Iris Agresti

Curriculum Vitae

Personal Data

29/10/1992 **Date of birth**, *Rome (Italy)*.

2016–2019 **PhD student**, *Università La Sapienza*, Rome (Italy), XXXII cycle.

May– August 2019 **PhD visit**, *Quantum Information theory group*, prof. Antonio Acín, (ICFO, Barcelona, Spain).

2019–Present **Post doctoral researcher**, *QuantumLab group* , prof. Fabio Sciarrino, (Università La Sapienza,Rome,Italy).

Education

2016–2019 **PhD in Physics**, *Università La Sapienza*, Rome (Italy).

Thesis Title *Certification of quantum technology.*

Supervisor prof. Fabio Sciarrino

Description This thesis investigates methods to verify the correct functioning of quantum hardware, with two different approaches. On one hand, machine learning techniques are used, in order to design certification protocols that are scalable with the investigated system size. On the other, device-independent protocols are used in order to certify quantum protocols with no assumptions on the inner functioning of the apparatus running them.

Final grade Ottimo

2014–2016 **Master degree in Matter Physics**, *Università La Sapienza*, Rome (Italy).

Thesis Title *Certificazione per il Boson Sampling.*

Supervisor prof. Fabio Sciarrino

Description This thesis proposes a protocol to determine whether an experimental sample of measurement outputs, drawn from an unknown device, is compatible with another sample, drawn from a certified device. Specifically, this protocol has been experimentally applied to hard-complexity problem of Boson Sampling validation.

Final grade 110/110 with honours

2011–2014 **Bachelor degree in Physics**, *Università La Sapienza*, Rome (Italy).

Thesis Title	*Emissione coerente di onde radio da sciami di particelle cariche in atmosfera.*
Supervisor	prof. Antonio Capone
Final grade	110/110 with honours
2006–2011	**Classical Studies High School**, *liceo scientifico "Ignazio Vian" (Bracciano, RM, Italy)*.
Final grade	100/100 with honours.

Awards

2019 *Finanziamento progetto di mobilità congiunta per studenti di dottorato*, offered by the università La Sapienza, Rome.

2018 *Borsa di studio per avviamento alla ricerca*, offered by the università La Sapienza, Rome.

2016–2019 *Borsa di dottorato* offered by the università La Sapienza, Rome.

2015 *Borsa di collaborazione*, università La Sapienza, Rome, to work in the Physics Department laboratories as tutor for younger students.

2014 *Borsa di collaborazione*, università La Sapienza, Rome, to work in the Physics Department Library.

2011–2014 University taxes exemption as *Studente Meritevole*, università La Sapienza, Rome.

Scientific Publications

- *Quantum violation of an instrumental test*, R. Chaves, G. Carvacho, **I. Agresti**, V. Di Giulio, L. Aolita, S. Giacomini, F. Sciarrino, Nature Physics **14** (3), 291 (2018)
- *Tunable two-photon quantum interference of structured light*, V. D'Ambrosio, G. Carvacho, **I. Agresti**, L. Marrucci, F. Sciarrino, Physical Review Letters **122** (1), 013601 (2019)
- *Pattern recognition techniques for boson sampling validation*, **I. Agresti**, N. Viggianiello, F. Flamini, N. Spagnolo, A. Crespi, R. Osellame, N. Wiebe, F. Sciarrino, Physical Review X **9**, 011013 (2019)
- *Experimental learning of quantum states*, A. Rocchetto, S. Aaronson, S. Severini, G. Carvacho, D. Poderini, **I. Agresti**, M. Bentivegna, F. Sciarrino, Science Advances **5** (3), eaau1946 (2019)
- *Experimental semi-device-independent tests of quantum channels*, **I. Agresti**, D. Poderini, G. Carvacho, L. Sarra, R. Chaves, F. Buscemi, M. Dall'Arno, F. Sciarrino, Quantum Science and Technology **4** (3) (2019)
- *Device independent certification of a quantum delayed choice experiment*, E. Polino, **I. Agresti**, D. Poderini, G. Carvacho, G. Milani, G.B. Lemos, R. Chaves, F. Sciarrino, Physical Review A, **100** (2), 022111 (2019).
- *Experimental violation of n-locality in a star quantum network*, D.Poderini, **I. Agresti**, G. Marchese, E. Polino, T. Giordani, A. Suprano, M. Valeri, G. Milani, N. Spagnolo, G. Carvacho, R. Chaves, F. Sciarrino, Nature Communications, **11** (1) (2020).
- *Experimental device-independent certified randomness generation with an instrumental causal structure*, **I. Agresti**, D. Poderini, L. Guerini, M. Mancusi, G. Carvacho, L. Aolita, D. Cavalcanti, R. Chaves, F. Sciarrino, Communications Physics, **3** (110) (2020).

Preprints

- *Experimental robust self-testing of the state generated by a quantum network*, **I. Agresti**, B. Polacchi, D. Poderini, E. Polino, A. Suprano, I. Šupić, J. Bowles, G. Carvacho, D. Cavalcanti, F. Sciarrino, *arXiv:2010.07737* (2020)

Proceedings

- *Exclusivity graph approach to Instrumental inequalities*, D.Poderini, R. Chaves, **I. Agresti**, G. Carvacho, F. Sciarrino, Proceedings of Conference on Uncertainty in Artificial Intelligence (UAI), 2019.
- *Experimental Connection between the Instrumental and Bell Inequalities*, **I. Agresti**, G. Carvacho, D. Poderini, L. Aolita, R. Chaves, F. Sciarrino , Proceedings **12**(1), 27 (2019).

Conference Papers

- *Quantum violation of an Instrumental test*, R. Chaves, G. Carvacho, **I. Agresti**, V. Di Giulio, L. Aolita, S. Giacomini, F. Sciarrino. Quantum Information and Measurement (QIM) V: Quantum Technologies, S1B.4. (2019).

Computer skills

Programming in C, PYTHON, MATHEMATICA, MATLAB.

Conferences and presentations

2017

- 23/1 to 1/2: *Quantum Machine Learning summer school 2017*, Drakensberg mountains (South Africa);
- 8 to 10/2: *Scientific School: architectures for quantum photonic circuits*, Nice (France);
- 11 to 15/9: *Conferenza annuale Società Italiana di Fisica*, Trento (Italy)– **oral contributed presentation** entitled "Pattern Recognition Techniques for Boson Sampling validation";
- 17/9: OSA *Leadership Student Conference*, Washinton DC (USA)– **poster presentation** of La Sapienza OSA student chapter activities;
- 18 to 21/9: *Frontiers in Optics*, Washinton DC (USA);
- 26 to 29/9: *Final Conference of PICQUE and QUCHIP projects*, Rome (Italy)– **poster presentation** entitled "Pattern Recognition Techniques for Boson Sampling validation";
- 1 to 6/10: *FisMat 2017*, Trieste (Italy)– **poster presentation** entitled "Pattern Recognition Techniques for Boson Sampling validation";
- 6 to 8/11: *Quantum Techniques in Machine Learning*, Verona (Italy)– **oral contributed presentation** entitled "Pattern Recognition Techniques for Boson Sampling validation".

2018

- 19 to 23/3: *Quantum Machine Learning and Biomimetic Quantum Technologies*, Bilbao (Spain)– **oral contributed presentation** entitled "Pattern Recognition Techniques for Boson Sampling validation";
- 30 to 10/8: *Modern Topics in Quantum Information (workshop and conference)*, Natal (Brazil)– **oral contributed presentation** entitled "Quantum violation of an Instrumental test";
- 17 to 20/9: *IQIS 2018*, Catania (Italy)– **oral and poster contributed presentation** entitled "Quantum violation of an Instrumental test".

2019

- 4/4 to 6/4: *Quantum Information and Measurement*, Roma (Italy)– **oral contributed presentation** entitled "Quantum violation of an Instrumental test".
- 29/4 to 4/5: *Conference on Quantum Measurement: Fundamentals, Twists, and Applications*, Trieste (Italy)– **poster presentation** entitled "Quantum violation of an Instrumental test".
- 1/7 to 13/7: *Quantum Information*, Benasque (Spain).
- 17/9 to 20/9: *Causality in the quantum world: harnessing quantum effects in causal inference problems*– **invited talk** entitled "Experimental device-independent randomness generation within an instrumental scenario".

2020

- 25/6: *POM Photonics Online Meetup 2020*– **poster contributed presentation** entitled "Pattern Recognition Techniques for Boson Sampling validation";
- Currently in the organizing committee of the "Young Italian Quantum Information Conference 2020" (https://agenda.infn.it/event/23347/).

2020

- 28/9 to 2/19: *Organization of Young Italian Quantum Information science conference*.

Languages

Italian **Mothertongue**
English **Advanced**
French **Basic**
Spanish **Intermediate**

Outreach Activities

2017–2019 **President of La Sapienza OSA student chapter**.
2017–2019 **Treasurer of SPIE La Sapienza student chapter**.
2016– 2017 **Ordinary member of Rome Association of young scientists (RAYS)**, *Our master and PhD student group is financially supported by the Optical Society (OSA, https://www.osa.org/en-us/home/) and by the Society of Photo-Optical Instrumentation Engineers (SPIE, http://spie.org/?SSO=1) and its aim is to promote the study of physics, and specifically, optics among high-school and bachelor degree students*.

Detailed Outreach Activities

2019

- Special Program Grant award by OSA (January 2019).
- Organization of the *Quantum Leap: from academia to industry* (satellite event of the *Quantum Information and Measurement* conference). Webpage *https://www.quantumlab.it/qim2019/wednesday-3-april-2019-quantum-leap/*) (April 2019).
- Organization of the talk *Measuring everything you've always wanted to know about a light pulse* by prof. Rick Trebino, in the Physics Department of La Sapienza university of Rome, sponsored by OSA distinguished travel lecturer grant to La Sapienza OSA chapter (June 2019).

2018

- outreach seminar to *Istituto paritario Sant'Apollinare*, Rome;

2017

- outreach seminar to *Liceo Lucio Anneo Seneca*, Rome;
- OSA travel grant award to participate to the *Leadership Student Conference* in Washinton DC (USA), as representative of La Sapienza OSA student chapter and presentation of a poster with the chapter activities (17th September 2017).

2016

- outreach seminar to *Liceo Isaac Newton*, Rome;
- outreach seminar to *Liceo Augusto Righi*, Rome;
- outreach seminar to *IIS Colasanti, Civita Castellana, (Rome);*
- participation to the *#EUFACTOR* project (La Sapienza 31st May 2016)
- participation to the *Maker Faire* (14-16th October 2016)