Press release

Quantum computers:
New Infineon quantum test lab boosts research

Villach, Innsbruck, Graz, 31 May 2022 – Experts at the Infineon research lab in Villach test industrially manufactured quantum chips in short cycles. The test lab acts as a catalyst for boosting the joint research work of Infineon, the University of Innsbruck and JOANNEUM RESEARCH in the field of quantum computers. The cooperation is Austria's and Europe's active contribution in the global race for this technology of the future.

The quantum test lab was officially opened today before **Sabine Herlitschka** (CEO of Infineon Austria), **Heinz Mayer** (Managing Director, JOANNEUM RESEARCH), **Thomas Monz** (Senior Researcher, University of Innsbruck) and **Henrietta Egerth** (Managing Director, Austrian Research Promotion Agency FFG).

With its revolutionary potential, the research field of quantum computers is considered to be the key technology of the 21st century. However, there are still some technical challenges to overcome to develop computers that can be used more productively. Therefore, the global research race to find the best technology is in full swing, and a team from Tyrol, Carinthia and Styria are competing with innovation leaders worldwide. They have joined forces in the "OptoQuant" research project, where together they are researching ion-based quantum processors with integrated optics to make marketable quantum computers a reality.

Research alliance strengthens Europe

Sabine Herlitschka, CEO of Infineon Technologies Austria: "With joint quantum activities, we are making the most of the great opportunity for Austria and Europe to play a pioneering role in a field that is groundbreaking for the future of the world. The new quantum test lab at Infineon in Villach combines scientific findings with industrial technologies. Our contribution is cutting-edge expertise. Thus, we form an excellent research alliance to be at the forefront of development and among the leading players, and in doing so we can use quantum technology as an opportunity for Europe in the global competition. We at Infineon are proactively committed to this."

Shorter testing and learning cycles

The new quantum test laboratory offers unique infrastructure that has been designed for fast test cycles and reliable operation. Quantum particles are trapped in the systems that use special cooling and are manipulated by laser waves. The measurement time of an industrially manufactured ion trap module can be reduced

Infineon Technologies Austria AG
Communications & Public Policies
Birgit Rader-Brunner
Phone: +43 51777-17178
birgit.rader-brunner@infineon.com

from several weeks to one day. Additionally, the time taken for the inspection and verification of individual quantum chips produced using different manufacturing methods and surface materials can be reduced, and chip design can be improved faster. This accelerates learning and knowledge transfer within the team. The team have also developed a joint standard to improve the quality and reliability of the development process as a whole.

Excellent quantum triangle

The new test lab in Villach and Infineon's semiconductor know-how complement the quantum expertise of the project partners. The focus of the University of Innsbruck is on fundamental research, control, and software programming, while JOANNEUM RESEARCH in Weiz specializes in 3D lithography with integrated optics.

Thomas Monz, Senior Researcher at the Institute for Experimental Physics at Innsbruck University: "Fundamental research has paved the way for the quantum processor. Now we need scalable processes and interfaces such as the new test laboratory to develop quantum processors further, using industrial standards. The lab provides the link between fundamental physics and engineering."

Heinz Mayer, Managing Director of JOANNEUM RESEARCH: "The experts at the MATERIALS Institute for Surface Technologies and Photonics work on optical structures to make quantum processors smaller. Together we are able to make that decisive step to further develop the core of future quantum computers."

The alliance is also an important hub for the next generation of quantum researchers. At Infineon Villach alone, ten students benefit from ideal conditions for their scientific research work. They are supervised by four quantum experts. Infineon currently has two vacancies for quantum specialists.

A place for research and innovation

Cutting-edge quantum lighthouse projects require the right framework conditions. **Henrietta Egerth,** Managing Director of Austrian Research Promotion Agency FFG: "When businesses invest in groundbreaking technologies early on and score with innovative products made in Austria, this is of enormous importance for Austria as a business location. That is why we are particularly pleased to support the new quantum test lab at Infineon through the OptoQuant R&D project. FFG, with its European network partners, also makes it possible to strengthen transnational cooperation schemes for this important key technology of the future."

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Communications & Public Policy
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Phone: +43 51777-17178
birgit.rader-brunner@infineon.com

Promising applications

Quantum computers have the potential to solve complex and data-intensive tasks many times faster than conventional computers. While today's computers work with bits and perform combinations of calculations one after the other, a quantum computer using qubits is able to account for all calculation questions simultaneously. It is game-changing technology for the resolution of previously unsolved tasks.

Highly complex processes of logistics or energy supply could be optimized more efficiently, for example, and thus contribute to robust supply chains. There is also great potential in the development of new drugs, vaccines or personalized medication where the effects and side effects could be simulated faster. The development of entirely new, more environmentally friendly and lighter materials also offers scope for pioneering applications.

The future of quantum computers is highly promising and will unfold disruptive potential, particularly in the case of successful industrialization and when the technology can be used for the benefit of society.

The OptoQuant research project

The quantum test lab is part of the 3-year OptoQuant research project that kicked off in June 2021 and will end in 2024. The total research volume is 2.7 million euros and is co-financed by the “Quantum Research and Technology” initiative of the National Foundation for Research, Technology and Development and the Austrian Research Promotion Agency FFG.

Additional links:
OptoQuant project: **Österreichische Forschung ebnet Weg für Quantencomputer**
Infineon **Quantencomputer als Gamechanger von morgen**
Universität Innsbruck **Institut für Experimentalphysik**
JOANNEUM RESEARCH **Materials Institut**
FFG **Quantenforschung und -technologie**

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Communications & Public Policy
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Phone: +43 51777-17178
birgit.rader-brunner@infineon.com

About Infineon Austria

Infineon Technologies Austria AG is a group subsidiary of Infineon Technologies AG, a world-leading provider of semiconductor solutions that make life easier, safer and greener. Microelectronics from Infineon reduce the energy consumption of consumer electronics, domestic appliances and industrial facilities. They make a major contribution to the convenience, security and sustainability of vehicles, and enable secure transactions in the Internet of Things.

Infineon Austria pools competencies for research and development, production as well as global business responsibility. The head office is in Villach, with further branches in Graz, Klagenfurt, Linz and Vienna. With 4,820 employees from 73 countries (including 2,100 in research and development), in the financial year 2021 (ending in September) the company achieved a turnover of € 3.9 billion. With a research expenditure of 516 million euros, Infineon Austria is one of the strongest research company in Austria.

For more information please refer to www.infineon.com/austria
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Contact and further information:

Infineon Technologies Austria AG
Birgit Rader-Brunner | Communications & Public Policy
Phone: 051777-17178, birgit.rader-brunner@infineon.com
Siemensstraße 2, 9500 Villach, Austria