

EN / LEARNING SERIES

Quantum Technology Glossary

Thirty essential terms without hype

SCIENCE · TECHNOLOGY · TALENT · FUTURE

Independent educational publication. Concepts are presented for learning and should be validated against primary technical sources for research, engineering or security decisions.

Information and states

Qubit - the basic unit of quantum information. State vector - a mathematical description of a pure quantum state. Amplitude - a complex number whose magnitude squared gives a probability. Basis - a chosen set of states used to express and measure a system.

KEY TERMS

qubit • state vector • amplitude • basis

Operations and results

Quantum gate - a reversible operation on a state. Circuit - an ordered set of gates and measurements. Shot - one execution of a circuit. Observable - a measurable property represented mathematically by an operator.

KEY TERMS

gate • circuit • shot • observable

Hardware quality

Coherence time - the period over which quantum information remains usable. Fidelity - similarity between intended and actual operation or state. Crosstalk - unwanted influence between controls or qubits. Calibration - estimation and adjustment of device parameters.

KEY TERMS

coherence • fidelity • crosstalk • calibration

Computing and evidence

Quantum advantage - demonstrated superiority for a defined task and metric. NISQ - noisy intermediate-scale quantum hardware. Logical qubit - an error-corrected encoded qubit. Benchmark - a transparent test used to compare systems or methods.

KEY TERMS

advantage • NISQ • logical qubit • benchmark

Suggested practice

Use the interactive modules at quantumserbia.com to test the ideas in this guide. Write down a prediction before every simulation, then compare the result and explain any difference.