

## About the Author

Linda Sansoni was born in Rome in 1983. She graduated in Physics in 2009 in the *Quantum Optics Group* of Sapienza Università di Roma with Prof. Francesco De Martini and Prof. Fabio Sciarrino with an experimental thesis on the quantum effects of the orbital angular momentum of light. After graduation she started the Ph.D. in the same group under the supervision of Prof. Paolo Mataloni and Prof. Fabio Sciarrino and she focused her research on integrated devices for quantum information. In particular some important experiments have been carried out using integrated waveguide optical devices fabricated by the ultrafast laser writing technique, and by introducing for the first time the polarization of the photon as a suitable degree of freedom to encode quantum information in integrated optics. Among the other results, the first realization of an integrated Controlled-NOT gate based on polarization encoded qubits and the realization of complex interferometric networks enabling accurate polarization behavior and phase and transmission control have been achieved. She focused on the study of photon propagation through such networks, simulating both single particles and two entangled particles traveling in discrete quantum walks. By exploiting polarization entanglement of photons to simulate the bunching-antibunching feature of noninteracting bosons and fermions, she investigated how particle statistics affects the diffusion through such systems. Moreover she performed a theoretical analysis of two-particle transport in quantum walks in presence or absence of disorder in the limit of a large number of steps.

Besides this topic she carried out experiments on quantum process tomography and characterization of quantum channels. She got the Ph.D. in February 2013 and continued her work in the same group till October 2013.

Her research gave rise to many publications in high impact Journals and she gave about 10 contribution talks and one invited talk in international conferences around the world.

Since November 2013 she is an assistant researcher at the *Integrated Quantum Optics Group* of the University of Paderborn (Germany) where she is investigating on integrated devices in nonlinear materials and on the realization of integrated photonic sources.

# List of Publications

1. E. Nagali, L. Sansoni, F. Sciarrino, F. D. Martini, L. Marrucci, B. Piccirillo, E. Karimi, and E. Santamato, *Optimal quantum cloning of orbital angular momentum photon qubits through Hong-Ou-Mandel coalescence*, *Nature Photonics* **3**, 720 (2009).
2. F. De Martini, V. Giovannetti, S. Lloyd, L. Maccone, E. Nagali, L. Sansoni, and F. Sciarrino, *Experimental quantum private queries with linear optics*, *Physical Review A* **80**, 010302 (2009).
3. E. Nagali, L. Sansoni, L. Marrucci, E. Santamato, and F. Sciarrino, *Experimental generation and characterization of single-photon hybrid ququarts based on polarization and orbital angular momentum encoding*, *Physical Review A* **81**, 052317 (2010).
4. L. Sansoni, F. Sciarrino, G. Vallone, P. Mataloni, A. Crespi, R. Ramponi, and R. Osellame, *Polarization entangled state measurement on a chip*, *Physical Review Letters* **105**, 200503 (2010).
5. I. Bongioanni, L. Sansoni, F. Sciarrino, G. Vallone, and P. Mataloni, *Experimental quantum process tomography of non-trace-preserving maps*, *Physical Review A* **82**, 042307 (2010).
6. A. Crespi, R. Ramponi, R. Osellame, L. Sansoni, I. Bongioanni, F. Sciarrino, G. Vallone, and P. Mataloni, *Integrated photonic quantum gates for polarization qubits*, *Nature Communications* **2**, 566 (2011).
7. L. Sansoni, F. Sciarrino, G. Vallone, P. Mataloni, A. Crespi, R. Ramponi, and R. Osellame, *Two-particle bosonic-fermionic quantum walk via integrated photonics*, *Physical Review Letters* **108**, 010502 (2012).
8. A. Crespi, R. Osellame, R. Ramponi, V. Giovannetti, R. Fazio, L. Sansoni, F. D. Nicola, F. Sciarrino, and P. Mataloni, *Anderson localization of entangled photons in an integrated quantum walk*, *Nature Photonics* (2013).
9. R. O. Vianna, A. Crespi, R. Ramponi, R. Osellame, L. Sansoni, F. Sciarrino, G. Milani, and P. Mataloni, *Variational quantum process tomography of two-qubit maps*, *Physical Review A* **87**, 032304 (2013).

10. L. Sansoni, F. De Nicola, F. Sciarrino, P. Mataloni, A. Crespi, R. Ramponi, and R. Osellame, *Bosonic and fermionic discrete-time quantum walk on integrated optics*, Journal of computation and theoretical Nanoscience **10**, 1662 (2013).
11. A. Orioux, L. Sansoni, M. Persechino, P. Mataloni, M. Rossi, and C. Macchiavello, *Experimental detection of quantum channels*, Physical Review Letters **111**, 220501 (2013).
12. N. Spagnolo, C. Vitelli, L. Sansoni, E. Maiorino, P. Mataloni, F. Sciarrino, D. Brod, E. Galvao, A. Crespi, R. Ramponi, and R. Osellame, *General rules for bosonic bunching in multimode interferometers*, Physical Review Letters **111**, 130503 (2013).
13. F. De Nicola, L. Sansoni, A. Crespi, R. Ramponi, R. Osellame, V. Giovannetti, R. Fazio, P. Mataloni, and F. Sciarrino, *Quantum simulation of bosonic-fermionic noninteracting particles in disordered systems via a quantum walk*, Physical Review A **89**, 032322 (2014).