

# Chiara Esposito

## List of works

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### Publications

- 12 May 2022 **Boson Sampling in a reconfigurable continuously-coupled 3D photonic circuit**  
Authors: *Francesco Hoch, Simone Piacentini, Taira Giordani, Zhen-Nan Tian, Mariagrazia Iuliano, Chiara Esposito, Anita Camillini, Gonzalo Carvacho, Francesco Ceccarelli, Nicolò Spagnolo, Andrea Crespi, Fabio Sciarrino, Roberto Osellame*  
Publication: *npj Quantum Information* 8, 55 (2022).  
<https://doi.org/10.1038/s41534-022-00568-6>
- 24 March 2022 **Quantum walks of two correlated photons in a 2D synthetic lattice**  
Authors: *Chiara Esposito, Mariana R. Barros, Andrés Durán Hernández, Gonzalo Carvacho, Francesco Di Colandrea, Raouf Barboza, Filippo Cardano, Nicolò Spagnolo, Lorenzo Marrucci, and Fabio Sciarrino*  
Publication: *npj Quantum Information* 8, 34 (2022).  
<https://doi.org/10.1038/s41534-022-00544-0>
- 9 April 2021 **Witnesses of coherence and dimension from multiphoton indistinguishability tests**  
Authors: *Taira Giordani, Chiara Esposito, Francesco Hoch, Gonzalo Carvacho, Daniel J. Brod, Ernesto F. Galvão, Nicolò Spagnolo, and Fabio Sciarrino*  
Publication: *Physical Review Research*, Vol. 3, Issue 2, pag. 023031, April 2021.  
<http://dx.doi.org/10.1103/PhysRevResearch.3.023031>
- 2 April 2020 **Experimental quantification of genuine four-photon indistinguishability**  
Authors: *Taira Giordani, Daniel J Brod, Chiara Esposito, Niko Viggianiello, Marco Romano, Fulvio Flamini, Gonzalo Carvacho, Nicolò Spagnolo, Ernesto F Galvão, Fabio Sciarrino*  
Publication: *New Journal of Physics*, Volume 22, April 2020,  
<http://dx.doi.org/10.1088/1367-2630/ab7a30>
- 23 January 2020 **Two-dimensional topological quantum walks in the momentum space of structured light**  
Authors: *Alessio D'Errico, Filippo Cardano, Maria Maffei, Alexandre Dauphin, Raouf Barboza, Chiara Esposito, Bruno Piccirillo, Maciej Lewenstein, Pietro Massignan, Lorenzo Marrucci*  
Publication: *Optica* Vol. 7, Issue 2, pp. 108-114 (2020),  
<https://dx.doi.org/10.1364/OPTICA.365028>

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### Conference and Workshop Contributions

- 2021 **Poster Presentation to CLEO Technical Conference and Exhibition 2021**  
Online event  
Duration: 9th-14th May 2021  
Title: "*Witnesses of coherence and dimension from multiphoton indistinguishability tests*"  
Insight: "We experimentally demonstrate the validity of witness tests on suitable interferometers designed for the purpose. Our findings confirm the effectiveness of this novel family of witness tests for capturing the quantum properties of high-dimensional systems."

- 2021 **Oral Presentation to APS March Meeting 2021**  
Online event  
Duration: 14th- 19th March 2021  
Title: *"Two-dimensional multiphoton Quantum Walk in transverse momentum of light"*  
Insight: "We present an innovative platform feasible for the realization of two-dimensional multiphoton QW in the transverse momentum of light by using a new device called G-plate. We experimentally realize the 3 steps dynamic of two walkers in different initial positions on the lattice in the quantum regime. "
- 2020 **Oral Presentation to Young IQIS 2020 - Young Italian Quantum Information Science Conference**  
Online event  
Duration: 28th September-2nd October 2020  
Title: *"Witnesses of coherence and dimension from multiphoton indistinguishability tests"*  
Insight: "We present an indistinguishability test for a multiphoton state based on an interferometer that allows measure simultaneously the three photon overlaps on a four photon state. We quantify the indistinguishability from the obtained value measured overlaps. Starting from these measurements we infer precise bounds for the unmeasured overlaps. We also formulate and test a coherence witness and dimension witness based on overlaps estimation. Our results provide a complete characterization of the single photon sources. "
- 2020 **Poster Presentation to 9th International Conference on Quantum Simulation and Quantum Walks**  
Place: Centre International de Rencontres Mathématiques, Marseille, France  
Duration: 20th-24th January 2020  
Title: *"Experimental quantification of genuine four-photon indistinguishability"*  
Insight: "We present an approach for the quantification of multiphoton indistinguishability based on two-photon HOM tests through a suitable interferometer without need of heralding. We show experimentally the validity of our approach and it represents a promising tool for the characterization of the deterministic or probabilistic future photon sources"
- 2019 **Poster Presentation to Causality in the quantum world: harnessing quantum effects in causal inference problems**  
Place: Anacapri, Capri, Naples, Italy  
Duration: 17th-20th September 2019  
Title: *"Experimental quantification of genuine four-photon indistinguishability"*  
Insight: "We present an approach for the quantification of multiphoton indistinguishability based on two-photon HOM tests through a suitable interferometer without need of heralding. We show experimentally the validity of our approach and it represents a promising tool for the characterization of the deterministic or probabilistic future photon sources"
- 2019 **Oral Presentation to SPIE Optics + Photonics**  
Place: SPIE, San Diego Convention Center, San Diego, CA, United State of America  
Duration: 11th-15th August  
Title: *"Two-dimensional topological quantum walks in the momentum space of structured light"*  
Insight: "We report the experimental realization of a 2D discrete-time quantum walk based on encoding the walker position in the transverse wavevector while the coin is encoded in the light polarization. The key element of this apparatus is the g-plate, which realize the walker translation. They allow us to add or subtract a fixed transverse momentum component of the incoming photons depending on their polarization. We benchmark our setup by implementing a periodically-driven Chern insulator and probing its topological features. In prospect, our platform could perform a 2D quantum walk on lattices with different geometry and more complex topologies."
- 2019 **Poster Presentation to Quantum Information and Measurement V: Quantum Technologies**  
Place: "Sapienza Università di Roma", Rome, Italy  
Duration: 4th-6th April  
Title: *"Refocusing in forced photonic quantum walks controlled by liquid crystal gratings"*  
Insight: "We mimic one dimensional forced quantum walks by using the photonic implementation obtained by means of a sequence of liquid-crystal devices ("g-plates"), which apply polarization-dependent transverse kicks to the photons in the beam. We observed refocusing phenomena for localized initial states."