

PRESS RELEASE

PRESS RELEASEApril 19, 2023 || Page 1 | 4

Fraunhofer IPMS is part of project Qu-Pilot

Leveraging Europe's pilot infrastructure federated quantum technology production facilities

Despite in scientific research in multiple technologies, European industry faces challenges in translating quantum technology innovation into robust and scalable hardware processes and products. Project Qu-Pilot will change this by leveraging the existing piloting infrastructure predominantly distributed across the European research and technology organizations (RTOs). The end goal is to accelerate the time-to-market of European industrial innovation in quantum technology and help establishing a trusted supply chain. Fraunhofer IPMS contributes its expertise in state-of-the-art, industry-compatible CMOS semiconductor fabrication in 300 mm wafer standard.

Success of the European start-ups and small and medium enterprises (SMEs) depends greatly on the efficient conversion of prototypes to pilots to production. Piloting, however, requires time and, in many cases, significant investments in infrastructure. These high costs represent a significant barrier for start-ups and SMEs to enter the very competitive quantum technology market early enough with their product. Project Qu-Pilot wants to change this. The aim is to upgrade the existing pilot line infrastructures in Europe, predominantly distributed across the research and technology organizations (RTOs), and to enable product development loops together with the quantum technology hardware industry in Europe. The end goal is to accelerate the time-to-market of European industrial innovation in quantum technology and help establishing a trusted supply chain.

The federated pilot lines are categorized into four technology platforms based on existing and under-development pilot lines across Europe. These focus on the four approaches of superconducting / photonics / semiconducting and diamond technologies. The various technology platforms provide solutions predominantly for different applications. Superconducting technology is one of the most established platforms for quantum devices. Broadly speaking, superconducting circuits and ion traps are the most mature quantum computing platforms, while photonics and nitrogen-vacancy (NV) centers in diamond platforms are dominant in quantum communications, and the diamond platform is also recognized as a suitable platform for sensing.

Fraunhofer IPMS contributes its expertise in state-of-the-art, industry-compatible CMOS semiconductor fabrication in 300 mm wafer standard to push the semiconducting and superconducting platforms. This concerns, for example, manufacturing processes such

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as deposition and nanostructuring or electrical characterization at wafer scale. A special focus is on metallization and BeoL module improvement. Several technological modules for superconducting local and global interconnects will be optimized which are essential for integrated semiconductor qubit initialization, control, and readout for large scale concepts. The end goal is to demonstrate an improved process and materials for low-loss superconducting electrodes as well as the demonstration of superconducting BEOL module comprising at least a via and trench level.

About the project

The Qu-Pilot project consists of 21 partners from 9 different countries and is funded by the European Union with € 19 m under project code 101079926. The project has started in April 2023 and will run for 3.5 years. The kick-off takes place in Prague on April 19, 2023.

About Fraunhofer IPMS

Fraunhofer Institute for Photonic Microsystems IPMS stands for applied research and development in the fields of industrial manufacturing, medical technology and mobility. Fraunhofer IPMS works on electronic, mechanical and optical components and their integration into miniaturized devices and systems. Our services range from conception and product development to pilot production in our own laboratories and clean rooms. 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.

PRESS RELEASEApril 19, 2023 || Page 2 | 4

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Images

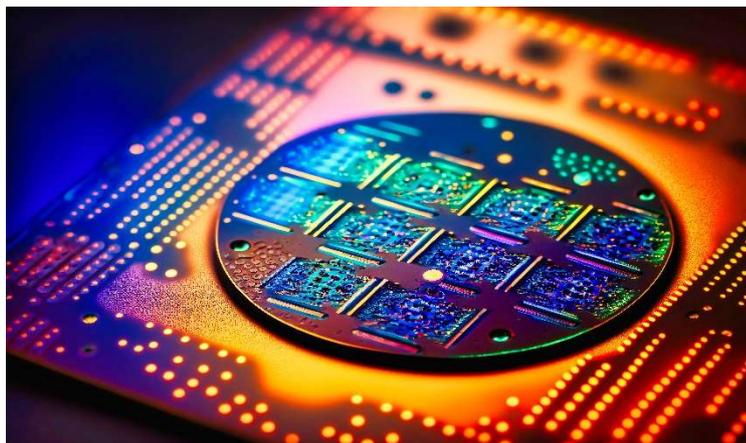
PRESS RELEASE

April 19, 2023 || Page 3 | 4



Technology platforms within Qu-Pilot and the predominant application areas where the platforms are currently used in. Top: RTOs; bottom: Companies participating in the project.

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Artistic rendering of a silicon wafer with quantum chips. © freepik

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300 mm clean room of Fraunhofer IPMS. © Fraunhofer IPMS

PRESS RELEASE

April 19, 2023 || Page 4 | 4
