Technology Roadmap in Q. Network

Based on the "Quantum Technology and Innovation Strategy" from Japanese Cabinet Office

In 5 years (2025)

In 10 years (2030)

In 20 years (2040)



Quantum Entanglement Distribution Field demonstration of quantum repeater

Entanglement distribution b/w 3 parties via a quantum repeater

Remote entanglement generation b/w memories by emission & absorption

Entanglement with communication-band photon

Entanglement distribution > 500 km via quantum repeater

Multi-party entanglement via quantum memories Key rate > 1 kbps via entanglement distribution

Quantum Memory

- · Single-qubit gate
- · Single-shot measurement
- Quantum error correction

Multiple memories ~10 memory time > 1 min

Two-qubit gate fidelity > 99.9%

Complete Bell measure on memories transferred from photons Individual access memories 100~1000 bits

Fault-tolerant logical memory with quantum coding

Scalable quantum repeater

Distributed

quantum computer

Quantum Interface Quantum Media Conversion b/w photon & quantum memory

Quantum wavelength conversion

Single photon fiber coupling

Quantum Media Conversion b/w superconducting qubit & quantum memory

Quantum wavelength conversion module

Wavelength division multiplexing quantum communication

photonic quantum sensor

Photon Source

Single photon source Entangled photon source All-photonic quantum repeater