Newsletter issue 12-2025, Dec. 27, 2025

AI and Quantum Research Center (AIQRC), Asia University, Taiwan

Activities

[1] 5 Feb. 2026

INTERNATIONAL SYMPOSIUM ON HUMANOID ROBOTICS AND SOVEREIGN AI FOR FUTURE LIVING, Asia University

Click here for more information

[2] Dec. 13, 2025

Professor Ka-Lok Ng delivered a presentation at the ICSB GIW conference, held at Hong Kong University.

Title: The Rise of Quantum Computing in Biomedical Research

[3] October 22 – November 12, 2025

2025 NCHC Open Hackathon: Qa-MolGen Team Sparks a New Era in Quantum Molecular Design

Among the highlights, the "Qa-MolGen" team stands out for its groundbreaking quantum-based approach to molecular generation, setting a new paradigm for designing molecular structures.

QuantWare Unveils VIO-40K and KiloFab: A Leap Toward Scalable Quantum Hardware

Dutch startup QuantWare has announced VIO-40K™, a 3D chiplet-based architecture designed to enable superconducting quantum processors with up to 10,000 qubits—roughly 100× larger than today's leading chips. The design uses vertical interconnects to overcome 2D wiring bottlenecks, supporting 40,000 I/O lines and high-fidelity chip-to-chip links for improved scalability and efficiency. This approach addresses one of the most pressing challenges in quantum hardware: wiring density and packaging. To support this vision, QuantWare will open KiloFab, Europe's first dedicated quantum chip fabrication facility, in 2026. The fab aims to increase production capacity by 20× and begin shipping VIO-40K processors by 2028. The company expects this innovation to democratize access to kilo-qubit hardware, accelerate quantum error correction, and integrate with NVIDIA NVQLink and CUDA-Q, enabling hybrid quantum-classical computing and strengthening Europe's position in the global quantum race.

Engineering Focus, Not Immediate Crypto Risk

QuantWare emphasizes that wiring and packaging—not qubit physics—are now the main barriers to scaling. Its 3D architecture tackles these engineering challenges head-on. Spun out of TU Delft's QuTech in 2021, QuantWare already supplies quantum processors worldwide and delivered a 64-qubit QPU for Italy's largest quantum computer, lending credibility to its roadmap. However, the announcement should not be misinterpreted as a cryptographic breakthrough. 10,000 physical qubits do not equal cryptographically relevant capability, which still requires millions of error-corrected qubits, ultra-low error rates, and robust fault-tolerant systems. Breaking RSA-2048, for example, is estimated to need about 1 million physical qubits with error correction, assuming error rates near 0.1%. VIO-40K represents progress in infrastructure, not the arrival of "Q Day."

Industry Context and Roadmaps

QuantWare's timeline aligns with broader industry ambitions. IonQ targets 10,000 qubits by 2027, 20,000 by 2028, and 2 million by 2030 using photonic interconnects. PsiQuantum aims for a million-qubit fault-tolerant system before 2030, building a new facility near Chicago and partnering with GlobalFoundries. IBM, meanwhile, focuses on fault-tolerant architectures and logical qubits. Each company addresses different challenges—hardware scaling, networking, or manufacturing—but all share the goal of achieving fault tolerance by decade's end.

What Comes Next

QuantWare's VIO-40K is a foundational improvement that could accelerate scaling by solving practical bottlenecks like wiring density and manufacturability. Yet, success depends on more than physical qubit counts. Key milestones include: (i) Demonstrating low error rates at scale, (ii) Publishing physical-to-logical qubit mappings, (iii) Validating chiplet link fidelity, and (iv) Automating calibration for thousands of qubits.

These steps will determine whether large, reliable systems can emerge. Until then, security professionals should view this as momentum in engineering, not an immediate cryptographic threat.

QuantWare's announcement signals a shift toward standardized, scalable quantum hardware and could speed progress toward fault-tolerant machines. But the race will be won by those who deliver robust, error-corrected systems—not just headline qubit counts. VIO-40K is an important step forward, yet Q Day remains far off.

Click here for more information

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