FISICA DELLE TECNOLOGIE QUANTISTICHE





dall'Unione europea **NextGenerationEU**



Ministero dell'Università e della Ricerca

Pavia prima in Italia





Gruppo di fotonica quantistica













Journal of Statistical Physics, Vol. 22, No. 5, 1980

International Journal of Theoretical Physics, Vol. 21, Nos. 6/7, 1982

Simulating Physics with Computers

Richard P. Feynman

Department of Physics, California Institute of Technology, Pasadena, California 91107

Received May 7, 1981

The Computer as a Physical System: A Microscopic **Quantum Mechanical Hamiltonian Model of Computers** as Represented by Turing Machines

Paul Benioff^{1,2}

Received June 11, 1979; revised August 9, 1979

Quantum computer

N qubits: d=2^N

quantum parallelism

"I want to talk about the possibility that there is to be an exact simulation, that the computer will do exactly the same as nature. If this is to be proved and the type of computer is as I've already explained, then it's going to be necessary that everything that happens in a finite volume of space and time would have to be exactly analyzable with a finite number of logical operations. The present theory of physics is not that way, apparently. It allows space to go down into infinitesimal distances, wavelengths to get infinitely great, terms to be summed in infinite order, and so forth; and therefore, if this proposition is right, physical law is wrong."

Proc. R. Soc. Lond. A 400, 97-117 (1985) Printed in Great Britain

> Quantum theory, the Church–Turing principle and the universal quantum computer

By D. Deutsch Department of Astrophysics, South Parks Road, Oxford OX1 3RQ, U.K.

(Communicated by R. Penrose, F.R.S. – Received 13 July 1984)

Proc. R. Soc. Lond. A 425, 73–90 (1989) Printed in Great Britain

Quantum computational networks

BY D. DEUTSCH Oxford University Mathematical Institute, 24–29 St Giles, Oxford OX1 3LB, U.K.

(Communicated by R. Penrose, F.R.S. – Received 8 July 1988)











A quantum computer can break RSA encryption

Algorithms for Quantum Computation: Discrete Logarithms and Factoring

> Peter W. Shor AT&T Bell Labs Room 2D-149 600 Mountain Ave. Murray Hill, NJ 07974, USA

0272-5428/94 \$04.00 © 1994 IEEE











quantum cryptography





security by physical laws no info without disturbance











The 2025 International Year of Quantum Science and Technology (IYQ) recognizes 100 years since the initial development of quantum mechanics. Join us in engaging with quantum science and technology and celebrating throughout the year!

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https://quantum2025.org/

Early 2000



Christopher A. Fuchs Computing Science Research Center Bell Labs, Lucent Technologies Room 2C-420, 600–700 Mountain Ave. Murray Hill, New Jersey 07974, USA

COMMENTARY

Is information the key?

GILLES BRASSARD

is in the Département d'informatique et de recherche opérationnelle, Université de Montréal, Québec H3C 3J7, Canada e-mail: brassard@iro.umontreal.ca

Quantum information science has brought us novel means of calculation and communication. But could its theorems hold the key to understanding the quantum world at its most profound level? Do the truly fundamental laws of nature concern — not waves and particles — but information?

Quantum Foundations in the Light of Quantum Information



Quantum Computing in the NISQ era and beyond

John Preskill

Institute for Quantum Information and Matter and Walter Burke Institute for Theoretical Physics, California Institute of Technology, Pasadena CA 91125, USA 30 July 2018



FISICA DELLE TECNOLOGIE QUANTISTICHE

12 INSEGNAMENTI

8 insegnamenti dal seguente elenco, di cui **1** in FIS/01, **3** di FIS/02 e **4** di FIS/03

Insegnamento

Laboratorio di Fisica Quantistica

Fondamenti della Meccanica Quantistica

Fisica Quantistica della Computazione

Fotonica

Teoria Fisica dell'Informazione

Nanostrutture Quantistiche

Ottica Quantistica

Termodinamica Quantistica

Meccanica Statistica

Gruppi e Simmetrie Fisiche

Magnetismo e Superconduttività

Fisica dello Stato Solido I

2 insegnamenti a scelta libera.

1 un insegnamento nei settori FIS/05, INF/01, MAT/05,06,07,08, ING-INF/01,02,03,04,05,07.



	Settore	Semestre
	FIS/01	I
	FIS/02	
	FIS/03	
	FIS/03	
	FIS/02	
	FIS/03	
	FIS/03	
	FIS/02	
(triennale)	FIS/02	
	FIS/02	Π
	FIS/03	
	FIS/03	



FISICA DELLE TECNOLOGIE QUANTISTICHE

1 insegnamento scelto dal seguente elenco

Insegnamento

Artificial Intelligence

Processi Stocastici

Teoria dei Sistemi Dinamici

Elementi di Statistica Matematica

Robotics

Digital Communications

Information Security

Bioinformatica

Settore	Semestre
ING-INF/05	
MAT/06	
MAT/07	
MAT/06	
ING-INF/05	
ING-INF/03	
ING-INF/05	
ING-INF/06	

