

PRESS RELEASE

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Fraunhofer IPMS is part of European project QLSI

Scalable silicon qubits for quantum computers: Launch of EU-funded project QLSI

Together with European partners, the Fraunhofer Institute for Photonic Microsystems IPMS is developing a scalable technology for silicon qubits for quantum computers. The QLSI project – "Quantum Large-Scale Integration with Silicon" – will develop a 16-qubit chip within four years, thus laying the foundation for industrial-scale implementation of semiconductor quantum processors. The EU is funding the project with a total of 14.6 million euros.

Fraunhofer IPMS is part of the newly launched European project QLSI (Quantum Large-Scale Integration with Silicon), which aims to develop a scalable technology for silicon qubits for quantum computing. Silicon qubits can be manipulated and read out quickly and are ideally suited for quantum computing due to their small size, high fidelity and compatibility with industrial manufacturing processes. Silicon qubits have been successfully demonstrated many times in the past; the project is now focusing on demonstrating a 16 qubit chip and developing a scalable technology for industrial implementation.

Within the four-year project, a consortium of 19 partners with complementary expertise is working together. Fraunhofer IPMS' Center Nanoelectronic Technologies contributes a 4000 m² clean room and its expertise in state-of-the-art, industry-compatible CMOS semiconductor fabrication on 300 mm wafer standard. "We intend to use our know-how and infrastructure to enable highly scalable quantum processors that build on the achievements and advantages of silicon-based semiconductor manufacturing. This concerns, for example, manufacturing processes for nanopatterning, but also material development and electrical manipulation and readout. In close cooperation with Infineon Dresden, RWTH Aachen and FZ Jülich we intend to demonstrate manufacturable and scalable qubit technology on CMOS-compatible wafer level," explains Dr. Benjamin Uhlig, business unit manager for Next Generation Computing at Fraunhofer IPMS.

About project QLSI

The project is a recent addition to the EU's ambitious Quantum Flagship program, a 10-year, € 1 R&D initiative launched in 2018. The overall goal is to consolidate and expand European scientific leadership and excellence in quantum computing, to kick-start a competitive European industry in quantum technologies and to make Europe a

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dynamic and attractive region for innovative research, business and investments in this field.

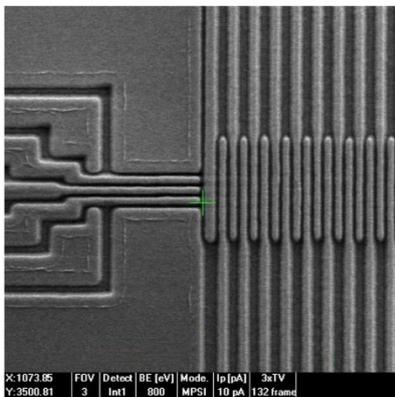
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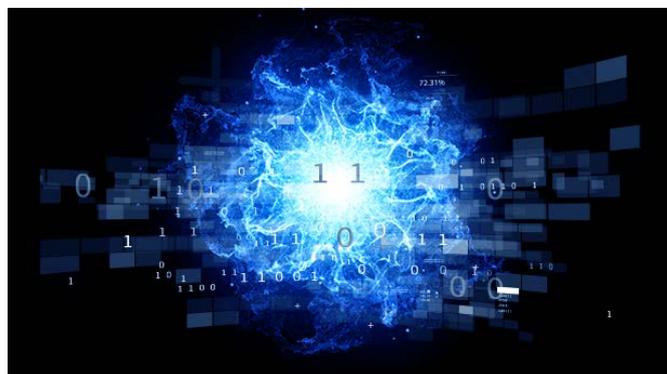
About Fraunhofer IPMS

The Fraunhofer Institute for Photonic Microsystems IPMS stands for applied research and development in the fields of intelligent industrial solutions, medical technology and improved quality of life. Our research focuses on miniaturized sensors and actuators, integrated circuits, wireless and wired data communication, and customized MEMS systems. With the Center Nanoelectronic Technologies (CNT), Fraunhofer IPMS contributes applied research on 300 mm wafers for microchip producers, suppliers, equipment manufacturers and R&D partners.

Images



Nanostructuring for silicon qubits from the 300 mm CMOS clean room of Fraunhofer IPMS. © Fraunhofer IPMS



Fraunhofer IPMS is part of project QLSI, which develops scalable technologies for silicon qubits. © freepik