

## **Superconducting quantum- and digital-hybrid computers - tackling of increasing wirings**

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### **Abstract**

Quantum computing gains intensive attention to broad fields of researchers, people in the industry, governments, and many scientific fans all over the world. In RIKEN Center for Quantum Computing, we research superconducting quantum computers by developing the quantum computers themselves. Whereas we know that fundamental elements in hardware include superconducting circuits fabricated on a silicon substrate, packaging enclosure, wiring inside a cryostat, control electronics, and signal processing circuits, a scalable organization of the elements for quantum computers are in the research stage. Here, I focus on the I/O interface between a chip and control electronics and discuss the scalable wiring architecture for a future goal. Having reconsidered current bottlenecks, we find that the uniformity of devices and quantum gates, exploits of translation symmetry in the surface code, and wiring hierarchization lead to I/O bandwidth reduction. I will lastly introduce a stacked heterogeneous quantum module structure as an organization of quantum computers.

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