data”, preprint arXiv:2101.03037, <https://arxiv.org/abs/2101.03037>
- [6] Seth Lloyd, Giacomo De Palma, Can Gokler, Bobak Kiani, Zi-Wen Liu, Milad Marvian, Felix Tennie, Tim Palmer, “Quantum algorithm for nonlinear differential equations”, preprint arXiv:2011.06571, <https://arxiv.org/abs/2011.06571>
- [7] Bobak Kiani, Giacomo De Palma, Dirk Englund, William Kaminsky, Milad Marvian, Seth Lloyd, “Quantum advantage for differential equation analysis”, preprint arXiv:2010.15776, <https://arxiv.org/abs/2010.15776>
- [8] Giacomo De Palma, Milad Marvian, Dario Trevisan, Seth Lloyd, “The Quantum Wasserstein Distance of Order 1”, IEEE Transactions on Information Theory 67(10), 6627-6643 (2021), <https://ieeexplore.ieee.org/document/9420734>
- [9] Seth Lloyd, Samuel Bosch, Giacomo De Palma, Bobak Kiani, Zi-Wen Liu, Milad Marvian, Patrick Reberntrost, David Arvidsson-Shukur, “Quantum polar decomposition algorithm”, preprint arXiv:2006.00841, <https://arxiv.org/abs/2006.00841>
- [10] Giacomo De Palma, Bobak Kiani, Seth Lloyd, “Adversarial Robustness Guarantees for Random Deep Neural Networks”, Proceedings of the 38th International Conference on Machine Learning, Proceedings of Machine Learning Research 139, 2522-2534 (2021), <http://proceedings.mlr.press/v139/de-palma21a.html>
- [11] Giacomo De Palma, Dario Trevisan, “Quantum optimal transport with quantum channels”, Annales Henri Poincaré 22, 3199-3234 (2021), <https://link.springer.com/article/10.1007/s00023-021-01042-3>
- [12] Giacomo De Palma, “The squashed entanglement of the noiseless quantum Gaussian attenuator and amplifier”, Journal of Mathematical Physics 60(11), 112201 (2019), <https://aip.scitation.org/doi/10.1063/1.5111489>, IF 2019: 1,317
- [13] Giacomo De Palma, Bobak Kiani, Seth Lloyd, “Random deep neural networks are biased towards simple functions”, Advances in Neural Information Processing Systems 32, 1962-1974 (2019),



<http://papers.nips.cc/paper/8471-random-deep-neural-networks-are-biased-towards-simple-functions>

- [14] Giacomo De Palma, “The Entropy Power Inequality with quantum conditioning”, *Journal of Physics A: Mathematical and Theoretical* 52(8), 08LT03 (2019), <https://iopscience.iop.org/article/10.1088/1751-8121/aaff4>, IF 2019: 1,996
- [15] Giacomo De Palma, “New Lower Bounds to the Output Entropy of Multi-Mode Quantum Gaussian Channels”, *IEEE Transactions on Information Theory* 65(9), 5959-5968 (2019), <https://ieeexplore.ieee.org/document/8706983>, IF 2019: 3,036
- [16] Giacomo De Palma, Dario Trevisan, Vittorio Giovannetti, Luigi Ambrosio, “Gaussian optimizers for entropic inequalities in quantum information”, *Journal of Mathematical Physics* 59(8), 081101 (2018), <https://aip.scitation.org/doi/10.1063/1.5038665>, IF 2018: 1,355
- [17] Giacomo De Palma, Stefan Huber, “The conditional entropy power inequality for quantum additive noise channels”, *Journal of Mathematical Physics* 59(12), 122201 (2018), <https://aip.scitation.org/doi/10.1063/1.5027495>, IF 2018: 1,355
- [18] Giacomo De Palma, Johannes Borregaard, “Minimum error probability of quantum illumination”, *Physical Review A* 98(1), 012101 (2018), <https://journals.aps.org/pr/abstract/10.1103/PhysRevA.98.012101>, IF 2018: 2,907
- [19] Giacomo De Palma, “Uncertainty relations with quantum memory for the Wehrl entropy”, *Letters in Mathematical Physics* 108(9), 2139-2152 (2018), <https://link.springer.com/article/10.1007/s11005-018-1067-y>, IF 2018: 1,203
- [20] Giacomo De Palma, Dario Trevisan, “The Conditional Entropy Power Inequality for Bosonic Quantum Systems”, *Communications in Mathematical Physics* 360(2), 639-662 (2018), <https://link.springer.com/article/10.1007%2Fs00220-017-3082-8>, IF 2018: 2,239
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