

# **A Systematic Review of Quantum Computing Methodologies and their Advancements**

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Abstract—Most computations and information processing in today's world are based on classical physics. The growth of quantum information processing is rapidly increasing due to its real-time computation impact in the midst of telecommunication and fintech industries. This article mainly focuses on the prospects of quantum computation, quantum communication, teleportation and its protocols and the recent developments in quantum computing methodologies. Quantum computing is the computation of data using quantum phenomena like entanglement, superposition, and related terms. Quantum entanglement is a correlation that exists between the subsystems of quantum multipartite systems. Quantum teleportation is the communication of quantum information between two distant locations. Quantum communication systems are more secure than classical communication, thus making the entanglement concept revolutionary. This article also includes a note on Spontaneous Parametric Down-Conversion (SPDC), Nuclear Magnetic Resonance (NMR), spin-based electrons in liquid helium, atomic spin on surfaces, and the underlying concept and the structure of the entanglement.

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