

A **qubit** (short for **quantum bit**) is the basic unit of quantum information in a quantum computer. It is the quantum version of a classical bit but has unique properties that give quantum computers their power.

### Key Properties of a Qubit:

1. **Superposition** – Unlike classical bits, which can only be **0 or 1**, a qubit can exist in both states **simultaneously**. This allows quantum computers to perform multiple calculations at once.
2. **Entanglement** – Two or more qubits can become **entangled**, meaning their states are linked regardless of distance. Changing one qubit instantly affects the other, enabling faster and more complex computations.
3. **Interference** – Quantum computers use interference to manipulate qubit states and improve the probability of correct answers in calculations.

### Physical Forms of Qubits:

Qubits can be created using various technologies, such as:

- **Superconducting Circuits** (used by IBM & Google)
- **Trapped Ions** (used by IonQ)
- **Photons** (used in quantum communication)
- **Silicon-based Qubits** (similar to traditional computer chips)

### Why Are Qubits Important?

Qubits enable **exponential processing power**, allowing quantum computers to solve problems that classical computers would take years or even centuries to compute. This makes them crucial for fields like AI, cryptography, materials science, and more.