

TROY TECHNICAL

QUANTUM COMPUTING WEEKLY REPORT

September 19 - September 25, 2026 | Issue 2026-W38

Verified computational advantage, error control and usable access

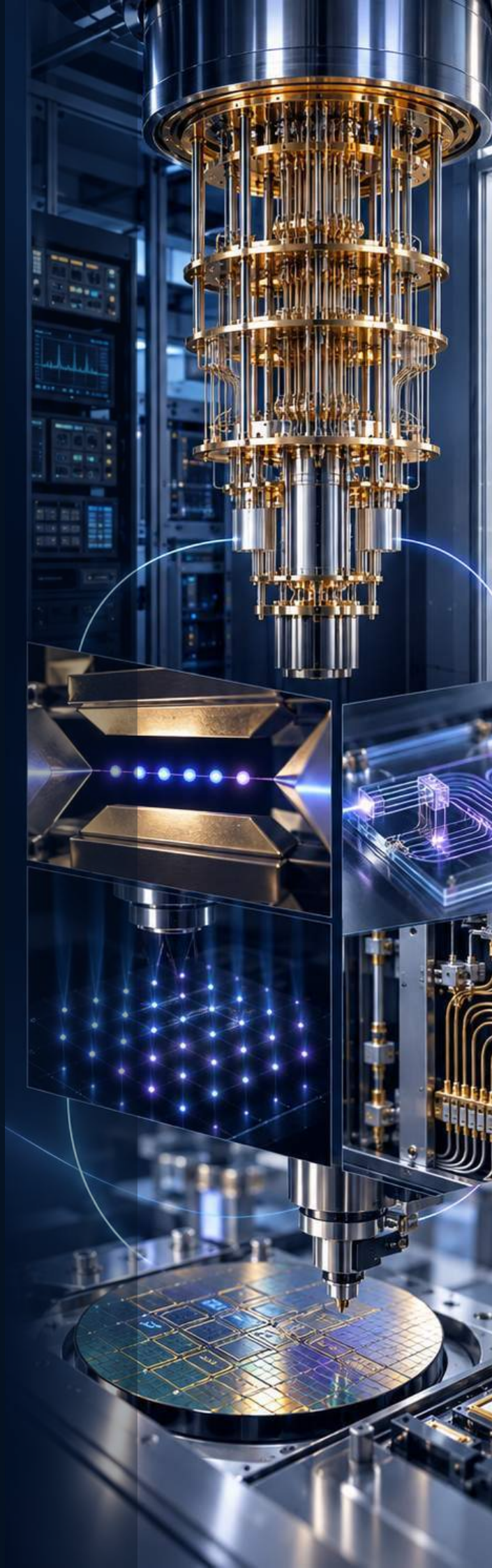
9

ANALYZED ARTICLES

9

PRIORITY THEMES

Issued 2026-09-25 | English edition | fixed approved cover artwork



Quantum Computing: the boundary moved from isolated claims to qualification evidence

9 English articles were reviewed independently from the Japanese edition. Ten themes are retained for management decisions.

SIGNAL 01 | QUBIT DEVICE

Intel and IBM Accelerate Quantum Computing Commercialization within Three Years by Overcoming Error

Intel and IBM are reportedly pushing quantum computing commercialization within three years by tackling key challenges in error correction and cryogenic infrastructure.

SIGNAL 02 | CONTROL STACK

IonQ Demonstrates Quantum Algorithms Accelerate Computer-Aided Engineering Workloads by Up to 14.6% with

IonQ, in collaboration with Synopsys, has demonstrated that integrating quantum algorithms into mainstream engineering software can accelerate complex industrial design workloads by up to 14.6%.

SIGNAL 03 | ERROR CORRECTION

Pasqal Reports 14% H1 2026 Revenue Growth to €4.9M, Achieves 1,024-Atom Defect-Free Registers

Pasqal Holding SA announced robust financial results for H1 2026, with revenue climbing 14% YoY to €4.9 million, driven by a 34% increase in QPU-related services to €3.9 million.

SIGNAL 04 | SYSTEM ACCESS

Infleqtion Achieves 30 Entangled Logical Qubits from 80 Physical Qubits on SqaLe Quantum

Infleqtion has successfully generated 30 entangled logical qubits using only 80 physical qubits on its SqaLe™ quantum computing platform, becoming the first neutral atom quantum computing company to achieve this milestone in a commercial system.

DECISION

Focus this week's management attention on verified computational advantage, error control and usable access. Move only when the linked evidence can be reproduced under your own operating conditions.

THREE MANAGEMENT MOVES

1. Buyers: benchmark valuable workloads against classical alternatives, including total execution and validation cost.
2. Suppliers: tie components and control systems to fidelity, uptime, calibration and scaling evidence.
3. Executives: track error rates, logical qubits, workload advantage, uptime, cost and roadmap timing.

EVIDENCE DISCIPLINE

FACT states what the collected English source reports. BUSINESS READ and ACTION are editorial interpretations. UNKNOWN lists information that the source file does not establish. A linked article is not treated as independent confirmation of every claim.

Five numbers or evidence anchors that require conditions

65%

A09

SOURCE-BOUND CONDITION

IBM validated an error detection and mitigation technique, filtering up to 65% of errors on quantum processors, and introduced a modular cryogenic architecture.

14.6%

A02

SOURCE-BOUND CONDITION

IonQ, in collaboration with Synopsys, has demonstrated that integrating quantum algorithms into mainstream engineering software can accelerate complex industrial design workloads by up to 14.6%.

14%

A03

SOURCE-BOUND CONDITION

Pasqal Holding SA announced robust financial results for H1 2026, with revenue climbing 14% YoY to €4.9 million, driven by a 34% increase in QPU-related services to €3.9 million.

10 times

A07

SOURCE-BOUND CONDITION

Achieved using their novel GPU lattice sieve, this factorization was accomplished at a cost 10 times lower than previous public methods.

122 million

A04

SOURCE-BOUND CONDITION

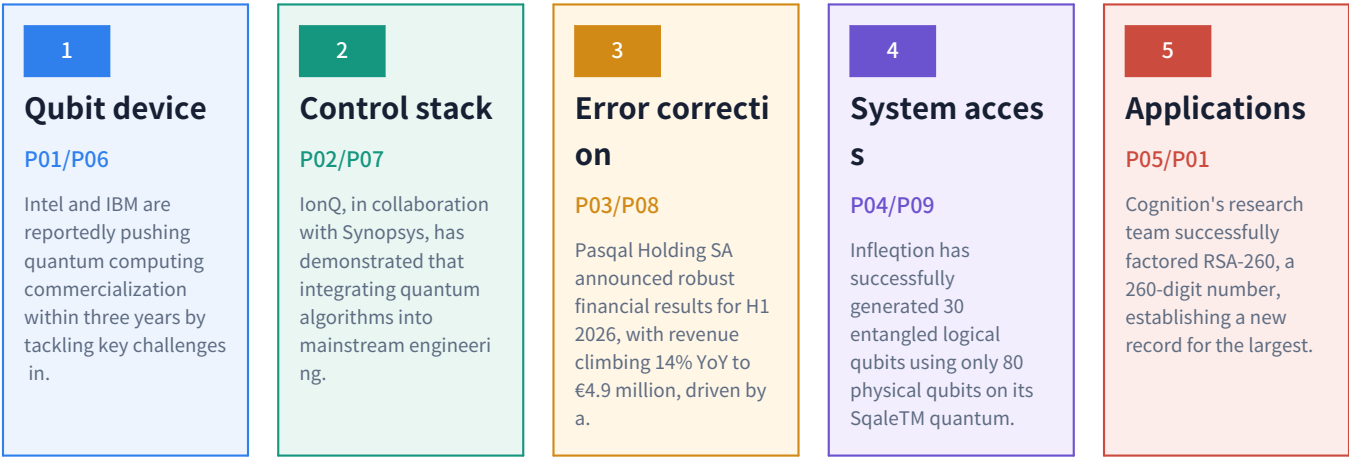
The German government has selected a QUDORA-led consortium for the €122 million (approximately \$138.8 million USD) "NFQC-1k Trapped-Ion Quantum Computer Project." This five-year initiative aims to build a fault-tolerant.

HOW TO USE THESE NUMBERS

Each value is shown with the condition stated in the collected English article. Do not compare values across different test methods, device sizes, operating temperatures or commercial stages without normalizing those conditions.

Where the value chain moved

Each stage combines one leading theme and one supporting theme. The report treats handoffs as evidence transfers, not decorative arrows.



EVIDENCE REQUIRED AT EACH HANDOFF

Qubit device to Control stack	Transfer test conditions, acceptance criteria, failure data, owner and decision date. Recheck error rates, logical qubits, workload advantage, uptime, cost and roadmap timing.
Control stack to Error correction	Transfer test conditions, acceptance criteria, failure data, owner and decision date. Recheck error rates, logical qubits, workload advantage, uptime, cost and roadmap timing.
Error correction to System access	Transfer test conditions, acceptance criteria, failure data, owner and decision date. Recheck error rates, logical qubits, workload advantage, uptime, cost and roadmap timing.
System access to Applications	Transfer test conditions, acceptance criteria, failure data, owner and decision date. Recheck error rates, logical qubits, workload advantage, uptime, cost and roadmap timing.

COMMON CONTROL POINT

No theme moves to a commercial commitment until a named owner has reproduced the relevant evidence and documented error rates, logical qubits, workload advantage, uptime, cost and roadmap timing.

Priority map: maturity and next decision locus



REPRODUCIBLE POSITIONING RULE
Horizontal position uses five discrete stages: Research, Prototype, Joint evaluation, Product adoption and Scale. The vertical bands classify the next decision locus: Tech / process, System / adoption, or Business / rules (including supply systems). Article-title cues take precedence; the overview is used only when the title is silent. These are categories, not impact ranks. Bubble diameter reflects the editorial score.

FACT is source-bound. BUSINESS READ, ACTION and UNKNOWN are explicit editorial layers.

P01

Intel and IBM Accelerate Quantum Computing Commercialization within Three Years by Overcoming Error

A09 | Qubit device | Product adoption

Date not stated

FACT

Intel and IBM are reportedly pushing quantum computing commercialization within three years by tackling key challenges in error correction and cryogenic infrastructure. IBM validated an error detection and mitigation technique, filtering up to 65% of errors on quantum processors, and introduced a modular cryogenic architecture.

WHY IT MATTERS

The decision relevance is verified computational advantage, error control and usable access. The signal should be tested at the application and operating-system level, not accepted from a headline alone.

BUSINESS READ

For operating companies, compare the reported change with current qualification, sourcing and product-roadmap assumptions. For suppliers, tie components and control systems to fidelity, uptime, calibration and scaling evidence.

ACTION

Within 30 days, benchmark valuable workloads against classical alternatives, including total execution and validation cost; record the evidence and owner against P01.

UNKNOWN

Still unproven or incompletely stated: error rates, logical qubits, workload advantage, uptime, cost and roadmap timing.

EDITORIAL SCORE 21/25 | MATURITY 4/5 | DECISION LOCUS: SYSTEM / ADOPTION

P02

IonQ Demonstrates Quantum Algorithms Accelerate Computer-Aided Engineering Workloads by Up to 14.6% with

A02 | Control stack | Joint evaluation

Date not stated

FACT

IonQ, in collaboration with Synopsys, has demonstrated that integrating quantum algorithms into mainstream engineering software can accelerate complex industrial design workloads by up to 14.6%. This research, which received a 1st Place Best Paper Award at IEEE Quantum Week 2026, highlights the potential of hybrid quantum computing to address significant computational bottlenecks in classical supercomputers.

WHY IT MATTERS

The decision relevance is verified computational advantage, error control and usable access. The signal should be tested at the application and operating-system level, not accepted from a headline alone.

BUSINESS READ

For operating companies, compare the reported change with current qualification, sourcing and product-roadmap assumptions. For suppliers, tie components and control systems to fidelity, uptime, calibration and scaling evidence.

ACTION

Within 30 days, benchmark valuable workloads against classical alternatives, including total execution and validation cost; record the evidence and owner against P02.

UNKNOWN

Still unproven or incompletely stated: error rates, logical qubits, workload advantage, uptime, cost and roadmap timing.

EDITORIAL SCORE 20/25 | MATURITY 3/5 | DECISION LOCUS: SYSTEM / ADOPTION

FACT is source-bound. BUSINESS READ, ACTION and UNKNOWN are explicit editorial layers.

P03

Pasqal Reports 14% H1 2026 Revenue Growth to €4.9M, Achieves 1,024-Atom Defect-Free Registers

A03 | Error correction | Research

Date not stated

FACT

Pasqal Holding SA announced robust financial results for H1 2026, with revenue climbing 14% YoY to €4.9 million, driven by a 34% increase in QPU-related services to €3.9 million. Operationally, Pasqal achieved significant milestones by preparing defect-free registers of 1,024 atoms, doubling prior records, and extending atom lifetimes by 40-fold.

WHY IT MATTERS

The decision relevance is verified computational advantage, error control and usable access. The signal should be tested at the application and operating-system level, not accepted from a headline alone.

BUSINESS READ

For operating companies, compare the reported change with current qualification, sourcing and product-roadmap assumptions. For suppliers, tie components and control systems to fidelity, uptime, calibration and scaling evidence.

ACTION

Within 30 days, benchmark valuable workloads against classical alternatives, including total execution and validation cost; record the evidence and owner against P03.

UNKNOWN

Still unproven or incompletely stated: error rates, logical qubits, workload advantage, uptime, cost and roadmap timing.

EDITORIAL SCORE 20/25 | MATURITY 1/5 | DECISION LOCUS: BUSINESS / RULES

P04

Infleqtion Achieves 30 Entangled Logical Qubits from 80 Physical Qubits on SqaLe Quantum

A05 | System access | Research

Date not stated

FACT

Infleqtion has successfully generated 30 entangled logical qubits using only 80 physical qubits on its SqaLe™ quantum computing platform, becoming the first neutral atom quantum computing company to achieve this milestone in a commercial system. This breakthrough was enabled by a co-design approach involving hardware-software optimization and AI-assisted discovery, effectively halving the number of physical gates required for key logical operations.

WHY IT MATTERS

The decision relevance is verified computational advantage, error control and usable access. The signal should be tested at the application and operating-system level, not accepted from a headline alone.

BUSINESS READ

For operating companies, compare the reported change with current qualification, sourcing and product-roadmap assumptions. For suppliers, tie components and control systems to fidelity, uptime, calibration and scaling evidence.

ACTION

Within 30 days, benchmark valuable workloads against classical alternatives, including total execution and validation cost; record the evidence and owner against P04.

UNKNOWN

Still unproven or incompletely stated: error rates, logical qubits, workload advantage, uptime, cost and roadmap timing.

EDITORIAL SCORE 20/25 | MATURITY 1/5 | DECISION LOCUS: SYSTEM / ADOPTION

FACT is source-bound. BUSINESS READ, ACTION and UNKNOWN are explicit editorial layers.

P05

Cognition's GPU Lattice Siever Factors RSA-260 at 10x Lower Cost, Setting New Record

A07 | Applications | Research

Date not stated

FACT

Cognition's research team successfully factored RSA-260, a 260-digit number, establishing a new record for the largest publicly factored RSA challenge number. Achieved using their novel GPU lattice siever, this factorization was accomplished at a cost 10 times lower than previous public methods. This breakthrough highlights a growing vulnerability in current RSA encryption and underscores the urgency for transitioning to post-quantum cryptography.

WHY IT MATTERS

The decision relevance is verified computational advantage, error control and usable access. The signal should be tested at the application and operating-system level, not accepted from a headline alone.

BUSINESS READ

For operating companies, compare the reported change with current qualification, sourcing and product-roadmap assumptions. For suppliers, tie components and control systems to fidelity, uptime, calibration and scaling evidence.

ACTION

Within 30 days, benchmark valuable workloads against classical alternatives, including total execution and validation cost; record the evidence and owner against P05.

UNKNOWN

Still unproven or incompletely stated: error rates, logical qubits, workload advantage, uptime, cost and roadmap timing.

EDITORIAL SCORE 20/25 | MATURITY 1/5 | DECISION LOCUS: TECH / PROCESS

P06

German Government Funds QUDORA-Led Consortium with €122M for Trapped-Ion Quantum Computer Project, Targeting

A04 | Qubit device | Research

Date not stated

FACT

The German government has selected a QUDORA-led consortium for the €122 million (approximately \$138.8 million USD) "NFQC-1k Trapped-Ion Quantum Computer Project." This five-year initiative aims to build a fault-tolerant trapped-ion quantum computer with at least 1,000 physical qubits and 50 logical qubits, achieving a logical gate error rate below 0.01%.

WHY IT MATTERS

The decision relevance is verified computational advantage, error control and usable access. The signal should be tested at the application and operating-system level, not accepted from a headline alone.

BUSINESS READ

For operating companies, compare the reported change with current qualification, sourcing and product-roadmap assumptions. For suppliers, tie components and control systems to fidelity, uptime, calibration and scaling evidence.

ACTION

Within 30 days, benchmark valuable workloads against classical alternatives, including total execution and validation cost; record the evidence and owner against P06.

UNKNOWN

Still unproven or incompletely stated: error rates, logical qubits, workload advantage, uptime, cost and roadmap timing.

EDITORIAL SCORE 20/25 | MATURITY 1/5 | DECISION LOCUS: BUSINESS / RULES

FACT is source-bound. BUSINESS READ, ACTION and UNKNOWN are explicit editorial layers.

P07

IonQ Demonstrates Quantum Generative Modeling for High-Resolution Radar Change Detection, Showing Advantage Where

A08 | Control stack | Research

Date not stated

FACT

IonQ has demonstrated high-resolution radar change detection using quantum generative modeling, revealing that quantum hardware offers an advantage in data-sparse regimes where conventional statistical methods underperform. This breakthrough accelerates the practical application of quantum machine learning in challenging data analysis areas like defense, surveillance, and environmental monitoring, providing concrete evidence of quantum computers' superiority under specific conditions.

WHY IT MATTERS

The decision relevance is verified computational advantage, error control and usable access. The signal should be tested at the application and operating-system level, not accepted from a headline alone.

BUSINESS READ

For operating companies, compare the reported change with current qualification, sourcing and product-roadmap assumptions. For suppliers, tie components and control systems to fidelity, uptime, calibration and scaling evidence.

ACTION

Within 30 days, benchmark valuable workloads against classical alternatives, including total execution and validation cost; record the evidence and owner against P07.

UNKNOWN

Still unproven or incompletely stated: error rates, logical qubits, workload advantage, uptime, cost and roadmap timing.

EDITORIAL SCORE 20/25 | MATURITY 1/5 | DECISION LOCUS: SYSTEM / ADOPTION

P08

GSA Mandates Federal Agencies Migrate to NIST-Standardized Post-Quantum Cryptography to Mitigate National Security

A01 | Error correction | Research

Date not stated

FACT

The General Services Administration (GSA) has underscored the critical importance of post-quantum cryptography (PQC) for securing data against both classical and future quantum computers. With Shor's Algorithm posing a potential threat to most modern public-key encryption, federal agencies are now subject to firm deadlines for inventorying their cryptographic assets and migrating to NIST-published PQC standards.

WHY IT MATTERS

The decision relevance is verified computational advantage, error control and usable access. The signal should be tested at the application and operating-system level, not accepted from a headline alone.

BUSINESS READ

For operating companies, compare the reported change with current qualification, sourcing and product-roadmap assumptions. For suppliers, tie components and control systems to fidelity, uptime, calibration and scaling evidence.

ACTION

Within 30 days, benchmark valuable workloads against classical alternatives, including total execution and validation cost; record the evidence and owner against P08.

UNKNOWN

Still unproven or incompletely stated: error rates, logical qubits, workload advantage, uptime, cost and roadmap timing.

EDITORIAL SCORE 19/25 | MATURITY 1/5 | DECISION LOCUS: BUSINESS / RULES

FACT is source-bound. BUSINESS READ, ACTION and UNKNOWN are explicit editorial layers.

P09

IonQ Demonstrates Quantum Generative Modeling for High-Resolution Radar Change Detection, Promising Defense and

A06 | System access | Research

Date not stated

FACT

IonQ has successfully demonstrated quantum generative modeling for high-resolution radar change detection. The research revealed that the quantum model achieved superior relative performance in the sparsest data regions compared to classical statistical methods. This advantage was sustained when the simulation model was executed on IonQ's quantum hardware.

WHY IT MATTERS

The decision relevance is verified computational advantage, error control and usable access. The signal should be tested at the application and operating-system level, not accepted from a headline alone.

BUSINESS READ

For operating companies, compare the reported change with current qualification, sourcing and product-roadmap assumptions. For suppliers, tie components and control systems to fidelity, uptime, calibration and scaling evidence.

ACTION

Within 30 days, benchmark valuable workloads against classical alternatives, including total execution and validation cost; record the evidence and owner against P09.

UNKNOWN

Still unproven or incompletely stated: error rates, logical qubits, workload advantage, uptime, cost and roadmap timing.

EDITORIAL SCORE 19/25 | MATURITY 1/5 | DECISION LOCUS: BUSINESS / RULES

Playbook and 0-5 year roadmap

STAKEHOLDER	NOW 0-30 DAYS	NEXT 1-12 MONTHS	LATER 1-5 YEARS
Operating companies	benchmark valuable workloads against classical alternatives, including total execution and validation cost	Run production-like qualification with explicit acceptance and stop criteria.	Build a portfolio and architecture that can absorb technology and supplier changes.
Materials, equipment and technology suppliers	tie components and control systems to fidelity, uptime, calibration and scaling evidence	Create shared reliability, process-window and failure-analysis data with customers.	Standardize interfaces, traceability, lifecycle support and recovery services.
Trading, investment and legal teams	Map error rates, logical qubits, workload advantage, uptime, cost and roadmap timing.	Contract for capacity, quality, change notice, liability, alternatives and exit.	Diversify regional, technical and customer concentration risk.

ROADMAP

NOW 0-30 DAYS Evidence ledger Owner: Strategy + quality Deliverable: claim, source, condition, owner	NOW 0-30 DAYS Risk screen Owner: Procurement + legal Deliverable: unknowns, alternatives, stop	NEXT 1-12 MONTHS Joint qualification Owner: R&D + supplier Deliverable: process window and failure data
NEXT 1-12 MONTHS Commercial gate Owner: Business + finance Deliverable: unit economics and capacity	LATER 1-5 YEARS Platform strategy Owner: Executive team Deliverable: portfolio and interface roadmap	LATER 1-5 YEARS Service layer Owner: Operations + channel Deliverable: monitoring, maintenance and recovery

GO / NO-GO GATES

GATE	OWNER	REQUIRED EVIDENCE	NO-GO CONDITION
G1 Evidence	Quality	Source, test conditions and reproducibility	No traceable evidence
G2 Integration	R&D	Interface, process window and failure analysis	Cannot meet system conditions
G3 Commercial	Business	Capacity, total cost, contract and alternatives	Economics or supply cannot be supported
G4 Lifecycle	Operations	Monitoring, maintenance, change notice and exit	No accountable operating plan

ANALYZED ARTICLES | ITEMS 01-09

Every title and URL is displayed in full. URLs wrap without shortening and remain clickable. A verified-reference label means the translated HTML did not retain its original source URL.

ID	FULL ARTICLE TITLE	FULL SOURCE / VERIFIED REFERENCE URL - CLICKABLE
A01	GSA Mandates Federal Agencies Migrate to NIST-Standardized Post-Quantum Cryptography to Mitigate National Security Vulnerabilities	https://www.gsa.gov/technology/it-contract-vehicles-and-purchasing-programs/it-security/postquantum-cryptography
A02	IonQ Demonstrates Quantum Algorithms Accelerate Computer-Aided Engineering Workloads by Up to 14.6% with Synopsys Collaboration	https://www.ionq.com/news/ionq-demonstrates-computer-aided-engineering-workload-acceleration-by-up-to-14-6-with-quantum-technology
A03	Pasqal Reports 14% H1 2026 Revenue Growth to €4.9M, Achieves 1,024-Atom Defect-Free Registers and Superior Logical Qubit ML Performance	https://www.pasqal.com/newsroom/pasqal-reports-first-half-2026-financial-results/
A04	German Government Funds QUDORA-Led Consortium with €122M for Trapped-Ion Quantum Computer Project, Targeting 1,000 Physical & 50 Logical Qubits with Sub-0.01% Logical Gate Error Rate	https://quantumcomputingreport.com/german-government-selects-qudora-led-consortium-for-e122-million-138-8-usd-nfqc-1k-trapped-ion-quantum-computer-project/amp/
A05	Infleqtion Achieves 30 Entangled Logical Qubits from 80 Physical Qubits on Sqale Quantum Computer, First for Neutral Atom Architecture	https://ir.infleqtion.com/news-events/press-releases/detail/212/infleqtion-achieves-30-entangled-logical-qubits-on-its-sqale-quantum-computer
A06	IonQ Demonstrates Quantum Generative Modeling for High-Resolution Radar Change Detection, Promising Defense and Environmental Monitoring Applications	https://ionq.com/news/ionq-demonstrates-quantum-generative-modeling-for-high-resolution-radar-change-detection
A07	Cognition's GPU Lattice Siever Factors RSA-260 at 10x Lower Cost, Setting New Record	https://quantumzeitgeist.com/cognition-gpu-lattice-siever-rsa-260/
A08	IonQ Demonstrates Quantum Generative Modeling for High-Resolution Radar Change Detection, Showing Advantage Where Conventional Statistics Were Sparsest	https://www.ionq.com/news/ionq-demonstrates-quantum-generative-modeling-for-high-resolution-radar-change-detection
A09	Intel and IBM Accelerate Quantum Computing Commercialization within Three Years by Overcoming Error Correction and Cryogenic Bottlenecks	https://finance.biggo.com/news/e571eb59-942c-4a5b-9294-ddcb4d5f1451

QuantumComputing — Selected Articles

Date: 2026-09-27

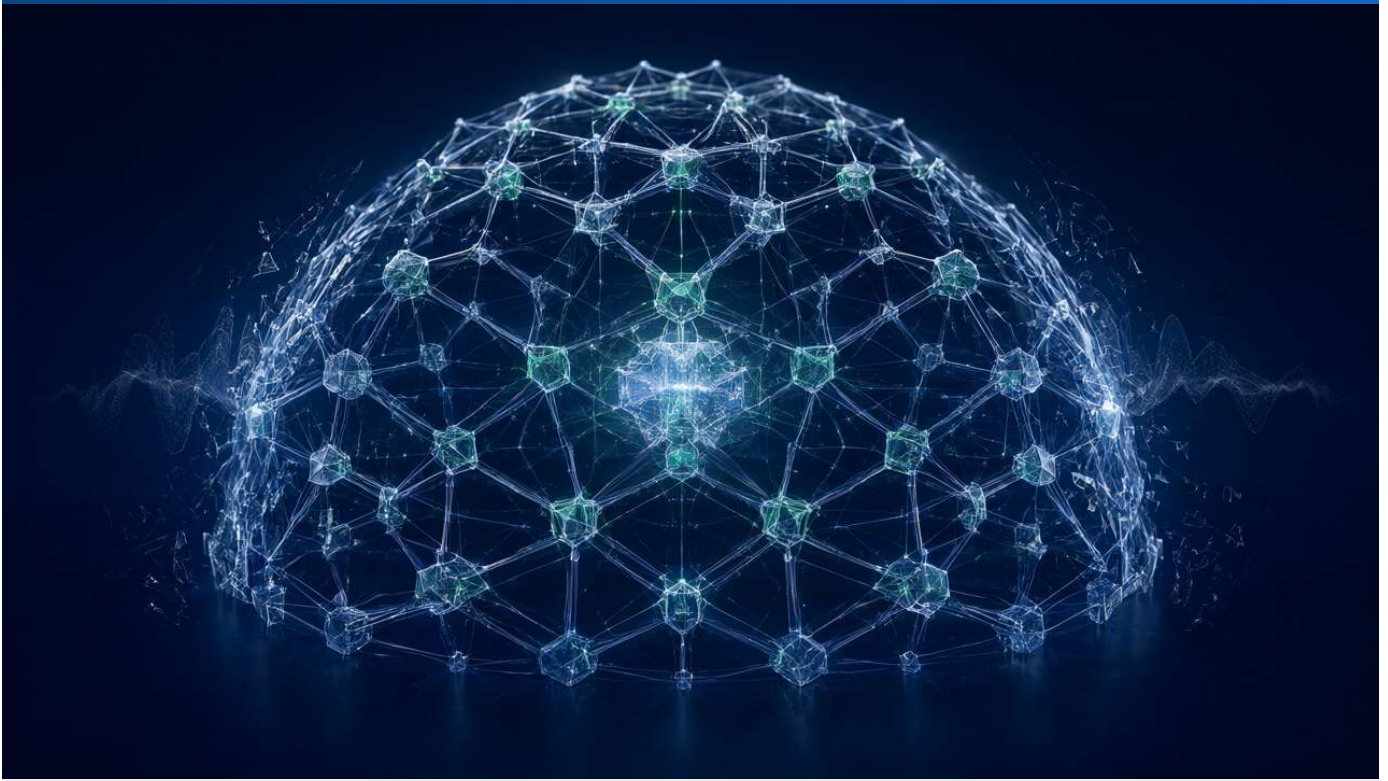
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- #03 Pasqal Reports 14% H1 2026 Revenue Growth to €4.9M, Achieves 1,024-Atom Defect-Free Registers and Superior Logical Qubit ML Performance
- #04 German Government Funds QUDORA-Led Consortium with €122M for Trapped-Ion Quantum Computer Project, Targeting 1,000 Physical & 50 Logical Qubits with Sub-0.01% Logical Gate Error Rate
- #05 Infleqtion Achieves 30 Entangled Logical Qubits from 80 Physical Qubits on SqaLe Quantum Computer, First for Neutral Atom Architecture
- #06 IonQ Demonstrates Quantum Generative Modeling for High-Resolution Radar Change Detection, Promising Defense and Environmental Monitoring Applications
- #07 Cognition's GPU Lattice Siever Factors RSA-260 at 10x Lower Cost, Setting New Record
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- #09 Intel and IBM Accelerate Quantum Computing Commercialization within Three Years by Overcoming Error Correction and Cryogenic Bottlenecks

#01 GSA Mandates Federal Agencies Migrate to NIST-Standardized Post-Quantum Cryptography to Mitigate National Security Vulnerabilities

Published September 22, 2026 GSA USA



OVERVIEW

The General Services Administration (GSA) has underscored the critical importance of post-quantum cryptography (PQC) for securing data against both classical and future quantum computers. With Shor's Algorithm posing a potential threat to most modern public-key encryption, federal agencies are now subject to firm deadlines for inventorying their cryptographic assets and migrating to NIST-published PQC standards. This preemptive transition is deemed crucial to avert national security vulnerabilities and economic disruption in the quantum era.

Key Findings

The General Services Administration (GSA) has issued a directive emphasizing the critical need for federal agencies to transition to Post-Quantum Cryptography (PQC). PQC algorithms are specifically designed to secure data against both conventional classical computers and the anticipated threat of large-scale quantum computers, addressing potential national security vulnerabilities arising from the advent of quantum computing capabilities.

Technical / Clinical Details

PQC comprises a new generation of cryptographic algorithms engineered to resist attacks from quantum computers, which, using algorithms like Shor's, could efficiently break current public-key encryption standards such as RSA and Elliptic Curve Cryptography. The GSA is imposing strict timelines on federal agencies to meticulously inventory their existing cryptographic algorithms and assets across their IT infrastructure. Subsequently, these agencies must migrate to the PQC standards published by the National Institute of Standards and Technology (NIST). This extensive migration effort involves complex planning and execution to ensure that data integrity and confidentiality are maintained across all digital communications and stored data, while minimizing disruption to critical operations. The transition mandates comprehensive risk assessments and phased deployments of the new cryptographic suites.

Background & Context

The emergence of quantum computing represents a paradigm shift in cybersecurity, as current cryptographic methods, which rely on the computational difficulty for classical computers, will be rendered vulnerable. Federal agencies, tasked with safeguarding national secrets, citizen data, and critical infrastructure, face an imperative to preempt this threat. The GSA's initiative is a proactive measure to build a resilient cyber defense for the future, ensuring that sensitive information remains protected even when powerful quantum computers become a reality. This federal mandate is expected to set a precedent, influencing private sector companies and international organizations to accelerate their own PQC transition efforts, thereby driving a global shift in cryptographic practices.

Strategic Significance & Outlook

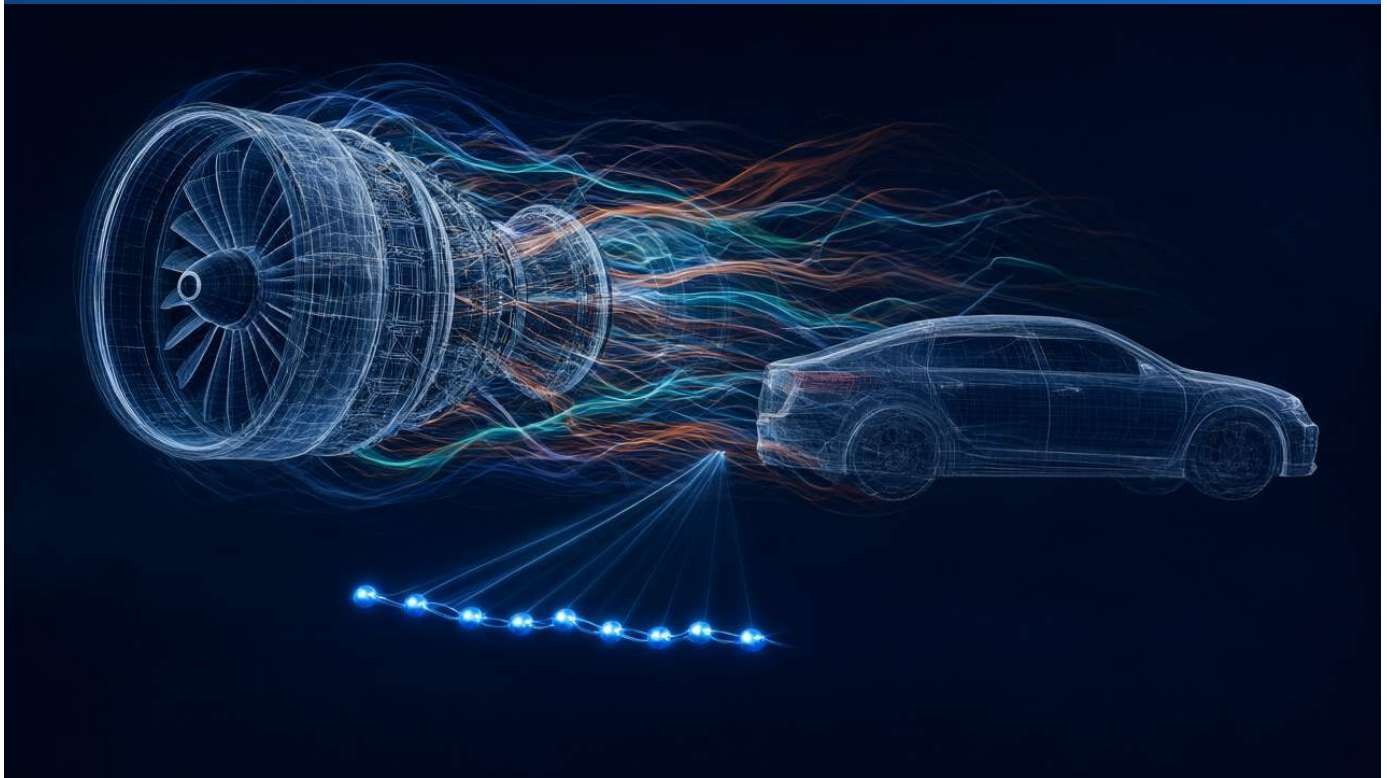
The transition to PQC is not merely a technical upgrade but a strategic imperative for national and economic security. The GSA's directive provides a comprehensive framework for federal agencies to navigate this complex process systematically. Moving forward, accelerated development of NIST-standardized PQC implementations and tools is anticipated, leading to their broader deployment across various applications. A successful PQC migration will ensure that global digital infrastructure remains secure in the post-quantum era, guaranteeing the long-term confidentiality and integrity of data against advanced quantum cyber threats. This foresight positions the U.S. government at the forefront of quantum-safe cybersecurity.

Source: <https://www.gsa.gov/technology/it-contract-vehicles-and-purchasing-programs/it-security/postquantum-cryptography>

Collected: September 25, 2026 | Automated Research System (Gemini API)

#02 IonQ Demonstrates Quantum Algorithms Accelerate Computer-Aided Engineering Workloads by Up to 14.6% with Synopsys Collaboration

Published September 17, 2026 IonQ USA



OVERVIEW

IonQ, in collaboration with Synopsys, has demonstrated that integrating quantum algorithms into mainstream engineering software can accelerate complex industrial design workloads by up to 14.6%. This research, which received a 1st Place Best Paper Award at IEEE Quantum Week 2026, highlights the potential of hybrid quantum computing to address significant computational bottlenecks in classical supercomputers. This breakthrough promises substantial time savings for complex simulations in critical areas such as automotive and jet engine design.

Key Findings

IonQ announced on September 17, 2026, a groundbreaking collaboration with Synopsys, demonstrating that quantum algorithms can accelerate computer-aided engineering (CAE) workloads by up to 14.6% when integrated into mainstream engineering software. This research was recognized with a 1st Place Best Paper Award at IEEE Quantum Week 2026, underscoring its innovative approach to addressing major computational bottlenecks in classical supercomputers. The demonstrated acceleration has profound implications for industries reliant on complex simulations, such as automotive and aerospace design, by potentially reducing processing times significantly.

Technical / Clinical Details

The research focused on integrating quantum algorithms into specific phases of complex industrial design simulations. This involved applying quantum techniques to computationally intensive parts of classical finite element method (FEM) simulations, particularly in areas like structural analysis, material property optimization, or solving large linear systems. By leveraging IonQ's quantum processing units (QPUs), the study showed that hybrid workflows could achieve a quantifiable speedup. The 14.6% acceleration translates into tangible time savings, which, for large-scale industrial simulations, could mean reducing computation from days to hours, or from hours to minutes. This advancement does not require fully fault-tolerant quantum computers but rather leverages the strengths of near-term quantum devices in conjunction with classical high-performance computing (HPC) resources, demonstrating a practical pathway to quantum advantage.

Background & Context

Computer-Aided Engineering (CAE) is a cornerstone of modern product development across sectors like manufacturing, aerospace, and automotive. However, critical simulations for material science, fluid dynamics, and structural optimization often demand immense computational resources and time, even with state-of-the-art classical supercomputers. This computational bottleneck limits the iterative design process and the ability to explore a wider range of design parameters or higher fidelity models. The collaboration between IonQ, a leading quantum hardware company, and Synopsys, a major provider of electronic design automation and semiconductor IP, represents a strategic move to address these challenges. It signifies a growing trend where quantum computing is moving beyond theoretical exploration to deliver concrete performance improvements in real-world industrial applications.

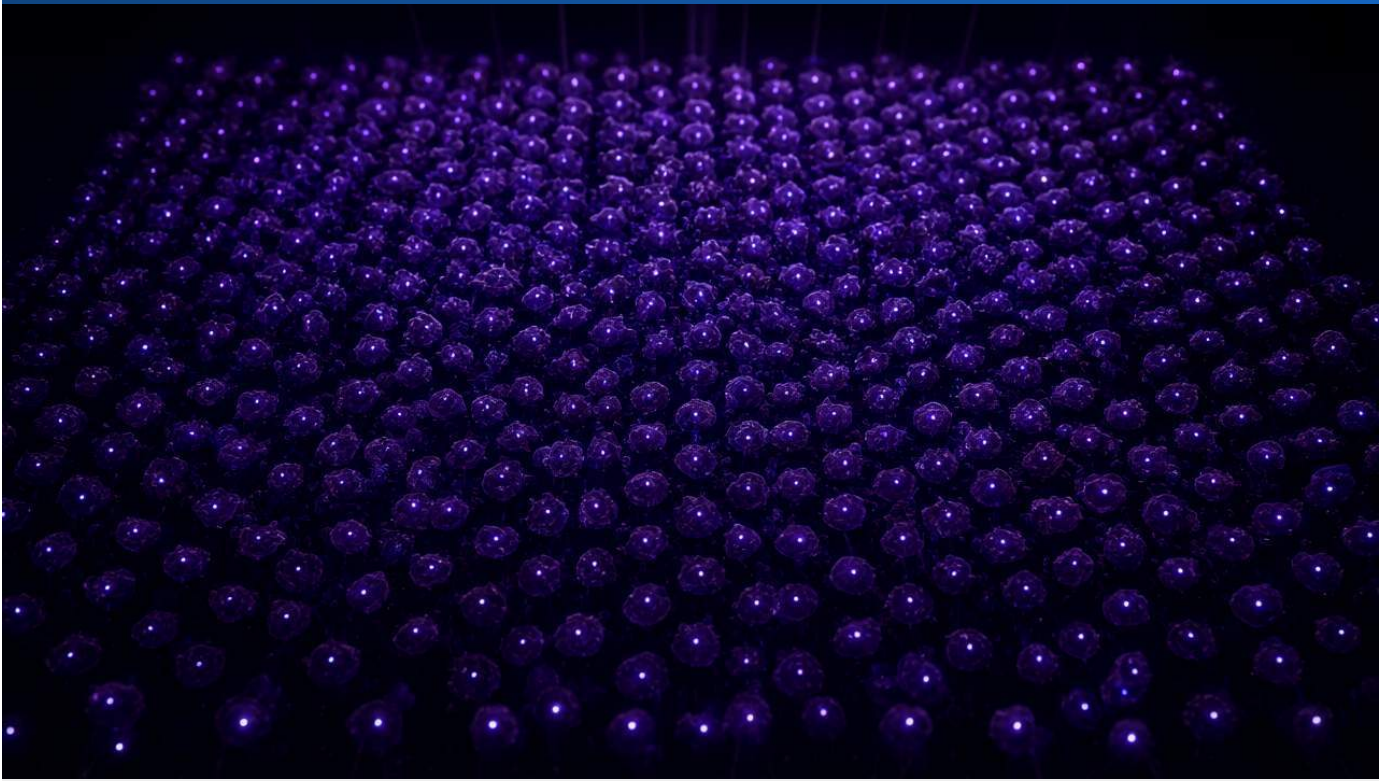
Strategic Significance & Outlook

This breakthrough is a pivotal moment for the quantum computing industry, providing a compelling, quantifiable example of quantum technology's potential to deliver near-term value. For engineers and product designers, it promises faster iteration cycles, reduced development costs, and the ability to optimize designs more thoroughly, leading to superior products. The success of this hybrid approach is likely to encourage broader adoption and investment in quantum solutions across other computationally intensive industries. As quantum hardware continues to improve, the acceleration rates are expected to increase further, solidifying quantum computing's role as an indispensable tool for advanced engineering and design.

Source: <https://www.ionq.com/news/ionq-demonstrates-computer-aided-engineering-workload-acceleration-by-up-to-14-6-with-quantum-technology>

#03 Pasqal Reports 14% H1 2026 Revenue Growth to €4.9M, Achieves 1,024-Atom Defect-Free Registers and Superior Logical Qubit ML Performance

Published September 24, 2026 GlobeNewswire (via Nasdaq) France



OVERVIEW

Pasqal Holding SA announced robust financial results for H1 2026, with revenue climbing 14% YoY to €4.9 million, driven by a 34% increase in QPU-related services to €3.9 million. Operationally, Pasqal achieved significant milestones by preparing defect-free registers of 1,024 atoms, doubling prior records, and extending atom lifetimes by 40-fold. The company also successfully executed a full machine-learning application using logical qubits, outperforming physical-qubit counterparts, marking a key step towards fault-tolerant quantum computing.

Key Findings

Pasqal Holding SA has reported strong financial performance and significant technical breakthroughs in the first half of 2026. The French quantum computing company saw its revenue increase by 14% year-over-year, reaching €4.9 million, with QPU-related services revenue growing even faster at 34% to €3.9 million. Crucially, Pasqal achieved a major operational highlight by successfully preparing defect-free registers of 1,024 atoms, effectively doubling their previous record. This achievement was accompanied by a 40-fold extension in atom lifetimes, indicating a substantial improvement in qubit coherence. Furthermore, Pasqal demonstrated the execution of a complete machine-learning application using logical qubits, which notably surpassed the performance of physical-qubit implementations.

Technical / Clinical Details

Pasqal's advancements are rooted in its neutral-atom quantum computing platform. The ability to prepare defect-free registers of 1,024 atoms represents a significant leap in scaling quantum hardware, directly addressing one of the most critical challenges in the field. This involves precisely trapping and arranging individual atoms using highly focused lasers, which act as qubits. The 40-fold increase in atom lifetime directly translates to longer coherence times, allowing for more complex and deeper quantum circuits before decoherence sets in. The successful implementation of a machine-learning application with logical qubits is a pioneering step towards fault-tolerant quantum computing. Logical qubits, constructed from multiple physical qubits, are designed to suppress errors inherent in physical qubits, thereby improving the reliability and accuracy of quantum computations. This demonstration highlights the potential for quantum computers to achieve practical advantage in complex computational tasks like machine learning, where error rates are currently a major limiting factor.

Background & Context

The global quantum computing landscape is characterized by intense competition among different qubit modalities, including superconducting circuits, trapped ions, and neutral atoms. Pasqal's neutral-atom approach offers a promising pathway for scalability due to the inherent uniformity and isolation of neutral atoms. The company's recent financial results underscore a growing market demand for quantum computing services, particularly in areas where early-stage quantum solutions can offer a demonstrable advantage. The progression from physical to logical qubits is a fundamental step towards building truly useful, error-corrected quantum computers capable of tackling real-world problems. Pasqal's over €440 million in total funding reflects investor confidence in its technology and its role in advancing Europe's deeptech ecosystem, further validated by its Nasdaq listing and recent EIC Fund Award.

Strategic Significance & Outlook

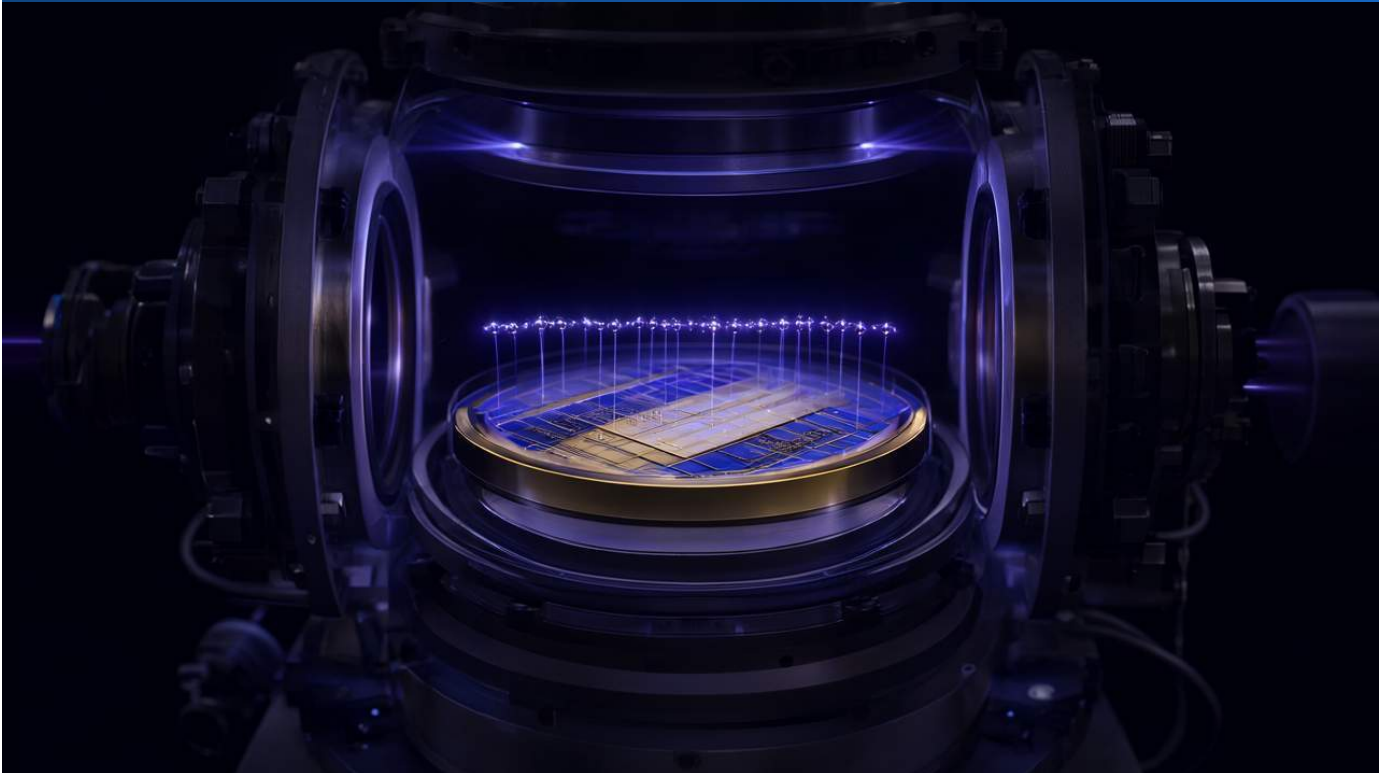
These achievements position Pasqal as a leading innovator in the quantum computing space. The increased qubit count with extended coherence times enhances the platform's capacity for larger simulations and more complex optimization problems. The demonstration of logical qubits in a machine-learning context not only validates Pasqal's error mitigation strategies but also accelerates the development of algorithms for future fault-tolerant machines. This progress is vital for translating theoretical quantum advantages into practical applications across industries such as finance, logistics, energy, and materials science. Pasqal's continued technical scaling and strong financial footing are crucial for securing its position in the competitive quantum market and driving the commercialization of quantum technologies globally, especially as the industry moves closer to the era of error-corrected quantum computers.

Source: <https://www.pasqal.com/newsroom/pasqal-reports-first-half-2026-financial-results/>

Collected: September 25, 2026 | Automated Research System (Gemini API)

#04 German Government Funds QUDORA-Led Consortium with €122M for Trapped-Ion Quantum Computer Project, Targeting 1,000 Physical & 50 Logical Qubits with Sub-0.01% Logical Gate Error Rate

Published September 24, 2026 Quantum Computing Report Germany



OVERVIEW

The German government has selected a QUDORA-led consortium for the €122 million (approximately \$138.8 million USD) "NFQC-1k Trapped-Ion Quantum Computer Project." This five-year initiative aims to build a fault-tolerant trapped-ion quantum computer with at least 1,000 physical qubits and 50 logical qubits, achieving a logical gate error rate below 0.01%. As the system integrator, QUDORA will deploy its proprietary Near-Field Quantum Control (NFQC®) technology, positioning Germany at the forefront of quantum technology development.

Key Findings

The German government has awarded a €122 million (approximately \$138.8 million USD) contract to a QUDORA-led consortium for the "NFQC-1k Trapped-Ion Quantum Computer Project." This significant national initiative, spanning five years, aims to construct a fault-tolerant trapped-ion quantum computer that will feature at least 1,000 physical qubits and 50 logical qubits, with an ambitious target of achieving a logical gate error rate below 0.01%.

Technical / Clinical Details

The NFQC-1k project centers on trapped-ion technology, utilizing individual trapped ions as qubits. Trapped-ion systems are renowned for their exceptional coherence times and high gate fidelities, making them a promising platform for fault-tolerant quantum computing. The project's goal of deriving 50 logical qubits from 1,000 physical qubits implies a substantial implementation of quantum error correction (QEC) techniques. QEC involves using numerous auxiliary physical qubits to monitor and correct errors in the primary logical qubits, thereby dramatically enhancing the reliability of overall computation. The targeted logical gate error rate of less than 0.01% is a critical threshold for executing practical quantum algorithms. QUDORA, acting as the system integrator, will leverage its proprietary Near-Field Quantum Control (NFQC®) technology to precisely manipulate individual ion qubits, enabling the realization of this high-precision system.

Background & Context

Achieving a fault-tolerant quantum computer is one of the paramount challenges in quantum computing's path to practical utility. The German government's substantial investment in the NFQC-1k project underscores a strong commitment to addressing this challenge at a national level and bolstering Germany's competitiveness in quantum technology. Trapped-ion quantum computers, owing to their superior coherence and control characteristics, are considered leading candidates for fault-tolerant architectures, with major research institutions and companies worldwide vying for advancements. This project capitalizes on Germany's strengths in quantum physics, pursuing a comprehensive approach from hardware development to system integration to build next-generation computing infrastructure.

Strategic Significance & Outlook

The success of the NFQC-1k project is poised to have a profound impact on the commercialization of quantum computing. If a system with 50 logical qubits and a sub-0.01% logical gate error rate can be realized, it would enable quantum computers to tackle complex, currently intractable problems across a wide array of fields, including drug discovery, materials science, finance, and optimization. Through this project, Germany aims to accelerate the standardization and industrialization of quantum technology, positioning itself as a leading player in the international quantum ecosystem. The successful demonstration of QUDORA's NFQC® technology is expected to further enhance the scalability and reliability of trapped-ion quantum computers, making a crucial contribution to future quantum computing roadmaps.

Source: <https://quantumcomputingreport.com/german-government-selects-qudora-led-consortium-for-e122-million-138-8-usd-nfqc-1k-trapped-ion-quantum-computer-project/amp/>

Collected: September 25, 2026 | Automated Research System (Gemini API)

#05 Infleqtion Achieves 30 Entangled Logical Qubits from 80 Physical Qubits on Sqale Quantum Computer, First for Neutral Atom Architecture

Published September 24, 2026 Business Wire USA



OVERVIEW

Infleqtion has successfully generated 30 entangled logical qubits using only 80 physical qubits on its Sqale™ quantum computing platform, becoming the first neutral atom quantum computing company to achieve this milestone in a commercial system. This breakthrough was enabled by a co-design approach involving hardware-software optimization and AI-assisted discovery, effectively halving the number of physical gates required for key logical operations. This represents a significant advancement towards building fault-tolerant quantum computers.

Key Findings

Infleqtion has achieved a groundbreaking milestone by demonstrating 30 entangled logical qubits on its Sqale™ quantum computing platform, utilizing only 80 physical qubits. This accomplishment positions Infleqtion as the first neutral atom quantum computing company to reach 30 logical qubits in a commercial system, fulfilling a key objective in its 2026 roadmap.

Technical / Clinical Details

This remarkable feat was made possible through a sophisticated combination of hardware and software co-design, further enhanced by AI-assisted algorithmic discovery. This optimized approach effectively reduced the number of physical gates required for critical logical operations by half. Neutral atom quantum computers operate by trapping and manipulating individual cold neutral atoms with lasers, leveraging Rydberg states to create strong interactions between qubits. This architecture inherently offers advantages such as long coherence times and scalable qubit arrangements. Achieving 30 entangled logical qubits is a testament to significant progress in achieving true computational power and error resilience, beyond a mere count of physical qubits.

Background & Context

Error tolerance remains one of the most formidable challenges in the development of quantum computing. Physical qubits are highly susceptible to noise, leading to errors during computation, which necessitates quantum error correction – the process of encoding one stable logical qubit using multiple physical qubits. Historically, a vastly larger number of physical qubits has been required to form even a single logical qubit. Infleqtion's achievement significantly improves this ratio, demonstrating a more efficient pathway to building fault-tolerant systems. This marks a crucial progression in the industry's collective effort to realize large-scale, practical quantum computers capable of performing complex calculations reliably.

Strategic Significance & Outlook

The successful demonstration of 30 entangled logical qubits acts as a substantial accelerator towards the realization of fault-tolerant quantum computers. This technological breakthrough opens the door for executing more complex quantum algorithms with higher fidelity, thereby advancing the practical applications of quantum computing across diverse fields such, as drug discovery, materials science, financial modeling, and optimization problems. Building on this achievement, Infleqtion is expected to continue developing systems with an even greater number of logical qubits, solidifying its leadership in the commercialization of quantum computing and bringing its industrial impact closer to reality.

Source: <https://ir.infleqtion.com/news-events/press-releases/detail/212/infleqtion-achieves-30-entangled-logical-qubits-on-its-sqale-quantum-computer>

Collected: September 25, 2026 | Automated Research System (Gemini API)

#06 IonQ Demonstrates Quantum Generative Modeling for High-Resolution Radar Change Detection, Promising Defense and Environmental Monitoring Applications

Published September 24, 2026 IonQ USA



OVERVIEW

IonQ has successfully demonstrated quantum generative modeling for high-resolution radar change detection. The research revealed that the quantum model achieved superior relative performance in the sparsest data regions compared to classical statistical methods. This advantage was sustained when the simulation model was executed on IonQ's quantum hardware. The achievement signifies practical advancements in quantum machine learning and suggests diverse future applications in defense, critical infrastructure monitoring, and environmental surveillance.

Key Findings

IonQ has successfully demonstrated the application of quantum generative modeling for high-resolution radar change detection. This research highlights a notable performance advantage of the quantum model, particularly in sparse data regimes, when compared to traditional statistical methods.

Technical / Clinical Details

In this study, quantum generative models were employed to detect subtle changes within radar imagery. Unlike classical statistical models that often rely on abundant data, the quantum model showcased its ability to perform high-precision pattern recognition and anomaly detection even with limited information. Crucially, this performance superiority was observed not only in simulation environments but also when the model was executed on IonQ's actual quantum hardware. Quantum generative modeling leverages quantum mechanical principles, such as superposition and entanglement, to learn probability distributions of data and generate new data samples. This approach holds the potential to identify minute anomalies or changes within complex datasets more efficiently and sensitively than classical techniques.

Background & Context

High-resolution radar change detection is of paramount importance across a wide array of fields, including military reconnaissance, border security, disaster monitoring, infrastructure health assessment, and tracking environmental shifts. These applications demand rapid and accurate detection of subtle yet critical changes (e.g., illicit activities, landslides, construction progress) from vast quantities of radar data in time-sensitive scenarios. Conventional classical image processing and machine learning algorithms often face limitations in terms of data volume, noise resilience, and computational load. IonQ's quantum generative modeling represents a potential breakthrough to address these challenges, enabling next-generation radar analysis capabilities.

Strategic Significance & Outlook

This quantum generative modeling technology opens doors for numerous practical applications, including real-time threat detection in defense, continuous health monitoring of critical infrastructure (like bridges and pipelines), and environmental surveillance for tracking deforestation or climate change impacts. IonQ's demonstration marks an early indication that quantum machine learning can offer practical advantages over classical methods in specific niche areas, making it a significant step towards the commercialization of quantum computing. Future advancements in algorithmic optimization and quantum hardware are expected to extend the application of this technology to a broader range of data analysis problems, bringing substantial societal impact.

Source: <https://ionq.com/news/ionq-demonstrates-quantum-generative-modeling-for-high-resolution-radar-change-detection>

Collected: September 25, 2026 | Automated Research System (Gemini API)

#07 Cognition's GPU Lattice Siever Factors RSA-260 at 10x Lower Cost, Setting New Record

Published September 22, 2026 Quantum Zeitgeist USA



OVERVIEW

Cognition's research team successfully factored RSA-260, a 260-digit number, establishing a new record for the largest publicly factored RSA challenge number. Achieved using their novel GPU lattice sieve, this factorization was accomplished at a cost 10 times lower than previous public methods. This breakthrough highlights a growing vulnerability in current RSA encryption and underscores the urgency for transitioning to post-quantum cryptography.

Key Findings

Cognition's research team has successfully factored RSA-260, a 260-digit number, marking a new record for the largest publicly factored RSA challenge problem. This significant achievement was made possible through the use of Cognition's new GPU lattice sieve, which enabled the factorization at a cost 10 times lower than previously public methods. This development serves as a crucial reminder of the potential vulnerabilities in RSA encryption, a cornerstone of modern cybersecurity.

Technical / Clinical Details

Integer factorization, the mathematical problem of breaking down a large composite number into its prime factors, underpins the security of RSA encryption. The GPU lattice sieve developed by Cognition optimizes and implements lattice sieving algorithms, a class of graph algorithms, on GPUs. By maximizing the parallel processing capabilities of GPUs, the team efficiently handled the immense computational steps, drastically reducing the cost of factorization. Specifically, the cost to factor RSA-260 was reduced by approximately 90% compared to previous records. The team estimates that hyper-scalers could potentially factor RSA-1024 for roughly \$30 million with this technology.

Background & Context

RSA encryption is a widely used public-key cryptosystem crucial for internet communication, digital signatures, and many other aspects of modern security infrastructure. However, advancements in quantum computing, particularly Shor's algorithm, pose a long-term threat by offering an efficient means to solve large-scale integer factorization problems, thereby breaking RSA. Cognition's achievement indicates that even classical computational advancements can threaten RSA's security, further emphasizing the importance and urgency of transitioning to post-quantum cryptography (PQC).

Strategic Significance & Outlook

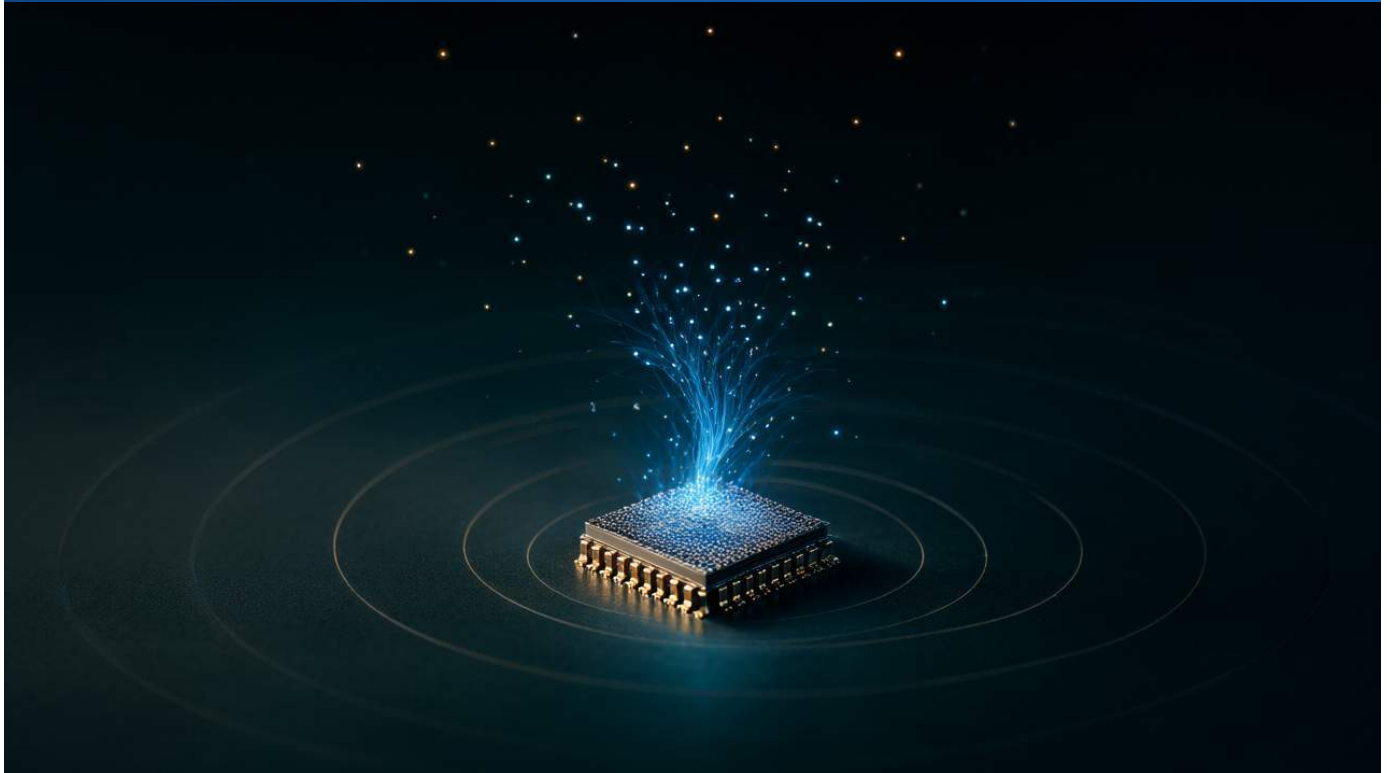
This breakthrough compels financial institutions, government agencies, and other organizations handling sensitive data to re-evaluate their existing cryptographic infrastructure and accelerate the adoption of quantum-resistant cryptographic technologies. The low-cost factorization of RSA-260 suggests that the potential attack cost for even larger RSA keys might be lower than anticipated, presenting an immediate challenge for cybersecurity strategies. Moving forward, the development of cryptographic technologies and PQC solutions is expected to accelerate, driven by both the enhanced efficiency of classical algorithms like Cognition's and the ongoing progress in quantum computing.

Source: <https://quantumzeitgeist.com/cognition-gpu-lattice-siever-rsa-260/>

Collected: September 25, 2026 | Automated Research System (Gemini API)

#08 IonQ Demonstrates Quantum Generative Modeling for High-Resolution Radar Change Detection, Showing Advantage Where Conventional Statistics Were Sparsest

Published September 24, 2026 IonQ News USA



OVERVIEW

IonQ has demonstrated high-resolution radar change detection using quantum generative modeling, revealing that quantum hardware offers an advantage in data-sparse regimes where conventional statistical methods underperform. This breakthrough accelerates the practical application of quantum machine learning in challenging data analysis areas like defense, surveillance, and environmental monitoring, providing concrete evidence of quantum computers' superiority under specific conditions.

Key Findings

IonQ has successfully demonstrated high-resolution radar change detection using quantum generative modeling. The research revealed a clear advantage for quantum hardware in scenarios where conventional statistical methods struggled due to sparse data, highlighting a key area where quantum computing can outperform classical approaches.

Technical / Clinical Details

The demonstration combined IonQ's quantum computer with generative modeling algorithms to detect subtle changes in radar images and learn their underlying patterns. Specifically, in 'data-sparse' or noisy environments, the quantum system exhibited more robust and accurate detection performance than classical methods. This showcases the strength of quantum machine learning, which leverages quantum mechanics properties like superposition and entanglement to efficiently sample complex probability distributions and learn latent data structures. This technology improves the ability to identify anomalies or unauthorized activities from high-resolution radar imagery.

Background & Context

Radar change detection is critical for numerous applications, including military reconnaissance, border security, disaster monitoring, and infrastructure surveillance. However, complex environments, noise, and data incompleteness often limit the performance of traditional classical algorithms. Quantum generative modeling is emerging as a promising approach to address these challenges, exploring specific instances where quantum computers might surpass classical ones—a concept known as 'quantum advantage.' This demonstration contributes empirical evidence to that exploration.

Strategic Significance & Outlook

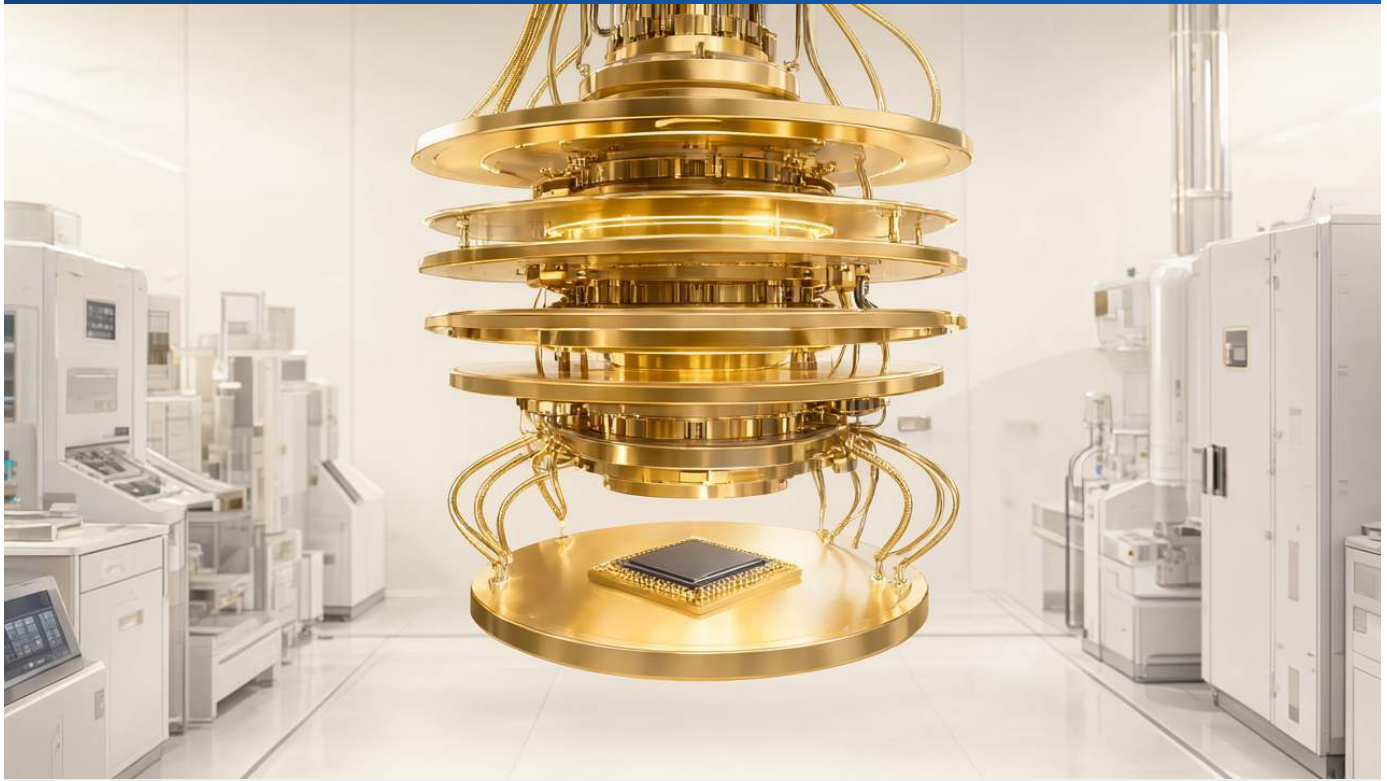
This demonstration by IonQ suggests that quantum machine learning holds significant potential to dramatically enhance existing data analysis capabilities in fields such as defense, surveillance, and environmental monitoring. Quantum generative modeling could become a powerful tool, particularly in situations with limited data or when identifying complex, non-linear patterns is crucial. This achievement marks an important step toward the practical application of quantum computers and is expected to contribute to the development of more advanced decision-support and autonomous systems in the future. IonQ aims to further develop and apply this technology to solve real-world problems.

Source: <https://www.ionq.com/news/ionq-demonstrates-quantum-generative-modeling-for-high-resolution-radar-change-detection>

Collected: September 25, 2026 | Automated Research System (Gemini API)

#09 Intel and IBM Accelerate Quantum Computing Commercialization within Three Years by Overcoming Error Correction and Cryogenic Bottlenecks

Published September 21, 2026 BigGo Finance USA



OVERVIEW

Intel and IBM are reportedly pushing quantum computing commercialization within three years by tackling key challenges in error correction and cryogenic infrastructure. IBM validated an error detection and mitigation technique, filtering up to 65% of errors on quantum processors, and introduced a modular cryogenic architecture. IBM aims to deliver large-scale fault-tolerant quantum computers to commercial customers by 2029, supported by a \$1 billion CHIPS Act award and IBM investment for a 300mm quantum wafer production line in Albany, New York.

Key Findings

Intel and IBM are reportedly intensifying efforts to accelerate the commercialization timeline for quantum computing, aiming for widespread deployment within three years. Their focus is on addressing critical bottlenecks in quantum error correction and developing scalable cryogenic infrastructure. IBM has notably validated an error detection and mitigation technique on its quantum processors, demonstrating the ability to filter out up to 65% of errors, a significant step towards practical fault tolerance.

Technical / Clinical Details

IBM's breakthrough in error mitigation represents a crucial advancement in quantum fidelity, significantly reducing the impact of environmental noise and decoherence on quantum bits. This improvement is vital for enabling the execution of larger and more complex quantum algorithms with higher reliability. Concurrently, IBM has introduced a modular cryogenic architecture designed to provide a more efficient and scalable cooling solution for quantum processors. This modularity is a departure from current custom-built cryogenic systems, offering a more adaptable and cost-effective path to scaling quantum hardware. Leveraging these technological advancements, IBM has set an ambitious target to deliver large-scale fault-tolerant quantum computers to commercial clients by 2029. This initiative is substantially supported by a \$1 billion award under the U.S. CHIPS Act and additional investment from IBM, directed towards establishing a state-of-the-art 300mm quantum wafer production line in Albany, New York.

Background & Context

The journey toward practical quantum computing has been hampered by fundamental technical challenges, including the inherent fragility of qubits, the complexity of error correction, and the demanding requirements for cryogenic operating environments. The concentrated efforts by technology giants like Intel and IBM to overcome these hurdles are indispensable for the quantum field's maturation. The significant government funding via the CHIPS Act underscores a national strategic imperative for the U.S. to secure leadership in quantum technology development and manufacturing.

Strategic Significance & Outlook

IBM's aggressive target of delivering fault-tolerant quantum computers to commercial customers by 2029 signals a potential inflection point where quantum technology transitions from research to industrial application within a few years. Progress in error correction and scalable cryogenic infrastructure will unlock quantum computing's potential in diverse sectors such as drug discovery, materials science, financial modeling, and artificial intelligence. The establishment of a 300mm quantum wafer production line is particularly significant, as it signifies a move towards industrial-scale manufacturing of quantum chips, which is a fundamental requirement for widespread commercialization and deployment.

Source: <https://finance.biggo.com/news/e571eb59-942c-4a5b-9294-ddcb4d5f1451>

Collected: September 25, 2026 | Automated Research System (Gemini API)