

Curriculum Dr. Ilaria Gianani

PERSONAL INFORMATION

Nationality: Italian , Date of birth: 01/07/1986

Researcher unique identifiers:

ORCID: [0000-0002-0674-767X](https://orcid.org/0000-0002-0674-767X)

Scholar: <https://tinyurl.com/igscholar>

Scopus: [43761981300](https://scopus.com/authid/detail.uri?authorid=43761981300)

Languages: Italian (Native), English (Fluent), French (Intermediate), German (beginner)

CURRENT POSITION

2021 – date Fixed-term Assistant Professor (RTDa), Science Department, Università degli Studi Roma Tre (IT)

PREVIOUS POSITIONS

2020 – 2021 Post Doctoral Researcher in Prof. M. Barbieri's group, Università degli Studi Roma Tre (IT)

2019 – 2020 Post Doctoral Researcher in Prof. F. Sciarrino's group, Sapienza Università di Roma (IT)

2019 – 2020 Visiting PostDoc with Prof. M. Barbieri, Università degli Studi Roma Tre (IT)

2019 – 2019 Visiting PostDoc (4 months) with Prof. F. Sciarrino, Sapienza Università di Roma (IT)

2016 – 2019 Post Doctoral Researcher in Prof. M. Barbieri's group, RM3 (IT)

2012 – 2013 Visiting PhD (2 months) in Prof. D. Reid's group, Heriot-Watt University, Edinburgh (UK)

EDUCATION

2011 – 2018 DPhil. in Atomic and Laser Physics. Thesis: "Characterisation of Ultrashort pulses" St Anne's College, University of Oxford (UK) Supervisor: Prof. I. A. Walmsley

2008 – 2011 Master (MSc) in Physics. Thesis: "Application of non-maximally entangled two-photon states in non-locality test and quantum communications" Department of Physics, Sapienza Università di Roma (IT) Supervisor: Prof. P. Mataloni, mark: 110/110 cum laude

2005 – 2008 Bachelor (BSc) in Physics, Thesis: "Biophysics of vision: Intramolecular mechanisms of signal transduction in rhodopsin" Department of Physics, Sapienza Università di Roma (IT) Supervisor: Prof. L. Guidoni, mark: 110/110 cum laude

ABILITAZIONE SCIENTIFICA NAZIONALE

Abilitazione Scientifica Nazionale 02/B1 Seconda Fascia valid from 30/05/2022 to 30/05/2032

TEACHING ACTIVITIES

- 2023 – date Elements of materials physics - molecules and lasers module, BSc in Optics and Optometry , Università degli Studi Roma Tre (IT)
- 2022 – date Data analysis module, Physical processes in Enogastronomy, BSc in Enogastronomic sciences and cultures, Università degli Studi Roma Tre (IT)
- 2022 – date “How to journal club” course on how to deliver a seminar, Nanotechnologies and complex systems (SciMaNo) Doctoral School, Università degli Studi Roma Tre (IT)
- 2021 – 2022 TA for “Elements of general physics”, BSc in Optics and optometry, Università degli Studi Roma Tre (IT)
- 2020 – 2022 Data analysis module (3 CFU), BSc in Sciences for the protection of nature and environmental sustainability, Università degli Studi Roma Tre (IT)
- 2020 – 2021 Data analysis module (3 CFU), BSc in Geology, Università degli Studi Roma Tre (IT)
- 2020 – 2021 TA for “Experimental Physics I”, BSc in Geology, Università degli Studi Roma Tre (IT)
- 2019 - 2020 “Cultore della Materia” for the course “Electromagnetism and optics with laboratory”, BSc in Optics and Optometry, Università degli Studi Roma Tre (IT)
- 2017 - 2018 Math revision course, BSc in Biology, Università degli Studi Roma Tre (IT)

STUDENT SUPERVISION

- PhDs M. Manrique (2023-date, Università degli Studi Roma Tre), G. Bizzarri, V. Cimini, L. Mancino, E. Rocca (2023-date, 2017-2020, 2016-2018, 2016-2018, assisted supervision, Università degli Studi Roma Tre) A. Suprano (2019, assisted supervision, Sapienza Università di Roma)
- MSc W. Zedda, M. Feyles (2021, 2018, assisted supervision, RM3)
- BSc D. Ashraf, L. Asiani, G. Grossi (2023,2023,2021, co-supervisor, Università degli Studi Roma Tre), D. Acciaccarelli (2018, assisted supervision, Università degli studi Roma Tre)
- Internships L. Toscani De Col, G. Satta (2021, 2021, co-.supervisor, Università degli Studi Roma Tre) F.Trezzini (2019, assisted supervision, Sapienza Università di Roma), R. Booth (2017, assisted supervision, Università degli studi Roma Tre)

RESEARCH INTERESTS

Keywords: *quantum optics, ultrafast optics, quantum information, quantum and ultrafast metrology*

*My main research priorities are the **exploration at a fundamental level** of quantum properties of light, and their **exploitation for technological advancements** with particular interest towards **sensing and biological applications**.*

Time- frequency correlations

Classical Ultrafast Metrology: I have a strong background in time-frequency characterisation of ultrafast light pulses. During my DPhil., I have developed a technique to reconstruct arbitrary pulses and helped developing a method for the mutual reconstruction of electric fields [3].

Quantum Time-Frequency Correlations: I have taken part in the investigation of indirect techniques for inferring time-frequency correlation [7,10,15], designed and led an experiment to tailor two photons interference through spectral shaping [14], designed and performed an experiment for quantum ghost spectrometry [42], led a collaboration using ghost spectroscopy for spectral discrimination [P8] and performed an experiment for line shape estimation with ghost spectroscopy [P6].

Quantum Ultrafast Metrology: I have combined my expertise to devise a novel metrological technique for the spectral characterization of single photon sources [24].

Quantum Metrology

Multiparameter estimation: I have participated in an experiment on multiparameter estimation [16], then taken a leading role of the research line, by designing the extension to dynamical tracking [19], coordinated and supervised the application to the study of biological samples [22]. I have performed an experiment extending the results to function estimation [38] and employed these for the investigation of the metrology of absorptive samples using Kramers-Kronig relations [41].

Integrated Multiphase estimation: I have taken part in the implementation of an adaptive multiphase experiment on an integrated platform [37].

Machine Learning for quantum optics and metrology

I have taken part in the experimental application of Machine learning techniques for the calibration of quantum sensors [23, 39]. I have then led a collaboration on Hamiltonian parameter estimation of continuous-time quantum walks using machine learning estimators [48] and a genetic algorithm [P7] for determining a network topology.

MAJOR COLLABORATIONS

- [8] Claudia Benedetti, Università degli Studi di Milano (IT)
(AVS Quantum Science [and 1 preprint, submitted project on frequency quantum walks and Machine Learning])
- [7] Lorenzo Maccone, Università di Pavia (IT) and P. Verrucchi, Università di Firenze (IT)
(I led a Templeton grant consortium as Project Leader in 2020 which passed the first stage of selection but was not funded at the second and final stage.)
- [6] Luis Lorenzo Sanchez Soto, Universidad Complutense Madrid (ES)
(PRX Quantum, 1, 020307, (2020), 1 submitted paper — ongoing FET project STORMYTUNE)
- [5] Aephraim Steinberg, University of Toronto (CA)
(Physical Review A, 102, 022230, (2020))
- [4] Chiara Macchiavello, Università di Pavia (IT)
(Phys. Rev. A 102, 052404, (2020) - Editors' suggestion)
- [3] Jan Sperling, University of Paderborn (DE)
(Physical Review Research 1, 033020, (2019))
- [2] Francesco Albarelli, University of Warwick (UK)

(Phys. Rev. A, 103, 042602, (2021))

- [1] Zixin Huang, Macquarie University (AU)
(Physical Review A 97(3),032305, (2018))

LOCAL COLLABORATIONS

- [4] Matteo Rosati and Gabriella Cincotti (Dip. ICITA)
- [3] Fabio Polticelli (Dip. Scienze)
(quantum circular dichroism - conceived for ERC stg proposal)
- [2] Iole Venditti and Chiara Battocchio (Dip. Scienze)
(shock and non linear optics in nanorods and pump probe experiments)
- [1] Livia Leoni and Giordano Rampioni (Dip. Scienze)
(tracking enzymatic activity with quantum light)

FUNDING

- [1] 2021-2023 - NATO-SPS Project "HADES" **Co-Investigator** for RM3 unit.
RM3 funded amount: 107k EUR

PARTICIPATION IN RESEARCH PROJECTS

- 2020-2023 H2020-FET OPEN "STORMYTUNE", Researcher (RTDa), RM3 PI: Prof. M. Barbieri
- 2019-2020 H2020-FET OPEN "CANCER SCAN", Post Doc, Sapienza PI: Prof. F. Sciarrino
- 2019-2020 Lazio Innova - SINFONIA (Regione Lazio), , Post Doc, Sapienza PI: Prof. F. Sciarrino
- 2016 - 2018 H2020- FET OPEN "QCUMbER", Post Doc, RM3 PI: Prof. M. Barbieri
- 2011 -2015 Ultrafast optical metrology within the scope of the EPSRC grants EP/H000178/1 and EP/L015137/1, DPhil, University of Oxford, PI: Prof. I. A. Walmsley

INSTITUTIONAL RESPONSIBILITIES

- 2022 Member of the selection committee for the PhD "Characterization of single photon sources" for the SciMaNo Doctoral school, RM3(IT)
- 2022-date Reviewer for INFN Commissione 5 grant proposals.
- 2022 Member of the selection committee for the Future Luminary Award, AIP
- 2022 - date Head of the workgroup Women in STEM Roma Tre, Università degli Studi Roma Tre (IT)
- 2022 - date Member of the orientation commission, Science Department, Università degli Studi Roma Tre (IT)
- 2021 Reviewer for Poland National Science Centre funding schemes.
- 2021 Panel member for the selection of PostDoc positions, Università degli Studi Roma Tre (IT)
- 2020 - date Head of the Outreach Committee for the FETOPEN STORMYTUNE EU Project
- 2016 - 2018 Member of the Outreach Committee for the FETOPEN QCUMbER EU Project

2014 - 2015 Graduate Rep, Oxford Women in Physics Society, University of Oxford (UK)

2013 - 2014 President of the Oxford University Italian Society, University of Oxford (UK)

ORGANIZATION OF SCIENTIFIC MEETINGS

- [9] 2022-2023 Organised over 10 scientific events (seminars, workshops and networking) for the group WIS3 throughout the year, involving four STEM RM3 Departments (Science, DIEM, DICITA, MatFis).
- [8] 2023 - WIS3 - International day of women and girls in science 3 Minute Thesis Competition, member of the organising committee (committee of 10), Departments of Science, Mathematics and Physics, DIEM and DICITA, Università degli Studi Roma Tre (IT)
- [7] 2022 - WIS3 - International day of women and girls in science 3 Minute Thesis Competition, chair, and member of the organising committee (committee of 8), Departments of Science, Mathematics and Physics, DIEM and Engineering, Università degli Studi Roma Tre (IT).
- [6] 2021 - WIS3 - International day of women and girls in science workshop and 3 Minute Thesis Competition, chair, and member of the organising committee (committee of 6), Departments of Science, Mathematics and Physics, and Engineering, Università degli Studi Roma Tre (IT).
- [5] 2020 - Young Italian Quantum Information Science Conference (committee of 6) - on-line
- [4] 2019 - Amaldi Research Center Open Day: Quantum Technologies (committee of 3), Sapienza Università di Roma (IT)
- [3] 2017 - QCUMbER Workshop (committee of 2) – Università degli Studi Roma Tre (IT)
- [2] 2015 - First Conference for Undergraduate Women in Physics (CUWiP UK 2015), Oxford (UK)
- [1] 2013 - As President of the Oxford University Italian Society in 2013-14 I have led the organisation of several events (usually with 100-150 guests)

INVITED TALKS

- [12] 2022 - CCS, Conference on Complex Systems, "Continuous time quantum walk recognition through machine learning", 17-21/10/2022, Palma de Mallorca (ES)
- [11] 2022 - Invited Seminar, University of Naples QST Seminars, "Time-frequency characterization of biphoton states", 26/04/2022, on-line.
- [10] 2021 - SIF conference, "Exploiting quantum frequency correlations: The metrology of ghost spectroscopy", 13-17/09/2021, on-line.
- [9] 2021 - Invited seminar, Queen's University, Belfast "Characterization of frequency-entangled biphoton states", 29/04/2021, on-line.
- [8] 2021 - Invited seminar, University of Milan QSPRING Seminars, "Response function estimation from phase measurements", 20/04/2021, on-line.
- [7] 2021 - Invited seminar, University of Toronto CQIQC Seminars, "Quantum Thermodynamics simulations and their energetic cost", 05/03/2021, on-line.

- [6] 2020 - (cancelled due to COVID restrictions) 12th workshop on Quantum Effects in Biological Systems - QuEBS 2020, Crete (GR)
- [5] 2020 - (cancelled due to COVID restrictions) ENEA LIMS2020, Frascati (IT)
- [4] 2019 - International Conference on Squeezed States and Uncertainty Relations, "Imperfect conditions in quantum sensors" 17-21/06/2019, Madrid (ES).
- [3] 2019 - Invited seminar, Heriot-Watt University, "Quantum Metrology: Practically as perfect as it gets", 20/03/2019, Edinburgh (UK).
- [2] 2019 - Invited seminar, Department of Science, RM3, "Quantum Metrology", 17/01/2019, Rome (IT)
- [1] 2017 - IQIS 2017, "Quantum optics and Quantum Thermodynamics: can there be a match?", 2-15/09/2017, Florence (IT)

CONTRIBUTED TALKS, POSTERS AND CONFERENCE ATTENDANCE

- [11] Causality in the quantum world Workshop, Anacapri, 17th-20th September 2019 - Poster
- [10] CEWQO 2019, Paderborn, 3rd-7th June 2019, Talk, Poster
- [9] QIM V 2019, Rome, 3rd - 5th April 2019, Talk, Chair
- [8] IQIS 2018, Catania, 17th - 20th September 2018, Poster
- [7] QCUMbER Conference, Oxford, 10th - 13th July 2018, Chair
- [6] IQIS 2017, Florence, 12-15 September 2017, Poster
- [5] QCUMbER Consortium Meeting, 2-3 March 2017, Rome
- [4] YQIS 2016, Barcelona, 19-21 October 2016. Poster
- [3] IQIS 2016, Rome, 20-23 September 2016
- [2] Oxford Photonics Day, Oxford, 12th March 2013 - awarded Poster Prize.
- [1] SU2P Third Annual Symposium, Heriot Watt University, Edinburgh, 23rd, 24th April 2012.

EDITORIAL EXPERIENCE

- [3] 2022 – date - Member of the Early Career Editorial Advisory Board of APL Photonics (AIP)
- [2] 2021 – 2022 - Guest editor for the special issue "The Interplay between photonics and Machine learning", Photonics (MDPI) (with F. Sciarrino, F. Flamini, and V. Cimini)
- [1] 2021 – date - Review Editor for Frontiers in Photonics - Quantum Optics

Referee for: Nature Communications, NPJ QI, PRX Quantum, Phys Rev Letters, Phys Rev Research, Phys Rev A, Optics Letters, JSTQE (IEEE), New Journal of Physics, Scientific Report, APL Photonics.

AWARDS AND HONOURS

- [3] 2022 - Selected as a member of the Early Career Editorial Advisory Board of APL Photonics (AIP)
- [2] 2020 - Shortlisted for the Fulbright Research Scholarship
- [1] 2013 - Awarded Poster Prize, Oxford Photonics Day (UK)

MEDIA COVERAGE

- [6] 2022 - La Repubblica magazine Interview (IT): <https://tinyurl.com/IGinterviewAL>
- [5] 2022 - Advanced Science News: <https://www.advancedsciencenews.com/embedding-data-in-quantum-states-for-machine-learning/>
- [4] 2021 - Le Scienze: <https://tinyurl.com/lescienzeKK> AGI PR: <https://tinyurl.com/agienergetics>, RaiNews 24: <https://tinyurl.com/n5u8qnp>, TG Leonardo: <https://tinyurl.com/18d8v9vo>
- [3] 2020 - SPIE PR: <https://tinyurl.com/spie-vvb>, Science Daily: <https://tinyurl.com/sciencedaily-vvb>
- [2] 2019 - OSA PR: <https://tinyurl.com/osa-enzymes>, ANSA PR: <https://tinyurl.com/notizia-ansa> (major IT media outlet), Optics and Photonics News: <https://tinyurl.com/opn-enzymes>, Roma3 Radio interview: <https://tinyurl.com/rm3radio>
- [1] 2017 - Pintofscience.it: <https://tinyurl.com/pos-gianani>, Le Scienze: <https://tinyurl.com/pos-lescienze>

OUTREACH ACTIVITIES

- [14] 2023 - Collaboration with [QPlayLearn](#) as outreach coordinator for the STORMYTUNE FET EU project, developing a computer game based on time-frequency entanglement and a "QUEST-quantum dictionary" page.
- [13] 2022 - Project "nDonnamo" installation on women in science, Municipio VIII - Roma Capitale, Globalshapers - Rome hub, RM3 (IT)
- [12] 2022 - European Researchers Night: talk "Quantum wars: la minaccia del sensore fantasma", RM3 (IT)
- [11] 2022 - Italian Quantum Weeks, national Italian quantum information video voice over.
- [10] 2022 - Italian Quantum Weeks exhibition "Dire L'indicibile", local organiser (team of 3), RM3 (IT)
- [9] 2021 - European Researchers Night: show "Hidden in plain sight" on Women in STEM (written, directed, produced, and performed)
- [8] 2020 - European Researchers Night: online video "How is an experiment conceived?"
- [7] 2020 - Seminar "Souvenirs from the quantum world" at "Occhi sulla luna" event, RM3 (IT)
- [6] 2019 - "Meet the scientist", Open Day: Quantum Technologies, Amaldi Research Center (IT)
- [5] 2019 - Lab tours for "Occhi su Marte" outreach event, RM3 (IT)
- [4] 2018 - European Researchers' Night: participation with experimental demonstrations, RM3 (IT)
- [3] 2017 - European Researchers' Night: participation with experimental demonstrations, RM3 (IT)
- [2] 2017 - Pint of Science: seminar on QCUMBER FET EU project, Rome (IT)

[1] 2016 - European Researchers' Night: participation with experimental demonstrations, RM3 (IT)

MEMBERSHIPS OF SCIENTIFIC SOCIETIES

OSA (2020 - 2021), IEEE Photonics Society (2016-2017), SIF (2011-2013, 2019 - 2021)

TECHNICAL SKILLS

- Strong expertise in design and realisation of optical apparatus
- Strong expertise in ultrafast optics and metrology
- Strong expertise in theoretical and experimental quantum optics.
- Strong expertise in theoretical and experimental nonlinear optics
- Strong expertise in theoretical and experimental quantum information.
- Strong expertise in machine learning for quantum optics
- Strong expertise in laser physics
- Solid expertise in machine learning
- Scientific programming with several software platforms (Python, Mathematica, Matlab)
- Graphic design and video editing (Photoshop, Illustrator, Blender, Cinema4D, Final Cut Pro X).
- Science communication, public speaking, and outreach skills

PUBLICATION SUMMARY

Total number of publications: 71 (48 peer-reviewed journal articles, 13 peer-reviewed conference proceedings, 1 thesis, 1 book chapter, and 8 articles at the peer-review stage),

H index: 16 (Scopus), 19 (Scholar)

Citations: 629 (Scopus), 939 (Scholar)

Papers on high-impact journals: 1 Advanced Photonics, 2 Optica, 3 AVS Quantum Science, 3 Phys Rev Lett, 1 PRX Quantum, 3 NPJ Quantum Information.

PEER-REVIEWED JOURNAL ARTICLES

[48] **I. Gianani**, C. Benedetti, "Multiparameter estimation of continuous-time Quantum Walk Hamiltonians through Machine Learning", AVS Quantum Science 5 (1), 014405, 2023

[47] J Sperling, **I. Gianani**, M Barbieri, E Agudelo, "Detector entanglement: Quasidistributions for Bell-state measurements", Physical Review A 107 (1), 012426, 2023

[46] W. Zedda, **I. Gianani**, V. Berardi, and M. Barbieri, "Thresholded quantum LIDAR in turbulent media", AVS Quantum Science, 4, 041401, 2022

[45] **I. Gianani**, I. Mastroserio, L. Buffoni, N. Bruno, L. Donati, V. Cimini, M. Barbieri, F. S. Cataliotti, F. Caruso, "Experimental Quantum Embedding for Machine Learning", Advanced quantum technologies, 2100140, 2022.

- [44] S.E. D'Aurelio, M. Valeri, E. Polino, V. Cimini, I. Gianani, M. Barbieri, G. Corrielli, A. Crespi, R. Osellame, F. Sciarrino, and N. Spagnolo, "Experimental investigation of Bayesian bounds in multiparameter estimation", *Quantum Sci. Technol.* 7, 025011, 2022
- [43] I. Gianani, V. Berardi, M. Barbieri, "Witnessing quantum steering by means of the Fisher information", *Phys. Rev. A* 105, 022421, 2022
- [42] A. Chiuri, I. Gianani, V. Cimini, L. De Dominicis, M. G. Genoni, and M. Barbieri, "Ghost imaging as loss estimation: Quantum versus classical schemes" *Phys. Rev. A* 105, 013506, 2022
- [41] I. Gianani, M. Barbieri, F. Albarelli, A. Verna, V. Cimini, R. Demkowicz-Dobrzanski, "Kramers-Kronig relations and precision limits in quantum phase estimation", *Optica*, 8, 12, 2021
- [40] V. Cimini, F. Albarelli, I. Gianani, M. Barbieri, "Semiparametric estimation in Hong-Ou-Mandel interferometry", *Phys. Rev. A* 104, L061701 2021
- [39] V. Cimini, E. Polino, M. Valeri, I. Gianani, N. Spagnolo, G. Corrielli, A. Crespi, R. Osellame, M. Barbieri, and F. Sciarrino, "Calibration of multiparameter sensors via machine learning at the single-photon level", *Phys. Rev. Applied*, 15, 044003, 2021
- [38] I. Gianani, F. Albarelli, V. Cimini, M. Barbieri, "Experimental function estimation from quantum phase measurements", *Phys. Rev. A*, 103, 042602, 2021
- [37] M. Valeri, E. Polino, D. Poderini, I. Gianani, G. Corrielli, A. Crespi, R. Osellame, N. Spagnolo, F. Sciarrino, "Experimental adaptive Bayesian estimation of multiple phases with limited data", *NJPQI* 6, 92, 2020
- [36] V. Cimini, S. Gherardini, M. Barbieri, I. Gianani, M. Sbroscia, L. Buffoni, M. Paternostro, F. Caruso, "Experimental characterization of the energetics of quantum logic gates" , *NJPQI* 6, 96 2020
- [35] A. Suprano, T. Giordani, I. Gianani, N. Spagnolo, K. Pinker, J. Kupferman, S. Arnon, U. Klemm, D. Gorpas, V. Ntziachristos, F. Sciarrino, "Propagation of structured light through tissue-mimicking phantoms", *Optics Express*, 28, 24, 2020.
- [34] V. Cimini, I. Gianani, M.F. Sacchi, C. Macchiavello, and M. Barbieri, "Experimental witnessing for the quantum channel capacity in the presence of correlated noise", *Phys. Rev. A* 102, 052404, 2020)
- **Editors' suggestion**
- [33] I. Gianani, Y.S. Teo, V. Cimini, G. Leuchs, M. Barbieri, and L. L. Sanchez-Soto, "Compressively certifying quantum measurements", *PRX Quantum*, 1, 020307, 2020
- [32] I. Gianani, D. Farina, M. Barbieri, V. Cimini, V. Cavina, V. Giovannetti "Discrimination of thermal baths by single qubit probes", *Physical Review Research*, 2, 033497, 2020.
- [31] A. Z. Goldberg, I. Gianani, M. Barbieri, F. Sciarrino, A. M. Steinberg, N. Spagnolo, "Multiphase estimation without a reference mode", *Physical Review A*, 102, 022230, 2020.

- [30] **I. Gianani**, A. Suprano, T. Giordani, N. Spagnolo, F. Sciarrino, D. Gorpas, V. Ntziachristos, K. Pinker, N. Biton, J. Kupferman, S. Arnon, "Transmission of Vector Vortex beams in dispersive media" *Advanced Photonics* 2(3), 036003, 2020 - **Press release SPIE**
- [29] **I. Gianani**, MG Genoni, M Barbieri, "Assessing data postprocessing for quantum estimation" *IEEE Journal of Selected Topics in Quantum Electronics*, 26, 3, 1-7, 2020 [**as corresponding author**]
- [28] V Cimini, I. Gianani, F Piacentini, IP Degiovanni, M Barbieri, "Anomalous values, Fisher information, and contextuality, in generalized quantum measurements", *Quantum Science and Technology*, 5, 2, 2020
- [27] V. Cimini, M.G. Genoni, I. Gianani, N. Spagnolo, F. Sciarrino, M. Barbieri "Diagnosing Imperfections in Quantum Sensors via generalized Cramér-Rao bounds" *Phys. Rev. Applied*, 13, 024048, 2020
- [26] F. Albarelli, M. Barbieri, M. G. Genoni, I. Gianani, "A perspective on multiparameter quantum metrology: from theoretical tools to applications in quantum imaging" *Physics Letters A*, 384, 126311, 2020
- [25] **I. Gianani**, M Sbroscia, M Barbieri, "Measuring the time-frequency properties of photon pairs: a short review", *AVS Quantum Science*, 2, 011701, 2020, **Selected as Journal Cover.**
- [24] **I. Gianani**, "Robust spectral phase reconstruction of time-frequency entangled bi-photon states" *Phys. Rev. Research*, 1, 033165, 2019
- [23] V.Cimini, **I. Gianani**, N. Spagnolo, F. Leccese, F. Sciarrino, M. Barbieri "Calibration of quantum sensors by neural networks" *Phys. Rev. Letters*, 123, 230502, 2019 [**as corresponding author**]
- [22] V. Cimini, M. Mellini, G. Rampioni, M. Sbroscia, L. Leoni, M. Barbieri, and **I. Gianani**, "Adaptive Tracking of Enzymatic Reactions with Quantum Light " *Optics Express*, 27, 35245, 2019 - **Selected as Editor's Pick - Press release OSA and ANSA** [**as corresponding author**]
- [21] V.Cimini, I. Gianani, M. Sbroscia, J. Sperling, and M. Barbieri "Measuring Coherence of Quantum Measurements", *Physical Review Research* 1, 033020, 2019
- [20] M. M. Feyles, L. Mancino, M. Sbroscia, I. Gianani, M. Barbieri "Dynamical role of quantum signatures in quantum thermometry", *Physical Review A* 99 (6), 062114, 2019
- [19] V.Cimini, **I. Gianani**, L. Ruggiero, T. Gasperi, M. Sbroscia, E. Roccia, D. Tofani, F. Bruni, M. A. Ricci, M. Barbieri "Quantum sensors for dynamical tracking of chemical processes", *Phys. Rev. A* 99, 053817, 2019 [**as corresponding author**]
- [18] V. Cavina, L. Mancino, A. De Pasquale, I. Gianani, M. Sbroscia, R. I. Booth, E. Roccia, R. Raimondi, V. Giovannetti, M. Barbieri, "Bridging thermodynamics and metrology in non-equilibrium Quantum Thermometry" *Phys. Rev. A*, 98, 050101, 2018.
- [17] L. Mancino, V. Cavina, A. De Pasquale, M. Sbroscia, R. I. Booth, E. Roccia, I. Gianani, V. Giovannetti, M. Barbieri, "Geometrical bounds on irreversibility in open quantum systems" *Phys. Rev. Lett.* 121, 160602, 2018. - **Editors' suggestion**

- [16] E. Roccia, V. Cimini, M. Sbroscia, I. Gianani, L. Ruggiero, L. Mancino, M. G. Genoni, M. A. Ricci, M. Barbieri. "Multiparameter approach to quantum phase estimation with limited visibility", *Optica*, 5, 10, 1171-1176, 2018.
- [15] M. Sbroscia, I. Gianani, E. Roccia, V. Cimini, L. Mancino, P. Aloe, M. Barbieri "Assessing frequency correlation through a distinguishability measurement" *Optics Letters*, 43, 16, 4045-4048, 2018
- [14] **I. Gianani**, E. Polino, M. Sbroscia, A. S. Rab, E. Roccia, L. Mancino, N. Spagnolo, M. Barbieri, F. Sciarrino, "Hong–Ou–Mandel control through spectral shaping" *Journal of Optics*, 20, 8, 2018 - **Selected as Paper of the Week. [as corresponding author]**
- [13] L. Mancino, M. Sbroscia, E. Roccia, I. Gianani, F. Somma, P. Mataloni, M. Paternostro, M. Barbieri. "The entropic cost of quantum generalized measurements", *NPJQI* 4, 20, 2018
- [12] L. Mancino, M. Sbroscia, E. Roccia, I. Gianani, V. Cimini, M. Paternostro, M. Barbieri. "Information-reality complementarity in photonic weak measurements", *Physical Review A* 97(6), 062108, 2018
- [11] M. Sbroscia, I. Gianani, L. Mancino, E. Roccia, Z. Huang, L. Maccone, C. Macchiavello, M. Barbieri "Experimental ancilla-assisted phase-estimation in a noisy channel", *Physical Review A* 97(3), 032305, 2018
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