

## 1. Record Nr.

## Titolo

UNINA9910808580803321

The theory of the quantum world : proceedings of the 25th Solvay Conference on Physics, Brussels, Belgium, 19-22 October, 2011 // editors, David Gross, director, Kavli Institute for Theoretical Physics, University of California, Santa Barbara, USA, Marc Henneaux, Universite Libre de Bruxelles, director, International Solvay Institutes, Belgium, Alexander Sevrin, Vrije Universiteit Brussel, also at the Universiteit Antwerpen and the KULeuven, deputy-directory, International Solvay Institutes, Belgium

## Pubbl/distr/stampa

[Hackensack] N.J., : World Scientific, c2013  
New Jersey : , : World Scientific, , [2013]  
2013

## ISBN

1-299-46275-8  
981-4440-62-0

## Descrizione fisica

1 online resource (xxiii, 362 pages) : illustrations

## Collana

Gale eBooks

## Disciplina

530.1/2  
539

## Soggetti

Quantum theory

## Lingua di pubblicazione

Inglese

## Formato

Materiale a stampa

## Livello bibliografico

Monografia

## Note generali

Conference proceedings.

## Nota di bibliografia

Includes bibliographical references.

## Nota di contenuto

The International Solvay Institutes; In Memoriam Jacques Solvay (1920-2010); 25th Solvay Conference on Physics; Opening Session; Contents; Session 1: History and Reflections Chair: M. Henneaux; John L. Heilbron: The First Solvay Council "A sort of private conference"; 1. Introduction; 2. Soda and Energy; 3. Positivism and Progress; 4. International Connections; 5. The Council of 1911; Works Cited; References; Murray Gell-Mann: From Solvay 1961 to Solvay 2011; Session 2: Foundations of Quantum Mechanics and Quantum Computation Chair: A. Aspect  
Rapporteur talk by A. Leggett: The Structure of a World Described by Quantum Mechanics  
References; Prepared comments; Discussion; Prepared comments; Discussion; Rapporteur talk by J. Preskill: Quantum Entanglement and Quantum Computing; 1. Introduction:

Toward Quantum Supremacy; 2. Quantum Entanglement and the Vastness of Hilbert Space; 3. Separating Classical from Quantum; 4. Easiness and Hardness; 5. Local Hamiltonians; 6. Quantum Error Correction; 7. Scalable Quantum Computing; 8. Topological Quantum Computing; 9. Quantum Computing vs. Quantum Simulation; 10. Conclusions and Questions

AcknowledgmentsReferences; Prepared comment; Discussion; Session 3: Control of Quantum Systems Chair: P. Zoller; Rapporteur talk by I. Cirac: Quantum Computing and Simulation with Atoms and Photons; 1. Introduction; 2. Bottom-up Approach: Quantum Information; 3. Top-down Approach: Quantum Simulations; 4. Conclusions; References; Prepared comments; Discussion; Rapporteur talk by S. Girvin: Quantum Machines: Coherent Control of Mesoscopic Solid-State Systems; 1. Introduction; 2. Superconducting Qubits and Quantum Microwave Circuits; 2.1. Quantum Limited Amplification, Measurement and Feedback

2.2. Future Directions for Superconducting Qubits3. Quantum Optomechanics; 4. Summary; Acknowledgments; References; Prepared comment; Discussion; Prepared comments; Discussion; Prepared comments; Discussion; Session 4: Quantum Condensed Matter Chair: B. Halperin; Rapporteur talk by S. Sachdev: The Quantum Phases of Matter; 1. Introduction; 2. Gapped Quantum Matter; 3. Conformal Quantum Matter; 4. Compressible Quantum Matter; 5. Connections to String Theory; Acknowledgments; References; Discussion; Prepared comments; Discussion; Prepared comments; Discussion; Prepared comments; Discussion

Session 5: Particles and Fields Chair: H. GeorgiRapporteur talk by F. Wilczek: A Long View of Particle Physics; 1. Origins: Understanding Matter; 2. Phenomena: New Questions and Surprising Answers; 3. Questions That the Standard Model Begs; 3.1. Questions from the Core; 3.2. Loose Ends; 3.3. Gravity; 4. Approaches: "Modest" Improvements; 4.1. Unification and Supersymmetry; 4.2. Problem and Axions; 5. Experimental Frontiers; 6. Cosmic Questions: Way Beyond the Standard Model; 6.1. Kinematics and Dynamics; 6.2. Dynamics and Initial Values; 6.3. The Ubiquity of Spinors

6.4. Information as Foundation?

## Sommario/riassunto

Ever since 1911, the Solvay Conferences have shaped modern physics. The 25th edition held in October 2011 in Brussels and chaired by David Gross continued this tradition and celebrated the first centennial of this illustrious series of conferences. The development and applications of quantum mechanics have always been the main threads in the history of the Solvay Conferences, hence the 25th Solvay conference gathered many of the leading figures working on a wide variety of profound problems in physics where quantum mechanical effects play a central role. The conference addressed some of the mo