

## Quantum Coherence In Solid State Systems Volume 171 International School Of Physics Enrico Fermi Proceedings Of The International School Of Physics Enrico Fermi

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Universal coherence protection in a solid-state spin qubit ...

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Quantum coherence breakthrough: 10,000 times longer. Universal coherence protection has been achieved in a solid-state spin qubit – a modification that allows quantum systems to stay operational ("coherent") for 10,000 times longer than before. In the coming decades, quantum technology has the potential to revolutionise our world – vastly expanding the capabilities for research and development in communication, computing, encryption, sensing, simulations and other areas.

~~Quantum coherence breakthrough: 10,000 times longer~~

Macroscopic electron quantum coherence in a solid-state circuit. A team of researchers at the Centre de Nanosciences et de Nanotechnologies (C2N, CNRS/Univ. Paris-Saclay) has experimentally ...

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Download Quantum Coherence In Solid State Systems books, Dedicated to the memory of Franco Bassani, the former President of the Societa Italiana di Fisica, this volume gives an overview of the manifestations of quantum coherence in different solid state systems, including semiconductor confined systems, magnetic systems, crystals and ...

~~[PDF] quantum coherence in solid state systems eBook~~

The lectures at the NATO Advanced Study Institute “ Manipulating Quantum Coherence in Solid State Systems ” presented a fundamental introduction to three solid-state approaches to achieving quantum computation: semiconductor spin-based, semiconductor charge-based, and superconducting approaches. The

~~Manipulating Quantum Coherence in Solid State Systems ...~~

Quantum coherence, or superposition, between different states is one of the main features of quantum systems. This distinctive property, coherence, ultimately leads to a variety of other phenomena, e.g., entanglement 1,2.

~~Witnessing Quantum Coherence: from solid state to ...~~

Optically addressable paramagnetic defects in wide-band-gap semiconductors are promising platforms for quantum communications and sensing. The presence of avoided crossings between the electronic levels of these defects can substantially alter their quantum dynamics and be both detrimental and beneficial for quantum information applications. Avoided crossings give rise to clock transitions ...

~~[2010.11077] Probing the coherence of solid state qubits ...~~

The term ‘ quantum coherence ’ represents the idea of a superpositioning that is at the heart of quantum mechanics and quantum computing. Specifically, quantum coherence contemplates a situation where an object ’ s wave property is split in two, and the two waves coherently interfere with each other. Techopedia explains Quantum Coherence

~~What is Quantum Coherence? – Definition from Techopedia~~

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Quantum coherence . Indeed, quantum coherence (see Box) has come up in cosmology and quantum computation. According to a quantum cosmological model in which the universe comes into being via a period of ' cosmic inflation ', the universe will naturally end up in a coherent superposition of classical states; and in quantum computation, people are asking whether anything interesting or useful will result by allowing computers to evolve as coherent superposition of computational states.

## ~~Quantum Phases and Quantum Coherence – I-SIS~~

The quantum description of imperfectly coherent paths is called a mixed state. A perfectly coherent state has a density matrix (also called the "statistical operator") that is a projection onto the pure coherent state and is equivalent to a wave function, while a mixed state is described by a classical probability distribution for the pure ...

## ~~Coherence (physics) – Wikipedia~~

QUANTUM SYSTEMS. Universal coherence protection in a solid-state spin qubit. Kevin C. Miao<sup>1</sup>, Joseph P. Blanton<sup>1,2</sup>, Christopher P. Anderson<sup>1,2</sup>, Alexandre Bourassa , Alexander L. Crook<sup>1,2</sup>, Gary...

## ~~QUANTUM SYSTEMS Universal coherence protection in a solid...~~

In physics, specifically in quantum mechanics, a coherent state is the specific quantum state of the quantum harmonic oscillator, often described as a state which has dynamics most closely resembling the oscillatory behavior of a classical harmonic oscillator. It was the first example of quantum dynamics when Erwin Schrödinger derived it in 1926, while searching for solutions of the Schrödinger equation that satisfy the correspondence principle. The quantum harmonic oscillator and hence ...

## ~~Coherent state – Wikipedia~~

A quantum system can be thrown out of coherence with the slightest temperature change or external electromagnetic field. While most efforts to keep the system coherent for longer involve physically isolating the system from its external environment, the University of Chicago researchers took a different approach.

## ~~Coherence of quantum system sustained 10,000 times longer...~~

coherence time approaches 64 milliseconds. Requiring few key platform-independent components, this result suggests that substantial coherence improvements can be achieved in a wide selection of quantum architectures. Electron spins embedded in a solid-state host, such as silicon carbide (SiC) and diamond,

## ~~Universal coherence protection in a solid-state spin qubit~~

Quantum coherence is one of the primary non-classical features of quantum systems. While protocols such as the Leggett-Garg inequality (LGI) and quantum tomography can be used to test for the existence of quantum coherence and dynamics in a given system, unambiguously detecting inherent "quantumness" still faces serious obstacles in terms of experimental feasibility and efficiency,

particularly in complex systems.

~~Witnessing Quantum Coherence: from solid state to ...~~

We describe a solid state implementation of a quantum computer using ballistic single electrons as flying qubits in 1D nanowires. We show how to implement all the steps required for universal ...

~~Quantum Computing in Solid State, and Coherent Behavior of ...~~

Though their tests were run in a solid-state quantum system using silicon carbide, the scientists believe the technique should have similar effects in other types of quantum systems, such as superconducting quantum bits and molecular quantum systems. This level of versatility is unusual for such an engineering breakthrough.

~~Scientists Discover Simple Innovation to Make Quantum ...~~

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