



Vrije
Universiteit
Brussel

2010 International Solvay Chair in Physics Inaugural Lecture - Solvay Colloquium

“Power and Strangeness of the Quantum World”

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Abstract

Quantum theory has allowed physicists to understand in depth the microscopic world, leading to applications (computers, lasers, magnetic resonance imaging, atomic clocks...) which have revolutionized our lives. And yet, in spite of its successes, quantum physics is deeply counterintuitive. Its strangeness resides in the principle of state superposition, which implies that a particle can behave as a wave, and in the related concepts of quantum entanglement and non-locality. At the macroscopic level, these odd phenomena are veiled by the process of decoherence which imparts to the world its classical appearance. Recent technological advances have allowed us to manipulate isolated quantum systems such as atoms, molecules, photons or superconducting microchips. These experiments lead to the direct observation of the most counterintuitive aspects of the quantum behaviour. Beyond their fundamental interest, they open fascinating perspectives for applications, letting us envision novel technologies in which the quantum strangeness will be harnessed to achieve tasks impossible to perform with devices relying on classical laws. We dream about quantum cryptography, teleportation, quantum computing... Which of these applications will become practical remains an open question. What is sure is that the ongoing exploration of the strange laws of the microscopic world will yield more surprises and reasons to wonder about Nature.

Friday 30 April 2010 at 16h00

COFFEE AND TEA WILL BE SERVED AT 15H45 IN FRONT OF THE SOLVAY ROOM
DRINK AT 17H15 IN FRONT OF THE SOLVAY ROOM



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