

CURRICULUM VITAE

PAOLO MATALONI

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Nazionalità

PAOLO MATALONI

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Italiana

ESPERIENZA LAVORATIVA

1 Marzo 2001 – oggi

1 Novembre 1992 – 29 Febbraio 2000
1985, 1987

1980 – 1992

1976 – 1980

Professore Ordinario presso Dipartimento di Fisica, Sapienza Università di Roma ", dove attualmente insegna Ottica non lineare e quantistica (Laurea Magistrale in Fisica)

Professore Associato presso Dipartimento di Fisica, Università di Roma "La Sapienza"
Visiting scientist presso l'Electronic Engineering Department del MIT, Cambridge, Massachusetts (USA)
Ricercatore Universitario confermato presso Dipartimento di Fisica, Università di Roma "La Sapienza"
Borsista del Consiglio Nazionale delle Ricerche

Datore di lavoro

Sapienza Università di Roma (Dipartimento di Fisica) P.le Aldo Moro 5, 00185 Roma

ISTRUZIONE E FORMAZIONE

15 Dicembre 1975

Laurea in Fisica, con lode, Università di Roma "La Sapienza"

INCARICHI ORGANIZZATIVI: ORGANI E COMITATI

Novembre 2015 – oggi
Novembre 2014 – oggi
1 Novembre 2009 – 31 Ottobre 2012

2009 – 2013

2006 – 2008

2004 – 2006

Direttore del Dipartimento di Fisica di Sapienza Università di Roma
Membro del Board degli Stakeholders di Photonics21
Presidente del Consiglio di Area Didattica" (CAD), Corso di Laurea in Fisica di Sapienza Università di Roma
Membro del Quantum Electronics and Optical Division (QEOD) Board della European Physical Society
Presidente del Consiglio Scientifico del Consorzio Nazionale Interuniversitario per le Scienze Fisiche della Materia, CNISM
Membro del Consiglio Direttivo dell'European Laboratory for Nonlinear Spectroscopy (LENS)

WORKSHOPS E CONFERENZE

21 - 25 Settembre 2009

20 – 22 Settembre 2004

Maggio 2004

Chairman della QIPC 2009, "International Conference on Quantum Information Processing and Communication", Roma
Responsabile del Comitato Organizzativo della 5th European Quantum Information Processing and Communication", Roma
Chairman della International Conference "Quantum Optics for Quantum Information Processing", Roma
Direttore della "Enrico Fermi" Varenna School 2016 on Quantum Simulators.

ATTIVITÀ SCIENTIFICA

Paolo Mataloni ha pubblicato più di 160 articoli scientifici su riviste JCR, con più di 4000 citazioni, h-index 33 su WOS (Google Scholar: 6223, 41).

La sua attività di ricerca ha riguardato lo studio dei fenomeni ottici non lineari in solidi e molecole, degli effetti ottici ultraveloci nella materia; dei fenomeni di emissione spontanea e stimolata e di superradianza all'interno di microcavità ottiche planari e in microlaser.

Negli ultimi 15 anni ha condotto numerosi esperimenti nel campo dell'informazione quantistica, riguardanti la generazione, rivelazione e caratterizzazione di stati di fotoni entangled, la non località quantistica, gli stati di fotoni hyperentangled e gli stati cluster a molti qubit e le loro applicazioni alla computazione e alla comunicazione quantistica, la Non-Markovianità e lo studio della dinamica di sistemi aperti. Particolarmente degna di nota è la realizzazione di una serie di esperimenti riguardanti l'uso dei sistemi fotonici integrati in guida d'onda finalizzati alla miniaturizzazione e alla integrazione di sistemi e di protocolli di informazione quantistica, con innovative applicazioni nella computazione e nella simulazione quantistica.

Paolo Mataloni ha tenuto più di 100 seminari e relazioni su invito in numerose università e conferenze nazionali e internazionali.

Highlights scientifici

- Experimental realization of the nonlinear quantum interferometry by "frequency hopping" (2003).
- First experimental demonstration of an "entanglement witness" (2003).
- Experimental realization and characterisation of Werner states (2004).
- First experimental demonstration of the "growing with size quantum nonlocality" by using 2-photon hyperentanglement (2006).
- First experimental realization of multiqubit (4- and 6- qubit) 2-photon cluster states for one-way quantum computation (2007 - 2009).
- Experimental realization of "multipath" entanglement (2009).
- Proposal and experimental realization of a genuine quantum nonlocality test of time-energy entanglement by Bell inequalities (2009 - 2010).
- Experimental realization of the Deutsch-Jozsa algorithm with a 2-photon 6-qubit cluster state (2010).
- First demonstration of a on-chip waveguide integrated device enabling the propagation of polarization photonic qubits (2010).
- First demonstration of a discrete Quantum Walk with 2-photon polarization entanglement (2012).
- Anderson localization in a discrete Quantum Walk (2013).
- First experiments on Boson Sampling with integrated photonics (2013-2015).
- Photonics quantum simulation of entanglement growth in a spin chain by integrated photonics (2017).

Progetti coordinati come PI

- PRIN 1998 "Emissione laser e generazione di luce quantistica in microcavità operanti con polimeri coniugati", 90380 Euro.
- PRIN 2005 "Nuove prospettive nella generazione e manipolazione di stati entangled e hyper-entangled", 171500 Euro.
- PRIN 2009 "Circuiti ottici integrati per l'Informazione Quantistica", 168356 Euro.
- Chist-Era Project 2009-2011 QUASAR (Quantum State: Analysis and Realizations), 125000 Euro.
- FET Project 2012-2015 QWAD (Quantum Waveguides Application and Devices), 340.000 Euro.

PUBBLICAZIONI

- M. A. CIAMPINI, G. PINNA, P. MATALONI, M. PATERNOSTRO, "Experimental signature of Quantum Darwinism in photonic cluster states", [[arXiv:1803.01913](#)].
- M. A. CIAMPINI, T. TILMA, M. J. EVERITT, W. J. MUNRO, P. MATALONI, K. NEMOTO, M. BARBIERI, "Wigner function reconstruction of experimental three-qubit GHZ and W states", [[arXiv:1710.02460](#)].
- THE BIG BELL TEST COLLABORATION, "Challenging local realism with human choices", *Nature* **557**, 212 (2018).
- A. CUEVAS, J. C. LOPEZ CARRENO, B. SILVA, M. DE GIORGI, D. G. SUAREZ FORERO, C. SANCHEZ MUNOZ, A. FIERAMOSCA, F. CARDANO, L. MARRUCCI, V. TASCO, G. BIASIOL, E. DEL VALLE, L. DOMINICI, D. BALLARINI, G. GIGLI, P. MATALONI, F. P. LAUSSY, F. SCIARRINO, D. SANVITTO, "First observation of the quantized exciton-polariton field and effect of interactions on a single polariton", *Science Advances* **4**, eaao6814 (2018).
- 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 (2018).
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- L. MANCINI, M. SBROSCIA, E. ROCCIA, I. GIANANI, F. SOMMA, P. MATALONI, M. PATERNOSTRO, M. BARBIERI, "The entropic cost of quantum generalized measurements", *npj Quantum Information* **4**, 20 (2018).
- 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).
- N. SPAGNOLO, E. MAIORINO, C. VITELLI, M. BENTIVEGNA, A. CRESPI, R. RAMPONI, R. OSELLAME, F. SCIARRINO, "Learning an unknown transformation via a genetic approach", *Sci. Rep.* **7**, 14316 (2017).
- M. A. CIAMPINI, C. VIGLIAR, V. CIMINI, S. PAESANI, F. SCIARRINO, A. CRESPI, G. CORRIELLI, R. OSELLAME, M. PATERNOSTRO, M. BARBIERI, "Experimental nonlocality-based network diagnostics of multipartite entangled states", *Sci. Rep.* **7**, 17122 (2017).
- A. CUEVAS, A. DE PASQUALE, A. MARI, A. ORIEUX, S. DURANTI, M. MASSARO, A. DI CARLI, E. ROCCIA, J. FERRAZ, F. SCIARRINO, P. MATALONI, V. GIOVANNETTI, "Amending entanglement-breaking channels via intermediate unitary operations", *Phys. Rev. A* **96**, 022322 (2017).
- A. CUEVAS, A. MARI, A. DE PASQUALE, A. ORIEUX, M. MASSARO, F. SCIARRINO, P. MATALONI, V. GIOVANNETTI, "Cut-and-paste restoration of entanglement-breaking channels", *Phys. Rev. A* **96**, 012314 (2017).
- M. A. CIAMPINI, P. MATALONI, M. PATERNOSTRO, "Structure of multipartite entanglement in random cluster-like photonic states", *Entropy* **19**, 473 (2017).
- A. CUEVAS, M. PROIETTI, M. A. CIAMPINI, S. DURANTI, P. MATALONI, M. SACCHI, C. MACCHIAVELLO, "Experimental detection of quantum channel capacities", *Phys. Rev. Lett.* **119**, 100502 (2017).
- M. A. CIAMPINI, L. MANCINO, A. ORIEUX, C. VIGLIAR, P. MATALONI, M. PATERNOSTRO, M. BARBIERI, "Experimental extractable work-based multipartite separability criteria", *npj Quantum Information* **3**, 10 (2017).
- G. VALLONE, G. DI GIUSEPPE, P. MATALONI, P. VILLORESI, M. LUCAMARINI, "Reply to "Comment on 'Device-independent entanglement-based Bennett 1992 protocol' " ", *Phys. Rev. A* **93**, 066304 (2016).
- M. A. CIAMPINI, A. ORIEUX, S. PAESANI, F. SCIARRINO, G. CORRIELLI, A. CRESPI, R. RAMPONI, R. OSELLAME, P. MATALONI, "Path-polarization hyperentangled and cluster states of photons on a chip", *Light:Science & Applications* **5**, e16064 (2016).
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- A. ORIEUX, M.A. CIAMPINI, P. MATALONI, D. BRUSS, M. ROSSI, C. MACCHIAVELLO "Experimental generation of entanglement from classical correlations via non-local unitary noise" **Phys. Rev. Lett.**, **115**, 160503 (2015).
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