

QuiX Quantum Announces Carina, the First Universal Photonic Quantum Computing Architecture for Commercial Deployment

Developed for the German Aerospace Center's Quantum Computing Initiative, Carina is a compact, room-temp foundation for fault-tolerant computing in data centers

ENSCHDEDE, NETHERLANDS, July 14, 2026 /EINPresswire.com/ -- [QuiX Quantum](#) today announced [Carina](#), the world's first universal photonic quantum computing architecture designed for deployment in customer data center environments as an essential foundation for future fault-tolerant systems.



QuiX Quantum Carina system

Developed as part of the Universal Photonic Quantum Computer (UPQC) project of the DLR Quantum Computing Initiative (DLR QCI), funded by the German Federal Minister of Research, Technology and Space, Carina brings together key building blocks for universal quantum computing using single photons as physical qubits, and integrates the critical technologies required for measurement-based photonic quantum computing into a single stack. The compact, room-temperature system is designed to work seamlessly with classical high-performance computing, AI and data center infrastructure to prepare workflows and staff for upcoming utility-scale devices.

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*Prof. Gerard J. Milburn,
University of Queensland.*

Unlike previous special-purpose photonic systems built around narrow computational models such as boson

samplers, Carina is designed to implement a universal gate-set to perform any gate-based quantum algorithm. By combining photon generation, multiplexing, state generation,

measurement, photonic assembly control and fast feed-forward control, Carina establishes the physical qubit foundation for the company's next-generation Dedalo architecture and its path toward logical qubits.

"When Manny Knill, Raymond Laflamme and I published our linear optics quantum computing scheme in 2001, the central question was whether the probabilistic nature of photon-to-photon interactions could be tamed into something computationally universal. The answer was yes in principle — but the engineering path looked formidable," said Prof. Gerard J. Milburn, University of Queensland. "What QuiX Quantum is showing with Carina and its measurement-based approach is that this path is not only tractable but navigable with integrated photonics. The combination of on-chip single-photon generation, feed-forward control and cluster-state generation in a system designed for deployment outside the laboratory is precisely the kind of milestone the field awaits. It moves the conversation from whether photonic quantum computing can be universal to how quickly it can be scaled."



"Quantum photonics aims to bring quantum technologies to a broader audience by leveraging the remarkable capabilities of the semiconductor fabrication industry. The launch of Carina from QuiX marks an exciting milestone in this journey: the first system designed both to generate on-chip cluster states, the fundamental resource for measurement-based quantum computing, and for commercial deployment," said Prof. Andrew G. White, University of Queensland. "To ensure robust and reliable operation, QuiX has integrated photon generation and detection, real-time feedforward, and control electronics into a platform designed for end users rather than exclusively for laboratory research. Congratulations to the whole QuiX team: I can't wait to see what the next few years bring for photonic quantum computing."

"Carina marks a major milestone for QuiX and the photonic quantum computing industry towards deploying utility-scale quantum systems at customer sites," said Dr.-Ing. Stefan Hengesbach, CEO of QuiX Quantum. "The field has been split between systems that could be commercialized quickly but were not built for universal, fault-tolerant computing, and architectures with long-term scalability potential that remained difficult to deploy. Carina is bringing those two requirements together into a universal architecture for installation into real customer environments."

The following recent announcements from QuiX establish the company's path to operate single photons at speed and scale to unlock universal fault-tolerant quantum computing:

- Feed Forward Control Unit (FFCU), which converts single-photon detector signals into control actions on photonic integrated circuits.
- Photonic Assembly Control Unit (PACU), which provides a standardized control layer for photonic chips and assemblies. Together, these two components support the real-time operation, rack-based integration, monitoring and serviceability required to move photonic quantum systems beyond laboratory environments.
- In a first for a European quantum company, QuiX demonstrated a production-ready method of “below threshold” error mitigation on a photonic quantum computer, suppressing physical qubit errors to the level compatible with scalable, fault-tolerant quantum computing.
- The company outlined its next-generation Dedalo architecture white paper designed to advance from physical qubits to logical qubits and fault-tolerant photonic quantum computing, with a focus on photon-loss protection, modular photonic hardware and data-center deployability.
- The delivery of Carina core hardware platform to DLR QCI, advancing Europe’s universal photon quantum computing roadmap.

“QuiX has always been a company that delivers real hardware to customers, and we know photonic quantum computing must go far beyond chip design to deliver on-premise fault-tolerant systems,” said Robin Wittland, CCO of QuiX Quantum. “The full machine must be built, controlled, maintained and scaled. Carina is designed as a complete system, with the photonic hardware, control electronics and deployment requirements developed together from the start.”

Many quantum computing platforms still depend on highly specialized operating environments, including extensive cryogenic infrastructure, which can make deployment, maintenance and integration difficult. Carina addresses the practical requirements that quantum systems need to operate where real-world workloads currently run.

The full white paper, Carina - Universal Photonic Quantum Computing Built for Customer Deployment, is now available from QuiX Quantum. Readers can download the paper [here](#) to explore the Carina architecture in detail, including its components for photon generation, multiplexing, cluster state generation, fast feed-forward, and more. By using components compatible with optical networking, rack-based infrastructure and room-temperature operation across much of the system, Carina will allow customers to begin building the operational layer around photonic quantum computing before utility-scale systems are available.

For questions, please contact c.taballione@quixquantum.com or r.wittland@quixquantum.com

About QuiX Quantum

QuiX Quantum is a European photonic quantum computing company founded in Enschede, the Netherlands, in 2019. The company develops integrated photonic quantum computing hardware and describes its approach as full-stack and fabless, with systems designed for modularity, scalability, and compatibility with data center and HPC environments. QuiX Quantum has offices in the Netherlands and Germany and is developing universal photonic quantum computing systems based on its silicon nitride photonic technology.

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