



International Year of Quantum Science and Technology

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The [United Nations \(UN\)](#) has designated the **year 2025** as the '**International Year of Quantum Science and Technology**' to increase public awareness of the importance of [quantum science](#) and its applications.

- The resolution for this was led by Mexico at the [UNESCO](#) General Conference in May 2023, which was adopted by almost 60 countries.
- Also, the year 2025 marks a century since German physicist **Werner Heisenberg** published a paper laying the foundation of **modern quantum mechanics**.
 - He was awarded the [Nobel Prize](#) for physics in **1932** for the creation of quantum mechanics.
- India launched the [National Quantum Mission](#) in April 2023, to be implemented from **2023 to 2031** by the **Department of Science & Technology (DST)**.
 - It has **four verticals: Quantum Computing, Quantum Communication, Quantum Sensing and Metrology, and Quantum Materials and Devices.**

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NATIONAL QUANTUM MISSION

Aims to put India among the top six leading nations involved in the R&D in quantum technologies

Presently, R&D works in quantum technologies are underway in the US, Canada, France, Finland, China and Austria

- Duration: 2023-24 to 2030-31
- Nodal Ministry: Ministry of Science & Technology
- Highlights of the Mission:
 - Four Thematic Hubs (T-Hubs) in different domains across the country
 - Wide-scale applications ranging from healthcare and diagnostics, defence, energy and data security
- Strengthening of indigenously building quantum-based computer
- Help develop magnetometers with high sensitivity in atomic systems and atomic clocks
- Support design and synthesis of quantum materials

A huge boost to National priorities like digital India, Make in India, Skill India, Stand-up India, Start-up India, Self-reliant India and SDGs

Quantum Technology

Works by using the principles of quantum mechanics (the physics of sub-atomic particles), including quantum entanglement and quantum superposition

Quantum Superposition

The ability of a quantum system to be in multiple states simultaneously

While digital computers store data as bits (the ones and zeros of binary), quantum computers use qubits that exist as one, zero or both at the same time

This superposition state creates a practically infinite range of possibilities, allowing for fast simultaneous and parallel calculations

Quantum Entanglement

It means the two members of a pair (Qubits) exist in a single quantum state

If you change the properties of one of them, the other changes instantly

This can be used to create a secure encryption key in quantum cryptography

If an eavesdropper tries to intercept the transmission, the entangled state of the particles will be disturbed, making the attempt detectable



Read more: [Quantum Technology](#), [National Quantum Mission](#)

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