Forschungsfabrik Mikroelektronik Deutschland

FRAUNHOFER GROUP FOR MICROELECTRONICS IN COOPERATION WITH LEIBNIZ FBH AND IHP

PRESS RELEASE

Research Fab for quantum and neuromorphic computing: Launch of the Germany-wide cooperation FMD-QNC

In order to consolidate and expand the existing microelectronic research and development in Germany regarding quantum and neuromorphic computing, the FMD launched on December 1, 2022, a joint project together with four other Fraunhofer institutes, the Jülich Forschungszentrum and AMO GmbH: The Research Fab Microelectronics Germany — Module Quantum and Neuromorphic Computing (FMD-QNC). The German Federal Ministry of Education and Research is funding the equipment and structural setup required for the project.

The performance limits of classical digital computers are increasingly being challenged by compute-intensive technologies and applications such as artificial intelligence, edge computing, and the optimization of complex systems. A promising approach to solving this challenge is offered by quantum computing (QC) and neuromorphic computing (NC). They are considered the essential foundations for Next Generation Computing, i.e. for novel computing technologies essential for the realization of many competitive and safety-critical applications in the future.

Contributing to the development of the future hardware foundation for Next Generation Computing with the FMD-QNC

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In Germany, several fundamental research projects are currently working on QC and NC. Nevertheless, there are still insufficient opportunities for application-oriented testing of the hardware developments that are required for the highly complex computing technologies, as well as for a rapid implementation of the results in prototypes and small series. In order to provide optimal support to researchers and industry in the development of customized microelectronics and scalable manufacturing and integration processes for the new computing technologies, the Research Fab Microelectronics Germany (FMD for its acronym in German) will be expanded to include the module Quantum and Neuromorphic Computing (QNC). To that purpose, the Fraunhofer institutes IMWS, IOF, IPM, and ILT, together with the Jülich Forschungszentrum and AMO GmbH, are cooperating to enhance the facility parks and diverse production lines of the participating partners, as well as the entire spectrum of expertise of the 13 FMD institutes. Based on the cross-organizational and cross-site expertise generated within the FMD, it will be feasible to implement the envisaged FMD-QNC project in a target-oriented and efficient manner. Besides the research activities and the application-oriented testing of the resulting developments, there are two further components of the overall FMD-QNC project: the QNC operating model and the Microelectronics Academy.

Networking among European research organizations to address current and future challenges in electronics research

At the European level, the FMD-QNC is complemented by the PREVAIL project (Partnership for Realization and Validation of AI hardware Leadership), which started on December 1, 2022 as well. The PREVAIL project is bringing together four European research organizations — CEA-Leti, Fraunhofer, imec and VTT — to establish a networked 300 mm technology platform for the fabrication of chip prototypes used in advanced artificial intelligence and neuromorphic computing applications.

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The intended project activities within PREVAIL and FMD-QNC will be synergetically interconnected and represent an essential preparatory work for the technological foundation of the European Chips Act.

The FMD-QNC project is funded by the German Federal Ministry of Education and Research.

The FMD-QNC cooperation partners

AMO GmbH, Forschungszentrum Jülich GmbH, Fraunhofer EMFT, Fraunhofer ENAS, Ferdinand-Braun-Institut gGmbH, Leibniz-Institut fuer Hoechstfrequenztechnik (FBH), Fraunhofer FHR, Fraunhofer HHI, Fraunhofer IAF, Leibniz Institute for High Performance Microelectronics (IHP), Fraunhofer IIS, Fraunhofer IISB, Fraunhofer IMS, Fraunhofer IMWS, Fraunhofer IOF, Fraunhofer IPM, Fraunhofer IPMS, Fraunhofer ILT, Fraunhofer ISIT, Fraunhofer IZM.

Research Fab for quantum and neuromorphic computing: Germany-wide cooperation *FMD-QNC* was launched to develop the future hardware foundation for novel computing technologies. © Fraunhofer MIKROELEKTRONIK

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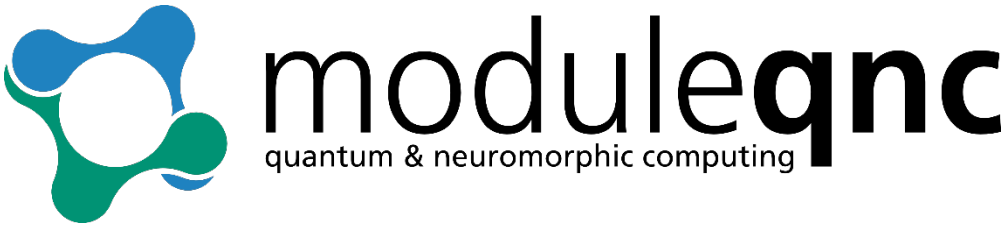

About the Research Fab Microelectronics Germany (FMD)

As a cooperation of the Fraunhofer Group for Microelectronics with the Leibniz institutes FBH and IHP, the Research Fab Microelectronics Germany (FMD for its acronym in German) is the central contact for all questions concerning micro- and nanoelectronics. As a one-stop shop, FMD has been combining scientific excellence, application-oriented technologies and system solutions of the 13 cooperating institutes from the Fraunhofer-Gesellschaft and Leibniz Association into a customer-specific offering since 2017.

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