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NTU Q

RECENT EVENTS

NTU-IBM Quantum System User Conference & Qiskit Hackathon Taiwan 2024

NTU Q-Hub hopes to bring together research teams from various universities currently using the NTU-IBM Quantum System for this conference, fostering mutual observation and exchange to expand research capabilities. We look forward to your participation in this conference!

Registration deadline: Thursday, July 11, 4:00 PM.

We warmly welcome and encourage you to register!

SCALABLE SYSTEM-ON-CHIP QUANTUM COMPUTER WITH TIN VACANCY SPIN QUBITS

Researchers at MIT and MITRE have developed a modular, scalable hardware architecture for quantum computers, enabling efficient control of a large array of qubits. This breakthrough, called quantum-system-on-chip (QSoC), integrates thousands of interconnected qubits onto a customized integrated circuit, with the potential to link multiple chips via optical networking for large-scale quantum communication. The QSoC architecture allows for precise tuning of qubits across 11 frequency channels, facilitating a new entanglement multiplexing protocol for quantum computing.

The team utilized diamond color centers as qubits due to their scalability, compactness, long coherence times, and compatibility with semiconductor fabrication processes. By integrating diamond color center qubits onto a CMOS chip, they achieved a system where qubit frequencies can be dynamically tuned, enhancing connectivity. The researchers perfected a lock-and-release fabrication process to transfer thousands of diamond microchiplets onto the CMOS chip, achieving a large-scale, tunable array.

Their system demonstrated successful tuning of over 4,000 qubits to the same frequency while maintaining their spin and optical properties. This work, supported by various organizations including the MITRE Corporation Quantum Moonshot Program and the U.S. National Science Foundation, marks a significant step towards practical, large-scale quantum computing.

READMORE

計畫補助單位：NSTC 國家科學及技術委員會 National Science and Technology Council

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