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SCIENTIFIC PUBLICATIONS

Last Update: October 2018

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 renormalized 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”***
S. Massar, S. Popescu - Phys. Rev. A 61 (2000) 062303

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”***
G. Mitchison, S. Massar - Phys. Rev. A 63, (2001) 032105

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 Massar
Phys. Rev. Lett. 86 (2001) 4938

34. ***“Optimality of the genetic code with respect to protein stability and amino acid frequencies”***
D. Gilis, S. Massar, N. Cerf, M Rooman - Genome Biology 2(11): research0049 (2001)

35. ***“Minimal Absorption Measurements”***
S. Massar, G. Mitchison, S. Pironio - Phys. Rev. A 64 (2001) 062303

36. ***“Greenberger-Horne-Zeilinger paradox for continuous variables”***
S. Massar, S. Pironio - Phys. Rev. A 64 (2001) 062108

37. ***“Minimum number of photons needed to distinguish two transparencies”***
G. Mitchison, S. Massar, S. Pironio - Phys. Rev. A 65 (2002) 022110
38. ***“Bell inequalities for arbitrarily high dimensional systems”***
D. Collins, N. Gisin, N. Linden, S. Massar, S. Popescu - Phys. Rev. Lett. 88 (2002) 040404
39. ***“Greenberger-Horne-Zeilinger paradoxes for many audits”***
N. J. Cerf, S. Massar, S. Pironio - Phys. Rev. Lett. 89 (2002) 080402
40. ***“Non locality, closing the detection loophole and communication complexity”***
S. Massar - Phys. Rev. A 65 (2002) 032121
41. ***“Quantum cloning of orthogonal cubits”***
J. Fiurasek, S. Iblisdir, S. Massar, N.J. Cerf - Phys. Rev. A 65 (2002) 040302(R)
42. ***“Multipartite classical and quantum secrecy monotones”***
N. J. Cerf, S. Massar, S. Schneider - Phys. Rev. A 66 (2002) 042309
43. ***“Measuring Energy, Estimating Hamiltonians, and the Time-Energy Uncertainty Relation”***
Y. Aharonov, S. Massar, S. Popescu - Phys. Rev. A 66 (2002) 052107
44. ***“Bell inequalities resistant to detector inefficiency”***
S. Massar, S. Pironio, J. Roland, B. Gisin - Phys. Rev. A 66, 052112 (2002)
45. ***“Continuous-Variable Quantum Games”***
Hui Li, Jiangfeng Du, Serge Massar - Phys. Lett. A 306 (2002) 73
46. ***“Generating a Superposition of Spin States in an Atomic Ensemble”***
S. Massar, E. S. Polzik - Phys. Rev. Lett. 91, 060401-1 (2003)
47. ***“Fiber-Optics implementation of the Deutsch-Jozsa and Bernstein-Vazirani Quantum Algorithms with Three Qubits”***
E. Brainis, L.-P. Lamoureux, N. J. Cerf, Ph. Emplit, M. Haelterman, S. Massar
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48. ***“Conditional generation of arbitrary multimode entangled states of light with linear optics”***
J. Fiurasek, S. Massar, N. J. Cerf - Phys. Rev. A 68, 042325 (9) (2003)

49. ***“Violation of local realism versus detection efficiency”***
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50. ***“Combinatorics and Quantum Nonlocality”***
Harry Buhrman, Serge Massar, Hein Roehrig - Phys. Rev. Lett. 91, 047903(4) (2003)
51. ***“Combinatorics and Quantum Nonlocality”***
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52. ***“Quantum cloning of orthogonal qubits”***
J. Fiurasek, S. Iblisdir, S. Massar, N.J. Cerf - Fortschr. Phys. 51, No. 2-3, 117-121 (2003)
53. ***“Quantum Coin Tossing and Bit-String Generation in the Presence of Noise”***
J. Barrett, S. Massar - Phys. Rev. A 69, 022322(6) (2004)
54. ***“Security of quantum bit-string generation”***
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55. ***“Quantum fingerprinting with a single particle”***
S. Massar - Phys. Rev. A 71, 012310(5) (2005)
56. ***“Provably Secure Experimental Quantum Bit-String Generation”***
L-P. Lamoureux, E. Brainis, D. Amans, J. Barrett, S. Massar - Phys. Rev. Lett. 94, 050503(4) (2005)
57. ***“Scalar and vector modulation instabilities induced by vacuum fluctuations in fibers: Numerical study”***
E. Brainis, S. Massar, and D. Amans - Phys. Rev. A 71, 023808(13) (2005)
58. ***“Nonlocal correlations as an information-theoretic resource”***
J. Barrett, N. Linden, S. Massar, S. Pironio, S. Popescu, D. Roberts - Phys. Rev. A 71, 022101(11) (2005)
59. ***“Extent of multipartite quantum Nonlocality”***
N. S. Jones, N. Linden, S. Massar - Phys. Rev. A 71, 042329(10) (2005)
60. ***“Measurement of the total energy of an isolated system by an internal observer”***
S. Massar, S. Popescu - Phys. Rev. A 71, 042106(6) (2005)

61. ***“Vector modulation instability induced by vacuum fluctuations in highly birefringent fibers in the anomalous-dispersion regime”***
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62. ***“Simulating Maximal Quantum Entanglement without Communication”***
N.J. Cerf, N. Gisin, S. Massar, S. Popescu - Phys. Rev. Lett. 94, 220403 (2005)
63. ***“Experimental Error Filtration for Quantum Communication Over Highly Noisy Channels”***
L-P. Lamoureux, E. Brainis, N.J. Cerf, Ph. Emplit, M. Haelterman, S. Massar
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64. ***“Error Filtration and Entanglement Purification for Quantum Communication”***
N. Gisin, N. Linden, S. Massar, S. Popescu - Phys. Rev. A 72, 012338 (2005)
65. ***“Quantum gloves: Quantum states that encode as much as possible chirality and nothing else”***
D. Collins, L. Diósi, N. Gisin, S. Massar, and S. Popescu - Phys. Rev. A 72, 022304 (2005)
66. ***“Quantum computing on lattices using global two-qubit gates”***
G. Ivanyos, S. Massar, and A. B. Nag - Phys. Rev. A 72, 022339 (2005)
67. ***“Causality and Tsirelson's bounds”***
H. Buhrman and S. Massar - Phys. Rev. A 72, 052103 (2005)
68. ***“Lower Bound on the Number of Toffoli Gates in a Classical Reversible Circuit through Quantum Information Concepts”***
S. Popescu, B. Groisman, and S. Massar - Phys. Rev. Lett. 95, 120503 (2005)
69. ***“Higher order harmonics of modulational instability”***
David Amans, Edouard Brainis and Serge Massar - Phys. Rev. E 72, 066617 (2005)
70. ***“Quantum Information processing and communication, Strategic Report on current status, visions and goals for research in Europe”***
P. Zoller, Th. Beth, D. Binosi, R. Blatt, H. Briegel, D. Bruss, T. Calarco, J.I. Cirac, D. Deutsch, J. Eisert, A. Ekert, C. Fabre, N. Gisin, Ph. Grangier, M. Grassl, S. Haroche, A. Imamoglu, A. Karlson, J. Kempe, L. Kouwenhoven, S. Kröll, G. Leuchs, M. Lewenstein, D. Loss, N. Lütkenhaus, S. Massar, J.E. Mooij, M.B. Plenio, E. Polzik, S. Popescu, G. Rempe, A. Sergienko, D. Suter, J. Twamley, G. Wendin, R. Werner, A. Winter, J. Wrachtrup and A. Zeilinger - Eur. Phys. J. D 36, 203-228 (2005)

71. ***“Multipartite nonlocal quantum correlations resistant to imperfections”***
H. Buhrman, P. Høyer, H. Röhrig, and S. Massar - Phys. Rev. A 73, 012321 (2006)
72. ***“Efficient quantum key distribution secure against no-signalling eavesdroppers”***
Antonio Acín, Serge Massar and Stefano Pironio - New J. Phys. 8 126 (2006)
73. ***“Enhanced cross phase modulation instability in birefringent photonic crystal fibers in the anomalous dispersion regime”***
A. T. Nguyen, K. Phan Huy, E. Brainis, P. Mergo, J. Wojcik, T. Nasilowski, J. Van Erps, H. Thienpont, and S. Massar - Opt. Express 14, 8290-8297 (2006)
74. ***“Fiber Optics Protocols for Quantum Communication”***
Serge Massar - Quantum Information Processing 5, 441-449 (2006)
75. ***“Einstein-Podolsky-Rosen correlations between two uniformly accelerated oscillators”***
S. Massar and P. Spindel - Phys. Rev. D 74, 085031 (2006)
76. ***“Photon pair source based on parametric fluorescence in periodically poled twin-hole silica fiber”***
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77. ***“Device-Independent Security of Quantum Cryptography against Collective Attacks”***
Antonio Acín, Nicolas Brunner, Nicolas Gisin, Serge Massar, Stefano Pironio, and Valerio Scarani
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78. ***“Reducing Polarization Mode Dispersion with Controlled Polarization Rotations”***
S. Massar and S. Popescu - New J. Phys. 9, 158 (2007)
79. ***“Spontaneous Growth of Raman Stokes and Anti-Stokes Waves in Fibers”***
E. Brainis, S. Clemmen and S. Massar - Opt. Lett. 32, 2819 (2007)
80. ***“Uncertainty Relations for Positive Operator Valued Measures”***
Serge Massar - Phys. Rev. A 76, 042114 (2007) - Erratum: Phys. Rev. A 78, 059901(E) (2008).

81. ***“Uncertainty Relation for the Discrete Fourier Transform”***
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82. ***“Experimental Quantum Tossing of a Single Coin”***
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83. ***“Device-independent quantum key distribution secure against collective attacks”***
Stefano Pironio, Antonio Acín, Nicolas Brunner, Nicolas Gisin, Serge Massar and Valerio Scarani - New J. Phys. 11, 045021 (25pp) (2009)
84. ***“Continuous wave photon pair generation in silicon-on-insulator waveguides and ring resonators”***
S. Clemmen, K. Phan Huy, W. Bogaerts, R. G. Baets, Ph. Emplit, S. Massar - Opt. Express 17, 16558 (13pp) (2009)
85. ***“The first peptides: the evolutionary transition between prebiotic amino acids and early proteins”***
Peter van der Gulik, Serge Massar, Dimitri Gilis, Harry Buhman, Marianne Rooman - Journal of Theoretical Biology 261, 531-539 (2009)
86. ***“Device independent state estimation based on Bell's inequalities”***
C-E. Bardyn, T. C. H. Liew, S. Massar, M. McKague, V. Scarani - Phys. Rev. A 80, 062327 (8pp) (2009)
87. ***“Non-locality and Communication Complexity”***
H. Buhman, R. Cleve, S. Massar, R. de Wolf - Rev. Mod. Phys. 82, pp. 665-698, 2010
88. ***“Random Numbers Certified by Bell's Theorem”***
S. Pironio*, A. Acín*, S. Massar*, A. Boyer de la Giroday, D. N. Matsukevich, P. Maunz, S. Olmschenk, D. Hayes, L. Luo, T. A. Manning and C. Monroe - Nature 464, pp. 1021-1024, 2010
*These authors contributed equally to this work.
89. ***“Frequency Bin Entangled Photons”***
L. Olislager, J. Cussey, A.T. Nguyen, Ph. Emplit, S. Massar, J-M. Merolla, K. Phan Huy - Phys. Rev. A. 82, 013804 (2010)
90. ***“Generation of correlated photons in hydrogenated amorphous-silicon waveguides”***
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91. ***“Family of loss-tolerant quantum coin-tossing protocols”***
 N. Aharon, S. Massar, J. Silman - Phys. Rev. A 82, 052307 (2010)
92. ***“On-chip parametric amplification with 26.5 dB gain at telecommunication wavelengths using CMOS-compatible hydrogenated amorphous silicon waveguides”***
 Bart Kuyken, Stéphane Clemmen, Shankar Kumar Selvaraja, Wim Bogaerts, Dries Van Thourhout, Philippe Emplit, Serge Massar, Gunther Roelkens, and Roel Baets - Optics Letters 36, 552-554 (2011)
93. ***“Fully Distrustful Quantum Bit Commitment and Coin Flipping”***
 J. Silman, A. Chailloux, N. Aharon, I. Kerenidis, S. Pironio and S. Massar - Phys. Rev. Lett. 106, 220501 (2011)
94. ***“Information processing using a single dynamical node as complex system”***
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95. ***“Estimating preselected and postselected ensembles”***
 Serge Massar and Sandu Popescu - Phys. Rev. A 84, 052106 (10pp) (2011)
96. ***“Nonlinear properties of and nonlinear processing in hydrogenated amorphous silicon waveguides”***
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97. ***“Randomness versus non locality and entanglement”***
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98. ***“Optoelectronic Reservoir Computing”***
 Y. Paquot, F. Duport, A. Smerieri, J. Dambre, B. Schrauwen, M. Haelterman, S. Massar - Scientific Reports 2, 287 (2012)
99. ***“Implementing two-photon interference in the frequency domain with electro-optic phase modulators”***
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100. ***“Z-scan measurement of the nonlinear refractive index of graphene”***
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101. ***“Low-power inelastic light scattering at small detunings in silicon wire waveguides at telecom wavelengths”***
- Stéphane Clemmen, Antony Perret, Jassem Safioui, Wim Bogaerts, Roel Baets, Simon-Pierre Gorza, Philippe Emplit, and Serge Massar - JOSA B 29, pp. 1977–1982 (2012)
102. ***“Information Processing Capacity of Dynamical Systems”***
- Joni Dambre, David Verstraeten, Benjamin Schrauwen, Serge Massar - Scientific Reports 2, 514 (2012)
103. ***“All Optical Reservoir Computing”***
- François Duport, Bendix Schneider, Anteo Smerieri, Marc Haelterman, Serge Massar - Optics Express 20, 22783 (2012)
104. ***“Security of practical private randomness generation”***
- Stefano Pironio and Serge Massar - Phys. Rev. A 87, 012336 (2013)
105. ***“Mean field theory of echo state networks”***
- Marc Massar and Serge Massar - Phys. Rev. E 87, 042809 (7 pages) (2013)
106. ***“Device-Independent Randomness Generation in the Presence of Weak Cross-Talk”***
- J. Silman, S. Pironio, S. Massar - Phys. Rev. Lett. 110, 100504 (5 pages) (2013)
107. ***« Silicon-on-insulator integrated source of polarization-entangled photons”***
- L Olislager, J Safioui, S Clemmen, KP Huy, W Bogaerts, R Baets, P Emplit, S. Massar - Optics letters 38, 1960-1962 (2013)
108. ***« No-go theorems for ψ -epistemic models based on a continuity assumption”***
- M. K. Patra, S. Pironio, S. Massar - Physical Review Letters 111, 090402 (2013)
109. ***Comment on “Ultra-short pulse generation by a topological insulator based saturable absorber [Appl. Phys. Lett. 101, 211106 (2012)]***
- Jassem Safioui, François Bernard, Maïté Swaelens, Serge Massar, Pascal Kockaert, Philippe Emplit and Simon P. Gorza - Appl. Phys. Lett. 103, 106101 (2013)
110. ***“Experimental refutation of a class of ψ -epistemic models”***
- M. K. Patra, L. Olislager, F. Duport, J. Safioui, S. Pironio, and S. Massar - Phys. Rev. A 88, 032112 (2013)

111. ***“Supercontinuum generation in hydrogenated amorphous silicon waveguides at telecommunication wavelengths”***
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112. ***“Secure and Robust Transmission and Verification of Unknown Quantum States in Minkowski Space”***
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113. ***“All-optical reservoir computer based on saturation of absorption”***
Antoine Dejonckheere, François Duport, Anteo Smerieri, Li Fang, Jean-Louis Oudar, Marc Haelterman, and Serge Massar - Optics Express, Vol. 22 Issue 9, pp.10868-10881 (2014)
114. ***“Information and communication in polygon theories”***
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115. ***“Creating and manipulating entangled optical qubits in the frequency domain”***
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116. ***“Generalized probabilistic theories and conic extensions of polytopes”***
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117. ***“High performance photonic reservoir computer based on a coherently driven passive cavity”***
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118. ***“Propagation and survival of frequency-bin entangled photons in metallic nanostructures”***
Laurent Olislager, Wakana Kubo, Takuo Tanaka, Simona Ungureanu, Renaud A. L. Vallée, Branko Kolaric, Philippe Emplit, and Serge Massar - Nanophotonics 4, pp. 324-331 (2015)
119. ***“Exponential Lower Bounds for polytopes in Combinatorial Optimization”***
Samuel Fiorini, Serge Massar, Sebastian Pokutta, Hans Raj Tiwary, Ronald de Wolf - Journal of the ACM (JACM) 62, Article 17, (2015)
120. ***“Investigating the emergence of time in stationary states with trapped ions”***
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121. ***“Hyperdense coding and superadditivity of classical capacities in hypersphere theories”***
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122. ***“Device-independent bit commitment based on the CHSH inequality”***
N. Aharon, S. Massar, S. Pironio, J. Silman - New J. Phys. 18 (2016) 025014
123. ***“Fully analogue photonic reservoir computer”***
François Duport, Anteo Smerieri, Akram Akrouf, Marc Haelterman, Serge Massar - Scientific Reports 6 (2016) 22381
124. ***“Virtualization of a photonic reservoir computer”***
François Duport, Akram Akrouf, Anteo Smerieri, Marc Haelterman, Serge Massar - Journal of Lightwave Technology 34 (2016) ; DOI 10.1109/JLT.2016.2524559
125. ***“Nonlinear optical interactions in silicon waveguides”***
B. Kuyken, F. Leo, S. Clemmen, U. Dave, H. Zhao, S. Holzner, T. Ideguchi, X. Liu, J. Safioui, M. Yan, S. Coen, W. Green, S. Gorza, T. Hansch, S. Selvaraja, S. Massar, N. Picque, R. Osgood, P. Verheyen, J. Van Campenhout, R. Baets, G. Roelkens - Nanophotonics 5, 1-16 (2016)
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