Q-Newsletter

THEMATIC HIGHLIGHT

Quantum in Medicine: Improving Retinal Scans with 'Spooky Action at a Distance'

The SEQUOIA project, led by Nicolaus Copernicus University with European partners, is a €4.5 million Horizon Europe initiative aiming to transform retinal imaging by using quantum principles. Traditional optical coherence tomography (OCT) systems send classical light into the eye to create a detailed cross-section, but they are limited by optical noise and the physics of diffraction.

SEQUOIA's innovation is to use entangled photon pairs, which are twin particles of light that share a linked quantum state. This means measuring one photon instantly gives correlated information about the other. In imaging, this allows the detection of extremely subtle interference patterns with less noise and greater phase sensitivity, achieving roughly twice the current resolution of medical OCT scanners.

By merging quantum principles with advanced AI image reconstruction, SEQUOIA hopes to enable earlier detection of eye diseases, demonstrating how quantum mechanics can have direct applications in medicine.

RESEARCH

Step Toward Quantum Decryption

This month, IBM reached a major milestone in quantum computing, successfully linking 120 quantum bits (qubits) together in a single "GHZ cat" state, setting a new record for keeping so many qubits entangled at once. The experiment achieved a fidelity score of 0.56, which is above the 0.5 mark scientists use to confirm genuine multi-qubit entanglement. To make this possible, the team used superconducting qubits and optimized their setup to avoid noisy sections of the system.

The group employed a technique called "uncomputation", which temporarily disconnects qubits that aren't needed and then brings them back in, helping to keep the system stable. The achievement advances quantum computing toward cracking classical encryption like RSA via Shor's algorithm, relying on large-scale entanglement for efficient factoring. Though not yet threatening Bitcoin's encryption, it marks a step toward the needed size and reliability.

MARKET

NVIDIA Bridges Quantum and AI with NVQLink
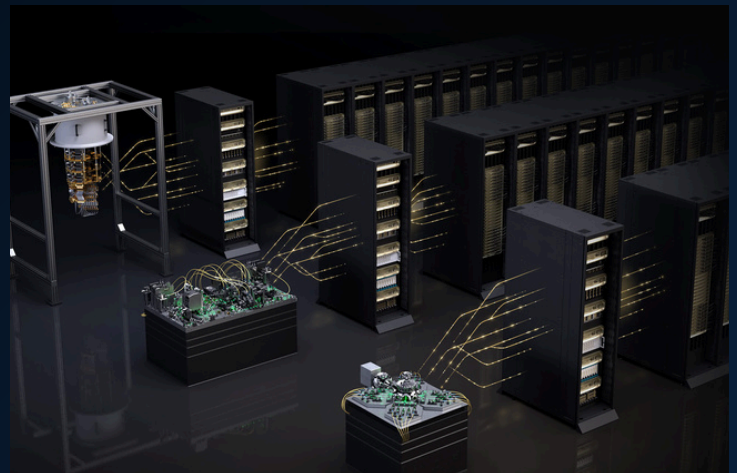
Nvidia has shifted the quantum conversation from lab demos to infrastructure with NVQLink, an open interconnect designed to bridge quantum processors with its GPU-accelerated systems and CUDA Q software. Rather than building a QPU, the company is selling the glue: a way to couple quantum processors and GPUs, enabling real-time, hybrid workflows such as calibration and error correction. The launch sits firmly in the market domain, backed by 17 quantum builders and nine national labs, positioning Nvidia as backbone for early quantum-classical deployments. For customers, the pitch is pragmatic: integrate QPUs into existing AI supercomputers, reuse familiar CUDA-Q tooling, and evolve architectures toward fault tolerance without ripping and replacing infrastructure.

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