Press Release

Leibniz Supercomputing Centre Computes With Light: World's First Photonic AI Processor From Q.ANT Goes Into Operation

- *Industry first deployment of Q.ANT's photonic processor marks a pivotal step toward a new class of high-density, energy-efficient computing.*
- *For complex AI and scientific applications: LRZ is evaluating the performance of photonic acceleration on the Q.ANT Native Processing Server.*
- *Moving analog photonic computing to practical use positions Germany at the forefront of sustainable, post-CMOS computing.*

Stuttgart/Garching, Germany – July 22, 2025 – Q.ANT has delivered its Native Processing Server (NPS) to the Leibniz Supercomputing Centre (LRZ), marking the first integration of an analog photonic co-processor into an operational high-performance computing (HPC) environment. This milestone deployment enables LRZ to evaluate photonic acceleration for artificial intelligence (AI) and simulation workloads - offering a path toward significantly higher performance with drastically lower energy consumption. LRZ ranks among the largest data centers in Europe and stands as a global powerhouse in the field of supercomputing. With its cutting-edge infrastructure and pioneering research, LRZ drives scientific progress and plays a pivotal role on the international stage, supporting groundbreaking discoveries across disciplines. The collaboration between Q.ANT and LRZ redefines how data centers approach performance, footprint, energy-efficiency, and system architecture and marks a new chapter in computing - where analog precision, powered by light, addresses the scaling crisis of AI infrastructure.

"Photonic processors offer a novel and promising path to accelerate AI and simulation workloads, while sharply reducing our environmental footprint. This deployment marks a milestone in our future computing mission to advance energy-efficient AI and high-performance computing," said Prof. Dr. Dieter Kranzlmüller, Chairman of the Board of Directors of LRZ. "Q.ANT's NPS integrates easily into our existing infrastructure, allowing us to immediately evaluate its performance. Bringing in future technologies and opening up new avenues for our users would, however, not be possible without the continuous support from both the federal and Bavarian government."

"Our collaboration with LRZ marks a pivotal milestone: for the first time in history, we're operating photonic processors in an HPC under practical workloads. With this step, we demonstrate that light-based processors have moved beyond research and into real-world application," said Dr. Michael Förtsch, CEO of Q.ANT. "This is a decisive step toward integrating photonic computing into the mainstream of next-generation computer architecture by 2030. The long-term commitment of the Ministry for Research, Technology and Space has been instrumental in enabling the breakthroughs that made this success possible."

Less electricity, more power - with light

Artificial intelligence is increasing computing requirements and pushing high-performance data centres to their limits in terms of power consumption, heat generation and space. Because Q.ANT's photonic chip generates no heat, costly cooling measures are unnecessary. Thanks to the special properties of light, complex calculations can also be performed faster and more efficiently on the photonic processor. Q.ANT's photonic technology enables a new class of high-performance, energy-efficient server rack solutions, with:

- Up to 90x lower power consumption per workload, due to the absence of on-chip heat and reduced cooling requirements.
- 100x increase in data center capacity enabled by greater computational density and faster execution of complex operations.
- 16-bit floating point precision with close to 100 % accuracy for all computational operations on the chip.
- Seamless integration into existing infrastructure via standard PCIe interface and x86 software compatibility - including support for PyTorch, TensorFlow, Keras.

The project: Researching new computer architectures for the future
The collaboration is aimed at researching hybrid digital-analog architectures for future HPC environments and is funded by the German Federal Ministry of Research, Technology and Space. Deploying Q.ANT's NPS, LRZ expands this scope to include photonic analog computing, an option that was not technically feasible at the start of the program but made viable by Q.ANT's advancements in photonics. LRZ will use the Q.ANT NPS to establish new benchmarks and real-world use cases for applications such as climate modeling, real-time medical imaging, or materials simulation for fusion research. With this deployment, LRZ is strengthening its role as a pioneer in the development of energy-efficient high-performance computers.

The first evaluation phase at LRZ involves installing several units of the latest generation Q.ANT NPS, selecting benchmark workloads, and testing real-world applications — particularly in AI inference, computer vision, and physics simulations. Later phases will include second- and third-generation NPS units for deeper evaluation.

Supporting statements from German ministries
The project was made possible with national funding. The commissioning ceremony was attended by guests from politics, research and industry. During her welcome address, the Minister for Research, Technology and Space (BMFTR), Dorothee Bär, acknowledged the significance of this milestone for Germany and Europe.

"Integrating Q.ANT's photonic processor at the Leibniz Supercomputing Centre is an impressive example of German cutting-edge technology and a major success for German research funding. We support ground-breaking innovations that strengthen our global scientific leadership and technological sovereignty. In the future, we will provide even greater support for research and innovation in our key enabling technologies through our High-Tech Agenda Germany. To this end, we are focusing on close collaboration between research and private enterprise – just like here at the LRZ in Garching," said Dorothee Bär, the Federal Minister of Science, Technology, and Space.

"Computing with light instead of electricity – what once sounded like science fiction is now becoming reality. For the first time worldwide, a photonic AI accelerator is in operation at a data center here in Garching, Germany: up to 90 percent less energy consumption with 100 times the performance. This shows the tremendous potential of our research institutions – and what becomes possible when science, industry and government join forces," said Markus Blume, Bavarian Minister of Science and the Arts.

About The Leibniz Supercomputing Centre (LRZ)
The Leibniz Supercomputing Centre (LRZ) proudly stands at the forefront of its field as a world-class IT service and computing user facility serving Munich's top universities and colleges as well as research institutions in Bavaria, Germany and Europe. As an institute of the Bavarian Academy of Sciences and Humanities, LRZ has provided a robust, holistic IT infrastructure for its users throughout the scientific community for over sixty years. As a member of Germany's Gauss Centre for Supercomputing (GCS), LRZ serves as part of the nation's backbone for the advanced research and discovery possible through high-performance computing (HPC).

About Q.ANT
Q.ANT is a photonic deep-tech scale-up developing photonic processing solutions that compute natively with light and deliver a scalable alternative to transistor-based systems. Its Light Empowered Native Arithmetics (LENA) architecture delivers analog co-processing power optimised for complex computation and enabling energy-efficient performance for next-generation AI and HPC applications. Q.ANT operates its own Thin-Film Lithium Niobate (TFLN) chip pilot line in collaboration with the Institute for Microelectronics Stuttgart, IMS CHIPS, and is currently shipping its Native Processing Servers to selected partners. Q.ANT was founded by Michael Förtsch in 2018 and is headquartered in Stuttgart, Germany.

###

Images and captions *** Please note higher resolution images and images from the event are available by request* or can be downloaded from here: Q.ANT_LRZ_Images_07.22.25

Dr. Michael Förtsch, CEO of Q.ANT and Prof. Dr. Dieter Kranzlmüller, Chairman of the Board of Directors of LRZ in front of the Q.ANT NPS Servers at LRZ.

MF and DK at NPS Server_1.jpg *(Image: Q.ANT GmbH)*

Dr. Michael Förtsch, CEO of Q.ANT in front of the company's Native Processing Server at the Leibniz Supercomputing Centre (LRZ), marking the world's first integration of a photonic co-processor into a live high-performance computing environment.

MF leaning at LRZServer_1.jpg *(Image: Q.ANT GmbH)*

Media Contacts:

USA: Toni Sottak —
Wired Island International
toni@wiredislandpr.com | +1 843 530 4442

EUROPE: Edith Laga —
Q.ANT PR
edith.laga@qant.gmbh | +49 157 830 407 51