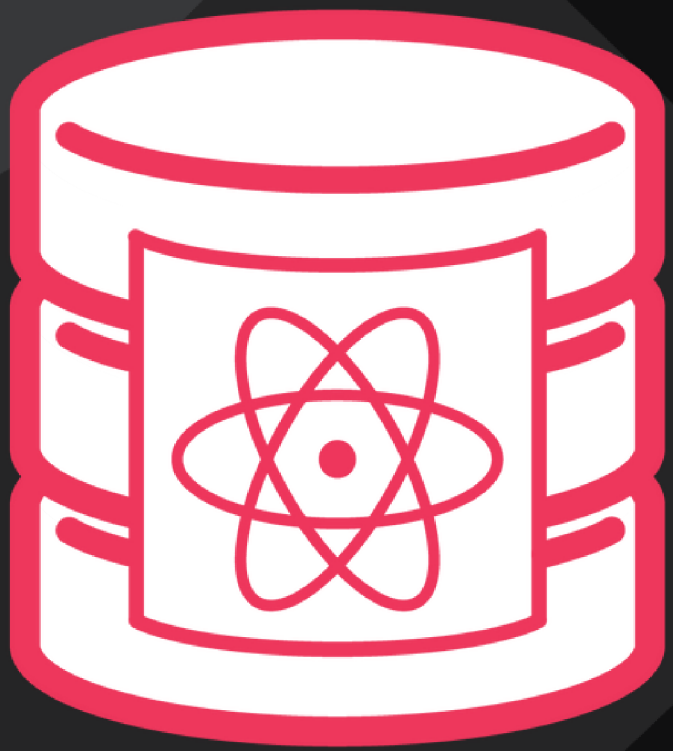
Quantum memories play an important role in entanglement-based quantum networks.



- Store qubits
- Enable longer distance quantum communication
- Aid the security of some key exchange protocols
- Essential to quantum information processing
- Store, manipulate, & modify quantum states

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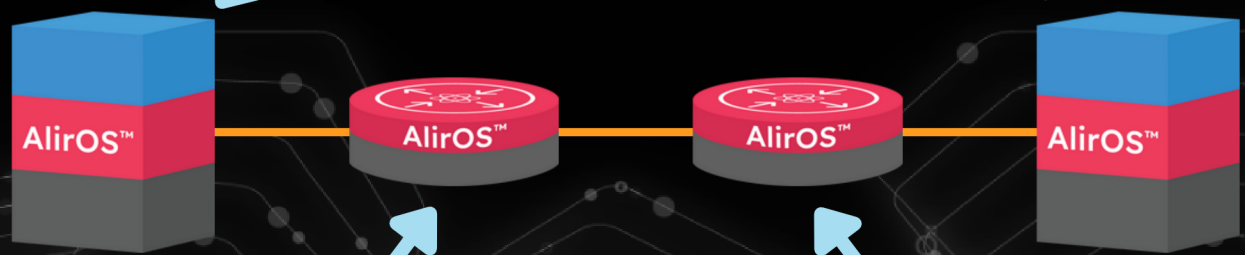
How are quantum memories used in quantum networks?

Quantum Network Node Support

Enable Entanglement at End Points

Sharing Quantum Keys/Secrets



Quantum Communication Protocol Support

Extend Range Via Quantum Repeaters

Quantum Application Support

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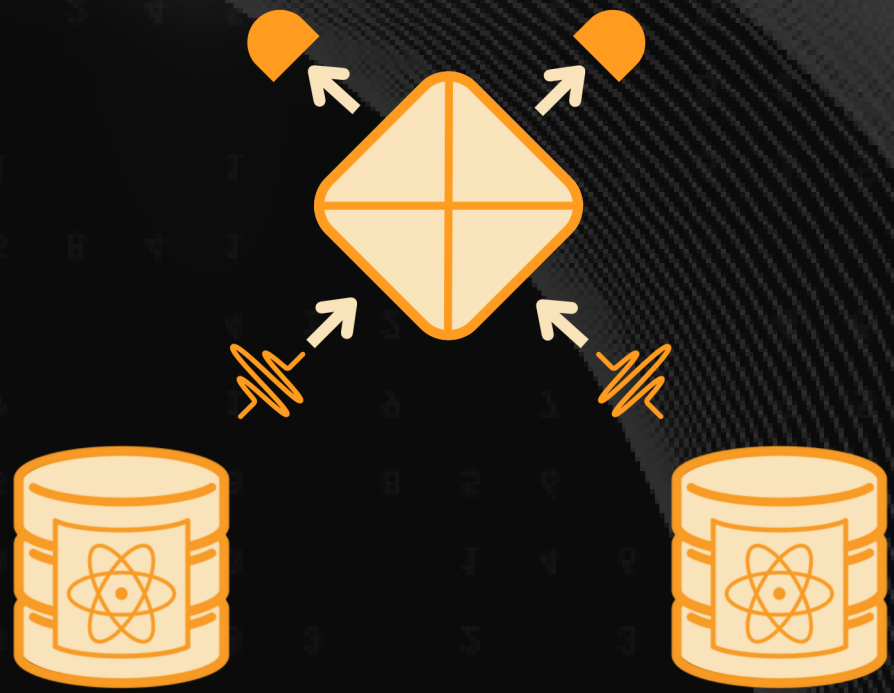
A look inside: Quantum Repeaters

Today, individual discrete components are brought together to perform the tasks of a quantum repeater.



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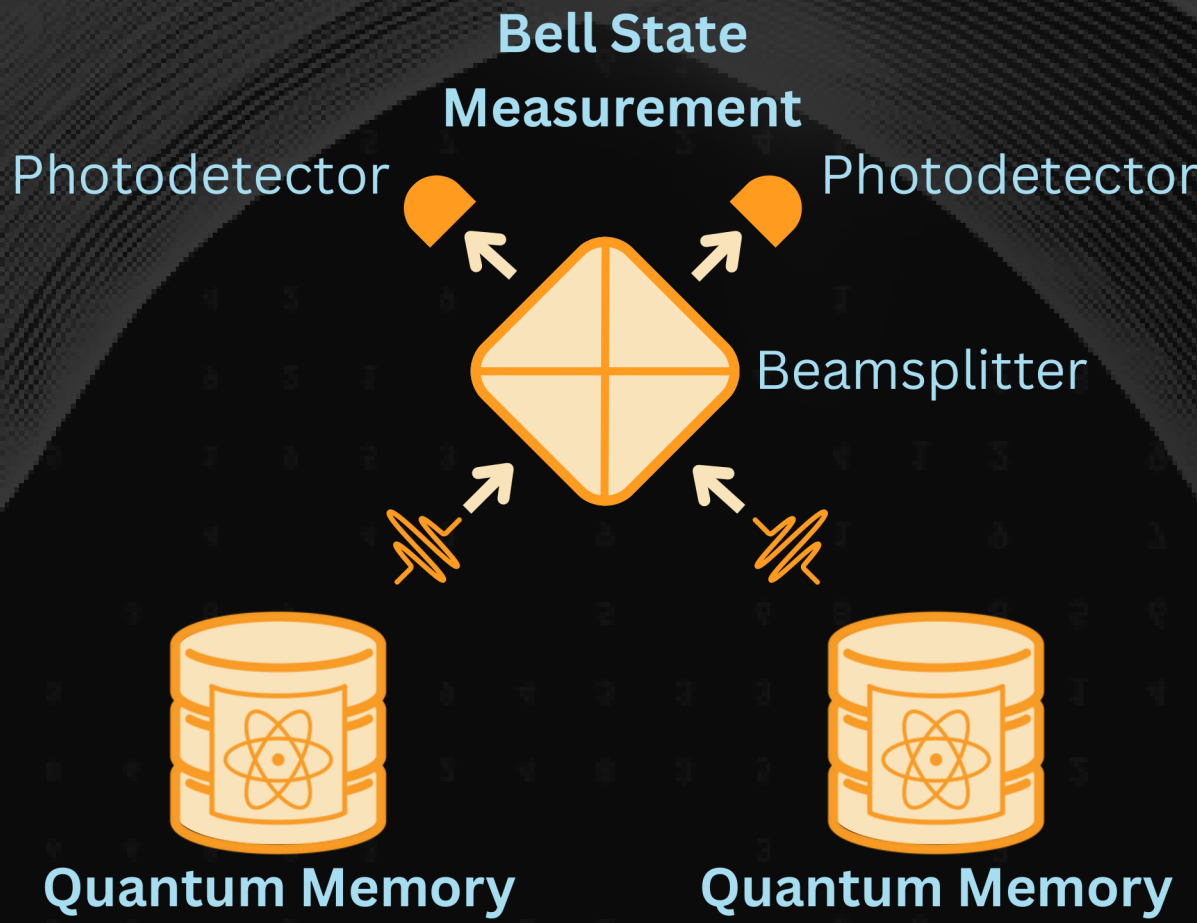
Quantum Repeaters: Internal Design



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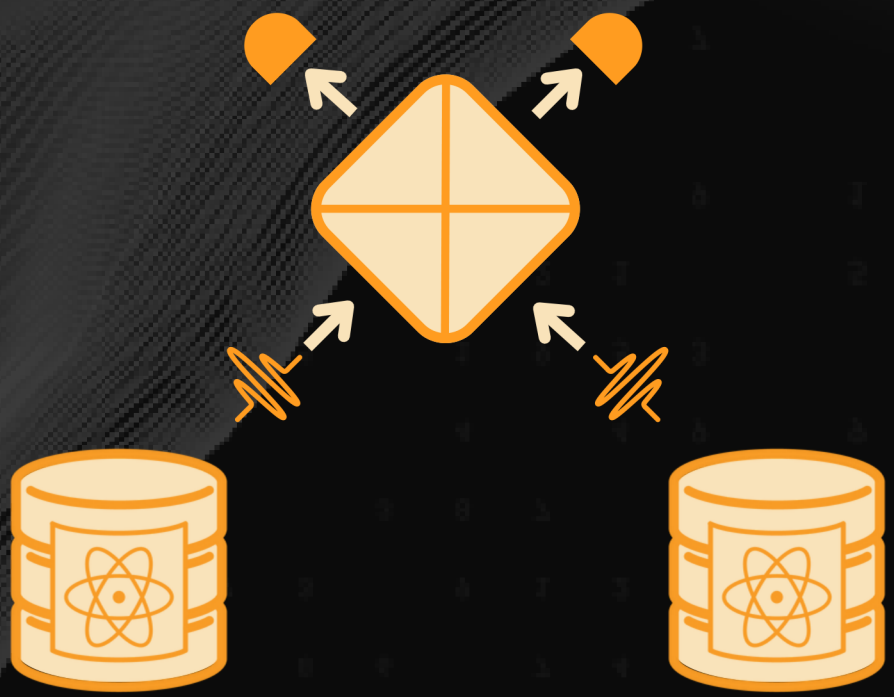
Quantum Repeaters: Internal Design



Entanglement Source
generates entangled particles that are distributed to the connected endpoints

Photon Sources and Detectors
generate and receive photons

Quantum Memories
store qubits and enable better photon indistinguishability (better fidelity) and better synchronization (incoming photons are buffered and do not have to arrive at the exact same time)

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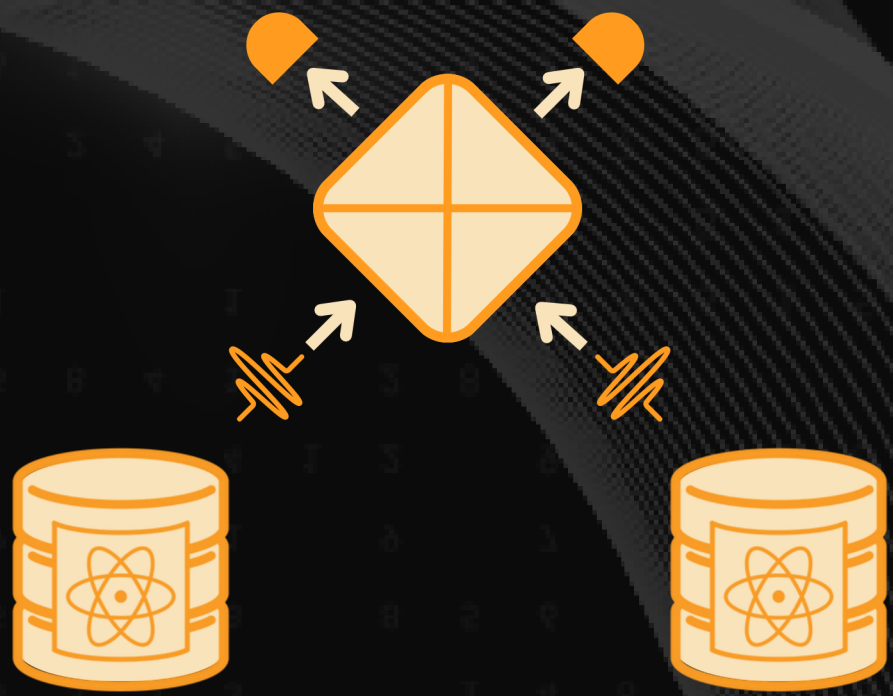
Quantum Repeaters: Internal Design

Bell State Measurement
measures then characterizes entanglement between the two particles (photons)

Quantum Error Correction
mitigates decoherence and other errors that may occur during transmission due to environmental factors

Classical Communication Channels
share quantum operations and implement error correction



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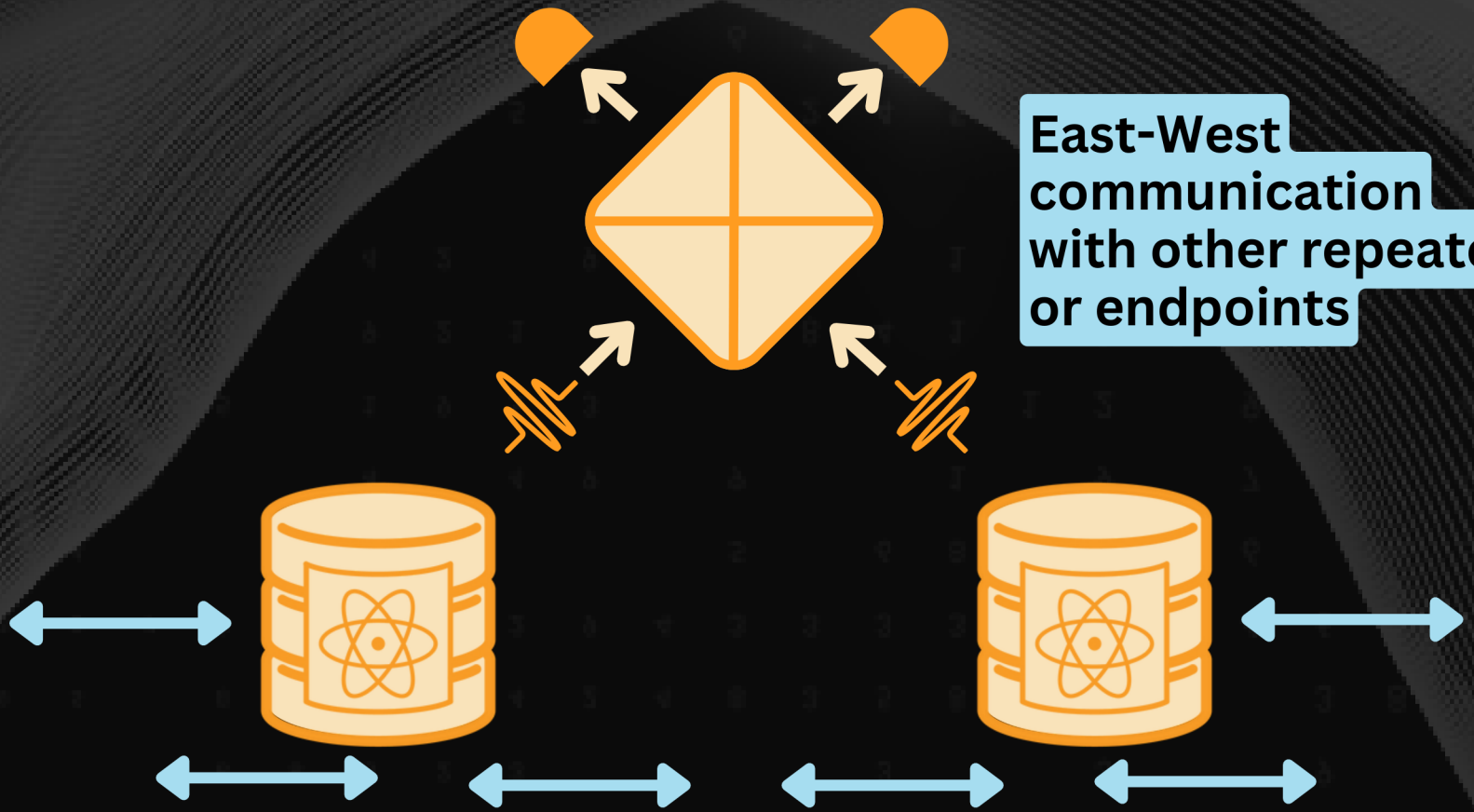
Quantum Repeaters:
Internal Operation
Configuration, Communication, & Protocols



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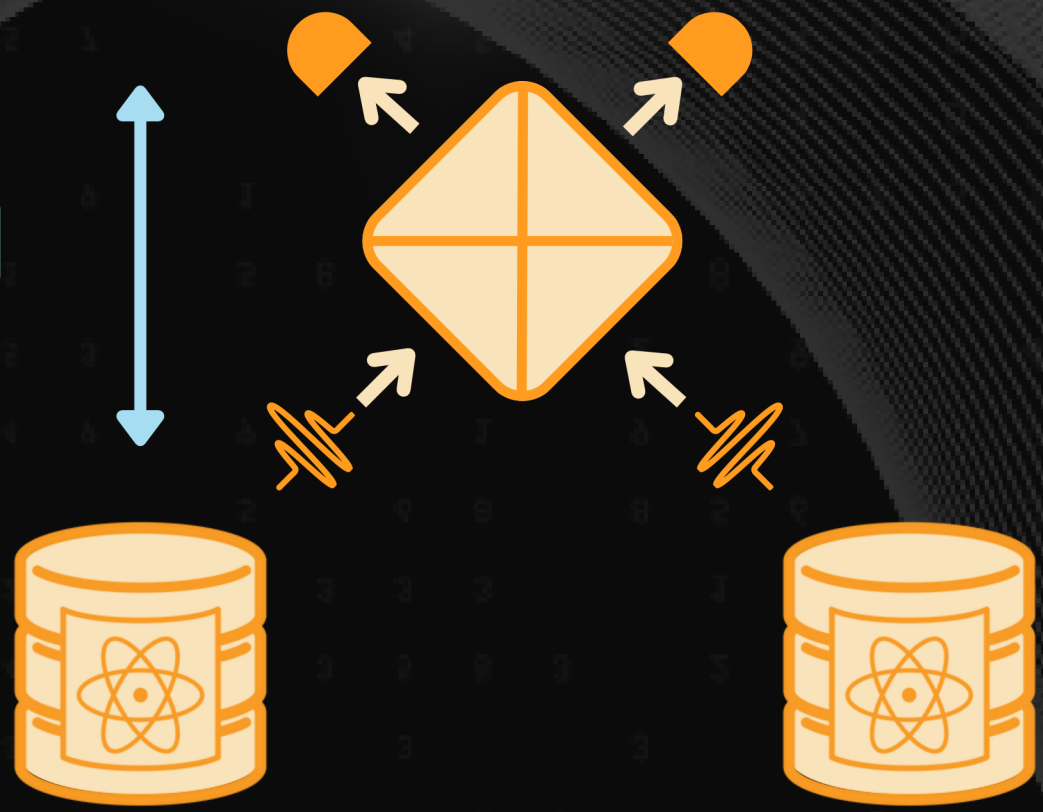
Internal Entanglement, Interoperability, Parameter Setting, Timing, Real Time Configuration

Quantum Repeaters:
Internal Operation
Configuration, Communication, & Protocols

North-South communication with system controller and orchestrator



Internal Entanglement, Interoperability, Parameter Setting, Timing, Real Time Configuration

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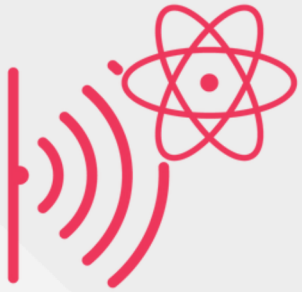
The Quantum Networking Company™

Entanglement-based Networks for

Quantum secure communication

Scaling quantum computing



Distributed quantum sensing

The quantum internet

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