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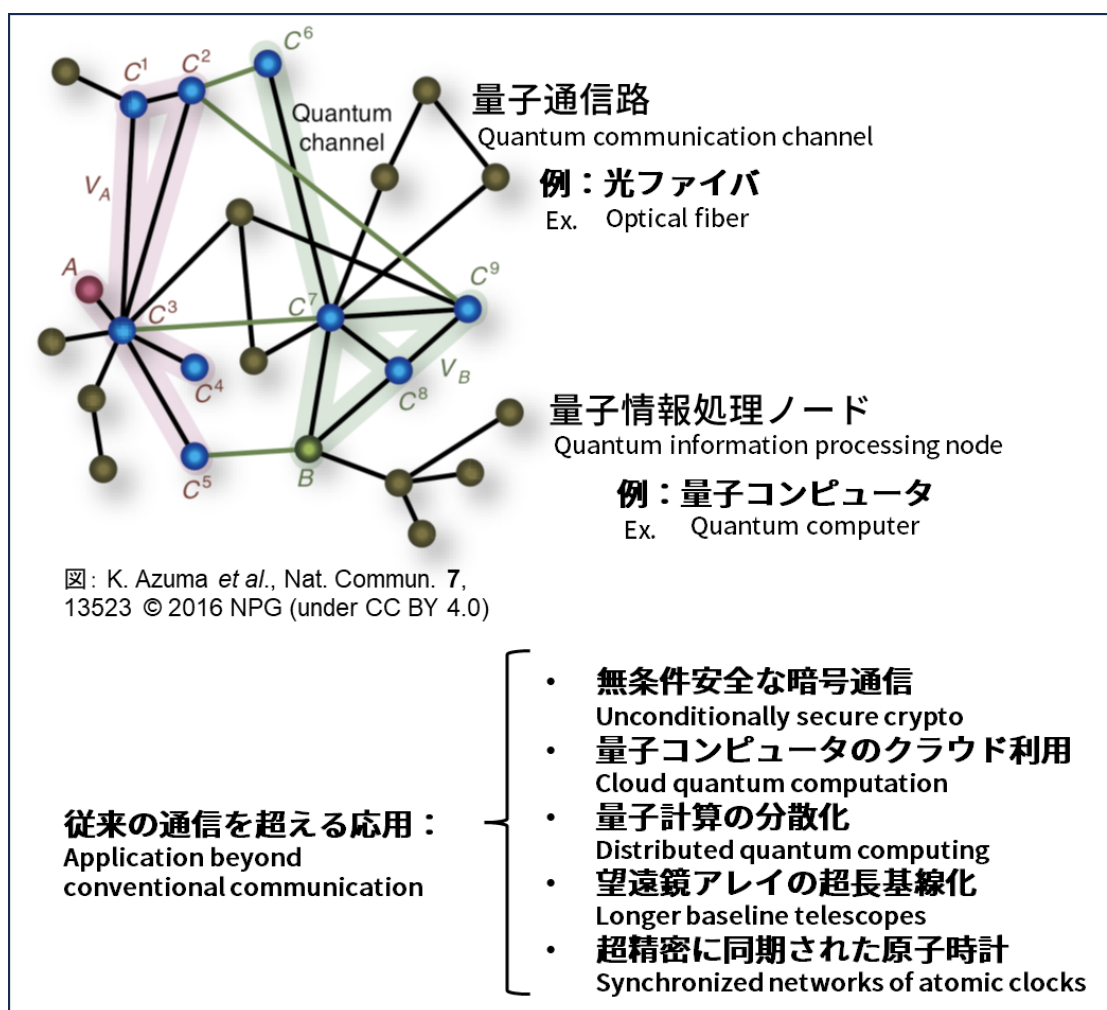
NTT R&D FORUM 2024

RESEARCH

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Ultimate communication network
allowed by the laws of physics

Toward realization of a universal quantum
communication network
Improving customers' experience



///Technical Issue

A quantum network is realizable with practical communication networks such as optical ones. However, loss and noise in them hinder its realization.

///Research Goal

The goal is to unveil the potential of a quantum communication network and to clarify technology necessary for the realization.

---Technology

Quantum repeaters are necessary for presenting quantum communication services to arbitrary clients against the loss and noise. NTT is leading by proposing “all-photonic” quantum repeaters and a quantum networking protocol with performance comparable with a theoretical limit.

---Novelty

NTT proposed such an efficient quantum networking protocol based on quantum repeaters, by referring to the theoretical limit of performance of practical networks, derived by themselves. With all-photonic repeaters, this introduces a concept of an all-photonic quantum network.

---Applicable Business

The quantum communication network has various kinds of applications beyond ones served by the current internet. For instance, it presents clients with cryptographic communication secure again cyberattacks from quantum computers and with cloud use of a quantum computer. Besides, it enables us to realize distributed quantum computing, longer baseline telescopes and a synchronized network of atomic clocks.