The Next Records Challenge: Quantum Information Science and Technology (QIST)

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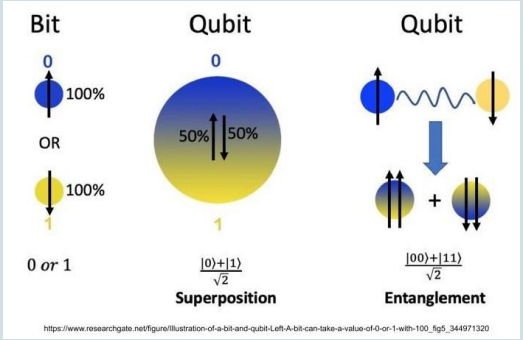
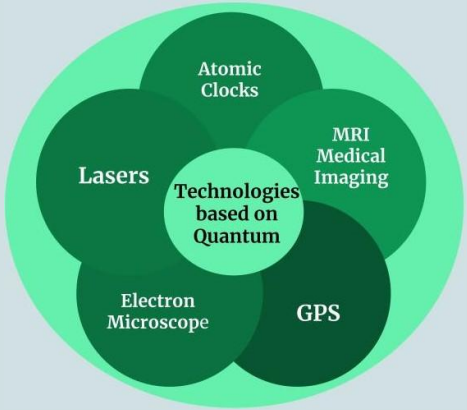
NATIONAL ARCHIVES

What is QIST?

QIST is the merger of quantum physics and information theory. Information theory is the study of quantification, storage, and communication of information. Quantum physics describes nature at an atomic and subatomic level.





1900 - 1920s	Development of Quantum Theory
1948	Claude Shannon "A Mathematical Theory of Communication."
1976	Office of Science and Technology Policy established
1981	Richard Feynman "Simulating Physics with Computers"
1994	Peter Shor factoring algorithm NIST First Quantum Workshop
1996	Lov Grover quantum search algorithm
2018	National Quantum Initiative Act (NQI) passed

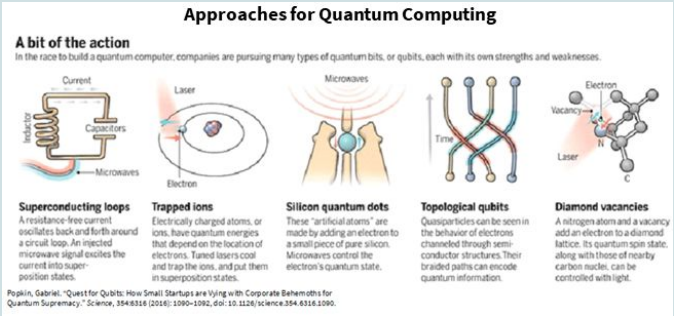
64 bit encryption

1.8 x 10^{19} combinations

Classical	Quantum
3.1 GHz processor processes 64 bits 3.1 billion times a second	64 qubits in superposition of all combinations of 64 bits
189 years	Seconds

Quantum records = intermediary records

- Create a subsequent record for use by a classical computer
- Copying causes superposition to collapse & changes the record



RM Implications	Cryptography	Search & Retrieval	Storage	Post Quantum Encryption