

## Nicolò Spagnolo - Full list of publications

### Refereed Journals

- [1] N. Spagnolo, C. Vitelli, S. Giacomini, F. Sciarrino, and F. De Martini, Polarization preserving ultra-fast optical shutter for quantum information processing, *Opt. Expr.* 16, 17609 (2008).
- [2] F. De Martini, F. Sciarrino, N. Spagnolo, C. Vitelli, and F. S. Cataliotti, Macroscopic quantum entanglement in light reflection from Bose-Einstein condensates, *Int. Journ. Quant. Inform.* 7, 171 (2009).
- [3] C. Vitelli, N. Spagnolo, F. Sciarrino, and F. De Martini, Amplification of polarization NOON states, *JOSA B* 26, 892 (2009).
- [4] F. De Martini, F. Sciarrino, and N. Spagnolo, Decoherence, environment-induced superselection, and classicality of a macroscopic quantum superposition generated by quantum cloning, *Phys. Rev. A* 79, 052305 (2009).
- [5] F. De Martini, F. Sciarrino, and N. Spagnolo, Anomalous Lack of Decoherence of the Macroscopic Quantum Superpositions based on Phase-Covariant Quantum Cloning, *Phys. Rev. Lett.* 103, 100501 (2009).
- [6] N. Spagnolo, C. Vitelli, T. De Angelis, F. Sciarrino, and F. De Martini, Wigner function theory and decoherence of the quantum-injected optical parametric amplifier, *Phys. Rev. A* 80, 032318 (2009), IF:2.808.
- [7] C. Vitelli, N. Spagnolo, L. Toffoli, F. Sciarrino, and F. De Martini, Quantum-to-classical transition via fuzzy measurements on high gain spontaneous parametric down-conversion, *Phys. Rev. A* 81, 032123 (2010).
- [8] F. De Martini, F. Sciarrino, N. Spagnolo, and C. Vitelli, Generation of Highly Resilient to Decoherence Macroscopic Quantum Superpositions via Phase-covariant Quantum Cloning, *Found. Phys.* 41, 492 (2010).
- [9] C. Vitelli, N. Spagnolo, L. Toffoli, F. Sciarrino, F. De Martini, Enhanced Resolution of Lossy Interferometry by Coherent Amplification of Single Photons, *Phys. Rev. Lett.* 105, 113602 (2010).
- [10] N. Spagnolo, F. Sciarrino, F. De Martini, Resilience to decoherence of the macroscopic quantum superpositions generated by universally covariant optimal quantum cloning, *Phys. Rev. A* 82, 032325 (2010).
- [11] N. Spagnolo, C. Vitelli, F. Sciarrino, and F. De Martini, Entanglement criteria for microscopic-macroscopic systems, *Phys. Rev. A* 82, 052101 (2010).
- [12] C. Vitelli, N. Spagnolo, F. Sciarrino, and F. De Martini, Measurement-induced quantum operations on multiphoton states, *Phys. Rev. A* 82, 062319 (2010).
- [13] M. Barbieri, N. Spagnolo, M. G. Genoni, F. Ferreyrol, R. Blandino, M. G. A. Paris, P. Grangier, and R. Tualle-Brouri, Non-Gaussianity of quantum states: An experimental test on single-photon-added coherent states', *Phys. Rev. A* 82, 063833 (2010).
- [14] F. Caruso, N. Spagnolo, C. Vitelli, F. Sciarrino, and M. B. Plenio, Simulation of noise-assisted transport via optical cavity networks, *Phys. Rev. A* 83, 013811 (2011).
- [15] N. Spagnolo, C. Vitelli, M. Paternostro, F. De Martini, and F. Sciarrino, Hybrid methods for witnessing entanglement in a microscopic-macroscopic system, *Phys. Rev. A* 84, 032102 (2011).
- [16] C. Vitelli, M. Terra-Cunha, N. Spagnolo, F. De Martini, F. Sciarrino, Continuous-variable nonlocality test performed over a multiphoton quantum state, *Phys. Rev. A* 85, 012104 (2012).
- [17] N. Spagnolo, C. Vitelli, V. G. Lucivero, V. Giovannetti, L. Maccone, F. Sciarrino, Phase Estimation via Quantum Interferometry for Noisy Detectors, *Phys. Rev. Lett.* 108, 233602 (2012).
- [18] N. Spagnolo, L. Aparo, C. Vitelli, A. Crespi, R. Ramponi, R. Osellame, P. Mataloni and F. Sciarrino, Quantum interferometry with three-dimensional geometry, *Sci. Rep.* 2, 862 (2012).
- [19] F. Ferreyrol, N. Spagnolo, R. Blandino, M. Barbieri, and R. Tualle-Bruori, Heralded processes on continuous-variable spaces as quantum maps, *Phys. Rev. A* 86, 062327 (2012).

- [20] N. Spagnolo, C. Vitelli, L. Aparo, P. Mataloni, F. Sciarrino, A. Crespi, R. Ramponi, and R. Osellame, Three-photon bosonic coalescence in an integrated tritter, *Nature Communications* 4, 1606 (2013).
- [21] C. Vitelli, N. Spagnolo, L. Aparo, F. Sciarrino, E. Santamato and L. Marrucci, Joining the quantum state of two photons into one, *Nature Photonics* 7, 521 (2013).  
**Highlight:** J. Neergaard-Nielsen, *Nature Photonics* 7, 512 (2013).
- [22] A. Crespi, R. Osellame, R. Ramponi, D. J. Brod, E. F. Galvao, N. Spagnolo, C. Vitelli, E. Maiorino, P. Mataloni, and F. Sciarrino, Integrated multimode interferometers with arbitrary designs for photonic boson sampling, *Nature Photonics* 7, 545 (2013).  
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- [23] V. D'Ambrosio, N. Spagnolo, L. Del Re, S. Slussarenko, Y. Li, L. C. Kwek, L. Marrucci, S. P. Walborn, L. Aolita, and F. Sciarrino, Photonic polarization gears for ultra-sensitive angular measurements, *Nature Communications* 4, 2432 (2013).
- [24] N. Spagnolo, C. Vitelli, L. Sansoni, E. Maiorino, P. Mataloni, F. Sciarrino, D. J. Brod, E. F. Galvão, A. Crespi, R. Ramponi, and R. Osellame, General Rules for Bosonic Bunching in Multimode Interferometers, *Phys. Rev. Lett.* 111, 130503 (2013).
- [25] E. Passaro, C. Vitelli, N. Spagnolo, F. Sciarrino, E. Santamato, L. Marrucci, Joining and splitting the quantum state of photons, *Phys. Rev. A* 88, 062321 (2013).
- [26] N. Spagnolo, C. Vitelli, M. Bentivegna, D. J. Brod, A. Crespi, F. Flamini, S. Giacomini, G. Milani, R. Ramponi, P. Mataloni, R. Osellame, E. F. Galvao, and F. Sciarrino, Experimental validation of photonic boson sampling, *Nature Photonics* 8, 615 (2014).
- [27] M. Bentivegna, N. Spagnolo, C. Vitelli, D. J. Brod, A. Crespi, F. Flamini, R. Ramponi, P. Mataloni, R. Osellame, E. F. Galvao, and F. Sciarrino, Bayesian approach to Boson Sampling validation, *Int. Journ. Quant. Inform.* 12, 1560028 (2014).
- [28] M. Bentivegna, N. Spagnolo, C. Vitelli, F. Flamini, N. Viggianiello, L. Latmiral, P. Mataloni, D. J. Brod, E. F. Galvao, A. Crespi, R. Ramponi, R. Osellame, and F. Sciarrino, Experimental scattershot boson sampling, *Science Advances* 1, e1400255 (2015).
- [29] M. Barbieri, N. Spagnolo, F. Ferreyrol, R. Blandino, B. J. Smith, R. Tualle-Bruori, Qubit-Programmable Operations on Quantum Light Fields, *Scientific Reports* 5, 15125 (2015).
- [30] F. Flamini, L. Magrini, A. S. Rab, N. Spagnolo, V. D'Ambrosio, P. Mataloni, F. Sciarrino, T. Zandrini, A. Crespi, R. Ramponi, R. Osellame, Thermally reconfigurable quantum photonic circuits at telecom wavelength by femtosecond laser micromachining, *Light: Science & Applications* 4, e354 (2015).  
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- [31] A. Crespi, R. Osellame, R. Ramponi, M. Bentivegna, F. Flamini, N. Spagnolo, N. Viggianiello, L. Innocenti, P. Mataloni, F. Sciarrino, Suppression law of quantum states in a 3D photonic fast Fourier transform chip, *Nature Communications* 7, 10469 (2016).
- [32] M. A. Ciampini, N. Spagnolo, C. Vitelli, L. Pezze, A. Smerzi, F. Sciarrino, Quantum-enhanced multiparameter estimation in multiarm interferometers, *Scientific Reports* 6, 28881 (2016).
- [33] L. Latmiral, N. Spagnolo, F. Sciarrino, Towards quantum supremacy with lossy scattershot boson sampling, *New J. Phys.* 18, 113008 (2016).
- [34] F. Flamini, N. Viggianiello, M. Bentivegna, N. Spagnolo, P. Mataloni, A. Crespi, R. Ramponi, R. Osellame, and F. Sciarrino, Generalized quantum fast transformations via femtosecond laser writing technique, *Interdisciplinary Information Sciences* 23, 115 (2017).
- [35] L. Pezzè, M. A. Ciampini, N. Spagnolo, P. C. Humphreys, A. Datta, I. A. Walmsley, M. Barbieri, F. Sciarrino, and A. Smerzi, Optimal Measurements for Simultaneous Quantum Estimation of Multiple Phases, *Phys. Rev. Lett.* 119, 130504 (2017).  
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- [36] A. S. Rab, E. Polino, Z.-X. Man, N. Ba An, Y.-J. Xia, N. Spagnolo, R. Lo Franco, F. Sciarrino, Entanglement of photons in their dual wave-particle nature, *Nature Communications* 8, 915 (2017).

- [37] N. Spagnolo, E. Maiorino, C. Vitelli, M. Bentivegna, A. Crespi, R. Ramponi, P. Mataloni, R. Osellame, F. Sciarrino, Learning an unknown unitary transformation via a genetic approach, *Scientific Reports* 7, 14316 (2017).
- [38] F. Flamini, N. Spagnolo, N. Viggianiello, A. Crespi, R. Osellame, F. Sciarrino, Benchmarking integrated linear-optical architectures for quantum information processing, *Scientific Reports* 7, 15133 (2017).
- [39] I. Pitsios, L. Banchi, A. S. Rab, M. Bentivegna, D. Caprara, A. Crespi, N. Spagnolo, S. Bose, P. Mataloni, R. Osellame, F. Sciarrino, Photonic simulation of entanglement growth and engineering after a spin chain quench, *Nature Communications* 8, 1569 (2017).
- [40] L. Innocenti, H. Majury, T. Giordani, N. Spagnolo, F. Sciarrino, M. Paternostro, A. Ferraro, Quantum state engineering using one-dimensional discrete-time quantum walk, *Phys. Rev. A* 96, 062326 (2017).
- [41] T. Giordani, F. Flamini, M. Pompili, N. Viggianiello, N. Spagnolo, A. Crespi, R. Osellame, N. Wiebe, M. Walschaers, A. Buchleitner, F. Sciarrino, Experimental statistical signature of many-body quantum interference, *Nature Photonics* 12, 173-178 (2018).
- [42] N. Viggianiello, F. Flamini, L. Innocenti, D. Cozzolino, M. Bentivegna, N. Spagnolo, A. Crespi, D. J. Brod, E. F. Galvao, R. Osellame, F. Sciarrino, Experimental generalized quantum suppression law in Sylvester interferometers, *New J. Phys.* 20, 033017 (2018).
- [43] S. Atzeni, A. S. Rab, G. Corrielli, E. Polino, M. Valeri, P. Mataloni, N. Spagnolo, A. Crespi, F. Sciarrino, R. Osellame, Integrated sources of entangled photons at the telecom wavelength in femtosecond-laser-written circuits, *Optica* 5, 311-314 (2018).
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- [45] I. Gianani, E. Polino, M. Sbroscia, A. S. Rab, E. Rocca, L. Mancino, N. Spagnolo, M. Barbieri, F. Sciarrino, Hong-Ou-Mandel control through spectral shaping, *Journal of Optics* 20, 085201 (2018).
- Selected as **Paper of the Week**.
- [46] A. Lumino, E. Polino, A. S. Rab, G. Milani, N. Spagnolo, N. Wiebe, F. Sciarrino, Experimental Phase Estimation Enhanced by Machine Learning, *Physical Review Applied* 10, 044033 (2018).
- Selected as **Editor Suggestion**.
- [47] N. Viggianiello, F. Flamini, M. Bentivegna, N. Spagnolo, A. Crespi, D. J. Brod, E. F. Galvao, R. Osellame, F. Sciarrino, Optimal photonic indistinguishability tests in multimode networks, *Science Bulletin* 63, 1470-1478 (2018).
- [48] F. Flamini, N. Spagnolo, F. Sciarrino, Photonic quantum information processing: a review, *Reports on Progress in Physics* 82, 016001 (2019).
- [49] T. Giordani, E. Polino, S. Emiliani, A. Suprano, L. Innocenti, H. Majury, L. Marrucci, M. Paternostro, A. Ferraro, N. Spagnolo, F. Sciarrino, Experimental engineering of arbitrary qudit states with discrete-time quantum walks, *Physical Review Letters* 122, 020503 (2019).
- [50] I. Agresti, N. Viggianiello, F. Flamini, N. Spagnolo, A. Crespi, R. Osellame, N. Wiebe, F. Sciarrino, Pattern recognition techniques for Boson Sampling validation, *Physical Review X* 9, 011013 (2019).
- [51] D. J. Brod, E. F. Galvao, N. Viggianiello, F. Flamini, N. Spagnolo, F. Sciarrino, Witnessing Genuine Multiphoton Indistinguishability, *Physical Review Letters* 122, 063602 (2019).
- [52] E. Polino, M. Riva, M. Valeri, R. Silvestri, G. Corrielli, A. Crespi, N. Spagnolo, R. Osellame, F. Sciarrino, Experimental multiphase estimation on a chip, *Optica* 6, 288-295 (2019).
- [53] F. Flamini, N. Spagnolo, F. Sciarrino, Visual assessment of multi-photon interference, *Quantum Science and Technology* 4, 024008 (2019).
- [54] D. J. Brod, E. F. Galvao, A. Crespi, R. Osellame, N. Spagnolo, F. Sciarrino, Photonic implementation of boson sampling: a review, *Advanced Photonics* 1, 034001 (2019).

## Conference Proceedings

- [CP1] F. S. Cataliotti, F. De Martini, F. Sciarrino, N. Spagnolo, and C. Vitelli, Macroscopic quantum entanglement, Proc. SPIE 7092, 7092T (2008).
- [CP2] C. Vitelli, N. Spagnolo, F. Sciarrino, and F. De Martini, Non Locality in a Micro-Macroscopic Photon System, AIP Conf. Proc. 1101, 29 (2009).
- [CP3] N. Spagnolo, C. Vitelli, F. Sciarrino, and F. De Martini, Entanglement and Decoherence in a Microscopic-Macroscopic system, AIP Conf. Proc. 1110, 211 (2009).
- [CP4] C. Vitelli, N. Spagnolo, F. Sciarrino, and F. De Martini, Micro-macro entangled photon systems: results and perspectives, Proc. SPIE 7355, 735508 (2009).
- [CP5] N. Spagnolo, C. Vitelli, F. Sciarrino, and F. De Martini, Entanglement test in micro-macroscopic photon system: criteria and assumptions, AIP Conf. Proc. 1327, 221 (2011).
- [CP6] N. Spagnolo, C. Vitelli, L. Toffoli, F. De Martini, and F. Sciarrino, Enhanced resolution in lossy phase estimation by optical parametric amplification, Proc. SPIE 8072, 80720M (2011).
- [CP7] N. Spagnolo, C. Vitelli, L. Toffoli, F. Sciarrino, F. De Martini, Quantum-to-classical transition via fuzzy measurements on high gain spontaneous parametric down-conversion, AIP Conf. Proc. 1363, 193 (2011).
- [CP8] C. Vitelli, N. Spagnolo, L. Toffoli, F. Sciarrino, F. De Martini, Enhanced resolution of lossy interferometry by coherent amplification of single photons, AIP Conf. Proc. 1363, 164 (2011).
- [CP9] A. Crespi, R. Ramponi, D. J. Brod, E. F. Galvao, N. Spagnolo, C. Vitelli, L. Sansoni, F. Sciarrino, P. Mataloni, R. Osellame, Arbitrary integrated multimode interferometers for the elaboration of photonic qubits, Proc. SPIE 8972, 89720V (2014).
- [CP10] F. Ferreyrol, N. Spagnolo, R. Blandino, M. Barbieri, R. Tualle-Brouiri, Heralded processes on continuous-variable spaces as quantum maps, AIP Conf. Proc. 1633, 222 (2014).
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- [CP13] A. Crespi, R. Osellame, R. Ramponi, M. Bentivegna, F. Flamini, N. Spagnolo, N. Viggianiello, L. Innocenti, P. Mataloni, F. Sciarrino, Observing quantum interference in 3D integrated-photonic symmetric multiports, Proc. SPIE 10106, 101061C (2017).

## Other publications

- [O1] L. Marrucci, C. Vitelli, N. Spagnolo, F. Sciarrino, Quantum multiplexing in single photons, SPIE Newsroom (2013), DOI: 10.1117/2.1201308.005020.
- [O2] L. Sansoni, N. Spagnolo, C. Vitelli, F. Sciarrino, P. Mataloni, Simulating quantum physics by integrated photonic circuits, Il Nuovo Saggiatore Vol.29, No. 5-6, p. 5-16 (2013).
- [O3] M. Bentivegna, N. Spagnolo, F. Sciarrino, Is my boson sampler working?, New J. Phys. 18, 041001 (2016)
- [O4] N. Spagnolo, F. Sciarrino, The race for quantum supremacy: pushing the classical limit for the photonic hardware, National Science Review 6, 2-3 (2019).

## Preprints

- [AR1] D. Cozzolino, E. Polino, M. Valeri, G. Carvacho, D. Bacco, N. Spagnolo, L. K. Oxenlowe, F. Sciarrino, Air-core fiber distribution of hybrid vector vortex-polarization entangled states, arXiv:1903.03452 (2019).
- [AR2] V. Cimini, I. Gianani, N. Spagnolo, F. Leccese, F. Sciarrino, M. Barbieri, Calibration of quantum sensors by neural networks, arXiv:1904.10392 (2019).

[AR3] F. Flamini, M. Walschaers, N. Spagnolo, N. Wiebe, A. Buchleitner, F. Sciarrino, Requirements for the validation of a quantum advantage in Boson Sampling, arXiv:1904.12318 (2019).