

PRESS RELEASE

Funding for Europe's Quantum Technologies

Fraunhofer IMS explores new materials for photonic quantum technologies

Duisburg, 11.11.2024 – *The Fraunhofer Institute for Microelectronic Circuits and Systems (IMS), in collaboration with the Leibniz Institute for Solid State and Materials Research Dresden e.V. (IFW), is launching the research project NANO-INC. The project aims to develop advanced materials for photonic circuits, which will serve as a foundation for future quantum technologies in Europe. Quantum technologies are seen as crucial for the future of communication, security, and computational power.*

Innovative material processes for NANO-INC at Fraunhofer IMS

The Fraunhofer IMS contributes its expertise in microelectronics and cleanroom operations to the project, taking on both project coordination and the development of photonic circuits.

At IFW Dresden, initial chemical precursors are being developed, from which thin material layers are deposited through specialized deposition processes. These novel material processes are then upscaled at IMS to create a CMOS-based quantum photonics platform. Thanks to CMOS compatibility, the photonic components can be seamlessly integrated into existing electronic systems, facilitating their industrial application.

Why quantum technologies will strengthen Europe

Photonic quantum technologies are vital for Europe's technological sovereignty, driving a high demand for powerful materials. The NANO-INC project addresses this need: "We are focused on researching new nonlinear materials that surpass current solutions in functionality and scalability," explains Prof. Anna Lena Schall-Giesecke, project coordinator at Fraunhofer IMS. These photonic circuits could, for example, enable secure transmission of encrypted data or the development of ultra-fast sensors, establishing the technological foundation for future innovations.

Future prospects and competitive advantage for Germany

With €1.8 million in funding from the Federal Ministry of Education and Research (BMBF), the project Nanolaminate for Innovative Nonlinear Nanophotonic Circuits (NANO-INC) officially started in early October and will run until September 30, 2027. The innovations developed within NANO-INC lay the groundwork for the creation of ultra-sensitive sensors. Initially, these quantum sensors could be used to detect underground water flows and diagnose materials. In the long term, applications in medicine and agriculture are also conceivable. These developments offer new market opportunities and help establish a stable value chain for quantum technologies in Europe. By developing technologies that meet international standards, new fields of application can be opened up in Europe.

About Fraunhofer IMS

Smart Sensor Systems for a safe, secure, and sustainable future: In numerous state-of-the-art research laboratories, Fraunhofer IMS works with more than 250 talented scientific employees and students on innovative microelectronic solutions. As a trusted research and development partner for industry, the institutes' goal is to develop customized sensor systems for your specific needs in the areas of

biomedical sensors, optical systems, open source semiconductors, embedded AI, technology services, and even quantum technology. The teams in the four business units – Health, Industry, Mobility, and Space and Security – are committed to implementing outstanding and versatile microelectronics that can be utilized across all your projects. For example, these solutions feature high integration capability, enormous energy efficiency and reliable functionality even under harsh conditions.

www.ims.fraunhofer.de/en.html

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