

SCIENTIFIC PUBLICATIONS

Last Update: February 2012

Thesis:

- 1) *From Vacuum Fluctuations to Radiation: Pair Creation in the Presence of External Electric Fields, Accelerated Detectors, Accelerated Mirrors and Black Holes*

Thesis presented to obtain the degree of doctor in science, June 1995, Université Libre de Bruxelles, Promotor: Prof. R. Brout

- 2) *Quantum Information Theory*

Thesis presented to obtain the title of Agrégé de l'Enseignement Supérieur, March 2003, Université Libre de Bruxelles

Patents:

- 1) *Handling Information in a Noisy Environment*

N. Gisin, N. Linden, S. Massar, S. Popescu
United States Patent 7,266,303 issued in 2007
Japan Patent 2002-533523
and PCT patent application 01972283.4-2415-GB0104392

- 2) *Reducing depolarisation*

S. Massar et S. Popescu
United States Patent 7,565,037 issued in 2009

Scientific publications in refereed journals :

- 1) *On the problem of the uniformly accelerated observer*

S. Massar, R. Parentani, R. Brout
Class. Q. Grav 10 (1993) 385

- 2) *Energy-momentum tensor of the evaporating black hole and local Bogoljubov transformations*

S. Massar, R. Parentani, R. Brout
Class. Q. Grav 10 (1993) 2431

- 3) *Source vacuum fluctuations of black hole radiance*

Englert, S. Massar, R. Parentani
Class. Q. Grav.11 (1994) 2919

- 4) *Local modes, local vacuum, local Bogoljubov coefficients and the renormalised stress tensor*
S. Massar
Int. J. Mod. Phys. D 3 (1994) 237
- 5) *Optimal extraction of information from finite quantum ensembles*
S. Massar, S. Popescu
Phys. Rev. Lett. 74 (1995) 1259
- 6) *Quantum source of the back reaction on a classical field*
R. Brout, S. Massar, R. Parentani, S. Popescu, Ph. Spindel
Phys. Rev. D 52 (1995) 1119
- 7) *A Primer for Quantum Black Hole Physics*
R. Brout, S. Massar, R. Parentani, Ph. Spindel
Phys. Repts. 260 (1995) 329
- 8) *Hawking radiation without transplanckian frequencies*
R. Brout, S. Massar, R. Parentani, Ph Spindel
Phys. Rev. D 52 (1995) 4559
- 9) *Semi-classical back reaction to black hole evaporation*
S. Massar
Phys. Rev. D 52 (1995) 5857
- 10) *Adiabatic measurements on metastable systems*
Y. Aharonov, S. Massar, S. Popescu, J. Tollaksen, L. Vaidman
Phys. Rev. Lett. 77 (1996) 983
- 11) *Applications of the complex geometric phase for meta-stable systems*
S. Massar
Phys. Rev. A 54 (1996) 4770
- 12) *From vacuum fluctuations to radiation: I - accelerated detectors*
S. Massar, R. Parentani
Phys. Rev. D 54 (1996) 7426
- 13) *From vacuum fluctuations to radiation: II - black holes*
S. Massar, R. Parentani
Phys. Rev. D 54 (1996) 7444
- 14) *Black hole horizon fluctuations*
Casher, F. Englert, N. Itzhaki, S. Massar, R. Parentani
Nucl. Phys. B 484 (1997) 419

- 15) *Schwinger mechanism, the Unruh effect and the production of accelerated black holes*
R. Parentani, S. Massar
Phys. Rev. D 55 (1997) 3603
- 16) *Comment on "Vanishing Hawking Radiation from a Uniformly Accelerated Black Hole" P. Yi, Phys. Rev. Lett. 75 (1995) 382*
S. Massar, R. Parentani
Phys. Rev. Lett. 78 (1997) 4526
- 17) *Gravitational Instanton for Black Hole Radiation*
S. Massar, R. Parentani
Phys. Rev. Lett. 78 (1997) 3810
- 18) *Optimal Quantum Cloning Machines*
N. Gisin, S. Massar
Phys. Rev. Lett. 79 (1997) 2153
- 19) *Particle Creation and Nonadiabatic Transitions in Quantum Cosmology*
S. Massar, R. Parentani
Nucl. Phys. B 513 (1998) 375
- 20) *Interacting Charged Particles in an Electric Field and the Unruh Effect*
C. Gabriel, P. Spindel, S. Massar, R. Parentani
Phys. Rev. D 57 (1998) 6496
- 21) *Purifying Noisy Entanglement Requires Collective Measurements*
N. Linden, S. Massar, S. Popescu
Phys. Rev. Lett. 81 (1998) 3279
- 22) *Optimal Quantum Clocks*
V. Buzek, R. Derka, S. Massar
Phys. Rev. Lett. 82 (1999) 2207
- 23) *Unitary and Non Unitary Evolution in Quantum Cosmology*
S. Massar, R. Parentani
Phys. Rev. D 59 (1999) 123519
- 24) *Optimal Entanglement Enhancement for Mixed States*
A. Kent, N. Linden, S. Massar
Phys. Rev. Lett. 83 (1999) 2656
- 25) *Classical Teleportation of a Quantum Bit*
N. J. Cerf, N. Gisin, S. Massar
Phys. Rev. Lett. 84 (2000) 2521

- 26) *State Estimation for Large Ensembles*
R. D. Gill, S. Massar
Phys. Rev. A 61 (2000) 042312
- 27) *How the Change in Horizon Area Drives Black Hole Evaporation,*
S. Massar, R. Parentani
Nucl. Phys. B 575 (2000) 333
- 28) *Amount of Information Obtained by a Quantum Measurement*
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- 29) *Collective versus local measurements on two parallel or antiparallel spins*
S. Massar
Phys. Rev. A 62(2000) 040101(R)
- 30) *Absorption Free discrimination between Semi-Transparent Objects*
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- 31) *Classical Simulation of Quantum Entanglement Without Local Hidden Variables*
S. Massar, D. Bacon, N. Cerf, R. Cleve
Phys. Rev. A 63 (2001) 052305
- 32) *Compression of quantum measurement operations*
A. Winter, S. Massar
Phys. Rev. A 64 (2001) 012311
- 33) *Optimal cloning of coherent states with a linear amplifier and beam splitter*
Samuel L. Braunstein, Nicolas J. Cerf, Sofyan Iblisdir, Peter van Loock, Serge
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- 34) *Optimality of the genetic code with respect to protein stability and amino acid
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- 35) *Minimal Absorption Measurements*
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- 36) *Greenberger-Horne-Zeilinger paradox for continuous variables*
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- 37) *Minimum number of photons needed to distinguish two transparencies*
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- 38) *Bell inequalities for arbitrarily high dimensional systems*
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- 39) *Greenberger-Horne-Zeilinger paradoxes for many qudits*
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- 40) *Non locality, closing the detection loophole and communication complexity*
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- 41) *Quantum cloning of orthogonal qubits,*
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- 43) *Measuring Energy, Estimating Hamiltonians, and the Time-Energy Uncertainty Relation,*
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- 44) *Bell inequalities resistant to detector inefficiency*
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- 45) *Continuous-Variable Quantum Games*
Hui Li, Jiangfeng Du, Serge Massar
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- 46) *Generating a Superposition of Spin States in an Atomic Ensemble*
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- 47) *Fiber-Optics implementation of the Deutsch-Jozsa and Bernstein-Vazirani Quantum Algorithms with Three Qubits*
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- 48) *Conditional generation of arbitrary multimode entangled states of light with linear optics*
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- 49) *Violation of local realism versus detection efficiency*
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- 52) *Quantum Coin Tossing and Bit-String Generation in the Presence of Noise*
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- 53) *Security of quantum bit-string generation*
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- 56) *Scalar and vector modulation instabilities induced by vacuum fluctuations in fibers : Numerical study*
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- 60) *Vector modulation instability induced by vacuum fluctuations in highly birefringent fibers in the anomalous-dispersion regime*
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- 61) *Simulating Maximal Quantum Entanglement without Communication*
N.J. Cerf, N. Gisin, S. Massar, S. Popescu
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- 62) *Experimental Error Filtration for Quantum Communication Over Highly Noisy Channels*
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- 63) *Error Filtration and Entanglement Purification for Quantum Communication*
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- 64) *Quantum gloves: Quantum states that encode as much as possible chirality and nothing else*
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- 65) *Quantum computing on lattices using global two-qubit gates*
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- 66) *Causality and Tsirelson's bounds*
H. Buhrman and S. Massar
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- 67) *Lower Bound on the Number of Toffoli Gates in a Classical Reversible Circuit through Quantum Information Concepts*
S. Popescu, B. Groisman, and S. Massar
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- 68) *Higher order harmonics of modulational instability*
David Amans, Edouard Brainis and Serge Massar
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- 69) *Quantum Information processing and communication, Strategic Report on*

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70) *Multipartite nonlocal quantum correlations resistant to imperfections*

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71) *Efficient quantum key distribution secure against no-signalling eavesdroppers*

Antonio Acín, Serge Massar and Stefano Pironio
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72) *Enhanced cross phase modulation instability in birefringent photonic crystal fibers in the anomalous dispersion regime*

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73) *Fiber Optics Protocols for Quantum Communication*

Serge Massar
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74) *Einstein-Podolsky-Rosen correlations between two uniformly accelerated oscillators*

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75) *Photon pair source based on parametric fluorescence in periodically poled twin-hole silica fiber*

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76) *Device-Independent Security of Quantum Cryptography against Collective Attacks*

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79) *Uncertainty Relations for Positive Operator Valued Measures*
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81) *Experimental Quantum Tossing of a Single Coin*
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82) *Device-independent quantum key distribution secure against collective attacks*
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84) *The first peptides: the evolutionary transition between prebiotic amino acids and early proteins*
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86) *Non-locality and Communication Complexity*
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*These authors contributed equally to this work

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90) *Family of loss-tolerant quantum coin-tossing protocols*

N. Aharon, S. Massar, J. Silman

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91) *On-chip parametric amplification with 26.5 dB gain at telecommunication wavelengths using CMOS-compatible hydrogenated amorphous silicon waveguides*

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Y. Paquot, F. Duport, A. Smerieri, J. Dambre, B. Schrauwen, M. Haelterman and S. Massar

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96) *Randomness versus non locality and entanglement*

A. Acin, S. Massar, S. Pironio

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1) *Local modes, local vacuum, local Bogoljubov coefficients and the renormalized stress tensor*

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4) *How much classical communication is required to simulate quantum communication and quantum entanglement?*

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7) *Fiber Optical Implementation of the Deutsch-Jozsa Algorithm,*

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8) *Pulse propagation in birefringent Kerr media : Stochastic coupled nonlinear Schrödinger equations*

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9) *Modulation instability in highly birefringent fibers in the anomalous dispersion regime*

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12) *Fiber Optics Protocols for Quantum Communication*

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- 15) *Photon pair generation in a continuous regime in nanophotonic silicon waveguide*
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- 16) *Integrated photon pair source for SOI-based quantum optics*
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Proceedings of the Conference CLEO/EUROPE-EQEC 2009, Munich, Germany, 14-
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- 17) *Towards an integrated narrowband source for quantum information : Photon pair generation in a silicon racetrack resonator*
S. Clemmen, K. Phan Huy, W. Bogaerts, R. G. Baets, Ph. Emplit, S. Massar
Proceedings of *OSA Optics & Photonics Congress and Tabletop Exhibits (Integrated Photonics and Nanophotonics Research and Applications)*, 7/12/2009 - 7/17/2009
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- 18) *Manipulating Frequency Entanglement with Phase Modulators*
L. Olislager, J. Cussey, A.T. Nguyen, Ph. Emplit, S. Massar, J.-M. Merolla, K. Phan Huy
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Communication September 21-25, 2009, Rome, Italy, Book of Abstracts, page183
Available at : <http://qipc09.phys.uniroma1.it/files/book.pdf>
- 20) *The missing link between prebiotic amino acids and early proteins*
Peter Van der Gulik, Serge Massar, Dimitri Gilis, Harry Buhrman, Marianne Rومان
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2009, Oral Presentation Abstract Book and list of posters, presentation 27-4 Oral,
page 321.
- 21) *Reservoir Computing: a Photonic Neural Network for Information Processing*
Y. Paquot, B. Schrauwen, J. Dambre, M. Haelterman, S. Massar
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- 22) *The spectral qubit : potential, progress and perspectives*
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Laurent Olislager, Ismael Mbodji, Johann Cussey, Anh Tuan Nguyen, Philippe Emplit, Kien Phan Huy, Jean-Marc Merolla, Serge Massar
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