New Test with Quantum Coins & Computers for Quantum Sensing

Why in News

- Researchers from the **Raman Research Institute (RRI)** (autonomous institution under the Department of Science & Technology) have devised a new test for fairness of **quantum coin or qubit using entanglement theory.**

Key Points

- The test uses **entanglement** to test the fairness of the quantum coin. Their strategy enables **better discrimination between quantum states.** Such an advantage is valuable in quantum sensors
- This is a significant contribution to quantum state discrimination and an essential aspect of quantum information science which is expected to influence quantum sensing.

Quantum Information and Quantum Computing Technology

- The domain of Quantum Information and Quantum Computing Technology is a growing area of research which is expected to influence **Data Processing,** which in turn, plays a central role in our lives in this Information Age.
- For instance, bank transactions, online shopping and so on crucially depend on the efficiency of information transfer.
- Thus the work on quantum state discrimination is expected to be valuable in people's lives in the current era.

Qubit

- A quantum bit, or qubit, is the **basic unit of information for a quantum computer,** analogous to a bit in ordinary machines.
- But unlike a bit, which can have the value 0 or 1, a qubit can take on an infinite number of values.

Quantum computer

- A quantum computer is any device for computation that makes direct use of distinctively **quantum mechanical phenomena,** such as superposition and entanglement, to perform operations on data.
- **Superposition** means that each qubit can **represent both a '1' and a '0' at the same time**
- **Quantum entanglement** occurs when **two particles become inextricably linked,** and whatever happens to one immediately affects the other, regardless of how far apart they are.

    - Entanglement is a special type of correlation that exists in the quantum world with **no classical counterpart.**

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