Press release

Q.ANT and IMS CHIPS Launch Production of High-Performance AI Chips, Establish Blueprint for Strengthening Chip Sovereignty

Innovative manufacturing approach upcycles existing CMOS facility accelerating development of energy-efficient photonic AI chips and democratizing semiconductor manufacturing, enabling supply chain resilience and technology independence

Stuttgart, February 25, 2025 - Q.ANT, a pioneer in photonic processing for AI, has launched a dedicated production line for its high-performance photonic AI chips at the Institute of Microelectronics Stuttgart (IMS CHIPS), marking a significant semiconductor manufacturing milestone. By integrating Q.ANT's patented photonic chip technology on the base of Thin-Film Lithium Niobate (TFLN) material and upcycling the existing CMOS production facility at IMS CHIPS, the partners have established a first-of-its-kind manufacturing line to accelerate the production of energy-efficient, high-performance processors for AI applications. Q.ANT has invested € 14 million in machinery and equipment to complement the new line for photonic chips.

This innovative manufacturing approach delivers faster, more energy-efficient processors to meet the growing computational demands of AI and high-performance computing (HPC), while also establishing a blueprint for cost-effectively modernizing chip production worldwide. This groundbreaking initiative establishes a blueprint for democratizing production capacity. It enables countries to attain greater semiconductor manufacturing resilience, reduce dependency on global supply chains, and accelerate the development of critical technologies that drive innovation across data centers, research institutions, and advanced industries.

The official launch event, attended by leading industry figures and German officials, underscored the project's significance in driving innovation within the European and global semiconductor ecosystem. By modernizing existing chip production capabilities, Q.ANT and IMS CHIPS have pioneered a scalable approach to bringing energy-efficient AI processors to the market at a faster pace, more cost-effectively, and more sustainably.

Q.ANT's photonic chips - which compute using light instead of electricity - deliver a 30-fold increase in energy efficiency and a 50-fold boost in computing speed, offering transformative potential for AI-driven data centers and HPC environments. The pilot line is specifically designed for production using TFLN, the optimal material for photonic computing and critical to the success of the technology. TFLN enables ultra-fast optical signal manipulation at several GHz without the need for heat to modulate the light on the photonic circuit. This advantage leads to more precise and energy-efficient control of the light, resulting in a significant increase in computing power and energy efficiency compared to traditional silicon.

Dr. Michael Förtsch, CEO of Q.ANT: A milestone in computing
"This approach establishes a new benchmark for AI chip manufacturing, providing a path towards greater self-sufficiency and more energy-efficient chip solutions," says Dr. Michael

Förtsch, CEO of Q.ANT. “As AI and data-intensive applications push conventional semiconductor technology to its limits, we need to rethink the way we approach computing at the core. Q.ANT is driving this shift with photonic computing to achieve unprecedented energy efficiency and computational density. With this pilot line, we are accelerating time to market and laying the foundation for photonic processors to become standard coprocessors in high-performance computing. This milestone marks a major step toward the future of sustainable AI chip technology, engineered and produced in Germany for a rapidly evolving global market. By 2030, we aim to make our photonic processors a scalable, energy-efficient cornerstone of AI infrastructure.”

Prof. Dr. Jens Anders, Director and CEO of IMS CHIPS:
Blueprint for energy-efficient next-generation computing
“This pilot line at IMS CHIPS demonstrates how transformative technologies can thrive on existing infrastructure, setting a blueprint for energy-efficient next-generation computing,” explains Prof. Dr. Jens Anders, Director and CEO of IMS CHIPS. "This comes at a critical time for the computing industry, as the exponential growth of AI and data-intensive applications will soon overwhelm the current data center infrastructure. By partnering with Q.ANT, we are leveraging our semiconductor manufacturing expertise to accelerate the industrialization of photonic processors and establish a scalable model for energy-efficient computing - a crucial step for the future of AI.”

Pilot line for greater autonomy and rapid market launch
Capable of producing up to 1,000 wafers per year, the pilot line enables Q.ANT to refine its chip architecture to meet evolving market requirements. It also serves as the R&D basis for Q.ANT's photonic Native Processing Units and Native Processing Server (NPS) solutions designed to power high-performance computing data centers.

“Six years ago, we made a bold bet on thin-film lithium niobate, and today that decision gives us a significant advantage,” explains Förtsch. “By combining our photonics expertise with our end-to-end control of the value chain - from raw material to finished processor - we are uniquely positioned to drive the next generation of computing and reshape the power and performance challenges of AI and HPC.”

Applications, Roadmap and Industry Impact
Q.ANT's photonic approach harnesses light instead of electrons, offering a paradigm shift in computing efficiency and enabling faster and more energy-efficient mathematical operations compared to traditional CMOS processors. Q.ANT has already demonstrated the potential of the technology in cloud-accessible AI inference demos. With PCIe integration, Q.ANT's Native Processing Servers can seamlessly integrate into existing HPC servers, accelerating adoption across industries.

By leveraging photonics, Q.ANT’s Native Processing Servers can accelerate key workloads such as:

- AI model training and inference
- Scientific and engineering simulations

- Real-time processing of complex mathematical equations
- High-density tensor operations for machine learning

“We are not replacing GPUs - we are reshaping the next generation compute ecosystem,” Dr. Förtsch summarized. “Just as GPUs have complemented CPUs, photonics will enable the next leap in AI - sustainably.”

About Q.ANT
Q.ANT is a deep tech company advancing photonic computing and quantum sensing. Its native sensing technology enables ultra-precise detection of electric and magnetic fields, while its native computing division develops photonic processors that use light to process information, delivering unprecedented efficiency for AI and high-performance computing (HPC). Based on the Q.ANT Para.Digm framework, its technology overcomes the limitations of conventional electronics unlocking new possibilities in AI, medical technology, aerospace and manufacturing. Founded in 2018 as a spin-off from TRUMPF, Q.ANT is headquartered in Stuttgart, Germany.

About IMS CHIPS
IMS CHIPS, Institute for Microelectronics Stuttgart, conducts business-oriented research in the field of microelectronics in the areas of silicon photonics, integrated circuits and systems, nanostructuring and MEMS. It is a recognized non-profit foundation under civil law and is located on the Stuttgart-Vaihingen research campus. The institute is a member of the Innovationsallianz Baden-Württemberg (innBW), a cooperation of ten contract research organizations in Baden-Württemberg comprising a total of twelve institutes.

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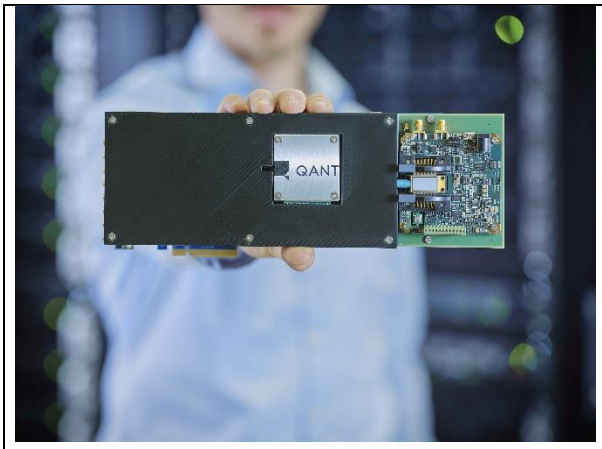
Pictures

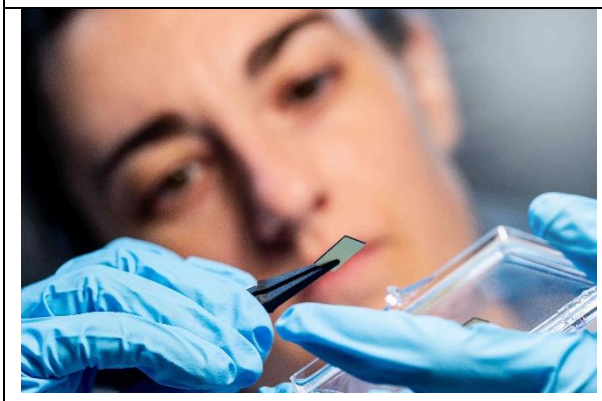


Photonic processor on PCI Express
(Picture: Q.ANT GmbH)

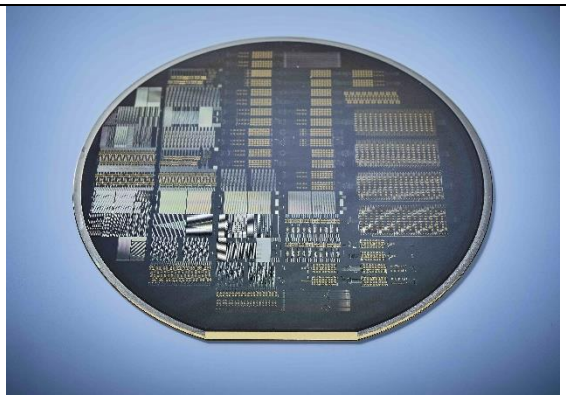
The Q.ANT NPU is available as a turnkey Native Processing Server (NPS) and can be integrated into any HPC or data center.
(Picture: Q.ANT GmbH)

Wafer handling in the clean room
(Picture: Q.ANT GmbH)

Wafer-Handling in the clean room
(Picture: Q.ANT GmbH)



The TFLN-Chip of Q.ANT
(Picture: Q.ANT GmbH)



The Q.ANT wafer is based on Thin-Flm Lithium Niobate (TFLN)
(Picture: Q.ANT GmbH)

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