PRESS RELEASE

Fraunhofer IZM is powering the evolution of chiplet technologies as part of the APECS pilot line

The Fraunhofer Institute for Reliability and Microintegration IZM announces its active contribution to the APECS pilot line launched as part of the EU Chips Acts. APECS intends to promote the development and integration of chiplet technologies as a means of making Europe's semiconductor industry more competitive.

Fraunhofer IZM is taking over a crucial role in the APECS pilot line with its expertise for the hardware integration of chiplet systems. With its access to individual chiplet components, the Institute can cover the entire process flow needed to create fully functioning systems. Its researchers are working on modern 300mm interposer technologies, high-density substrates, advanced assembly technologies, and the necessary processes for the advanced heterointegration of highly integrated systems. Fraunhofer IZM is establishing itself as a key partner for system-level heterointegration in Europe with several focus innovations.

Creating high-precision integration technologies

Chiplet technology requires highly precise assembly on high-density interposers and printed circuit boards. Fraunhofer IZM will advance innovative solutions for implementing these technologies. For example, silicon-based interposers will reduce the contact pitch from the current 15 micrometers to less than a single micrometer. For circuit boards, so-called „advanced PCBs" promise to also bring the pitch down to the micrometer scale.

To connect chiplets requires efficient interconnection technologies and specialized materials to ensure signal integrity. For the packaging technology, the researchers are pursuing various integration approaches (2D, 2.5D, 3D), where thermal management is crucial to avoid hotspots. In addition, Fraunhofer IZM provides comprehensive test environments to ensure the functionality of the individual chiplets after their integration.

Prototyping substrates

When working with tiny structures at scales down to a single micrometer, specialized substrates are needed for the prototypes that the Institute's partners in science and industry are using to develop and test advanced technologies for artificial intelligence or high-performance computing.

To this end, the researchers are refining current technologies that work with organic substrates and putting a new focus on novel materials like glass.

Editorial contact
Georg Weigelt | Fraunhofer Institute for Reliability and Microintegration IZM | Phone +49 30 46403-279 |
Gustav-Meyer-Allee 25 | 13355 Berlin | www.izm.fraunhofer.de | georg.weigelt@izm.fraunhofer.de |

Developing modular chiplet architectures

By bringing together multiple specialized chiplets on a single substrate, Fraunhofer IZM is making electronic systems more modular and more economical. Existing chiplet designs can also be reused effectively, a modularity made possible by the toolbox of integration technologies already established at Fraunhofer IZM and refined further as part of APECS.

About the APECS pilot line

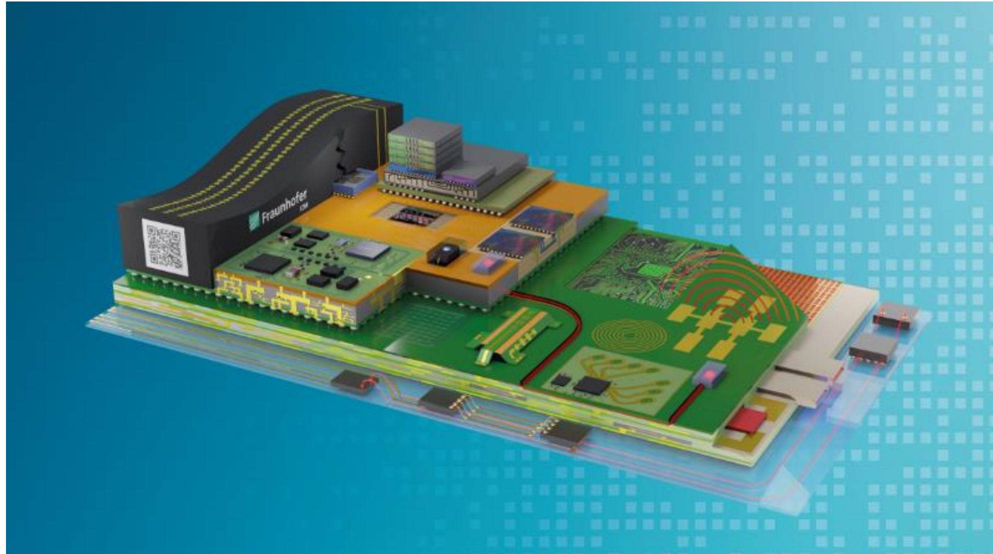
The pilot line for »Advanced Packaging and Heterogeneous Integration for Electronic Components and Systems« (or APECS in brief) is a key part of the EU Chips Act, as it will propel innovation in chiplet technology and enrich the semiconductor research and production capacities in Europe. The institutes cooperating in the Research Fab Microelectronics Germany (FMD) are working closely with other European partners to complete the APECS line and contribute substantially to making Europe more technologically resilient and competitive in the global semiconductor industry. The pilot line will give large industry players and SMEs or smaller startups easier access to cutting-edge technology and feed into more reliable and resilient semiconductor value chains.

APECS is supported by the Chips Joint Undertaking and by funding from Austria, Belgium, Finland, France, Germany, Greece, and Spain as part of the »Chips for Europe« initiative. In total, funding for the APECS pilot line amounts to 730 million EUR over a period of 4.5 years.

Visit: www.apecs.eu.

Technical contact

Erik Jung | Phone +49 30 46403-230 | erik.jung@izm.fraunhofer.de | Fraunhofer Institute for Reliability and Microintegration IZM, Berlin | www.izm.fraunhofer.de



No chiplets without heterogeneous integration: High-end performance packaging of wafers and systems is essential for creating the APECS pilot line hardware
Print quality images: https://www.izm.fraunhofer.de/en/news_events/pics.html

Technical contact
Erik Jung l Phone +49 30 46403-230 l erik.jung@izm.fraunhofer.de | Fraunhofer Institute for Reliability and Microintegration IZM, Berlin l www.izm.fraunhofer.de

The **Fraunhofer-Gesellschaft**, headquartered Germany, is the world's leading applied research organization. With its focus on developing key technologies that are vital for the future and enabling the commercial exploitation of this work by business and industry, Fraunhofer plays a central now and in the future. Founded in 1949, the Fraunhofer-Gesellschaft currently operates 76 institutes and research institutions throughout Germany. The majority of the organization's 32,000 employees are qualified scientists and engineers, who work with an annual research budget of 3.4 billion euros. Of this sum, 3.0 billion euros are generated through contract research.

As a cooperation between the Fraunhofer Group for Microelectronics and the Leibniz Institutes FBH and IHP, the Research Fab Microelectronics Germany (FMD) is the central point of contact for all issues concerning research and development in the field of micro- and nanoelectronics in Germany and Europe. 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. With more than 4,900 employees and a diversity of expertise and infrastructure, the virtual umbrella organization of FMD is the largest association of its kind in Europe. www.forschungsfabrik-mikroelektronik.de/en

Highly integrated microelectronics are omnipresent and yet often evade the eye. With 4 central technology clusters, **Fraunhofer IZM** covers a wide range of areas in quantum, as well as medical, communications and high-frequency technology. With our world-leading expertise, we offer our customers cost-effective development and reliability assessment of electronic packaging technologies, as well as custom-tailored system integration technologies at wafer, chip and board level. For over 30 years and at 3 locations, we have been supporting start-ups as well as medium-sized and large international companies (with knowledge transfer) and researching key technologies for intelligent electronic systems of the future.

Technical contact
Erik Jung l Phone +49 30 46403-230 l erik.jung@izm.fraunhofer.de | Fraunhofer Institute for Reliability and Microintegration IZM, Berlin l www.izm.fraunhofer.de