Davide Poderini

Curriculum Vitæ

Education

Bachelor degree in Physics, *University of Perugia*.

Master

Master degree in Physics, *La Sapienza University of Rome*.

Master thesis *Quantum Contextuality on Chip*

Supervisor Fabio Sciarrino

PhD

PhD Student in Physics, *La Sapienza University of Rome*, XXXIII cycle.

PhD Project *Causal inference for quantum technologies*

Supervisor Fabio Sciarrino

Courses, workshops and other experiences

29th May – 30th August 2019 — **Secondment**, *Working with the Quantum information group led by Prof. Rafael Chaves*, at the IIP (International Institute of Physics), Natal (Brazil), Funded by "Borsa per la mobilitá congiunta per dottorandi Sapienza.".

13 – 14th March 2018 — **Workshop**, *Fundamental concepts of quantum mechanics to solving basic problems in computation and communication*, ICTP (International Center for Theoretical Physics), Trieste (Italy).

April – June 2018 — **PhD Course**, *Advanced Quantum Information*, by F. Sciarrino, La Sapienza University of Rome.

March – May 2018 — **PhD Course**, *Machine learning in Physics*, by S. Giagu, La Sapienza University of Rome.

5th – 9th August 2019 — **School**, *VII Paraty Quantum information School*, Paraty, RJ (Brazil).

13th – 17th January 2020 — **Workshop**, *Quantum Information Structure of Spacetime*, Computer Science Department, Hong Kong University..

Conferences contributions

19 – 23th March 2018 — **Poster contribution**, *Experimental learning of quantum states*, at Quantum Machine Learning and Biomimetic Quantum Technologies.
University of the Basque Country, Bilbao (Spain)

30th July – 10th August 2018 **Oral contribution**, *Experimental learning of quantum states*, at Modern Topics in Quantum Information (workshop and conference).
IIP (International Institute of Physics), Natal (Brazil)

17th – 21st September 2018 **Poster contribution**, *Experimental learning of quantum states*, at Quantum Machine Learning Plus (conference).
Universität Innsbruck, Innsbruck (Austria)

29th April –– 4th May 2019 **Poster contribution**, *Experimental learning of quantum states*, at Conference on Quantum Measurement: Fundamentals, Twists, and Applications. ICTP Trieste (Italy)

12th – 16th August 2019 **Oral contribution**, *Randomness certification with an instrumental causal structure*, at VII Paraty Quantum Information Workshop.
Paraty, RJ (Brazil)

17th –– 20th September 2019 **Poster contribution**, *Exclusivity graph approach to instrumental inequalities*, at Causality in the quantum world: harnessing quantum effects in causal inference problems.
Anacapri (Italy)

Grants and awards

Borsa di dottorato, offered by La Sapienza University of Rome (2018).

Borsa per avviamento alla ricerca: "Experimental device independent random number generation certification within an instrumental scenario.", offered by La Sapienza University of Rome (2018).

Special Program Grant award by OSA (2018).

Borsa per la mobilita congiunta per dottorandi Sapienza: offered by La Sapienza University of Rome (2019).

Borsa per avviamento alla ricerca: "Exploring causal constraints in quantum mechanics", offered by La Sapienza University of Rome (2019).

Outreach activities

Member of the Rome Association of young scientists (RAYS), *Association to promote the study of physics, and specifically optics, among high-school and undergraduate students*.
Supported by the Optical Society (OSA, https://www.osa.org) and by the Society of Photo-Optical Instrumentation Engineers (SPIE, https://spie.org)

2018 – 2019 **Vice President of La Sapienza OSA student chapter**.

2019 – **President of La Sapienza OSA student chapter**.

14th – 16th October 2016 **Participation to the Rome *Maker Faire***, as "Maker" in the context of an event organized by the RAYS association.

Languages

Italian Mothertongue

English Proficient

Technical skills

Programming	C/C++, Python, Julia, Lua, Java, JavaScript, PHP languages
Libraries	GSL (GNU Scientific Library), OpenCV, Qt, Numpy stack (Numpy, Sympy, Pandas), Tensorflow
Scientific	Octave/Matlab, Maple, Maxima, Reduce software
Web frameworks	Django, F3
Operating	Linux and UNIX-like systems, OSX, MS Windows. systems
Other skills	HTML and CSS, SQL databases (PostgresSQL, Sqlite)

Publications

[1] Iris Agresti, Gonzalo Carvacho, Davide Poderini, Leandro Aolita, Rafael Chaves, and Fabio Sciarrino. Experimental connection between the instrumental and bell inequalities. In *Multidisciplinary Digital Publishing Institute Proceedings*, volume 12, page 27, 2019.

[2] Iris Agresti, Davide Poderini, Leonardo Guerini, Michele Mancusi, Gonzalo Carvacho, Leandro Aolita, Daniel Cavalcanti, Rafael Chaves, and Fabio Sciarrino. Experimental device-independent certified randomness generation with an instrumental causal structure. *Communications Physics*, 3(1):1–7, 2020.

[3] Andrea Crespi, Marco Bentivegna, Ioannis Pitsios, Davide Rusca, Davide Poderini, Gonzalo Carvacho, Vincenzo D'Ambrosio, Adán Cabello, Fabio Sciarrino, and Roberto Osellame. Integrated-optics circuits for validation of non-classicality. In *European Quantum Electronics Conference*, page EB_6_1. Optical Society of America, 2017.

[4] Andrea Crespi, Marco Bentivegna, Ioannis Pitsios, Davide Rusca, Davide Poderini, Gonzalo Carvacho, Vincenzo D'Ambrosio, Adán Cabello, Fabio Sciarrino, and Roberto Osellame. Single-photon quantum contextuality on a chip. *ACS photonics*, 4(11):2807–2812, 2017.

[5] Davide Poderini, Iris Agresti, Guglielmo Marchese, Emanuele Polino, Taira Giordani, Alessia Suprano, Mauro Valeri, Giorgio Milani, Nicolò Spagnolo, Gonzalo Carvacho, et al. Experimental violation of n-locality in a star quantum network. *Nature communications*, 11(1):1–8, 2020.

[6] Davide Poderini, Samuraí Brito, Ranieri Nery, Fabio Sciarrino, and Rafael Chaves. Criteria for non-classicality in the prepare and measure scenario. *Submitted to Physical Review Research*.

[7] Davide Poderini, Rafael Chaves, Iris Agresti, Gonzalo Carvacho, and Fabio Sciarrino. Exclusivity graph approach to instrumental inequalities. *Proceedings of the 35th conference on Uncertainty in Artificial Intelligence (UAI 2019).*, 2019.

[8] Emanuele Polino, Iris Agresti, Davide Poderini, Gonzalo Carvacho, Giorgio Milani, Gabriela Barreto Lemos, Rafael Chaves, and Fabio Sciarrino. Device-independent test of a delayed choice experiment. *Physical Review A*, 100(2):022111, 2019.

[9] Andrea Rocchetto, Scott Aaronson, Simone Severini, Gonzalo Carvacho, Davide Poderini, Iris Agresti, Marco Bentivegna, and Fabio Sciarrino. Experimental learning of quantum states. *Science advances*, 5(3):eaau1946, 2019.

[10] Mauro Valeri, Emanuele Polino, Davide Poderini, Ilaria Gianani, Giacomo Corrielli, Andrea Crespi, Roberto Osellame, Nicolò Spagnolo, and Fabio Sciarrino. Experimental adaptive bayesian estimation of multiple phases with limited data. *arXiv preprint arXiv:2002.01232*, 2020.