

## Toward Scalable Quantum Computing: The Quantum Interconnect Project of KRISS, KIST, ETRI, and KISTI

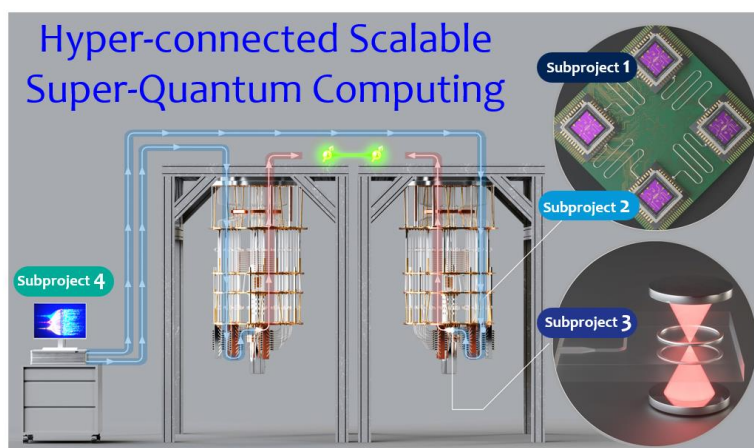
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### Abstract:

By exploiting a computational state space that grows exponentially with the number of qubits, quantum computers are expected to address complex problems that are intractable for conventional digital computers. However, today's quantum computers, which contain only hundreds to a few thousand physical qubits, remain far from the scale required for practically important applications, particularly when the substantial overhead of quantum error correction is taken into account.

To overcome the limitations of a single quantum processor, this national research project aims to develop scalable quantum computing architectures based on quantum interconnects. The project consists of four closely coordinated research programs. KRISS is developing technologies for interconnecting multiple superconducting-qubit modules. KIST is pursuing modular photonic quantum processors and methods for interconnecting multiple photonic-qubit modules. ETRI is developing quantum interconnect technologies for networking the resulting quantum computing systems. KISTI is developing the system software, middleware, and quantum algorithms required to operate and utilize these interconnected, modular quantum computing platforms.



Subproject 4.  
Multi-Core Quantum **Operating  
Softwares and Algorithms**



Subproject 1.  
**Superconducting Multi-Core  
Quantum Processor**



Subproject 2.  
**Photonic Multi-Core  
Quantum Processor**



Subproject 3.  
**Interconnecting  
Multiple Quantum Computers**

