# Extended references on quantum computing 

By various people - gathered here by Tom Carter
http://cogs.csustan.edu/~ tom/quantum

May, 1999

## Our general topics: $\leftarrow$

© Extended references
© Selected on-line references

This is an unedited collection of references on quantum computation and related topics that I gathered in 1999 from a variety of sources. I claim no originality for this compilation, and, unfortunately, I didn't keep good notes about where I found many of these references. I apologize to those to whom credit should go.

I hope it is all right to make this large list available purely to assist researchers in the field ...

> To top $\leftarrow$

## References

[1] Abrams D S and Lloyd S, Simulation of Many-Body Fermi Systems on a Universal Quantum Computer, Phys.Rev.Lett. 79 2586-2589, 1997
[2] Abrams D S and Lloyd S, Non-Linear Quantum Mechanics implies Polynomial Time solution for NP-complete and \#P problems, http://xxx.lanl.gov/abs/quant-ph/9801041
[3] Adleman L, Demarrais J and Huang M-D, Quantum Computability, SIAM Journal of Computation 265 pp 1524-1540 October, 1997
[4] Adleman L, Molecular computation of solutions to combinatorial problems, Science, 266, 1021-1024, Nov. 11, 1994
[5] Aharonov D and Ben-Or M, Fault-Tolerant Quantum Computation with Constant Error, Proc. of the 29th Annual ACM Symposium on Theory of Computing (STOC) 1997
[6] Aharonov D and Ben-Or M, Polynomial Simulations of Decohered Quantum Computers 37th Annual Symposium on Foundations of Computer Science (FOCS) pp 46-55, 1996
[7] Aharonov D, Kitaev A Yu and Nisan N, Quantum Circuits with Mixed States, Proc. of the 30th Annual ACM Symposium on Theory of Computing (STOC) 1998
[8] Aharonov D, Ben-Or M, Impagliazo R and Nisan N, Limitations of Noisy Reversible Computation, in LANL e-print quant-ph/9611028, http://xxx.lanl.gov (1996)
[9] Aharonov D, Beckman D, Chuang I and Nielsen M, What Makes Quantum Computers Powerful? http://wwwcas.phys.unm.edu/m̃nielsen/science.html
[10] Anderson P W, More Is Different, Science, 177, 4047, 393-396,1972
[11] Aharonov, D., Quantum Computation, Annual Reviews of Computational Physics VI, Edited by Dietrich Stauffer, World Scientific, 1998
[12] Aspect A, Dalibard J and Roger G, Experimental test of Bell's inequalities using time-varying analyzers, Phys. Rev. Lett. 49, 1804-1807, 1982
[13] Aspect A, Testing Bell's inequalities, Europhys. News. 22, 73-75, 1991
[14] Barahona F, in J. Phys. A vol. 15, (1982) 3241
[15] Barenco A A universal two-bit gate for quantum computation, Proc. R. Soc. Lond. A 449 679-683, 1995
[16] Barenco A and Ekert A K Dense coding based on quantum entanglement, J. Mod. Opt. 42 1253-1259, 1995
[17] Barenco A, Deutsch D, Ekert E and Jozsa R, Conditional quantum dynamics and quantum gates, Phys. Rev. Lett. 74 4083-4086, 1995
[18] Barenco A, Bennett C H, Cleve R, DiVincenzo D P, Margolus N, Shor P, Sleator T, Smolin J A and Weinfurter H, Elementary gates for quantum computation, Phys. Rev. A 52, 3457-3467, 1995
[19] Barenco A 1996 Quantum physics and computers, Contemp. Phys. 37 375-389 1996
[20] Barenco A, Ekert A, Suominen K A and Torma P, Approximate quantum Fourier transform and decoherence, Phys. Rev. A 54, 139-146, 1996
[21] Barenco A, Berthiaume A, Deutsch D, Ekert A, Jozsa R, and Macchiavello C, Stabilization of Quantum Computations by Symmetrization, SIAM J. Comp.26,5, 1541-1557, 1997
[22] Barenco A, Brun T A, Schak R and Spiller T P, Effects of noise on quantum error correction algorithms, Phys. Rev. A 56 1177-1188, 1997
[23] Barnum H, Fuchs C A, Jozsa R and Schumacher B 1996 A general fidelity limit for quantum channels, Phys. Rev. A 54 4707-4711
[24] Barnum H, Caves C, Fuchs C A, Jozsa R and Schumacher B, Non commuting mixed states cannot be broadcast, Phys. Rev. Lett. 76 2818-2822, 1996
[25] Barnum H, Nielsen M and Schumacher B, in Phys. Rev. A, 57,6, 1998, pp. 4153-4175
[26] Beals R, Quantum computation of Fourier transform over symmetric groups Proc. of the 29th Annual ACM Symposium on Theory of Computing (STOC) 1997
[27] Beals R, Buhrman H, Cleve R, Mosca M and de Wolf R, Quantum Lower Bounds by Polynomials, in 39th Annual Symposium on Foundations of Computer Science(FOCS), (1998)
[28] Beckman D, Chari A, Devabhaktuni S and Preskill J Efficient networks for quantum factoring, Phys. Rev. A 54, 1034-1063, 1996
[29] Bell J S On the Einstein-Podolsky-Rosen paradox, Physics 1 195-200, 1964
[30] Bell J S On the problem of hidden variables in quantum theory, Rev. Mod. Phys. 38 447-52, 1966 Speakable and unspeakable in quantum mechanics 1987 (Cambridge University Press)
[31] Benioff P, The Computer as a Physical Systems: A Microscopic Quantum Mechanical Hamiltonian Model of Computers as Represented by Turing Machines, J. Stat. Phys. 22 563-591, 1980
[32] Benioff P Quantum mechanical Hamiltonian models of Turing machines, J. Stat. Phys. 29 515-546 1982
[33] Bennett C H, Logical reversibility of computation, IBM J. Res. Develop. 17 525-532, 1973
[34] Bennett C H, The Thermodynamics of Computation - a Review, International Journal of Theoretical Physics, 21, No. 12, p 905, 1982
[35] Bennett C H and Landauer R, The fundamental physical limits of computation, Scientific American, July 38-46, 1985
[36] Bennett C H, Demons, engines and the second law, Scientific American 257 no. 5 (November) pp 88-96, 1987
[37] Bennett C H, Brassard G, Briedbart S and Wiesner S, Quantum cryptography, or unforgeable subway tokens, Advances in Cryptology: Proceedings of Crypto '82 (Plenum, New York) pp 267-275, 1982
[38] Bennett C H and Brassard G, Quantum cryptography: public key distribution and coin tossing, in Proc. IEEE Conf. on Computers, Syst. and Signal Process. pp 175-179, 1984
[39] Bennett C H and Wiesner S J, Communication via one- and two-particle operations on Einstein-Podolsky-Rosen states, Phys. Rev. Lett. 69, 2881-2884, 1992
[40] Bennett C H, Quantum information and computation, Phys. Today 4810 24-30, 1995
[41] C.H. Bennett, Time/Space Trade-offs for Reversible Computation, SIAM Journal of Computation, 18, 4, pp 766-776, 1989
[42] Bennett C H and Brassard G 1989, SIGACT News 20, 78-82
[43] Bennett C H, Bessette F, Brassard G, Savail L and Smolin J Experimental quantum cryptography, J. Cryptology 5, pp 3-28, 1992
[44] Bennett C H Quantum Computers: Certainty from Uncertainty, Nature, 362, 1993
[45] Bennett C H, Brassard G, Crépeau C, Jozsa R, Peres A and Wootters W K Teleporting an unknown quantum state via dual classical and Einstein-Podolsky-Rosen channels, Phys. Rev. Lett. 70 1895-1898, 1993
[46] Bennett C H, Progress towards quantum computation 1995
[47] Bennett C H, Brassard G, Popescu S, Schumacher B, Smolin J A and Wootters W K 1996a Purification of noisy entanglement and faithful teleportation via noisy channels, Phys. Rev. Lett. 76 722-725
[48] Bennett C H, DiVincenzo D P, Smolin J A and Wootters W K Mixed state entanglement and quantum error correction, Phys. Rev. A 54 3825, 1996
[49] Bennett C H, Bernstein E, Brassard G and Vazirani U Strengths and Weaknesses of quantum computing, SIAM Journal of Computation 265 pp 1510-1523 October, 1997
[50] Berman G P, Doolen G D, Holm D D, Tsifrinovich V I Quantum computer on a class of one-dimensional Ising systems, Phys. Lett. 193 444-450 1994
[51] Bernstein E and Vazirani U, 1993, Quantum complexity theory, SIAM Journal of Computation 265 pp 1411-1473 October, 1997
[52] Berthiaume A, Deutsch D and Jozsa R, The stabilization of quantum computation, in Proceedings of the Workshop on Physics and Computation, PhysComp 94 60-62 Los Alamitos: IEEE Computer Society Press, 1994
[53] Berthiaume A and Brassard G, The quantum challenge to structural complexity theory, in Proc. of the Seventh Annual Structure in Complexity Theory Conference 1992 (IEEE Computer Society Press, Los Alamitos, CA) 132-137
[54] Berthiaume A and Brassard G, Oracle quantum computing, in Proc. of the Workshop on Physics of Computation: PhysComp '92 (IEEE Computer Society Press, Los Alamitos, CA) 60-62, 1992
[55] Boghosian B M and Taylor W, Simulating quantum mechanics on a quantum computer in Physica D, 120 (1998) pp. 30-42
[56] Bohm D 1951 Quantum Theory (Englewood Cliffs, N. J.)
[57] Bohm D and Aharonov Y 1957 Phys. Rev. 108 1070
[58] Bollinger J J, Heinzen D J, Itano W M, Gilbert S L and Wineland D J, Phys Rev Lett 63 1031, 1989
[59] D. Boneh, R. Lipton, Quantum Cryptoanalysis Of Hidden Linear Functions, Proceedings of CRYPTO'95
[60] Bouwmeester D, Pan J-W, Mattle K, Weinfurter H, Zeilinger A, Experimental quantum teleportation Nature 390, 575-579 1997
[61] Boyer M, Brassard G, Hoyer P and Tapp A, Tight bounds on quantum searching, in Fortsch.Phys. 46, (1998) pp. 493-506
[62] Brassard G, Searching a quantum phone book, Science 275 627-628 1997
[63] Brassard G and Crepeau C, SIGACT News 27 13-24 1996
[64] Brassard G, Hoyer P and Tapp A, Quantum Algorithm for the Collision Problem in LANL e-print quant-ph/9705002, http://xxx.lanl.gov (1997)
[65] Brassard G and Hoyer P, An Exact Quantum-Polynomail Algorithm for Simon's Problem Proceedings of the 5th Israeli Symposium on Theory of Computing and Systems (ISTCS), 1997
[66] Brassard G, Teleportation as Quantum Computation, in Physica D, 120 (1998) 43-47
[67] Brassard G, The dawn of a new era for quantum cryptography: The experimental prototype is working!, Sigact News, 20(4), 78-82, 1989
[68] Braunstein S L, Mann A and Revzen M 1992 Maximal violation of Bell inequalities for mixed states, Phys. Rev. Lett. 68, 3259-3261
[69] Braunstein S L and Mann A 1995 Measurement of the Bell operator and quantum teleportation, Phys. Rev. A 51, R1727-R1730
[70] Brillouin L 1956, Science and information theory (Academic Press, New York)
[71] Brune M, Nussenzveig P, Schmidt-Kaler F, Bernardot F, Maali A, Raimond J M and Haroche S, From Lamb shift to light shifts: vacuum and subphoton cavity fields measured by atomic phase sensitive detection, Phys. Rev. Lett. 72, 3339-3342 1994
[72] Buhrman H, Cleve R and van Dam W, Quantum Entanglement and Communication Complexity, in LANL e-print quant-ph/9705033, http://xxx.lanl.gov (1997)
[73] Buhrman H, Cleve R and Wigderson A, Quantum vs. Classical Communication and Computation, in Proc. of the 30th Annual ACM Symposium on Theory of Computing (STOC) (1998)
[74] Calderbank A R and Shor P W, Good quantum error-correcting codes exist, Phys. Rev. A 54 1098-1105, 1996
[75] Calderbank A R, Rains E M, Shor P W and Sloane NJA Quantum error correction and orthogonal geometry, Phys. Rev. Lett. 78 405-408, 1997
[76] Calderbank A R, Rains E M, Shor P W and Sloane N J A, Quantum error correction via codes over $G F(4)$ in LANL e-print quant-ph/9608006, http://xxx.lanl.gov (1996), To appear in IEEE Transactions on Information Theory.
[77] Caves C M 1990 Quantitative limits on the ability of a Maxwell Demon to extract work from heat, Phys. Rev. Lett. 64 2111-2114
[78] Caves C M, Unruh W G and Zurek W H 1990 comment, Phys. Rev. Lett. 651387
[79] Chernoff. See Feller W, An Introduction to Probability Theory and Its Applications, Wiley, New York,1957
[80] Chuang I L, Laflamme R, Shor P W and Zurek W H, Quantum computers, factoring, and decoherence, Science 270 1633-1635, 1995
[81] Chuang I L, Laflamme R and Paz J P, Effects of Loss and Decoherence on a Simple Quantum Computer, http://xxx.lanl.gov/abs/quant-ph/9602018
[82] I.Chuang and W.C.D. Leung and Y. Yamamoto, Bosonic Quantum Codes for Amplitude Damping, in Phys. Rev. A, 56, 2, (1997) pp. 1114-1125
[83] Chuang I L and Yamamoto Creation of a persistent qubit using error correction Phys. Rev. A 55, 114-127, 1997
[84] Chuang I L ,Vandersypen L M K, Zhou X, Leung D W and Lloyd S, Experimental realization of a quantum algorithm, in Nature, 393, 143-146 (1998)
[85] Church A An unsolvable problem of elementary number theory, Amer. J. Math. 58 345-363, 1936
[86] Cirac I J and Zoller P Quantum computations with cold trapped ions, Phys. Rev. Let., 74: 4091-4094, 1995.
[87] Cirac J I, Pellizari T and Zoller P, Enforcing coherent evolution in dissipative quantum dynamics, Science 273, 1207, 1996
[88] Cirac J I, Zoller P, Kimble H J and Mabuchi H Quantum state transfer and entanglement distribution among distant nodes of a quantum network, Phys. Rev. Lett. 78, 3221, 1997
[89] Cirel'son (Tsirelson) B, Reliable storage of information in a system of unreliable components with local interactions. Lecture notes in Mathematics653 15-30, 1978
[90] Clausen M, Fast Generalized Fourier transforms, Theoret. Comput. Sci. 56 55-63 1989
[91] Clauser J F, Holt R A, Horne M A and Shimony A Proposed experiment to test local hidden-variable theories, Phys. Rev. Lett. 23 880-884, 1969
[92] Clauser J F and Shimony A, Bell's theorem: experimental tests and implications, Rep. Prog. Phys. 41 1881-1927, 1978
[93] Cleve R and DiVincenzo D P, Schumacher's quantum data compression as a quantum computation, Phys. Rev. A 54 2636, 1996
[94] Cleve R and Buhrman H, Substituting Quantum Entanglement for Communication inPhys rev A,56 2, (1997) pp. 1201-1204
[95] Cleve R, van Dam W, Nielsen M and Tapp A, Quantum Entanglement and the Communication Complexity of the Inner Product Function, in LANL e-print quant-ph/9708019, http://xxx.lanl.gov (1997)
[96] C. Cohen-Tanoudji, Quantum Mechanics, Wiley press, New York (1977)
[97] Coppersmith D, An approximate Fourier transform useful in quantum factoring, IBM Research Report RC 19642, 1994
[98] Cormen T, Leiserson C and Rivest R, Introduction to Algorithms, (pp 776-800 for FFT, 837-844 for primality test, 812 for extended Euclid algorithm, 834-836 for RSA cryptosystem) MIT press, 1990
[99] Cory D G, Fahmy A F, and Havel T F, Nuclear magnetic resonance spectroscopy: an experimentally accessible paradigm for quantum computing, in Proc. of the 4th Workshop on Physics and Computation (Complex Systems Institute, Boston, New England) 1996
[100] D. G. Cory, M. P. Price, and Havel T F, Physica D, 1998. In press (quant-ph/9709001).
[101] Cory D. G, Fahmy A F, and Havel T F Proc. Nat. Acad. of Sciences of the U. S., 94:1634-1639, 1997.
[102] Cory D G, Mass W, Price M, Knill E, Laflamme R, Zurek W H, and Havel T F and Somaroo S S, Experimental quantum error correction in Phys. Rev. Let. 81 10, (1998) pp. 2152-2155
[103] Cover T M and Thomas J A, Elements of Information Theory, John Wiley and Sons, New York, 1991
[104] R. E. Crandall The challenge of large numbers, In Scientific American February 59-62, 1997
[105] Chupp T.E and Hoare R.J, Phys Rev Lett 64 22611990
[106] van Dam W, A Universal Quantum Cellular Automaton, Proceedings of the Fourth Workshop on Physics and Computation, 1996
[107] Deutsch D, Quantum theory, the Church-Turing principle and the universal quantum computer, In Proc. Roy. Soc. Lond. A 400 97-117, 1985
[108] Deutsch D, Quantum computational networks, In Proc. Roy. Soc. Lond. A 425 73-90, 1989
[109] Deutsch D and Jozsa R, Rapid solution of problems by quantum computation, In Proc. Roy. Soc. Lond A 439 553-558, 1992
[110] Deutsch D, Barenco A and Ekert A, Universality in quantum computation, In Proc. R. Soc. Lond. A 449 669-677, 1995
[111] D. Deutsch D and A. Ekert and R. Jozsa and C. Macchiavello and S. Popescu and A. Sanpera Quantum privacy amplification and the security of quantum cryptography over noisy channels, In Phys. Rev. Lett. 77 2818, 1996
[112] Diaconis P and Rockmore D, Efficient Computation of the Fourier transform on finite groups, J. AMS 3 No. 2, 297-332, 1990
[113] Dieks D, Communication by EPR Devices, Phys Lett A, 92(6) 271-272 1982
[114] Diedrich F, Bergquist J C, Itano W M and. Wineland D J 1989 Laser cooling to the zero-point energy of motion, Phys. Rev. Lett. 62 403
[115] Dieks D 1982 Communication by electron-paramagnetic-resonance devices, Phys. Lett. A 92271
[116] DiVincenzo D P, Two-bit gates are universal for quantum computation, Phys. Rev. A 51 1015-1022 1995
[117] DiVincenzo D P, Quantum computation, Science 270 255-261 1995
[118] DiVincenzo D P and Shor P W, Fault-tolerant error correction with efficient quantum codes, Phys. Rev. Lett. 77 3260-3263, 1996
[119] DiVincenzo D P, Quantum Gates and Circuits, in Proceedings of the ITP Conference on Quantum Coherence and Decoherence, December, (1996), Proc. R. Soc. London A
[120] Durr C and Hoyer P, A Quantum Algorithm for Finding the Minimum, in LANL e-print quant-ph/9607014, http://xxx.lanl.gov (1996)
[121] Durr C, LeThanh H and Santha M, A decision procedure for well formed linear quantum cellular automata, Proceeding of the 37th IEEE Symposium on Foundations of Computer Science, 38-45, 1996, and Random Structures \& Algorithms, 1997
[122] Einstein A, Rosen N and Podolsky B, Phys. Rev. 47, 7771935
[123] Ekert A, Quantum cryptography based on Bell's theorem Phys. Rev. Lett. 67, 661-663, 1996
[124] Ekert A and Jozsa R Quantum computation and Shor's factoring algorithm, Rev. Mod. Phys. 68 7331996
[125] Ekert A and Macchiavello C 1996 Quantum error correction for communication, Phys. Rev. Lett. 77 2585-2588
[126] Ekert A 1997 From quantum code-making to quantum code-breaking, (preprint quant-ph/9703035)
[127] van Enk S J, Cirac J I and Zoller P 1997 Ideal communication over noisy channels: a quantum optical implementation, Phys. Rev. Lett. 78, 4293-4296
[128] Another proof of the parity lower bound, using interesting techniques, was found recently by E . Farhi, J. Goldstone, S. Gutmann, M. Sipser A Limit on the Speed of Quantum Computation in Determining Parity in LANL e-print quant-ph/9802045, http://xxx.lanl.gov (1998)
[129] Feynman R P Simulating physics with computers, In Int. J. Theor. Phys. 21 467-488, 1982
[130] Feynman R P, Quantum mechanical computers, In Found. of Phys. 16 507-531, 1986 see also Optics News February 1985, 11-20.
[131] R. Feynman, Feynman lectures on computation, 1996.
[132] Fortnow L and Rogers J, Complexity Limitations on quantum computation Technical report 97-003, DePaul University, School of Computer science, 1997
[133] Fredkin E and Toffoli T 1982 Conservative Iogic, Int. J. Theor. Phys. 21 219-253
[134] Freedman M, Logic, P/NP and the quantum field computer, preprint, 1997
[135] P. Ga'cs, Self Correcting Two Dimensional Arrays, in Randomness and Computation,1989, edited by S. Micali, vol 5, in series "Advances in Computing Research", pages 240-241,246-248, series editor: F.P.Preparata
[136] P. Ga'cs, one dimensional self correcting array.
[137] Gardiner C W, Quantum Noise, Springer-Verlag, Berlin, 1991
[138] Garey M R and Johnson D S, Computers and Intractability, published by Freeman and Company, New York, 1979
[139] A. Gaudí. The set of ropes is presented in la sagrada familia in Barcelona, Spain. Pictures of la sagrada familia can be found in: http://futures.wharton.upenn.edu/ jonath22/Gaudi/eltemple.html
[140] R. Geroch and G. Hartle Computability and Physical theories in Between Quantum and Cosmos edited by Zurek and Van der Merwe and Miller, Princeton University Press, 1988, 549-566
[141] Gershenfeld N A and Chuang I L Bulk spin-resonance quantum computation, Science, 275:350-356, 1997.
[142] Glauber R J 1986, in Frontiers in Quantum Optics, Pike E R and Sarker S, eds (Adam Hilger, Bristol)
[143] Golay M J E 1949 Notes on digital coding, Proc. IEEE 37657
[144] Gottesman D 1996 Class of quantum error-correcting codes saturating the quantum Hamming bound, Phys. Rev. A 54, 1862-1868
[145] Gottesman D A theory of fault-tolerant quantum computation, in Phys. Rev. A,57 127-137
[146] Gottesman D, Evslin J, Kakade D and Preskill J, preprint (1996)
[147] Greenberger D M, Horne M A and Zeilinger A 1989 Going beyond Bell's theorem, in Bell's theorem, quantum theory and conceptions of the universe, Kafatos M, ed, (Kluwer Academic, Dordrecht) 73-76
[148] Greenberger D M, Horne M A, Shimony A and Zeilinger A 1990 Bell's theorem without inequalities, Am. J. Phys. 58, 1131-1143
[149] R. B. Griffiths and C. S. Niu 1996 Semi classical Fourier transform for quantum computation in Phys. Rev. Lett. ,76, pp. 3228-3231
[150] Grover L K, Quantum mechanics helps in searching for a needle in a haystack, Phys. Rev. Lett. 79, 325-328 1997 and the original STOC paper: A fast quantum mechanical algorithm for database search Proc. of the 28th Annual ACM Symposium on Theory of Computing (STOC) 212-221, 1996
[151] Grover L K, A framework for fast quantum mechanical algorithms, http://xxx.lanl.gov/abs/quant-ph/9711043
[152] Grover L K, Quantum computers can search arbitrarily large databases by a single query in Phys. Rev. Let. 79 23, 4709-4712, 1997
[153] Grover L K, A fast quantum mechanical algorithm for estimating the median, http://xxx.lanl.gov/abs/quant-ph/9607024
[154] Hagley E et. al, Generation of Einstein Podolsky Rosen pairs of atoms, Phys. Rev. Lett, 79, 1-5, 1997
[155] Hamming R W 1950 Error detecting and error correcting codes, Bell Syst. Tech. J. 29147
[156] Hamming R W 1986 Coding and information theory, 2nd ed, (Prentice-Hall, Englewood Cliffs)
[157] Hardy G H and Wright E M 1979 An introduction to the theory of numbers (Clarendon Press, Oxford)
[158] Haroche S and Raimond J-M 1996 Quantum computing: dream or nightmare? Phys. Today August 51-52
[159] Hellman M E 1979 The mathematics of public-key cryptography, Scientific American 241 August 130-139
[160] Hill R 1986 A first course in coding theory (Clarendon Press, Oxford)
[161] Hodges A 1983 Alan Turing: the enigma (Vintage, London)
[162] Hughes R J, Alde D M, Dyer P, Luther G G, Morgan G L ans Schauer M 1995 Quantum cryptography, Contemp. Phys. 36 149-163
[163] Hungerford T W, 1974 Algebra (Springer-Verlag, New York)
[164] Jones D S 1979 Elementary information theory (Clarendon Press, Oxford)
[165] A. J. Jones, M. Mosca and R. H. Hansen, Implementation of a Quantum Search Algorithm on a Nuclear Magnetic Resonance Quantum Computer, in Nature 393 (1998) 344-346, and see also A. J. Jones and M. Mosca, Implementation of a Quantum Algorithm to Solve Deutsch's Problem on a Nuclear Magnetic Resonance Quantum Computer, in J. Chem. Phys. 109 (1998) 1648-1653
[166] Jozsa R and Schumacher B 1994 A new proof of the quantum noiseless coding theorem, J. Mod. Optics 412343
[167] Jozsa R 1997 Entanglement and quantum computation, appearing in Geometric issues in the foundations of science, Huggett S et. al., eds, (Oxford University Press)
[168] Jozsa R 1997 Quantum algorithms and the Fourier transform, submitted to Proc. Santa Barbara conference on quantum coherence and decoherence (preprint quant-ph/9707033)
[169] Khalfin L A and Tsirelson B S, Quantum/Classical Correspondence in the Light of Bell's Inequalities. Foundations of physics,22 No. 7, 879-948 July 1992
[170] Lord Kelvin, differential analyzer (1870), presented in the Science Museum of Aarhus, Denmark (1998)
[171] Keyes R W and Landauer R 1970 IBM J. Res. Develop. 14, 152
[172] Keyes R W Science 168, 796, 1970
[173] Kholevo A S 1973 Probl. Peredachi Inf 9, 3; Probl. Inf. Transm. (USSR) 9, 177
[174] Kitaev A Yu, Quantum Computations: Algorithms and Error Corrections, in Russian Math. Serveys, 52:6, 1191-1249
[175] Kitaev A Yu, Quantum measurements and the Abelian stablizer problem, in LANL e-print quant-ph/9511026, http://xxx.lanl.gov (1995)
[176] Kitaev. A. Yu Quantum error correction with imperfect gates, Quantum Communication, Computing, and Measurement, eds: Hirota, Holevo and Caves, 181-188, Plenum Press, New York, 1997.
[177] Kitaev A Yu 1997 Fault-tolerant quantum computation by anyons, in LANL e-print quant-ph/9707021, http://xxx.lanl.gov (1997)
[178] A. Yu. Kitaev, private communication
[179] Knill E and Laflamme R, Concatenated quantum codes, in LANL e-print quant-ph/9608012, http://xxx.lanl.gov (1996)
[180] Knill E, Laflamme R, and Zurek W, Resilient quantum computation, Science, vol 279, p.342, 1998.
[181] Knill E and Laflamme R 1997 A theory of quantum error-correcting codes, Phys. Rev. A 55 900-911
[182] Knill E, Laflamme R and Zurek W H 1997
Resilient quantum computation: error models and thresholds
http://xxx.lanl.gov/abs/quant-ph/9702058
[183] E. Knill, Non-Binary Unitary Error Bases and Quantum Codes, in LANL e-print quant-ph/9608048, http://xxx.lanl.gov (1996)
[184] Knuth D E 1981 The Art of Computer Programming, Vol. 2: Seminumerical Algorithms, 2nd ed (Addison-Wesley).
[185] Kondacs A and Watrous J On the power of Quantum Finite State Automata 38th Annal Symposium on Foundations of Computer Science,(FOCS) 1997
[186] Kwiat P G, Mattle K, Weinfurter H, Zeilinger A, Sergienko A and Shih Y 1995 New high-intensity source of polarization-entangled photon pairs Phys. Rev. Lett. 75, 4337-4341
[187] R. Laflamme, E. Knill, W.H. Zurek, P. Catasti and S. Marathan. quant-ph/9709025, 1997.
[188] Laflamme R, Miquel C, Paz J P and Zurek W H 1996 Perfect quantum error correcting code, Phys. Rev. Lett. 77, 198-201
[189] Landauer R. Is quantum mechanics useful? Phil. Trans. Roy. Soc. of London, 353:367-376, 1995.
[190] Landauer R 1961 IBM J. Res. Dev. 5 183, and 1970 IBM J. Res. Dev, volume 14, page 152.
[191] Landauer R 1991 Information is physical, Phys. Today May 1991 23-29
[192] Landauer R 1996 The physical nature of information, Phys. Lett. A 217188
[193] Lecerf Y 1963 Machines de Turing réversibles . Récursive insolubilité en $n \in N$ de l'equation $u=\theta^{n} u$, où $\theta$ est un isomorphisme de codes, C. R. Acad. Francaise Sci. 257, 2597-2600
[194] Leung D W, Nielsen M A, Cuang I L and Yamamuto Y , Approximate quantum error correction can lead to better codes in Phys. Rev. A,56, 1, 2567-2573, 1997
[195] Levitin L B 1987 in Information Complexity and Control in Quantum Physics, Blaquieve A, Diner S, Lochak G, eds (Springer, New York) 15-47
[196] Lidar D A and Biham O 1996 Simulating Ising spin glasses on a quantum computer (preprint quant-ph/9611038)
[197] van Lint J H Coding Theory, Springer-Verlag, 1982
[198] Lipton R J, Using DNA to solve NP-complete problems. Science, 268 542-545, Apr. 28, 1995
[199] Lloyd S, Universal quantum simulators, Science, 273:1073-1078, 1996.
[200] Lloyd S 1993 A potentially realisable quantum computer, Science 261 1569; see also Science 263695 (1994).
[201] Lloyd S 1995 Almost any quantum logic gate is universal, Phys. Rev. Lett. 75, 346-349
[202] Lloyd S 1997 The capacity of a noisy quantum channel, Phys. Rev. A 55 1613-1622
[203] Lo H-K and Chau H F 1997 Is quantum bit commitment really possible?, Phys. Rev. Lett. 78 3410-3413
[204] Loss D and DiVincenzo D P Quantum Computation with Quantum Dots, in Phys. Rev. A,57,1, pp. 120-126, 1997
[205] MacWilliams F J and Sloane N J A 1977 The theory of error correcting codes, (Elsevier Science, Amsterdam)
[206] Majumder et.al Phys. rev.lett. 652931 (1990)
[207] Mattle K, Weinfurter H, Kwiat P G and Zeilinger A 1996 Dense coding in experimental quantum communication, Phys. Rev. Lett. 76, 4656-4659.
[208] Margolus N 1986 Quantum computation, Ann. New York Acad. Sci. 480 487-497
[209] Margolus N 1990 Parallel Quantum Computation, in Complexity, Entropy and the Physics of Information, Santa Fe Institute Studies in the Sciences of Complexity, vol VIII p. 273 ed Zurek W H (Addison-Wesley)
[210] Maxwell J C 1871 Theory of heat (Longmans, Green and Co, London)
[211] Mayers D 1997 Unconditionally secure quantum bit commitment is impossible, Phys. Rev. Lett.
78 3414-3417
[212] Mayers D 1997 secure key distribution
[213] Menezes A J, van Oorschot P C and Vanstone S A 1997 Handbook of applied cryptography (CRC Press, Boca Raton)
[214] Mermin N D 1990 What's wrong with these elements of reality? Phys. Today (June) 9-11
[215] Meyer D A 1996 Quantum mechanics of lattice gas automata I: one particle plane waves and potentials, (preprint quant-ph/9611005)
[216] Minsky M L 1967 Computation: Finite and Infinite Machines (Prentice-Hall, Inc., Englewood Cliffs, N. J.; also London 1972)
[217] Miquel C, Paz J P and Perazzo 1996 Factoring in a dissipative quantum computer Phys. Rev. A 54 2605-2613
Miquel C, Paz J P and Zurek W H 1997
Quantum computation with phase drift errors, Phys. Rev. Lett. 78 3971-3974
[218] Monroe C, Meekhof D M, King B E, Jefferts S R, Itano W M, Wineland D J and Gould P 1995a Resolved-sideband Raman cooling of a bound atom to the 3D zero-pointenergy, Phys. Rev. Lett. 75 4011-4014
[219] Monroe C, Meekhof D M, King B E, Itano W M and Wineland D J. Demonstration of a universal quantum logic gate, Phys. Rev. Lett., 75:4714-4717, 1995.
[220] N. F. Mott, The wave Mechanics of $\alpha$-Ray Tracks, in Proc. Roy. Soc. London, A126, 79-84, (1929), and in Quantum Theory and Measurement, edited by Wheeler J A and Zurek W H, Princeton Univ. Press, Princeton, NJ (1983)
[221] Mukamel D, private communication
[222] Myers J M 1997. Can a universal quantum computer be fully quantum? Phys. Rev. Lett. 78, 1823-1824
[223] von Neumann, Probabilistic logic and the synthesis of reliable organisms from unreliable components, in automata studies(
Shanon,McCarthy eds), 1956
[224] Nisan N and Szegedy M, On the degree of Boolean functions as real polynomials, Proc. of the 24th Annual ACM Symposium on Theory of Computing (STOC) 1992
[225] Nielsen M A and Chuang I L 1997
Programmable quantum gate arrays, Phys. Rev. Lett. 79, 321-324
[226] Palma G M, Suominen K-A \& Ekert A K 1996 Quantum computers and dissipation, Proc. Roy. Soc. Lond. A 452 567-584
[227] Papadimitriou C H, Computational Complexity, Addison-Wesley, 1994
[228] J. Mod. Opt. 41, no 121994 Special issue: quantum communication
[229] See also in this context: Y. Ozhigov, Quantum computers cannot speed up iterated applications of a black box, in LANL e-print quant-ph/9712051, http://xxx.lanl.gov (1997)
[230] Pellizzari T, Gardiner S A, Cirac J I and Zoller P 1995 Decoherence, continuous observation, and quantum computing: A cavity QED model, Phys. Rev. Lett. 75 3788-3791
[231] Peres A 1993 Quantum theory: concepts and methods (Kluwer Academic Press, Dordrecht)
[232] Phoenix S J D and Townsend P D 1995 Quantum cryptography: how to beat the code breakers using quantum mechanics, Contemp. Phys. 36, 165-195
[233] , Pippenger and Stamoulis and Tsitsiklis, On a Lower Bound for the Redundancy of Reliable Networks with Noisy Gates, in IEEETIT: IEEE Transactions on Information Theory, volume 37, 1991
[234] Plenio M B and Knight P L 1996 Realisitic lower bounds for the factorization time of large numbers on a quantum computer, Phys. Rev. A 53, 2986-2990.
[235] Polkinghorne J 1994 Quarks, chaos and Christianity (Triangle, London)
[236] J. Preskill. Proc. Roy. Soc. of London A, in press.
[237] Preskill J 1997 Fault tolerant quantum computation, to appear in Introduction to Quantum Computation, edited by H.-K. Lo, S. Popescu, and T. P. Spiller http://xxx.lanl.gov/abs/quant-ph/9712048
[238] Preskill J, Kitaev A, Course notes for Physics 229, Fall 1998, Caltech Univ., http://www.theory.caltech.edu/people/preskill/ph229
[239] Privman V, Vagner I D and Kventsel G 1997 Quantum computation in quantum-Hall systems, in Phys. Lett. A, 239 (1998) 141-146
[240] Rabin M O, Probabilistic Algorithms Algorithms and Complexity: New Directions and Recent Results, pp. 21-39, Academic Press, 1976.
[241] Rains E, Nonbinary quantum codes, (quant-ph/9703048)
[242] Rains E, Hardin R H, Shor P W and Sloane N J A, A non additive quantum code, Phys.Rev.Lett. 79 953-954 1997
[243] Rieffel E, Polak W An Introduction to Quantum Computing for Non-Physicists http://xxx.lanl.gov/abs/quant-ph/9809016
[244] Rivest R, Shamir A and Adleman L 1979 On digital signatures and public-key cryptosystems, MIT Laboratory for Computer Science, Technical Report, MIT/LCS/TR-212
[245] J.J.Saqurai Modern Quantum Mechanics, revised edition. Addison Wesley, 1994
[246] Schroeder M R 1984 Number theory in science and communication (Springer-Verlag, Berlin Heidelberg)
[247] Schumacher B 1995 Quantum coding, Phys. Rev. A 51 2738-2747
[248] L. J. Schulman and U. Vazirani in LANL e-print quant-ph/9804060, http://xxx.lanl.gov (1998),
[249] Schumacher B W and Nielsen M A 1996 Quantum data processing and error correction Phys Rev A 54, 2629
[250] Shamir A 1979 Factoring Numbers in $\mathrm{O}(\log (n))$ Arithmetic Steps, in Information Processing Letters 8(1) 28-31.
[251] Shankar R 1980 Principles of quantum mechanics (Plenum Press, New York)
[252] Shannon C E 1948 A mathematical theory of communication Bell Syst. Tech. J. 27 379; also p. 623
[253] Shor P W, Polynomial-time algorithms for prime factorization and discrete logarithms on a quantum computer, SIAM J. Comp., 26, No. 5, pp 1484-1509, October 1997
[254] Shor P W, Scheme for reducing decoherence in quantum computer memory, Phys. Rev. A, 52: 2493-2496, 1995.
[255] Shor P W, Fault tolerant quantum computation, In Proceedings of the 37th Symposium on the Foundations of Computer Science, pages 56-65, Los Alamitos, California, 1996. IEEE press. quant-ph/9605011.
[256] Shor P W and Laflamme R 1997 Quantum analog of the MacWilliams identities for classical coding theory, Phys. Rev. Lett. 78 1600-1602
[257] Simon J On feasible numbers, in Proc. of the 9th Annual ACM Symposium on Theory of Computing (STOC) 195-207, 1977
[258] Simon D 1994 On the power of quantum computation, SIAM J. Comp., 26, No. 5, pp 1474-1483, October 1997
[259] Simon D 1998, private communication.
[260] Slepian D 1974 ed, Key papers in the development of information theory (IEEE Press, New York)
[261] R Solovay and A. C-C Yao, preprint, 1996
[262] Spiller T P 1996 Quantum information processing: cryptography, computation and teleportation, Proc. IEEE 84, 1719-1746
[263] Steane A, Multiple particle interference and quantum error correction, Proc. Roy. Soc. of London A, 452:2551-2577, 1996.
[264] Steane A M, Error correcting codes in quantum theory, Phys. Rev. Lett. 77 793-797, 1996, Simple quantum error-correcting codes, Phys. Rev. A 54, 4741-4751, 1996, Quantum Reed-Muller codes, submitted to IEEE Trans. Inf. Theory (preprint in LANL e-print quant-ph/9608026, http://xxx.lanl.gov) Active stabilization, quantum computation, and quantum state synthesis, Phys. Rev. Lett. 78, 2252-2255, 1997
[265] Steane A, Quantum Computation, Reports on Progress in Physics 61 (1998) 117, preprint in http://xxx.lanl.gov/abs/quant-ph/9708022
[266] Steane A M The ion trap quantum information processor, Appl. Phys. B 64 623-642 1997
[267] Steane A M Space, time, parallelism and noise requirements for reliable quantum computing, in Fortsch. Phys. 46 (1998) 443-458
[268] Stern A, Aharonov Y and Imry Y, "Phase uncertainty and loss of interference: a general picture" Phys. Rev. A 41, 3436 (1990). and "Dephasing of interference by a back reacting environment" in "Quantum coherence" ed. J. Anandan, World Scientific, 1990.
[269] Szilard L 1929 Z. Phys. 53 840; translated in Wheeler and Zurek (1983).
[270] Teich W G, Obermayer K and Mahler G 1988 Structural basis of multistationary quantum systems II. Effective few-particle dynamics, Phys. Rev. B 37 8111-8121
[271] W. Tittel, J. Brendel, B. Gisin, T. Herzog, H. Zbinden, N. Gisin Experimental demonstration of quantum-correlations over more than 10 kilometers, in Phys. Rev. A,57, 3229 (1998)
[272] Toffoli T 1980 Reversible computing, in Automata, Languages and Programming, Seventh Colloquium, Lecture Notes in Computer Science, Vol. 84, de Bakker J W and van Leeuwen J, eds, (Springer) 632-644
[273] Turchette Q A, Hood C J, Lange W, Mabushi H and Kimble H J 1995 Measurement of conditional phase shifts for quantum logic, Phys. Rev. Lett. 75 4710-4713
[274] Turing A M 1936 On computable numbers, with an application to the Entschneidungsproblem, Proc. Lond. Math. Soc. Ser. 2 42, 230 ; see also Proc. Lond. Math. Soc. Ser. 2 43, 544
[275] Unruh W G, Maintaining coherence in quantum computers, Phys. Rev. A, 51:992-997, 1995.
[276] Valiant, unpublished
[277] Valiant L. G, Negation can be exponentially powerful. Theoretical Computer Science, 12(3):303-314, November 1980.
[278] Valiant L G and Vazirani V V. NP is as easy as detecting unique solutions. Theoretical Computer Science, 47(1):85-93, 1986
[279] Vedral V, Barenco A and Ekert A 1996 Quantum networks for elementary arithmetic operations, Phys. Rev. A 54 147-153
[280] Vergis A, Steiglitz K and Dickinson B,"The Complexity of Analog Computation", Math. Comput. Simulation 28, pp. 91-113. 1986
[281] Walsworth et.al. Phys rev. lett. 64,2599, 1990.
[282] Warren W S, Science, 277:1688-1698, 1997.
[283] Watrous J, On one Dimensional quantum cellular automata, Complex Systems 5 (1), pp 19-30, 1991
[284] Weinfurter H 1994 Experimental Bell-state analysis, Europhys. Lett. 25 559-564
[285] Wiesner S 1983 Conjugate coding, SIGACT News 15 78-88
[286] Wiesner S 1996 Simulations of many-body quantum systems by a quantum computer in LANL e-print quant-ph/9603028, http://xxx.lanl.gov (1996)
[287] Wheeler J A and Zurek W H, eds, 1983 Quantum theory and measurement (Princeton Univ. Press, Princeton, NJ)
[288] A. Wigderson, private communication
[289] Wineland D J, Monroe C, Itano W M, Leibfried D, King B, and Meekhof D M 1997 Experimental issues in coherent quantum-state manipulation of trapped atomic ions, preprint, submitted to Rev. Mod. Phys.
[290] Wootters W K and Zurek W H 1982 A single quantum cannot be cloned, Nature 299, 802
[291] Wootters W K A Measure of the Distinguishability of Quantum States Quantum Optics, General Relativity, and Measurement eds: Marlan O. Scully and Pierre Meystre, 145-154, Plenum Press, New York, 1983
[292] Yao A C-C, Quantum circuit complexity, in 33th Annual Symposium on Foundations of Computer Science(FOCS), (1993) pp. 352-361
[293] Zalka C, Efficient simulation of quantum systems by quantum computers Proc. Roy. Soc. of London A, in press, in LANL e-print quant-ph/9603026, http://xxx.lanl.gov (1996)
[294] Zalka C, Grover's quantum searching algorithm is optimal, http://xxx.lanl.gov/abs/quant-ph/9711070
[295] Zbinden H, Gautier J D, Gisin N, Huttner B, Muller A, Tittle W 1997 Interferometry with Faraday mirrors for quantum cryptography, Elect. Lett. 33, 586-588
[296] Zurek W H, Decoherence and the transition from quantum to classical, Physics Today 44(10), October, 1991 36-44.
[297] Zurek W H 1989 Thermodynamic cost of computation, algorithmic complexity and the information metric, Nature 341 119-124

To top $\leftarrow$

## Selected on-line references

Some of the references listed above are available on line. A few are listed again here for easy access:

Abrams D S and Lloyd S, Non-Linear Quantum Mechanics implies Polynomial Time solution for NP-complete and \#P problems, http://xxx.lanl.gov/abs/quant-ph/9801041

Aharonov D, Beckman D, Chuang I and Nielsen M, What Makes Quantum Computers Powerful? http://wwwcas.phys.unm.edu/m̃nielsen/science.html

Chuang I L, Laflamme R and Paz J P, Effects of Loss and Decoherence on a Simple Quantum Computer, http://xxx.lanl.gov/abs/quant-ph/9602018

Grover L K, A framework for fast quantum mechanical algorithms, http://xxx.lanl.gov/abs/quant-ph/9711043

Grover L K, A fast quantum mechanical algorithm for estimating the median, http://xxx.lanl.gov/abs/quant-ph/9607024

Knill E, Laflamme R and Zurek W H 1997 Resilient quantum computation: error models and thresholds http://xxx.lanl.gov/abs/quant-ph/9702058

Preskill J 1997 Fault tolerant quantum computation, to appear in Introduction to Quantum Computation, edited by H.-K. Lo, S. Popescu, and T. P. Spiller http://xxx.lanl.gov/abs/quant-ph/9712048

Preskill J, Kitaev A, Course notes for Physics 229, Fall 1998, Caltech Univ.,
http://www.theory.caltech.edu/people/preskill/ph229
Rieffel E, Polak W An Introduction to Quantum Computing for Non-Physicists http://xxx.lanl.gov/abs/quant-ph/9809016

Steane A, Quantum Computation, Reports on Progress in Physics 61 (1998) 117, http://xxx.lanl.gov/abs/quant-ph/9708022

Zalka C, Grover's quantum searching algorithm is optimal, http://xxx.lanl.gov/abs/quant-ph/9711070

To top $\leftarrow$

