

Fraunhofer Institute for
Integrated Systems and Device Technology IISB

Annual Report 2025

Annual Report 2025



Achievements and Results



»Today, Fraunhofer IISB is the European center of excellence for wide-bandgap semiconductors and power electronic systems.«

*Prof. Jörg Schulze, Director of Fraunhofer IISB and Head of Chair of Electron Devices
© Daniel Karmann / Fraunhofer IISB*

Editorial

40 Years of Semiconductors and Power Electronics for a Sustainable Future – Last year, Fraunhofer IISB celebrated the anniversary of its founding in 1985. At that time, it was a traditional microelectronics institute supporting regional industry; today, it is the European center of excellence for wide-bandgap semiconductors and power electronic systems in mobility, energy supply, industry, as well as security and resilience. We were able to showcase this impressively at our IISB Annual Conference in May.

In doing so, the institute underscores its role as a reliable R&D partner in times of growing national and global challenges. Across the entire value chain - from materials to electron devices, modules, and systems - we contribute to technological sovereignty in Germany and Europe and support the economy in its diversification and transformation - whether through future-oriented materials such as the extremely high-performance ultra-wide-bandgap (UWBG) semiconductor aluminum nitride or cryogenic power electronics in electric powertrains for aircrafts. As one of the largest aviation institutes within the Fraunhofer-Gesellschaft, the IISB now plays a significant role in the community and in the committees of the European Clean Aviation program.

Many of these important developments are based on strong partnerships. At the regional level, for example, in our High Performance Center for Electronic Systems (LZE) or in the transform_EMN project to support the small- and medium-sized automotive supplier industry. At the national level, for instance, in the INNOBAT project, in which the world's first battery system based on aluminum-ion technology was developed under the coordination of our IISB site in Freiberg. Within the Research Fab Microelectronics Germany (FMD), the IISB coordinates the FMD power electronics roadmap. To this end, we were able to invite all participating institutes to a kick-off workshop in Erlangen in September 2025. The proven concept of a joint FMD Power booth at PCIM Europe in Nuremberg was continued, as well – with a steadily growing number of participating institutes. At the European level, the official launch of the Wide-Bandgap (WBG) pilot line under the European Chips Act took place.

As the sole German partner, the IISB serves as the national bridge to this international network. Our institute continues to expand. In April 2025, our E|Road Center for wireless charging in Hallstadt was officially opened, just two months after the Cleantech Innovation Park officially began operations. We have also prepared another branch lab in Leipzig focused on UWBG-based quantum technologies, to be established in the spring of 2026.

The rapid transfer of research results into industrial application is a key aspect of Fraunhofer's work. This is a central part of our strategy, in the frame of the LZE and within the institute itself: Our »Flying Cubes« approach – a novel, ultra-fast, and deposition-free strategy for Focused Ion Beam (FIB) cross-section preparation in semiconductor manufacturing – was accepted into Phase II of the Fraunhofer AHEAD program after the team demonstrated a compelling go-to-market strategy. In the field of standardization, e.g., an IISB employee was honored with the SEMI Merit Award 2025 for his contributions to industry standards for 4H-SiC metrology.

None of this would be possible without highly qualified and motivated employees. I am therefore all the more pleased that several young colleagues from the IISB have once again been honored with research prizes, such as the PCIM Conference Young Researcher Award. As part of our internal program for doctoral students, they organized their first Ph.D. student workshop to discuss within the IISB community how to balance a doctoral degree, project work, and personal life. In closing, as always, I can only thank all our employees, partners, and our Bavarian, federal, and European funding agencies – and encourage you to review our exciting work in this annual report.



Sincerely yours,

Prof. Jörg Schulze
(Erlangen, March 2026)

Table of Contents

Editorial	3
Table of Contents	4
At a Glance	6
Profile	7
History	7
Advisory Board	8
Operating Budget	9
Staff Development	9
Organizational Chart 2025	10
The Next Generation Power Electronics Value Chain	12
Division Energy Materials and UWBG Semiconductor Technology	14
Energy Materials and Test Devices	16
Division Semiconductor Production Technology	18
Modeling and Artificial Intelligence	20
Materials	21
Front End	22
R&D Semiconductor Devices and Processing	24
Division Power Electronic Systems	26
Power Electronics	28
Division Intelligent Energy Systems	30
Intelligent Energy Systems	32
Division Production Technology	34
E Road-Center	36
Highlight: Aviation	38
Locations and Network	44
Headquarters of Fraunhofer IISB	45
Technology Center High Performance Materials THM	45
E Road-Center	45
Friedrich-Alexander-Universität Erlangen-Nürnberg (FAU) /	
Chair of Electron Devices (LEB)	46
Chair of Power Electronics (LEE)	46
Chair of Manufacturing Automation	
and Production Systems (FAPS)	46

Technische Universität Bergakademie Freiberg (TUBAF) /	
Institute of Applied Physics (IAP)	47
University of Bayreuth / Bavarian Center for Battery Technology (BayBatt) /	
Chair of Electronics for Electrical Energy Storage (LEEE)	47
Academic Teaching /	
Lectures Held by IISB Researchers	49
pe-bauhaus erlangen-nürnberg /	
The Technical-Academic Master Forge	49
The Fraunhofer-Gesellschaft	50
Fraunhofer	51
The Research Fab Microelectronics Germany (FMD)	52
The FMD as Enabler of Transformation and Innovation	53
Fraunhofer IISB – The SiC Specialists within the FMD	54
IISB Science Stars 2025	56
Imprint	69



At a Glance

Profile

Founded in 1985, the IISB is now one of Europe's leading research institutions for wide-bandgap semiconductors and efficient power electronics, covering the complete value chain. Here, material and device know-how merges with complex system development, especially for e-mobility and sustainable energy supply. The spectrum ranges from basic materials, semiconductor devices and process technologies, power electronic modules and components to complex power electronic and energy systems.

Main target applications of the IISB are semiconductor manufacturing, electromobility, aerospace, sustainable energy supply as well as security and defense.

With its solutions, the institute has been setting benchmarks in energy efficiency and performance, even for extreme operating conditions. The integration of intelligent data-based functionalities also continuously opens up new application scenarios. This allows the IISB to support customers and partners worldwide in transferring scientific results into commercial products.

A total of around 400 employees work at the IISB's locations: the headquarters in Erlangen, the EJRoad Center at the Cleantech Innovation Park in Hallstadt, and the Fraunhofer Technology Center High Performance Materials THM in Freiberg / Saxony.

iisb.fraunhofer.de/network-cooperations

History

The Fraunhofer Institute for Integrated Systems and Device Technology IISB in Erlangen has established itself as an important center of applied research and development for electronic systems, power electronics, semiconductor technology, and materials development in the Nuremberg metropolitan region, Germany and Europe.

It was founded in 1985 when the Fraunhofer-Gesellschaft took over the Erlangen-based »Zentrum für Mikroelektronik und Informationstechnik GmbH« and turned it into the Fraunhofer Working Group for Integrated Circuits AIS. Within this working group, there was the Department of Device Technology AIS-B, which became a Fraunhofer Institute (IIS-B) in 1993. However, IIS-B was still formally affiliated with its sister institute IIS-A, today's Fraunhofer Institute for Integrated Circuits IIS in Erlangen-Tennenlohe. In the fall of 1994, IIS-B moved into a new institute building on the campus of the Technical

Faculty in Erlangen. At the beginning of 2003, IIS-A and IIS-B became formally independent institutes and have since then the names »Fraunhofer Institute for Integrated Circuits IIS« and »Fraunhofer Institute for Integrated Systems and Device Technology IISB«.

Prof. Heiner Ryssel headed the IISB from 1985 until his retirement in 2008. Prof. Lothar Frey succeeded Prof. Ryssel in October 2008. Between 2018 and 2021, the IISB was provisionally headed by Prof. Martin März. Since September 1, 2021, Prof. Jörg Schulze has been Institute Director of the IISB.

From the beginning, the IISB has been closely cooperating with the University of Erlangen-Nürnberg (FAU). In 2015, the IISB together with the IIS and the FAU Erlangen-Nürnberg founded the »Leistungszentrum Elektroniksysteme« (LZE).

iisb.fraunhofer.de/history

Advisory Board

Dr. Stefan Kampmann (Chairman)

&alwaysahead

Prof. Dr. Nejila Parspour

University of Stuttgart

Katrin Feurle

Wolfspeed

Dr. Ann-Kathrin Schatz

Saxon State Ministry for Science, Culture and Tourism

Dr. Christina Hack

Brose Fahrzeugteile

Dr. Verena Vescoli

LEM International

Thomas Harder

European Center for Power Electronics

Dr. Peter Wawer

Infineon Technologies

Prof. Dr. Joachim Hornegger

Friedrich-Alexander-Universität Erlangen-Nürnberg

Dr. Stefan Wimbauer

Bavarian Ministry of Economic Affairs, Regional Development and Energy

Dr. Gabriel Kittler

X-FAB Semiconductor Foundries

Katharina Westrich

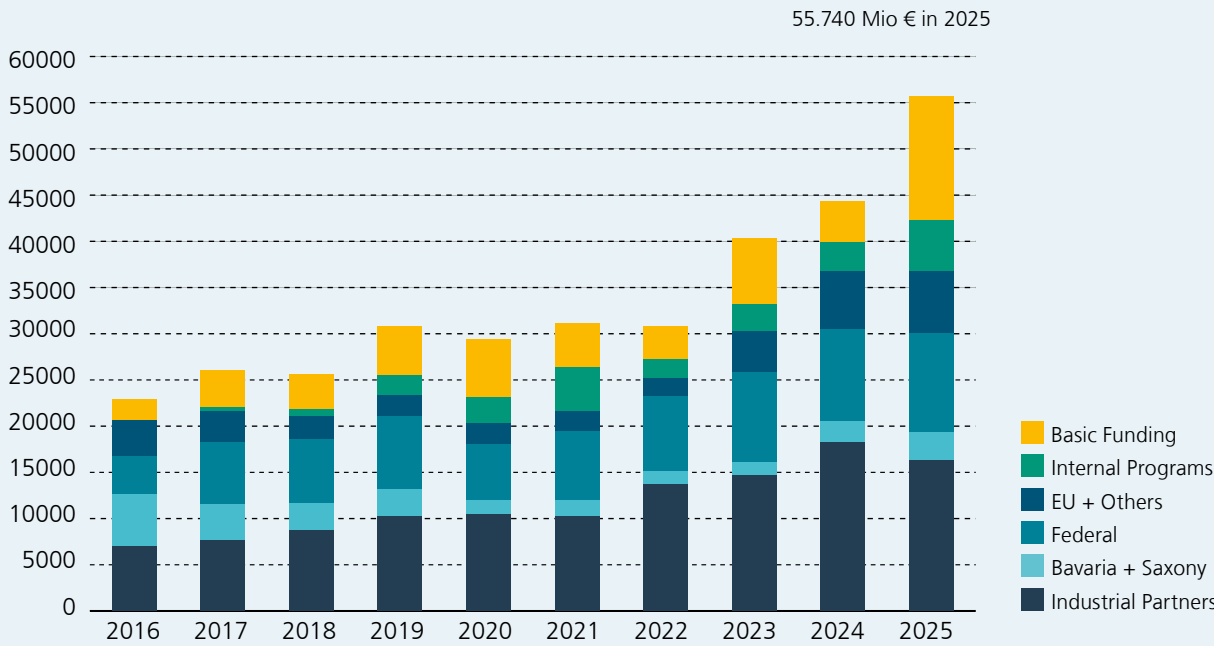
Siemens

Dr. Andreas Mühe

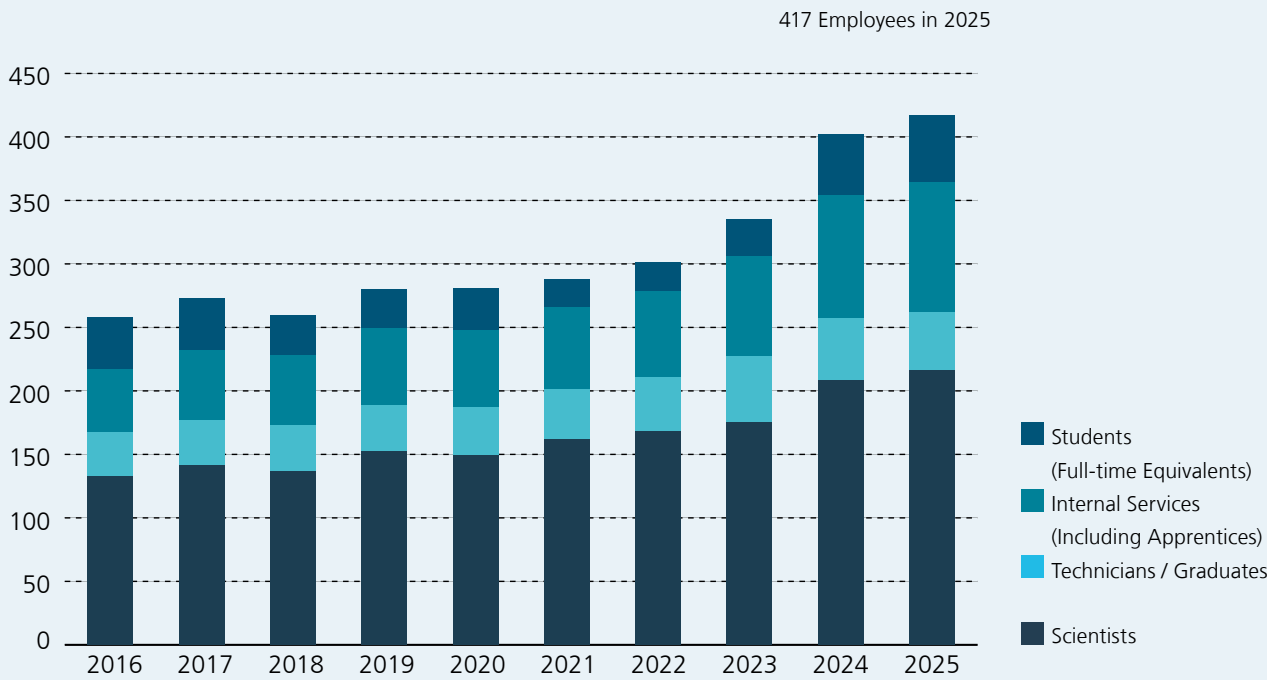
MJA Process Engineering

The IISB Advisory Board consists of members from science, industry and politics who advise the IISB Directorate on strategic and structural development issues

Operating Budget



Staff Development





Fraunhofer IISB: one Institute, many opportunities © Elisabeth Iglhaut | Fraunhofer IISB

Organizational Chart 2025

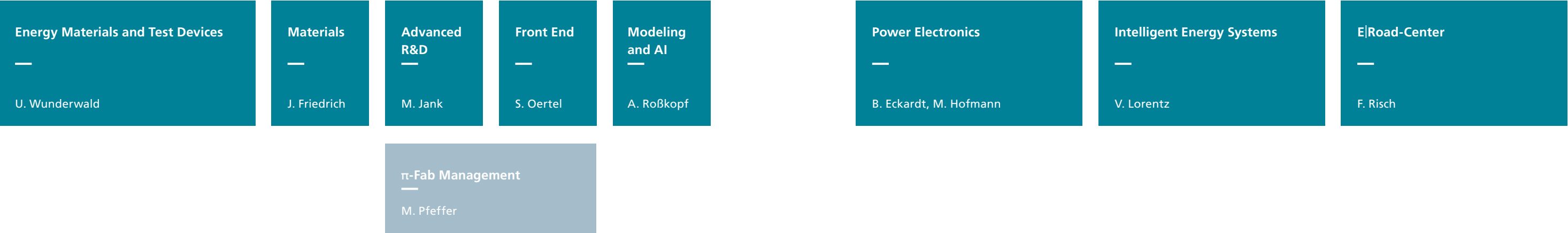
Institute Management



Divisions



Departments



Fraunhofer IISB: Wide-Bandgap Semiconductors and Power Electronics, from Crystal to System.

Here, materials and device know-how merges with complex system development, especially for e-mobility and sustainable energy supply.



**Unique Value Chain for
Next-Generation Power Electronics**

Division Energy Materials and UWBG Semiconductor Technology

»High-performance energy materials and ultra-wide-bandgap semiconductors are key enablers for a resilient, climate-neutral and digitally connected society. By combining a fundamental understanding of material properties with advanced characterization, scalable processes and application-oriented integration, we are accelerating the transfer of innovative battery and semiconductor technologies into efficient energy systems, sustainable mobility and next-generation power electronics.«



*Prof. Johannes Heitmann,
Head of Energy Materials and UWBG Semiconductor Technology Division,
Head of Technology Center High Performance Materials THM and
Director of the Institute of Applied Physics
of the TU Bergakademie Freiberg
© Daniel Karmann / Fraunhofer IISB*

At our site in Freiberg, Fraunhofer IISB and the Institute of Applied Physics (IAP) at TU Bergakademie Freiberg jointly investigate new, high-performance semiconductor materials and the associated efficient manufacturing technologies for the processing and characterization of novel electronic devices.

Similarly, we develop Li-free Al-ion batteries, which are based on cost-effective electrode materials and non-flammable electrolytes, achieving high charging currents and high cycle stability. Researching a totally new battery approach allows us to address a recycling-friendly design and to establish a model system for the realization of a circular economy already at an early stage of technology development.

In the field of semiconductor materials and devices, one major point of our work is to evaluate the role of defects for the reliability and functionality of upcoming power electronic or quantum devices based on ultra-wide-bandgap materials. The development of processes and materials and their integration into prototypes and test vehicles are among the most important tools we use here. We are developing in-operando characterization techniques using spectroscopy and X-ray metrology for the characterization of our devices under working conditions or for identification and recognition in sorting and recycling.

Energy Materials and Test Devices

»We bridge the gap between advanced materials and their application in high-performance electronic devices and sustainable energy storage systems. By combining operando analytics, scalable processes and application-oriented integration, we accelerate the transfer of innovative technologies from research into practice.«



Dr. Ulrike Wunderwald,
Head of Energy Materials and Test Devices Department
© Daniel Karmann / Fraunhofer IISB

The Energy Materials and Test Devices department is located at the Fraunhofer IISB branch in Freiberg, Saxony. Here, we operate the Fraunhofer Technology Center for High-Performance Materials THM in collaboration with Fraunhofer IKTS. Both institutes complement each other thematically at this location and work together closely in joint projects. We are researching new, high-performance electronic materials, related efficient process technologies for the processing and characterization of electron devices, and recycling approaches for recovering valuable.

Our focus is on gaining a deep understanding of fundamental material properties and physical mechanisms. Based on this, we develop new manufacturing processes and integration methods for the requirements of our customers in industry and research.

Within the value chain for power electronics at Fraunhofer IISB – from semiconductor materials to power electronic systems – we see ourselves as the link between material development and the final electronic or energy storage device.

Combined with many years of experience in analytics, characterization, and metrology, particularly using operando and inline methods, and with state-of-the-art laboratory equipment, we act as a front-end foundry for two major research areas:

1. Development and evaluation of innovative semiconductor devices and associated processing steps, especially on the basis of nitride WBG and UWBG semiconductor materials.

We carry out device and process development in the jointly used, CMOS-compatible clean room at the TU Bergakademie Freiberg. Here, we are able to independently and flexibly integrate novel materials into test devices and to develop and evaluate individual processing steps, all the way to piloting. A special feature is our expertise in atomic layer processing and atomic scale precision. For functional characterization, we use comprehensive in-operando analytics at Fraunhofer THM, which allows us to observe the test devices live during switching.

We work hand in hand with the Materials department at Fraunhofer IISB, which provides us with innovative substrates, for example based on gallium nitride (GaN) or aluminum nitride (AlN). After the evaluation phase, the processes and process chains will be transferred to the joint cleanroom of the IISB and FAU Erlangen-Nürnberg for further development and to achieve higher levels of technological maturity and reliability. To this end, we are in close contact with our semiconductor technology departments.

2. Development of new battery technologies and their evaluation using appropriate cell prototypes, in particular based on aluminum-ion cell chemistry.

We develop new cell concepts and manufacturing processes for sustainable batteries, such as aluminum-ion cell chemistry, which does not require critical materials such as lithium or cobalt and is safe, cost-effective and recyclable. Building on this, we develop multilayer pouch cells and application-oriented system demonstrators to transfer promising cell chemistries from laboratory-scale prototypes toward realistic operating conditions. We evaluate the cells and demonstrators using our analysis and characterization tools. Our in-operando measurement methods enable us to observe the battery cells in real time and analyze structural changes. In order to ensure that our cell chemistries meet the requirements of the applications and to continuously develop them further, we work together closely with the Intelligent Energy Systems department at the IISB.

Our activities regarding the characterization of semiconductor base materials and semiconductor test devices as well as the development of innovative battery technologies are supported by extensive analytics, which we perform with a very high degree of technical expertise. The level of expertise and

scientific know-how that we have achieved with our in-operando and inline methods is a unique selling point for the Energy Materials and Test Devices department at Fraunhofer IISB.

Due to their outstanding importance, these research activities and services have been organized in a separate working group called »Operando and In-line Analytics.« This methodology also allows material flows and process sequences to be tracked. This generates a large amount of data, which we evaluate using AI routines.

The triad of scientific theory, research methodology, and practical application makes us a reliable research and service partner for the semiconductor and battery sectors.

 iisb.fraunhofer.de/lemut



Material characterization at cryogenic temperatures (77 K)
© Daniel Karmann / Fraunhofer IISB

Division Semiconductor Production Technology

»Global competitiveness, technology sovereignty, and resilience require easy access to novel semiconductor technologies and materials for partners from industry, SMEs and research. This is what we offer not only by contract R&D, but with our unique infrastructure and dedicated platforms like our prototyping foundry π -Fab, EUROPRACTICE, the High Performance Center for Electronic Systems (LZE), or with our successful IISB joint lab approach – backed up by comprehensive system and application know-how, modeling and AI competencies.«



*Prof. Jörg Schulze,
Director of Fraunhofer IISB,
Head of Semiconductor Production Technology Division and
Chair of Electron Devices (LEB) of the
Friedrich-Alexander-Universität Erlangen-Nürnberg
© Daniel Karmann / Fraunhofer IISB*

Right at the beginning of our well-established R&D value chain, the portfolio of Fraunhofer IISB in semiconductor technology covers the development of crystalline and other functional materials as well as of power, sensor and passive devices and processing technologies in a comprehensive laboratory and cleanroom environment. This is supplemented by research on novel sensors and quantum technologies. Focusing on (ultra-)wide-bandgap (UWBG) semiconductors like silicon carbide (SiC), gallium nitride (GaN) or aluminum nitride (AlN), this paves the way for the development of innovative and highly efficient power modules and systems for industry-relevant applications.

Supported by characterization, test, and metrology, modeling and artificial intelligence, our prototyping fab ensures high flexibility with regard to our customers' needs. It provides a continuous silicon CMOS as well as a silicon carbide (SiC) processing line in an industry-compatible environment. This includes a proprietary high-temperature SiC CMOS technology.

In this context, IISB is the competence center and contact for SiC, UWBG, and power electronics within the Fraunhofer-Gesellschaft and the Research Fab Microelectronics Germany (FMD) and also the German entry point into the European Wide-Bandgap (WBG) Pilot Line.

Modeling and Artificial Intelligence

»The MKI department continuously expands know-how in physics, mathematics, artificial intelligence, and cutting-edge computing to tackle real, industry-relevant challenges.«



Dr. Andreas Roßkopf,
Head of Modeling & Artificial Intelligence Department
© Elisabeth Iglhaut / Fraunhofer IISB

While traditional simulation departments - including those at the IISB - have typically had access to extensive CPU clusters, the growing demand for GPU-accelerated computing tasks has become a strategic bottleneck.

Complex lithography simulations, molecular dynamics simulations to support TCAD models, and the multiparameter optimization of algorithms for power electronics or battery systems increasingly rely on GPU architectures to achieve feasible computation times. To address this issue, we have invested in a dedicated high-performance server equipped with the latest NVIDIA H200 GPUs. Since the purchase was made in time before the recent rise in memory prices, the system ensures our autonomy in GPU-intensive simulation tasks and enables us to fully explore the emerging field of GPU-accelerated simulation - and in particular, agent-based AI - which involves the close coupling of AI agents with physics-based simulations - entirely in-house.

The calculation and optimization of several hundred different power electronics designs per second, the development of realistic metasurfaces, and the creation of silicidation models for semiconductor contacts not only provide valuable support for research projects but also enable tailored solutions for our industry partners. To further strengthen our methodological foundation, we have developed jNO (JAX Neural Operators) - an open-source, JAX-native library for training neural operators and fundamental PDE models. Its differentiable combination of AI and numerical implementation combines geometry, model definition, and pre-defined physics use cases into a single optimization pipeline, enabling efficient use across various application areas, from crystal growth to power electronics. The combination of domain expertise, physical and mathematical rigor, and state-of-the-art hardware positions the MKI department as a central enabler for simulation-driven innovation across all fields along the value chain addressed by the IISB.

 iisb.fraunhofer.de/mki

Materials

»We have profound experience in the areas of semiconductor crystal growth, epitaxy, and device processing including characterization and modeling.«



Dr. Jochen Friedrich,
Head of Materials Department
© Amelie Schardt / Fraunhofer IISB

The R&D activities of the IISB cover the complete value chain for complex and intelligent electronic systems, from basic materials to devices and modules all the way to complete systems for application in mobility and energy technologies, with power electronics being a consistent backbone of the institute.

We support material, device, and equipment manufacturers as well as their suppliers with scientific-technological solutions in the field of production and characterization of crystals, epitaxial layers, and devices. We improve the material quality and reduce the production cost. We identify defects harmful for device performance and reliability and find solutions to avoid them. We develop technologies for new materials, and tailor the material properties for new applications.

Our focus is on semiconductors for power electronics, photonics, sensors & detectors, and quantum technologies. Our strategy is to optimize manufacturing processes through a combination of experimental process analysis, tailored characterization techniques and numerical modeling.

For that purpose, we have a well-suited infrastructure consisting of R&D furnaces and epitaxial reactors, state-of-the-art metrology tools for investigating the physical, chemical, electrical, and structural material properties, and powerful simulation programs for heat and mass transport calculations. State of the art AI and ML techniques are integrated into our work in the field defect recognition as well as in the field of numerical simulation.

 iisb.fraunhofer.de/materials

Front End

»By expanding our 200 mm infrastructure for SiC and emerging wide-bandgap semiconductors, Front End strengthens Europe’s capability to transfer innovative device concepts into reliable pilot-scale manufacturing.«



Dr. Susanne Oertel,
Head of Front End Department
© Daniel Karmann / Fraunhofer IISB

The Front End department combines a Process Enhancement group with teams of scientists, engineers, technicians, and microtechnologists who provide comprehensive expertise in semiconductor manufacturing within an industry-compatible cleanroom environment. The department covers all major technology areas, including lithography, wet processing, dry etching, ion implantation, metallization, hot processing, back end technologies, and advanced process control. Together with the π -Fab and the R&D Semiconductor Devices and Processing department, Front End ensures the transfer of innovative device concepts into robust manufacturing flows at Technology Readiness Levels (TRL) 6 to 8.

A major focus in 2025 was the strategic expansion of the Institute’s infrastructure to further close the remaining 200 mm capability gap for silicon carbide (SiC) device manufacturing. As part of this initiative, Front End prepared and initiated the procurement and integration activities for four new Centrotherm furnace tubes dedicated to LPCVD TEOS and LPCVD nitride depositions. These systems will significantly increase process capacity and flexibility while enabling the transfer of established 150 mm process modules towards fully scalable 200 mm manufacturing. In parallel, additional redundant furnace tubes for wet and dry oxidation processes are being implemented. The resulting increase in availability

and operational robustness is essential for future pilot-line activities and for meeting the growing demands of industrial and European research projects in the field of wide-bandgap semiconductors.

Another key milestone of 2025 is the aquisition of a new dry etching / PECVD-processing cluster platform consisting of six process chambers. The configuration includes two different PECVD chambers and four dedicated etching chambers, creating a highly flexible manufacturing environment for next-generation semiconductor technologies. Besides supporting established silicon and silicon carbide process flows, the new cluster is specifically designed for emerging materials such as gallium nitride (GaN). Advanced plasma processes for deep trench etching in SiC open new opportunities for innovative device concepts, including highly efficient vertical power devices and future ultra-wide-bandgap semiconductor applications.

A further strategic investment initiated in 2025 focuses on strengthening the Institute’s long-term 200 mm manufacturing capabilities and analytical excellence. A next-generation Mask Aligner Gen4 platform combined with semi-automated wafer handling will significantly increase lithography throughput, process stability, and reproducibility for pilot-line manufacturing. In parallel, the analytical infrastructure is being expanded through the acquisition of an ICP-MS system and an

automated Vapor Phase Decomposition (VPD) chamber with Wafer Surface Preparation and Sampling (WSPS) capability. These tools enable highly sensitive trace-contamination monitoring and qualification of semiconductor processes at contamination levels required for advanced CMOS-compatible manufacturing. The enhanced analytical capabilities are particularly important for integrating emerging wide- and ultrawide-bandgap semiconductor materials such as GaN, diamond, and SiGeSn into existing CMOS-compatible cleanroom process environments while maintaining strict contamination control and quality standards.

iisb.fraunhofer.de/semiconductortechnology

In addition to these infrastructure developments, Front End continued to support customers from industry and research through prototype manufacturing, process optimization, and technology transfer activities. The combination of enhanced manufacturing capabilities, advanced process control, and expanding 200 mm infrastructure strengthens Fraunhofer IISB’s position within European pilot-line initiatives and provides a robust foundation for future SiC, GaN, and ultra-wide-bandgap semiconductor technologies.

Fraunhofer IISB is bridging the gap between 150 mm and 200 mm for silicon carbide (SiC) device manufacturing to support customers from industry and research through prototype manufacturing, process optimization, and technology transfer activities
© Daniel Karmann / Fraunhofer IISB



R&D Semiconductor Devices and Processing

»The R&D Semiconductor Devices and Processing department conducts research on new device concepts and their realization, and offers development services for customers and project partners.«



*Dr. Michael Jank,
Head of R&D Semiconductor Devices and Processing Department
© Elisabeth Iglhaut / Fraunhofer IISB*

In the silicon carbide value chain, the development of devices and the process integration as standardized sub-process sequences, known as modules, are essential steps.

Process Modules are Key

Process modules define the electrical parameters of components through the harmonized interaction of sequentially executed semiconductor manufacturing steps. One example is contact formation, which, starting with surface doping, cleaning, metallization, thermal silicide formation, purification, and finally coating with the connection metal, leads to an overall result through several steps, each with its own specific characteristics. In this case, the result is the optimized specific contact resistance. Numerical models and analysis tools are available at all stages of the development process.

Since the process modules can be used across applications for power devices, CMOS circuits, or radiation detectors, they form a universal basis for deriving new device concepts or for quality assurance in the IISB's p-FAB. At the same time, development services based on semiconductor technologies from third-party suppliers, known as foundries, can be carried out.

Ways to Work Together

For the deployment of research and development capacities, various cooperation models have been established. These range from the demonstration of single functionalities at process or module level to the development of complete prototypes based on customer-specific parameters through to joint labs. The technology transfer is executed in close collaboration with the client, even down to the individual process level. Together with the Front End department and the p-FAB management group, it is possible to manufacture established prototypes in medium quantities.

In addition to its activities in the field of silicon carbide, the R&D Semiconductor Devices and Processing department also focuses on silicon technologies for special devices and conducts research into process and device technologies for new semiconductor materials with wide bandgap.

iisb.fraunhofer.de/semiconductortechnology

*Europe's only high-temperature 4H-SiC CMOS technology:
IISB's SiC CMOS early access technology enables fabrication of
integrated analog & digital circuits on 150 mm wafers which
can operate at temperatures up to approx. 600 °C
© Daniel Karmann / Fraunhofer IISB*





Division Power Electronic Systems

»Sustainability in energy supply and mobility is a key in meeting the imminent environmental and economic challenges our society is facing. Innovative solutions require fresh thinking, leaving beaten tracks, and a comprehensive view of the overall system. This is exactly the mission and motivation behind the research work at Fraunhofer IISB on intelligent power electronics and energy systems.«



*Prof. Martin März,
Head of Power Electronic Systems Division and
Chair of Power Electronics (LEE)
of the Friedrich-Alexander-Universität Erlangen-Nürnberg
© Amelie Schardt / Fraunhofer IISB*

One focus of our research work is on sustainable mobility systems whether in the automotive sector, commercial vehicles, ships, or aircrafts. Electric flying in particular poses enormous challenges for power electronics, especially with regard to safety, robustness, availability, power density, and weight. In addition, there are demanding technical boundary conditions such as cryogenic cooling media, the use of superconductors or cosmic radiation.

We are also constantly expanding our research activities in the area of local DC networks, particularly with regard to new protection components and converter concepts for applications up to the medium-voltage and megawatt power range.

Another important field of research is cognitive power electronics, i.e., power electronics that is able to generate maximum information about its environment – whether it is monitoring the stability of grids or the condition of customer systems and machines.

Power Electronics

»The Power Electronics Department covers the value chain from power modules to complete power electronic systems and gets a well-coordinated dual leadership focusing on upcoming developments.«



Dr. Bernd Eckardt,
Head of Power Electronics Department
© Daniel Karmann / Fraunhofer IISB

»Innovations like electric aircraft and cryogenic power electronics, utilizing supra conducting technologies to enhance efficiency and reduce emissions, pave the way for a cleaner, more sustainable future in aviation and energy systems.«



Dr. Maximilian Hofmann,
Head of Power Electronics Department
© Kurt Fuchs / Fraunhofer IISB

In order to address the growing demand of our customers and project partners for laboratory infrastructure for the megawatt and kilovolt range, Fraunhofer IISB has set up a unique medium-voltage test field
© Daniel Karmann / Fraunhofer IISB

The ongoing electrification in trucks, ships, and aircrafts are driving the demand for more powerful and tailored power electronic solutions. Consequently, the Power Electronics Department is focused on designing the next generation of power electronics, incorporating wide (e.g., SiC and GaN) and ultra-wide (e.g., AlN and GaO) bandgap semiconductors, as well as advanced power electronic concepts and control strategies for innovative applications, including aircraft.

The ongoing electrification in trucks, ships, and aircrafts are driving the demand for more powerful and tailored power electronic solutions. Consequently, the Power Electronics Department is focused on designing the next generation of power electronics, incorporating wide (e.g., SiC and GaN) and ultra-wide (e.g., AlN and GaO) bandgap semiconductors, as well as advanced power electronic concepts and control strategies for innovative applications, including aircraft.

Collaborating with industry and research partners, we are already showcasing power electronic solutions that will enter production by 2035. Our efforts include the development of the latest SiC and GaN devices, alongside new power modules designed for low parasitic impedance and enhanced thermal conductivity. These modules are integrated into advanced mechatronic solutions that prioritize compactness, lightweight construction, and mechanical robustness, ensuring that cutting-edge technology is ready for reliability testing and vehicle integration.

A key focus area is drive trains for next-generation electric vehicles, along with the development of SiC and multi-level GaN inverters for high-speed drives necessary for electric air compressors in fuel cell systems, capable of spinning up to 160,000 RPM. These inverters must operate at switching frequencies around 100 kHz to minimize magnetic losses in the motors, and the low switching losses associated with wide-bandgap semiconductors significantly enhance efficiency.

Additionally, DC/DC converters with up to 1MW play a vital role in adapting the output voltage of fuel cells to the vehicle's DC link voltage. With over 25 years of experience, Fraunhofer IISB excels in custom converter designs for diverse requirements, with several prototypes already operational in test vehicles and trucks, demonstrating the advantages of this new technology.

To provide comprehensive powertrain solutions, the Power Electronics Department expands its expertise to include electric motor drives, magnetic and mechanical design, testing, and co-simulation of electric motors and power electronic inverters. This integration enhances drive system performance and delivers reliable data on efficiency and performance.

For dependable solutions, we maintain a test lab specializing in active and passive power cycling and electromagnetic compatibility (EMC), while also developing innovative active and passive EMC filters. These advancements will further reduce the size and weight of next-generation power converters.

New challenges arise with supra conducting powertrains operating at temperatures as low as -200 °C, which alter the behavior of semiconductor devices and passive components, creating significant thermomechanical stress on interconnections. To address these challenges, we have established new test benches and simulation capabilities, successfully providing our research partners with fully functional prototype systems for testing applications.

Over the past 25 years, the demand for power has grown substantially. In response, we have set up our medium voltage and high-power lab, capable of handling voltages up to 30 kV and electric power up to 10 MW.

All this positions Fraunhofer IISB as an outstanding partner for developing innovative power electronic solutions.

www.iisb.fraunhofer.de/powerelectronics



Fast-charging capable, weight-optimized, modular 800 V high-performance traction battery developed at Fraunhofer IISB for the European 1000kmPLUS project

© Thomas Richter / Fraunhofer IISB



Division Intelligent Energy Systems

Division Intelligent Energy Systems

»Effective energy storage systems and good power conversion systems require three essential components: a modular hardware, a robust yet evolutive software, and a comprehensive data set!«



*Prof. Vincent Lorentz,
Head of Intelligent Energy Systems Division and
Chair of Electronics for Electrical Energy Storage (LEEE)
of the University of Bayreuth
© Anja Grabinger / Fraunhofer IISB*

The Intelligent Energy Systems Division at Fraunhofer IISB develops electronic solutions and advanced technologies for the digitalization of energy storage and power conversion systems, serving both mobile and stationary applications. These intelligent devices and methods are part of our Cognitive Power Electronics (CPE) ecosystem, aimed at the transportation and energy sectors, and cover a wide power range, from milliwatts to megawatts.

We integrate innovative data analytics into our systems, enabling smart monitoring with enhanced diagnostics, anomaly detection, and self-healing capabilities. These technologies are implemented in our cutting-edge electronic power converters and high-performance battery systems, including our disruptive open-source battery and fuel-cell management system, foxBMS®, developed in close collaboration with the University of Bayreuth and its Bavarian Center for Battery Technology (BayBatt).

Our research and development focus on power and control electronics, software, and data processing technologies, leveraging the latest advancements in artificial intelligence to provide innovative state estimation and anomaly detection functions for energy storage systems, power conversion systems, and energy management systems.

Intelligent Energy Systems

»Our department develops innovative electronic hardware, embedded software, backed with AI solutions for digitalizing energy storage and power conversion systems in mobile and stationary applications.«



Prof. Vincent Lorentz,
Head of Intelligent Energy Systems Department
© Anja Grabinger / Fraunhofer IISB

The Department »Intelligent Energy Systems« combines four research groups developing hardware and software solutions for electrical energy storage and electrical power conversion applications in the submarine, waterborne, road, railway, airborne, and space domains.

The group »Battery Systems« develops high-performance energy storage solutions around next-generation cells, including silicon-anode and solid-state technologies. Its work links lightweight system integration, stack-pressure management, thermal-runaway safety for aviation, foxBMS®-based battery management, advanced state estimation, and module-level impedance spectroscopy.

The group »DC Grids« develops solutions for bidirectional and megawatt charging, large charging parks, DC data centers and resilient energy systems. Its work covers short-circuit behavior, safety concepts, stability, control, electronic DC breakers and sector-wide design and optimization with the intEMT® software toolbox.

The group »Industrial Power Electronics« supports customers with demanding converter technologies, with a growing focus on solid-state transformers for data centers, charging infrastructure and local grids. It also evaluates SiC-based MMC approaches and MOSFET solutions for fluctuating HVDC loads, where cost and high-power device availability remain key challenges.

The group »Data Analytics« turns industrial data into application-specific AI for energy, power electronics, semiconductor and industrial systems. Its portfolio includes local and trustworthy AI and LLM solutions, interoperable data spaces and knowledge ecosystems, digital twins, simulation-based optimization, edge AI, resilient microgrid methods, and predictive maintenance.

 iisb.fraunhofer.de/ies

AI-based real-time monitoring of sensor integrity on an intelligent battery management system
© Elisabeth Iglhaut / Fraunhofer IISB



»With Production Technology, Fraunhofer IISB opens up a new research area: we explore novel methods of value creation and, above all, their implementation – from the first process idea to automated, scalable production.«



*Prof. Jörg Franke
Head of Production Technology Division and
Chair of Manufacturing Automation and Production Systems (FAPS)
of the Friedrich-Alexander-Universität Erlangen-Nürnberg
© Daniel Karmann / Fraunhofer IISB*

The Production Technology research area investigates new methods of value creation and, in particular, how they can be put into practice – in other words, production and automation. Our aim is to close the gap between a functioning laboratory sample and a product that can be manufactured reproducibly, economically, and at industrial scale.

Our work therefore covers the entire chain from process development, joining and assembly technologies, and automation concepts through to test and quality assurance strategies, supported by simulation and digital process data. We regard manufacturability, testability, and scalability not as downstream questions but as design criteria from day one.

The research area currently comprises one department, the E|Road-Center, which applies these methods to inductive power transfer – a technology whose industrial breakthrough depends decisively on production and testing capability. In 2025 we laid the structural foundations for this: building up the team, commissioning a laboratory hall of more than 900 m², and initiating the procurement of the production and test systems required. In the coming years, we will systematically extend our production expertise to further fields of application.

Division Production Technology

E|Road-Center

»Wireless power transfer becomes a product only when three elements come together: a design that can be manufactured, testing that is reproducible, and a team that masters both. In 2025, we built exactly this team.«



Prof. Florian Risch
Head of E|Road-Center
© Daniel Karmann / Fraunhofer IISB

The E|Road-Center at Fraunhofer IISB researches inductive power transfer along the entire value chain – from coil and power electronics design through production and automation technology to standard-compliant testing. Our applications range from stationary charging of vehicles and dynamic charging while driving (electric road systems) to special applications such as medical technology, robotics, and space.

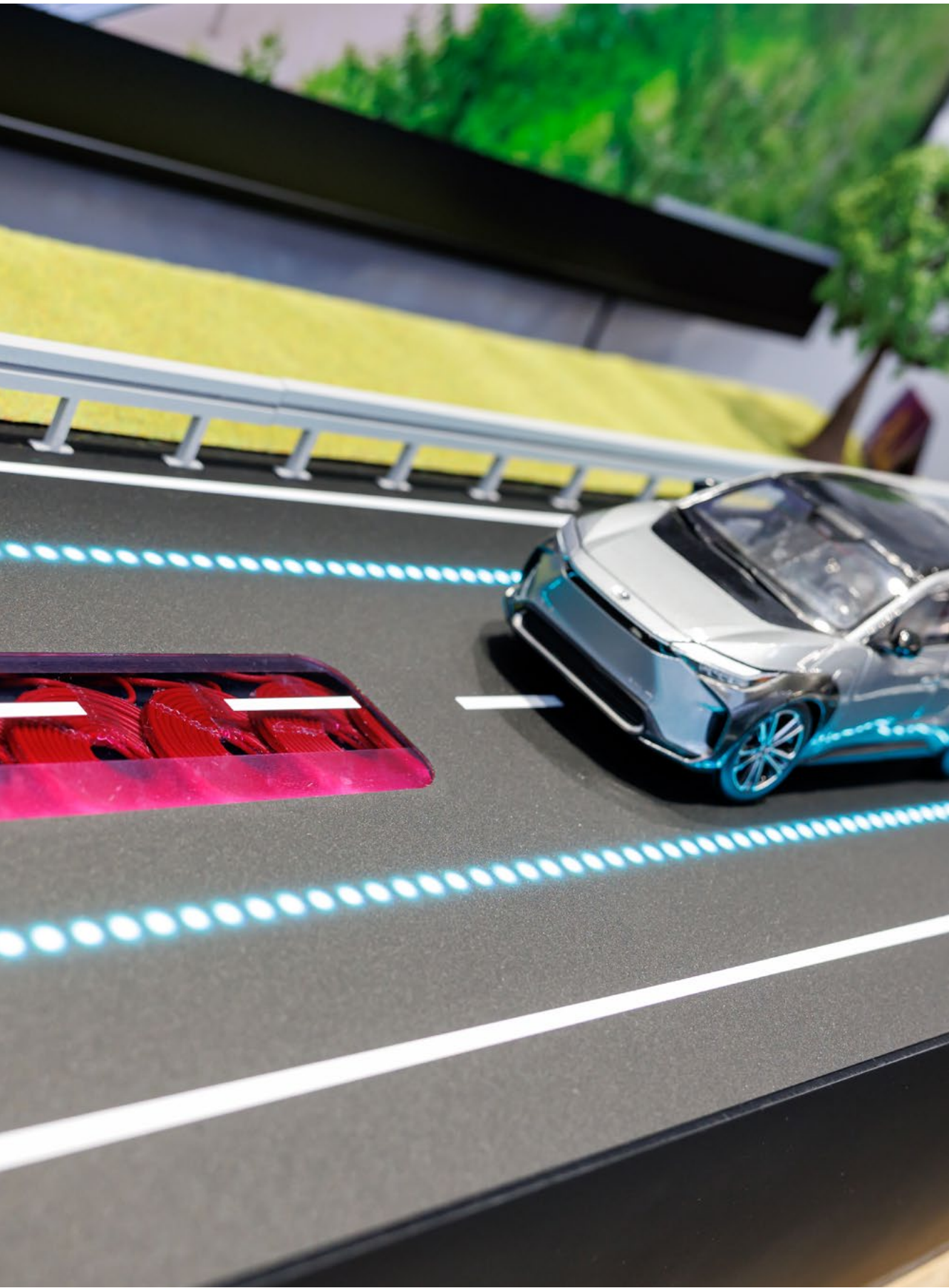
The year 2025 marked the starting point for the E|Road-Center and was characterized by growth. Under the leadership of the group manager, we assembled a strong team of three production technologists, two test technologists, one technician, one power electronics engineer, and one simulation engineer – a combination that deliberately brings production, testing, and electronics development together in one department.

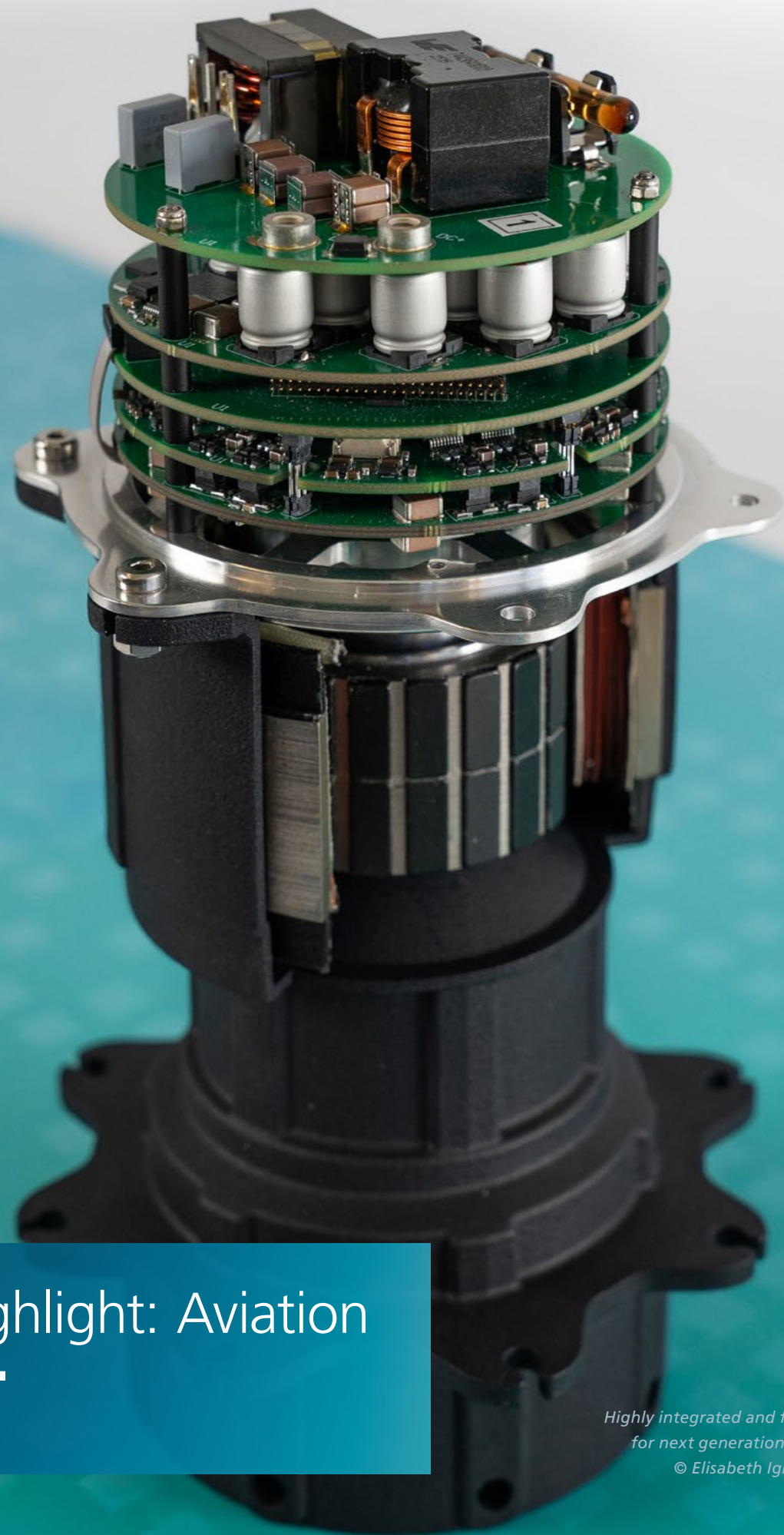
At the same time, we moved into our new laboratory hall of more than 900 m² and launched the procurement processes for the laboratory and production systems that will form the basis of our future work. Our first demonstrators were built and presented at trade fairs, including a standard-compliant inductive charging system in the WPT3 power class.

A further focus was networking: through scientific exchange, committee work, and intensive dialogue with industry, we established the E|Road-Center as a visible partner for inductive power transfer. In parallel, several project proposals were submitted to establish a sound financial basis for the newly founded center. Building on this rapid progress, our first funded projects will start in 2026.

 iisb.fraunhofer.de/erc

Model of an electrified road for contactless power transfer directly to electric vehicles, stationary and while driving
© Daniel Karmann / Fraunhofer IISB



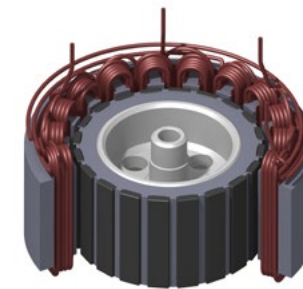


Highlight: Aviation

*Highly integrated and fault-tolerant actuator
for next generation electric aircraft doors*
© Elisabeth Iglhaut / Fraunhofer IISB

Power Electronics for the Future of Aviation – From Power Modules to Electric Aircraft Systems

Electric and hybrid-electric flight places demanding requirements on power electronics: Energy must be converted efficiently, distributed reliably, and delivered under challenging operating conditions. To meet these requirements, Fraunhofer IISB combines the development of power modules, converters, and electric drives with control technology, protection systems, and system integration. The results achieved in 2025 demonstrate how this integrated approach produces tangible hardware and application-oriented solutions for aviation.



*CAD model of the concentrated windings of an electric motor
for safety-critical functions in aviation*
© Fraunhofer IISB

An End-to-End Development Perspective

The vision of low-emission, comfortable, high-performance aviation requires close interaction among electrical components. Weight and efficiency are just as critical as thermal behavior, insulation, and fault management. IISB addresses these requirements across multiple levels of development: from packaging and interconnection technology and power modules to converters and drives, and ultimately to integration into electrical power networks.

These capabilities are embedded in the institute's broad power electronics value chain. This gives industry partners a development pathway in which electrical, thermal, and mechanical issues can be addressed together. Applications range from power distribution in hybrid-electric propulsion systems to the electrification of auxiliary units and actuators. Fuel-cell systems are an important focus within a broader portfolio of electric aviation technologies.

NEWBORN: Building Blocks for the Megawatt Class

In the European Clean Aviation project NEWBORN, the consortium is developing a ground-based demonstrator for a megawatt-class, fuel-cell-based hybrid-electric aircraft propulsion system.

IISB contributes power electronics and electrical power distribution to the project. DC/DC converters connect energy sources and storage systems to the electrical network, while high-voltage distribution and protection components provide the basis for controlled operation.

A milestone in 2025 was the first successful testing of the NEWBORN power electronics on a high-voltage bus together with Honeywell Aerospace. The tests marked a tangible step from developing individual components toward integrating them within the electrical network. Building on this achievement, investigating bus stability and coordinating control and protection functions remain central tasks in the next phase of system integration.

Developed Hardware Moving Toward Integration

At the end of 2025, IISB delivered a high-voltage junction box with pyrotechnic fuses and the first seven DC/DC converters to Honeywell Aerospace in Brno, Czech Republic. The converters for fuel-cell and battery systems are in the 500 kW class; their published measured power density is well above 20 kW/kg. The delivery provided essential electrical building blocks for further integration of the demonstrator. Under the project schedule in place at the time, completion and testing of the overall system were planned for 2026.

NEWBORN thus highlights the connection between compact energy conversion and application-specific protection technology. Within the consortium, IISB is responsible for the electrical components and integration tasks. The successful delivery of this hardware lays the foundation for subsequent system-level validation.



*Highspeed drive for fuel-cell air compressors with 80 kW of
peak power at 150,000 rpm, direct liquid cooling, three-stage
GaN inverter and a power density of 30 kW / kg*
© Elisabeth Iglhaut / Fraunhofer IISB



DC/DC converters and high-voltage distribution and protection components for a megawatt-class, fuel-cell-based hybrid-electric aircraft propulsion system ready to ship for the first test run
© Markus Meindl / Fraunhofer IISB

HABICHT: High Speed, Compact Design

In the HABICHT project, successfully completed in 2025, Fraunhofer IISB, IFAM, LBF, and SCAI demonstrated a high-speed drive for fuel-cell air compressors. In addition to overall coordination, IISB handled key tasks spanning electromagnetic, thermal, and mechanical design, manufacturing and assembly, and test-bench validation. Potential applications include both commercial vehicles and aviation.

The electric machine delivers 80 kW of peak power at 150,000 rpm and 48 kW of continuous power at 116,500 rpm. Direct liquid cooling of the rotor and stator supports the compact design, and the machine is rated at a power density of 30 kW/kg. It is driven by a three-stage GaN inverter with a switching frequency of 90 kHz. The result illustrates how machine development, cooling, and power electronics can be jointly tailored to the requirements of high-speed auxiliary systems.

DIMENSION: Fault Tolerance for Electric Aircraft Doors

Aviation electrification also extends to functions beyond the main propulsion system. In the DIMENSION project, Airbus, Airbus Helicopters, WITTENSTEIN, Fraunhofer ICT, and IISB jointly developed a highly integrated, fault-tolerant door actuator. It combines an inverter with two independent three-phase systems, a corresponding electric machine, and a three-stage planetary gearbox in a polymer housing.

The actuator provides up to 1.1 kW of motor power at 48 V and drive torque of up to 500 Nm at 12 rpm. The total weight is 2.7 kg. If a fault occurs, the affected subsystem is shut down while the remaining system enables emergency operation. The development demonstrates how redundancy and close mechatronic integration can enable compact electrical solutions for safety-critical aviation functions.

HeDrive: Fault-Tolerant Drive Electronics for Helicopters

The fault tolerance required for electric actuators is equally critical for high-power main propulsion systems. In the HeDrive research project (Helicopter Electric Drive; January 2022 to June 2026), IISB is investigating an all-electric helicopter powertrain together with Kopter Germany, MACCON, Nuremberg Institute of Technology, and PyroGlobe. IISB's contribution centers on a highly integrated, nine-phase, 750 kW SiC traction inverter.

The architecture consists of three three-phase inverter subsystems rated at 250 kW each. The design specifications call for an operating voltage of up to 850 V and an efficiency above 98%. A distinctive feature is the pyrotechnic emergency disconnect integrated into the DC-link capacitor: A faulty inverter subsystem can be selectively disconnected from the DC network while the remaining subsystems maintain operation. The concept combines fault management for redundant propulsion subsystems with the integration and weight advantages of a compact drive unit.

The project scope includes functional testing of the inverter, motor, and gearbox on a test bench, as well as a concept study for supplying the system with an application-specific fuel-cell and battery system, including the associated management system. HeDrive thus expands the system perspective from the energy source to the electric machine. The project is funded through the Bavarian Aeronautics Research Program (BLU-2109-0014 / BayLu21-008-B).

HyPoTraDe: State-of-Charge Balancing in the Aircraft Electrical Network

The coordinated use of multiple batteries is another system-level task. As part of the Clean Aviation project HyPoTraDe, Elias Berschneider, Bernhard Wagner, Markus Meindl, and Bernd Eckardt published the paper »Centralized SoC Balancing for Batteries with Droop-Controlled DC/DC Converters for Electric Aircraft^[1]« in the MDPI journal Batteries in 2025. The work focuses on balancing the state of charge of two batteries connected to the DC network of a fuel-cell-electric aircraft through droop-controlled DC/DC converters.

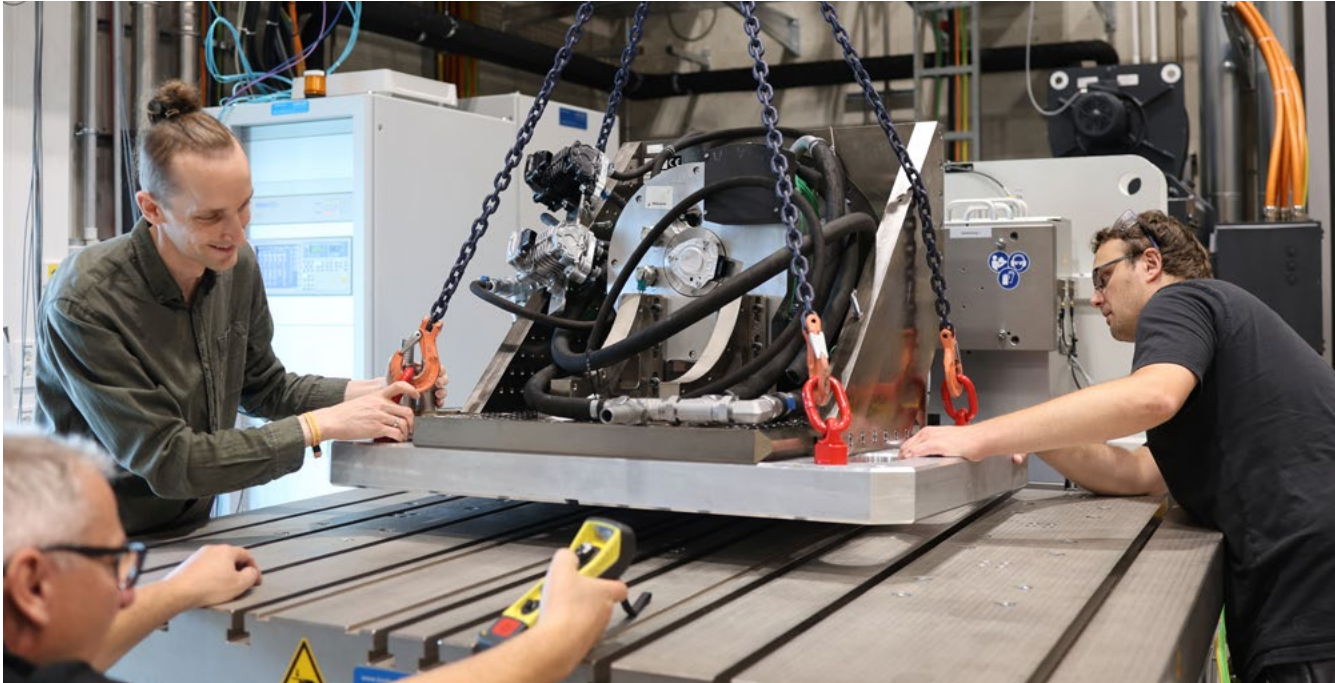
The proposed approach influences power distribution by shifting the droop reference voltages and prevents one battery from charging while the other is discharging. In this way, the work addresses the coordinated operation of multiple energy-storage units in the aircraft network. It complements the development of high-performance converters with a specific control strategy and underscores the close connection among

power electronics, battery management, and supervisory energy management.

ASCEND: 500 kW Power Electronics at –196 °C

A technological foundation for future electric and hydrogen-electric aircraft propulsion is provided by ASCEND (Advanced Superconducting & Cryogenic Experimental Powertrain Demonstrator, 2021–2023), a demonstrator project led by Airbus UpNext. IISB developed the cryogenically cooled 500 kW motor control unit. The motor inverter operates at 77 K (–196 °C), is cooled with liquid nitrogen, and achieved an efficiency of approximately 99%. Limiting electrical losses is particularly important under these conditions because they directly affect the required cooling capacity.

ASCEND combined the inverter with superconducting DC and AC distribution, cryogenic protection systems, and a superconducting electric motor. The electric powertrain was designed for 300 V and currents of up to approximately 1,700 A. In November 2023, Airbus successfully commissioned the complete 500 kW powertrain. In addition to the power electronics, IISB's contribution included designing the cryogenic cooling system and integrating and testing the inverter. The powertrain, demonstrated before the reporting year, serves as a reference for the feasibility of high-performance cryogenic aircraft propulsion systems. Airbus UpNext revisited the system in a presentation at the IISB Annual Forum 2025.



Functional testing of an all-electric helicopter powertrain with inverter, motor, and gearbox
© Jennifer Reißig / Fraunhofer IISB

Collaborative Development and Application-Oriented Testing

These examples demonstrate the value of a development approach that links components and system requirements at an early stage. This includes interactions within the high-voltage network as well as cooling, insulation, partial-discharge behavior, and fault-tolerant operating modes. Experimental setups and test benches connect design work with experimental evaluation. Participation in European and national research projects, together with collaboration across the Fraunhofer-Gesellschaft, provides a diverse partner network.

For companies, opportunities for collaboration range from concept and system design to the development of customized power electronics and drives, as well as the integration and testing of prototypes. A particularly valuable aspect is the joint consideration of interfaces: between the power module and converter, between the electric machine and inverter, and among the energy source, storage system, and electrical network.

Outlook: Modular Solutions, System Validation, and Knowledge Transfer

The next steps focus on highly integrated, modular electrical solutions and their validation in larger system configurations. A full-system test of a megawatt-scale fuel-cell system is planned for 2026. It is intended to enable further investigation of the interaction among the fuel-cell system, power electronics, and control system. In parallel, preparing for the requirements of future flight tests remains a development objective. The component and integration milestones achieved in 2025 provide a solid foundation for this work.

 iisb.fraunhofer.de/powerelectronics

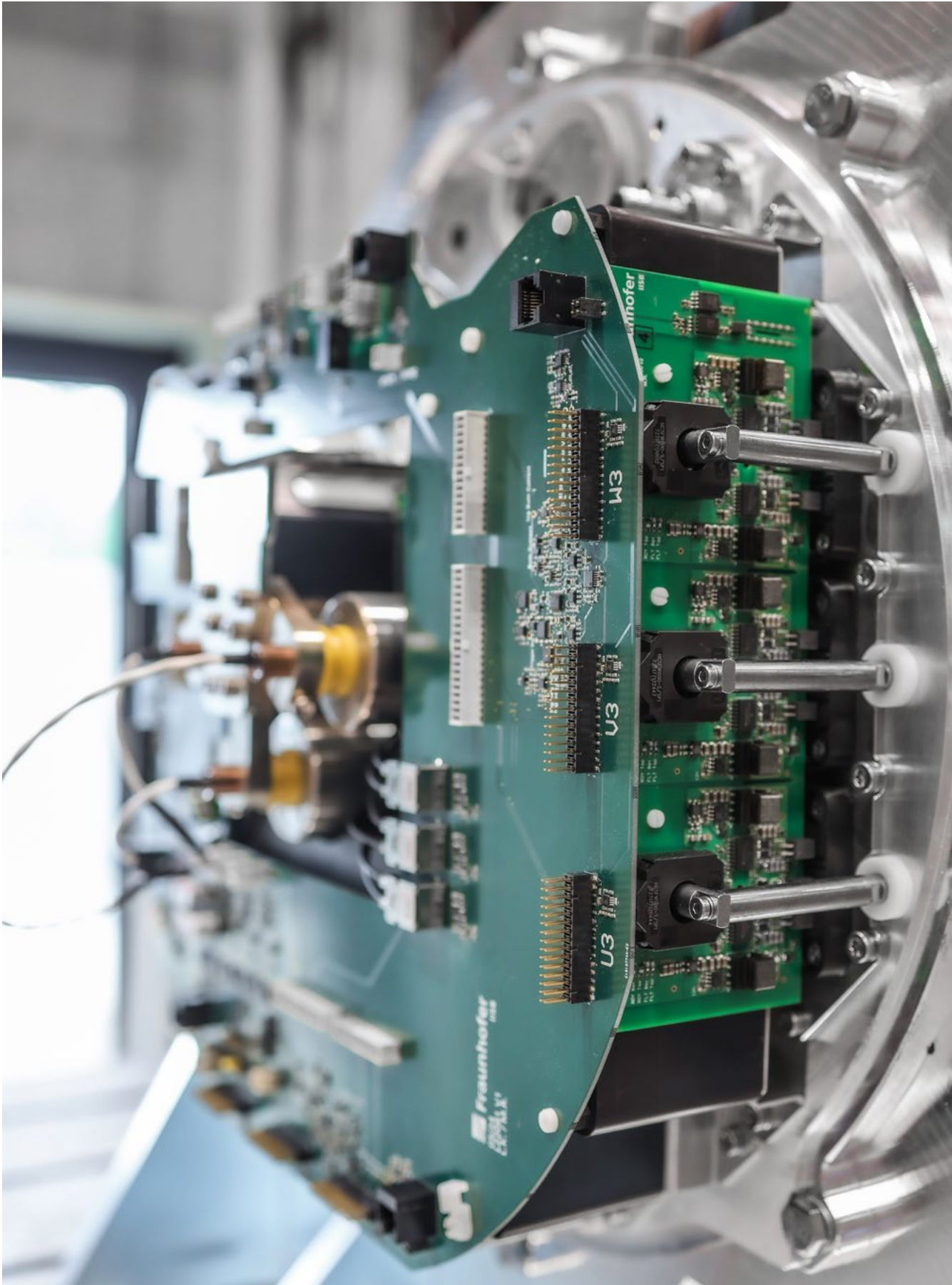
Scientific knowledge transfer is also being expanded: IISB is preparing the contribution on electrical power distribution for the Elsevier reference book Aviation Electrification, edited by Tao Yang, Bulent Sarlioglu, and Patrick Wheeler. Listed in the publisher's catalog as »Power Electronics for Electrical Distribution Systems^[2],« the chapter addresses one of the institute's core areas of expertise. According to the publisher's current schedule, the book is expected to be released in January 2027 and is intended for researchers, developers, and educators working in electric aircraft systems.



The IISB developed cryogenic cooled ultra-high-efficiency wide-bandgap power electronics cooled with liquid nitrogen
© blubb.media / Fraunhofer IISB

Highly integrated, nine-phase, 750 kW SiC traction inverter with an efficiency above 98% and pyrotechnic emergency disconnect integrated into the DC-link capacitor
© Jennifer Reißig / Fraunhofer IISB

[1] E. Berschneider, B. Wagner, M. Meindl, B. Eckardt: Centralized SoC Balancing for Batteries with Droop-Controlled DC/DC Converters for Electric Aircraft. Batteries 2025, 11(11), 411. DOI: 10.3390/batteries11110411.
[2] Elsevier: Aviation Electrification. Editors: Tao Yang, Bulent Sarlioglu, Patrick Wheeler. ISBN 978-0-443-33961-5. Publisher's release date: January 2027; Chapter 5: Power Electronics for Electrical Distribution Systems.



Locations and Network

Headquarters of Fraunhofer IISB

Schottkystrasse 10, 91058 Erlangen

The headquarters of Fraunhofer IISB in Erlangen are located close to the University of Erlangen-Nürnberg. About 10,000 m² of laboratories and office area allow research and development on a broad range of power electronics, semiconductor technology, and materials development. The infrastructure includes among others: A test center for electric cars, a medium-voltage test bench, an application center for DC grid technology, and an extensive cleanroom area for semiconductor technology on silicon and silicon carbide, which is partly operated together with the Chair of Electron Devices of the University.

The Fraunhofer IISB operates various crystal growth and wafering laboratories in which crystals and sub-strates can be grown from different semiconductor materials such as SiC, AlN or GaN. In addition to an advanced packaging line for power electronics, the institute also runs an environmental laboratory for testing active and passive components specifically geared towards the application areas of energy transmission, mobility, aerospace and industry.

 iisb.fraunhofer.de

Technology Center High Performance Materials THM

Am St.-Niclas-Schacht 13, 09599 Freiberg

The Fraunhofer Technology Center High Performance Materials THM in Freiberg, Saxony, is a research and transfer platform of the Fraunhofer Institute for Integrated Systems and Device Technology IISB and the Fraunhofer Institute for Ceramic Technologies and Systems IKTS. Together, semiconductor and energy materials are being transferred to new applications, with particular emphasis on material recycling. The activities at

Fraunhofer THM are focused on the analysis and development of sustainable battery systems with improved life cycle assessment and raw material availability as well as the research and evaluation of innovative semiconductor components and the associated process steps.

 thm.fraunhofer.de

E|Road-Center

Bgm.-Popp-Ring 40, 96103 Hallstadt

The E|Road-Center is a pioneering initiative for the electrification of road infrastructure. This location of Fraunhofer IISB's is situated at the Cleantech Innovation Park in Hallstadt, Bavaria.

The aim is to develop and implement technologies for the wireless, inductive charging of electric vehicles when stationary, but also while driving. Research focuses on safe and efficient energy transmission from the infrastructure side to the vehicles. This includes the adaptation of vehicle-side systems

and the development of innovative infrastructure components such as coil and grid systems as well as the associated power electronics. To accelerate industrial rollout, the E|Road-Center also works on the optimization of automation-oriented production processes.

 iisb.fraunhofer.de/erc

Friedrich-Alexander-Universität Erlangen-Nürnberg (FAU)

Chair of Electron Devices (LEB)

The Fraunhofer IISB and the Chair of Electron Devices (German abbreviation: LEB) of the Universität Erlangen-Nürnberg are both headed by Prof. Jörg Schulze.

Within the framework of a cooperation agreement, the two institutions not only jointly operate the University's cleanroom facility and other laboratories, but also work closely together with regard to teaching and research.

The cooperation of the Chair of Electron Devices and the Fraunhofer IISB makes it possible to cover the entire chain of topics from basic research to the transfer to industry.

For many years now, the vocational training as a microtechnologist has been offered jointly by the IISB and the Chair of Electron Devices. Also, employees of the IISB assist in courses and internships at the university.



Chair of Power Electronics (LEE)

The Chair of Power Electronics (German abbreviation: LEE / Prof. März: at Fraunhofer IISB.) of the Universität Erlangen-Nürnberg is headed by Prof. Martin März, also head of the Power Electronic Systems Division.

It conducts research on current topics in the field of power electronics for electric power supply. Besides stationary

decentralized electrical power systems, the addressed application fields also include the power grids in vehicles, ships, railways, and airplanes.

The LEE is part of the Energie Campus Nürnberg (EnCN) in the Fürther Straße in Nuremberg, and the first chair grown out of the EnCN.



Chair of Manufacturing Automation and Production Systems (FAPS)

The Chair of Manufacturing Automation and Production Systems (German abbreviation: FAPS) of the Friedrich-Alexander-Universität Erlangen-Nürnberg is headed by Prof. Jörg Franke, also Head of the Production Technology Division at Fraunhofer IISB.

The Chair of FAPS was established in 1982 as part of the newly founded Department of Manufacturing Engineering at the University Erlangen-Nuremberg. In 2009, Prof. Dr.-Ing. Jörg Franke assumed leadership of the Chair of FAPS. The overarching objective is to integrate all of a factory's subfunctions into a computer-integrated overall concept.



Technische Universität Bergakademie Freiberg (TUBAF)

Institute of Applied Physics (IAP)

Institute of Applied Physics of the TU Bergakademie Freiberg is headed by Prof. Johannes Heitmann, also head of the Energy Materials and UWBG Semiconductor Technology Division and head of the Technology Center High Performance Materials THM in Freiberg.

The THM has been conducting joint research with the TU Bergakademie Freiberg for more than 15 years, and with the Institute of Applied Physics (IAP) for 8 years, complementing each other's competencies and sharing resources in the field

of electronic device fabrication, characterization, and material processing.

Main activities of the IAP are the development and evaluation of new materials and processes, like thin film dielectrics and contact material formation for nitride semiconductor and photovoltaic devices, synthesis and characterization of semiconductor nanostructures, and the defect characterization of semiconductor materials and its impact on and the reliability of microelectronic and photovoltaic devices.



University of Bayreuth

Bavarian Center for Battery Technology (BayBatt) / Chair of Electronics for Electrical Energy Storage (LEEE)

The Bavarian Center for Battery Technology (BayBatt) at the University of Bayreuth is a research center that bundles interdisciplinary fundamental research, the development of innovative battery technologies, and technology transfer to the industry. With the BayBatt, an expertise center is being established that provides know-how and research to meet the increasing demand for storage technologies, e.g., to ensure grid stability as the share of renewable energies grows.

The core topics of the BayBatt are the safety and sustainability of batteries and their components, the intelligent use of the storage medium, and economic efficiency. The entire spectrum of battery technology is considered, from the molecular basis to the structuring of electrodes and cell development. Specific focus is on the battery cells and systems, and the use of batteries in connected energy storage systems.

Within BayBatt, Fraunhofer IISB cooperates closely with the Chair of Electronics for Electrical Energy Storage (LEEE), led by Prof. Vincent Lorentz, at the University of Bayreuth. Prof. Vincent Lorentz is also head of the Intelligent Energy Systems Department at Fraunhofer IISB.

The main focus of the chair's research is on solutions for the electronic monitoring and control of electrical energy storage systems such as batteries, supercaps, and fuel cells, which are used in mobile and stationary applications. For example, the foxBMS® battery management system platform emerged from an initiative of Fraunhofer IISB in 2015. It is being further developed in BayBatt and enables research and validation of safer, more robust and reliable system architectures.





Academic Teaching

Lectures Held by IISB Researchers

Lecturer	Lecture
Dr. Bernd Eckardt	Electrical Energy Storage Systems
Dr. Andreas Erdmann	Optical Lithography
Prof. Dr. Marc Hainke	Basics of Construction
	Construction & CAD
	Construction & Development
	Engineering Mechanics
	Fluid Mechanics & Thermodynamics
	Materials Engineering
	Medical Product Development
	Medical Technology Materials
Prof. Dr. Johannes Heitmann	Alternative Solar Cell Concepts
	Functional Nanomaterials
	Semiconductor Chemistry
	Nanoelectronic Devices
	Physics for Engineers
	Materials Analysis
Dr. Michael Jank	Flexible Electronics
	Nanoelectronics
	Power Semiconductor Devices
Dr. Maximilian Hofmann	Selected Topics in Vehicle Electrification

Lecturer	Lecture
Dr. Jürgen Lorenz	Process and Device Simulation
Prof. Dr. Vincent Lorentz	Analog Circuit Technology
	Battery System Technology
	Digital Circuit Technology
	Digital and Computer Technology
	Electrotechnical Fundamentals of Electrochemical Energy Storage Systems
Prof. Dr. Martin März	Power Electronics
	Power Electronics for Decentral Energy Systems
	Thermal Management in Power Electronics
Prof. Dr. Schulze	Bipolar Technology
	CMOS Technology
	Quantum Electronics Physics
	Semiconductor Devices
	Spintronic and Quantum Computation
	Technology of Integrated Circuits
	Tunnel and Quantum Well Devices

IISB's scientific staff holds academic lectures and supervises a multitude of final theses.

µe-bauhaus erlangen-nürnberg



The Technical-Academic Master Forge

The µe-bauhaus erlangen-nürnberg transfers the teaching concept of the famous Bauhaus Weimar-Dessau-Berlin to the idea of a »Bauhaus of Microelectronics« within the Chair of Electron Devices (LEB) and Fraunhofer IISB.

This includes the self-understanding that »teachers« and »learners« work together and jointly plan and realize extensive ideas and designs. The indispensable basis of this creative work is the thorough technical training of students in laboratories

and at trial and work stations, which enables them to learn and work independently in teams in a creative manner.

At the µe-bauhaus, the theoretical study of natural sciences and electrical engineering and information technology runs parallel to practical training along the process chain, starting with the design of devices, their development and production up to validation, trial and testing.

iisb.fraunhofer.de/bauhaus

»Red Place« at the Faculty of Engineering of the Friedrich-Alexander-Universität Erlangen-Nürnberg (FAU) © David Hartfiel



The Fraunhofer-Gesellschaft

Fraunhofer

The Fraunhofer-Gesellschaft, headquartered in Germany, is a leading organization for applied research. Since its founding as a nonprofit in 1949, Fraunhofer has held a unique position in the German research and innovation ecosystem. The research organization with more than 30,000 employees currently operates 74 institutes and independent research units throughout Germany. Fraunhofer plays a major role in innovation by focusing on cutting-edge technologies and transferring research results to industry to strengthen Germany as a business location and benefit society.

Its primary customer base comprises large and medium-sized companies, which utilize Fraunhofer's expertise to boost their competitiveness with new technologies. For years, Fraunhofer has been one of the most active patent applicants in Germany and Europe. Its international patent portfolio is the basis for technology transfer through research projects, spin-offs and licensing. Moreover, Fraunhofer addresses societal goals in key technology sectors through interdisciplinary and international partnerships in specific markets. Examples include solutions for microelectronics, artificial intelligence and quantum computing, healthcare, the circular economy, new materials, energy, critical infrastructure security, and defense.

Fraunhofer is a sought-after and established partner in publicly funded projects with industry partner involvement. It is also instrumental in strengthening Germany as a hub for innovation and business, ensuring its future viability. Its activities create jobs in Germany, boost the impact of investment on industry, give companies a competitive edge and foster public acceptance of advanced technologies. International partnerships with excellent research organizations and companies around the world directly connect the Fraunhofer-Gesellschaft with the most influential research communities and economic areas.

Fraunhofer's total annual budget amounts to 3.6 billion euros. Contract research, Fraunhofer's mainstay, generates 3.2 billion of this budget. Unlike other public research organizations, institutional funding from federal and state governments accounts for no more than one-third of its contract research budget, thus providing merely the base. Fraunhofer raises at least two-thirds of its contract research budget competitively from private-sector contracts and public project funding. Unlike organizations that are largely institutionally funded,



Fraunhofer explains the spectrometer to his friends.
© Painting by Rudolf Wimmer

the resulting strong incentive to develop business fosters entrepreneurial spirit, ensuring that Fraunhofer continuously develops solutions for current and future economic and societal needs. In 2025, industrial revenue accounted for 966 million euros.

Since highly motivated employees are the most important factor behind Fraunhofer's success, the research organization provides opportunities for independent, creative and goal-driven work. Fraunhofer facilitates career development in the research community and in industry with targeted programs for professional and personal development.

The Fraunhofer-Gesellschaft is a recognized nonprofit named after the scholar Joseph von Fraunhofer (1787–1826), who lived and worked in Munich. Joseph von Fraunhofer's inquisitiveness and business acumen enabled him to rise from a glass grinder to a scientific pioneer who, as an inventor and entrepreneur, turned ideas into marketable products and commercialized them. His innovativeness and market focus, as well as the belief that research and practical application go hand in hand, pervade the work of the Fraunhofer-Gesellschaft, which remains committed to his legacy.



The Research Fab Microelectronics Germany (FMD)

A One-Stop Shop for Microelectronics as a Key Enabling Technology

Over the past year, FMD has further strengthened its role as a central point of contact across locations and organizations for micro- and nanoelectronics research and development in Germany and Europe. As a cooperation of 13 Fraunhofer Institutes together with the Leibniz Institutes FBH and IHP, FMD consolidates application-driven expertise across the entire microelectronics value chain.

FMD exemplifies how Europe's technological resilience is built: through a nationally distributed yet tightly coordinated research landscape that operates across disciplines and technologies. By aligning competencies, infrastructure, and strategy, FMD enables efficient translation of research results into industrial innovation.

Through the targeted expansion of strategic research and transfer infrastructures, close integration of science and industry, and active participation in European efforts such as the EU Chips Act, FMD makes a substantial contribution to a strong and competitive European semiconductor ecosystem. At the same time, it sustainably strengthens the innovation capacity and competitiveness of the European semiconductor ecosystem. Fraunhofer IISB is one of the institutes cooperating within FMD.

Heterogeneous Integration and Advanced Packaging: Establishing the APECS Pilot Line

Since late 2024, the institutes collaborating within FMD have been working together with further European partners to establish the pilot line for Advanced Packaging and Heterogeneous Integration for Electronic Components and Systems (APECS). By the end of 2025, procurement processes for more than 50 percent of the required equipment had been initiated, and key work packages were successfully launched.

Implemented under the EU Chips Act, the APECS pilot line combines state-of-the-art microelectronics technologies with the specific needs of German and European industry. It provides the foundation for low-threshold, scalable transfer of newly developed technologies into industrial applications, thereby reinforcing Europe's international competitiveness in advanced semiconductor technologies.

Broadening Expertise: New Institutes Join the FMD Network

As part of the pilot line development, two additional institutes joined FMD, strengthening its technological expertise: the Fraunhofer Institute for Applied and Integrated Security AISEC and the Fraunhofer Institute for Microstructure of Materials and Systems IMWS. Fraunhofer AISEC contributes extensive expertise in hardware security and trusted electronics. Fraunhofer IMWS complements FMD with its capabilities in advanced materials, microelectronics analytics, as well as assembly and interconnect technologies. The broader institutional base allows FMD to more effectively address security, materials, and system-level challenges in an integrated manner.

National Gateway to European Design and Manufacturing Pilot Lines: G3C

Launched in October 2025, the German Chips Competence Centre (G3C) supports companies, start-ups, and research organizations in translating semiconductor ideas into concrete development projects. Acting as an independent, comprehensive advisory and matchmaking entity, G3C assesses technical and economic feasibility while identifying suitable development and implementation partners. The Europe-wide establishment of national Chips Competence Centres is a core element of the EU Chips Act and complements existing European research and transfer structures in microelectronics.

Connecting Chip Design Expertise: Chipdesign Germany

As one of four partners, FMD is actively involved in the Chip-design Germany (CDG) network, which strengthens pre-competitive exchange and networking among Germany's chip design community. Together with edacentrum GmbH, Leibniz University Hannover, and the Rhineland-Palatinate University of Technology Kaiserslautern-Landau, a central platform for research, industry, and talent development is being established. The platform supports workforce qualification, technology monitoring, start-up and SME promotion, and science communication. To inspire young people to pursue careers in chip design, the microelectronics podcast »Chip Happens kleine Dinge, die alles verändern« was launched in 2025 as part of CDG. The podcast is released weekly on all major platforms under the strategic guidance of FMD.

Strategic Expansion of FMD Research Capabilities Over the Past Three and a Half Years

Through two large, organization-spanning flagship projects, FMD has strategically expanded its competence portfolio in recent years, with a particular focus on quantum and neuromorphic computing as well as environmentally sustainable information and communication technologies (ICT).

Within FMD-QNC, a national research infrastructure for hardware development in emerging computing technologies was established. Core elements of this infrastructure are being further developed within the APECS pilot line. In parallel, FMD established the Green ICT @ FMD competence center, a platform that consolidates institute-spanning R&D activities aimed at reducing the energy and resource consumption of digital technologies.

The technologies, technical approaches, and best practices developed through these projects directly feed into FMD's work and that of its partners, enabling targeted advisory support for companies, start-ups, and research organizations on their path toward more ecologically sustainable digital applications.

FMD as a Forum for Dialogue, Technology Transfer, and Future Technologies

Beyond infrastructure development and microelectronics R&D, FMD actively facilitates structured dialogue between research, industry, and policymakers. In initiatives such as Green ICT @ FMD and FMD-QNC, Fraunhofer and Leibniz Institutes continued to collaborate with partners throughout 2025 on key microelectronics topics, ranging from sustainable ICT to quantum and neuromorphic computing.

Through expert conferences such as Green ICT Connect and the QNC Summit, FMD fostered early networking among stakeholders across the innovation ecosystem. Talent development was further supported through initiatives such as the Green ICT Camp for university students, the Green ICT Award recognizing outstanding bachelor's and master's theses, and the online game ICT.factory, which introduces secondary school students to the challenges of sustainable electronics manufacturing in an engaging and accessible way.

New integration technologies and innovative assembly and system concepts for prototyping and the production of future power modules are available in the backend area. This makes it possible, for example, to realize particularly complex and compact structures, heavily stressed (special) applications with sometimes small quantities or durable high-temperature power electronic modules.

Extensive, complementary methods are available along the process chain for quality control. The most important of these are a fast, high-resolution X-ray topography system for the analysis of the structural properties of crystals, wafers, and partially processed wafers, and a combined surface inspection photoluminescence device for the analysis of the near-surface material properties of SiC along the process chain. The SiC metrology is supplemented by special measuring stations, which are adapted to the specific, sometimes extreme

conditions of power electronics, such as an extra-high voltage measuring station as well as special lifetime and reliability test laboratories.

For the research on new semiconductor materials with large band gaps, crystals of these materials are needed, which then have to be further processed into wafers in order to evaluate the potential in the FMD for power electronics or for other applications such as in quantum technology. Since the new crystal materials, such as GaN, AlN, Ga₂O₃ or diamond, are usually crystals with smaller diameters (50 mm or smaller), Fraunhofer IISB operates a special substrate and wafer laboratory to produce wafers from such crystals. The quality of the wafers used to manufacture the devices is tested using various analytical methods, including the determination of their epitaxial suitability and the production of special test structures.

 iisb.fraunhofer.de/sic-services

 forschungsfabrik-mikroelektronik.de



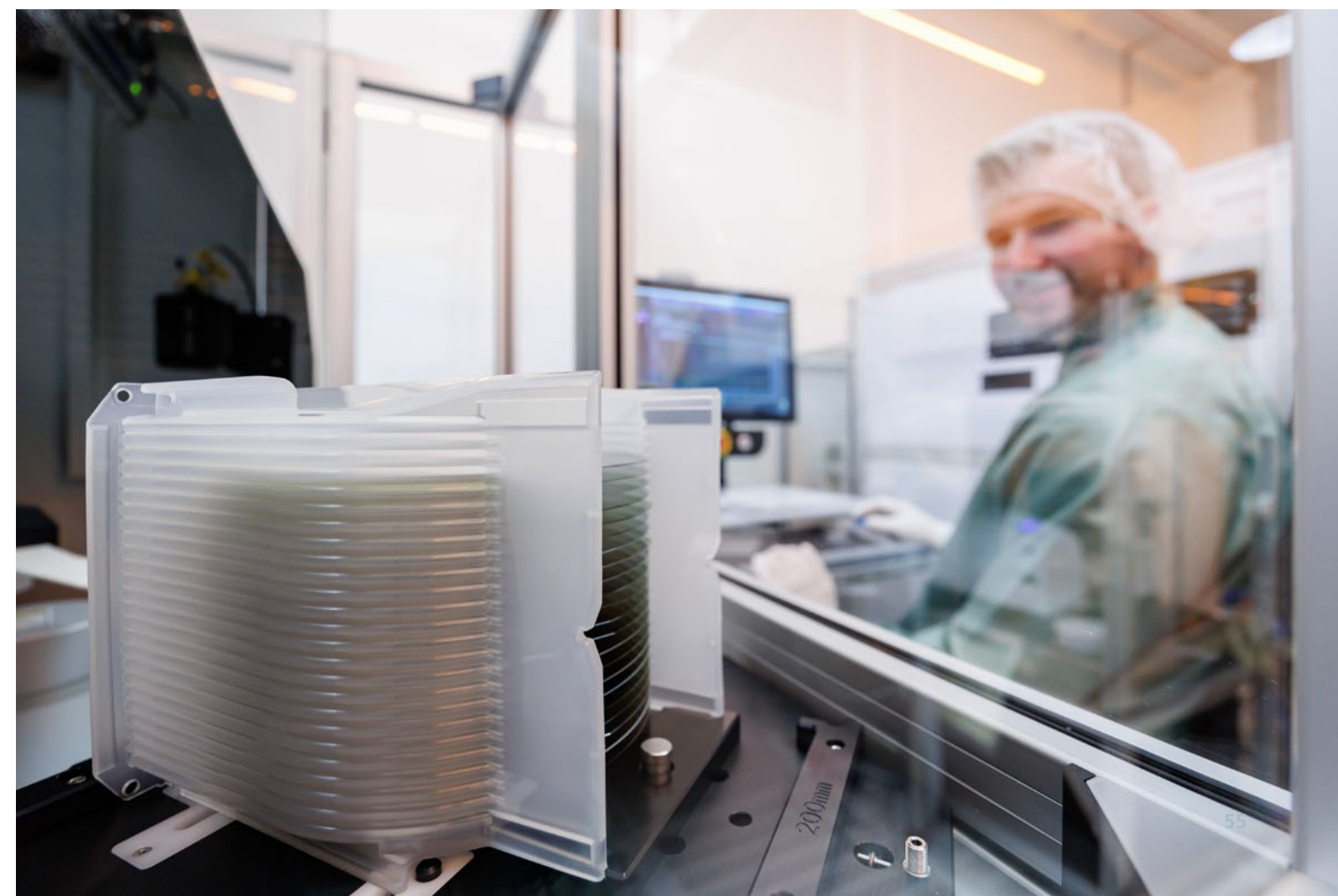
Fraunhofer IISB – The SiC Specialists Within the FMD

Within the FMD, the IISB has a unique selling point with its integrated, certified production line for the processing of individual SiC-based prototype devices in an industry-compliant environment.

In the front-end area for wafer sizes of 150 mm to 200 mm, all necessary process steps can be performed at Fraunhofer IISB, such as epitaxy, ICP dry etching, growth of silicon dioxide, aluminum implantation at elevated temperatures, activation

anneal, and metallization. Usually, vertical devices are manufactured in SiC for power electronics. Therefore, the processing of the backside of the SiC wafers is of critical importance. The FMD investments enables the bonding and debonding of already finally processed wafers at the front side, the thin grinding of wafers at the backside, and the reduction of contact resistance at the backside by means of advanced metallization and laser silicidation.

Within the FMD, the IISB specializes in highly efficient wide and ultra-wide bandgap power electronics
© Daniel Karmann / Fraunhofer IISB





Good vibes only at our summer party on July 9, 2025 to celebrate the 40th anniversary of the IISB! We were all invited to a big birthday party - made by us, for us and for our families. Eagerly and creatively, our colleagues organized a fantastic DIY garden party at the IISB with lots of great activities
© Elisabeth Iglhaut / Fraunhofer IISB



IISB ScienceStars 2025



The Chair of Electron Devices (LEB) at FAU Erlangen-Nürnberg celebrated its 40th anniversary on April 1, 2025. In the presence of Bavarian Minister of State Hans Zehetmaier, Prof. Heiner Rysse laid the foundation stone for the LEB cleanroom laboratory and institute building on June 27, 1990. Fraunhofer IISB and LEB share deep roots, a close professional partnership, and a longstanding friendship
© Fraunhofer IISB





*Bavarian Minister of Economic Affairs Hubert Aiwanger holds an aluminum nitride crystal from Fraunhofer IISB during the ceremony to present the certificate for Bavaria's share of funding for the EU Chips Act pilot lines for wide-bandgap semiconductors on March 20, 2025, in Munich
© Aaron Gottardi / Bay. StMWi*



*From classroom to laboratory: at Girls'Day 2025 on April 3 at Fraunhofer IISB. The next-generation female researchers explored STEM careers firsthand in Fraunhofer IISB's laboratories, guided by our scientists. Among other activities, they processed their own silicon wafers in the cleanroom and took them home as a keepsake.
© Elisabeth Iglhaut / Fraunhofer IISB*



*One year of (U)WBG metrology joint lab with Semilab and the set-up for WBG, SiC and GaN characterization at the IISB has been completed. We celebrated this milestone with a big metrology workshop for wide-bandgap materials and welcomed guests from the European compound / SiC & GaN semiconductor industry here at the IISB on April 1, 2025
© Elisabeth Iglhaut / Fraunhofer IISB*



*On April 10, 2025, Bavarian Minister of Economic Affairs Hubert Aiwanger opened Fraunhofer IISB's new technology center for research into contactless energy transfer for electric vehicles and presented the funding certificate. The E|Road-Center adds another high-tech facility to the Cleantech Innovation Park in Hallstadt near Bamberg
© Daniel Karmann / Fraunhofer IISB*



Full Fraunhofer power with five institutes on 135 m² of joint exhibition space from May 6 to 8, 2025 at PCIM 2025 in Nuremberg: Together with Fraunhofer ENAS, Fraunhofer IAF, Fraunhofer ISIT, Fraunhofer IMS, Fraunhofer IISB and FMD - Research Fab Microelectronics Germany - we showcased tried-and-tested cutting-edge power electronics along the entire value chain
© Thomas Richter / Fraunhofer IISB



Quo vadis, power electronics? Fraunhofer IISB's 2025 Annual Meeting marked »25 Years of Power Electronics at Fraunhofer IISB« on May 15, 2025. In the photograph, Bernd Eckardt, Head of the Power Electronics Department, discusses the transformation of the mobility sector and the momentum behind disruptive power electronics technologies. We also thank Tobias Gotthardt of the Bavarian Ministry of Economic Affairs, Regional Development and Energy for his welcoming address
© Elisabeth Iglhaut / Fraunhofer IISB

Lena Köhler from the Data Analytics Group of Fraunhofer IISB has been honored with the PCIM Conference Young Researcher Award 2025 on May 6, 2025. In her paper titled »Machine Learning and Digital Twins for RUL Prediction of DC Semiconductor Circuit Breakers«, Lena presented a novel approach and base implementation of a digital twin framework to predict remaining useful life (RUL) of power semiconductors in real-time
© Thomas Richter / Fraunhofer IISB



We are delighted to welcome six committed young people to our vocational training programs in microtechnology, information technology, and office management. We wish Anastasia, Annika, Jamila, Robin, Sarah, and Steven every success and enjoyment during their training at our institute. Tanja Reinhardt from the HR Department and our Institute Director Jörg Schulze personally welcomed our new trainees during two engaging onboarding days on May 27 and 28, 2025
© Elisabeth Iglhaut / Fraunhofer IISB



Fraunhofer IISB celebrated its 40th anniversary on July 1, 2025. On July 1, 1985, the Fraunhofer-Gesellschaft established the Integrated Circuits Working Group AIS, (German »Arbeitsgruppe Integrierte Schaltungen«), from which Fraunhofer IISB and Fraunhofer IIS - formerly AIS-A - developed. The photograph shows Bavarian Minister of Education and Cultural Affairs Prof. Hans Maier, standing at far right beside Prof. Heiner Ryssel, visiting our first cleanroom laboratory on Artilleriestrasse in Erlangen for the inauguration of AIS-B, which later became IIS-B and ultimately today's IISB
© Fraunhofer IISB



Small cube, big impact: Susanne Beuer of the Front End Department developed a practical solution for quality and process control in semiconductor manufacturing technology. For her work, Susanne has been honored with the IISB R&D Award. Institute Director Jörg Schulze presented the Award at the staff meeting on July 9, 2025
© Elisabeth Iglhaut / Fraunhofer IISB



Congratulations to the winners of the Fraunhofer IISB R&D Team Award 2025 on July 9, 2025: Gudrun Weidauer, Daniel Joch, Thomas Lang and Tom Becker from the R&D Semiconductor Devices Department and Dr. Hubert Rauh, Manuel Seidenath and Adem Erboga from the Power Electronics Department. In an outstanding cross-departmental collaboration they developed a unique power electronic module for racing application
© Elisabeth Iglhaut / Fraunhofer IISB



Between posters and a party: How can doctoral researchers balance their dissertations, project work, and personal lives - and how can the IISB best support them? These and many other questions shaped the institute's first self-organized gathering of doctoral researchers, graduates, supervisors, and interested colleagues on September 15, 2025
© Tamara Himmer / Fraunhofer IISB



On September 19, 2025, Fraunhofer IISB welcomed Bavarian Minister of Economic Affairs Hubert Aiwanger back to the E|Road-Center in Hallstadt. The visit also provided an opportunity to present our new branch facility to his colleagues Dr. Fabian Mehring, Bavarian Minister of State for Digital Affairs, and Thorsten Glauber, Bavarian Minister of State for the Environment and Consumer Protection, as well as to members of their parliamentary group
© Thomas Richter / Fraunhofer IISB



After World War II, physicists Walter Schottky and Eberhard Spenke led research on silicon - a then-new semiconductor material - at Pretzfeld Castle. It was here that they succeeded for the first time in producing high-purity, perfect silicon crystals. Two newly installed information panels, jointly designed by the Forchheim District, the municipality of Markt Pretzfeld, and the Fraunhofer IISB, provide insights into the site's technological significance. The panels were unveiled on October 19, 2025
© Carmen Schwind

Congratulations to Dr. Christian Kranert on receiving the SEMI Merit Award, honoring his contribution to SEMI's Standards Program and presented on October 7 at SEMICON West 2025 in Phoenix, Arizona. Christian is group manager for crystal and wafer metrology within the IISB's materials department and has been actively working with SEMI for many years
© Elisabeth Iglhaut / Fraunhofer IISB



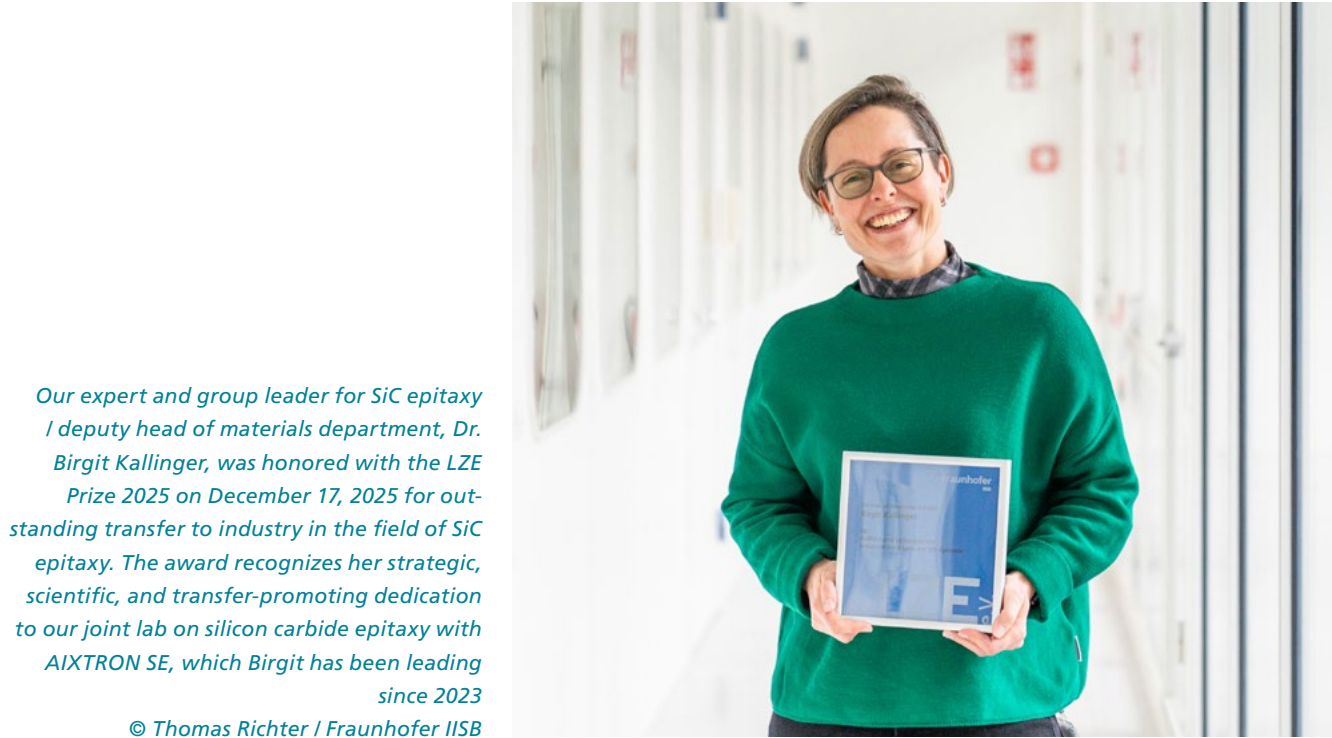
Continuing a popular tradition, Fraunhofer IISB welcomed curious night owls from the Nuremberg Metropolitan Region and the EU Innovation Valley to the Long Night of Sciences in Nuremberg, Fürth, and Erlangen on October 25, 2025. A varied program brought applied research and science to life through demonstrations, hands-on exhibits, and interactive experiments
© Thomas Richter / Fraunhofer IISB



We had the pleasure to welcome Eric Fribourg-Blanc, Senior Programme Officer at the Chips Joint Undertaking of the European Union, and Dirk Schumann, Managing Director of the APECS Pilot Line at the Research Fab Microelectronics Germany (FMD) on November 17, 2025. During a tour of our institute, we showcased the IISB's entire R&D value chain from semiconductor materials, device technology and packaging up to complex power electronic systems for sustainable mobility and energy supply
© Thomas Richter / Fraunhofer IISB



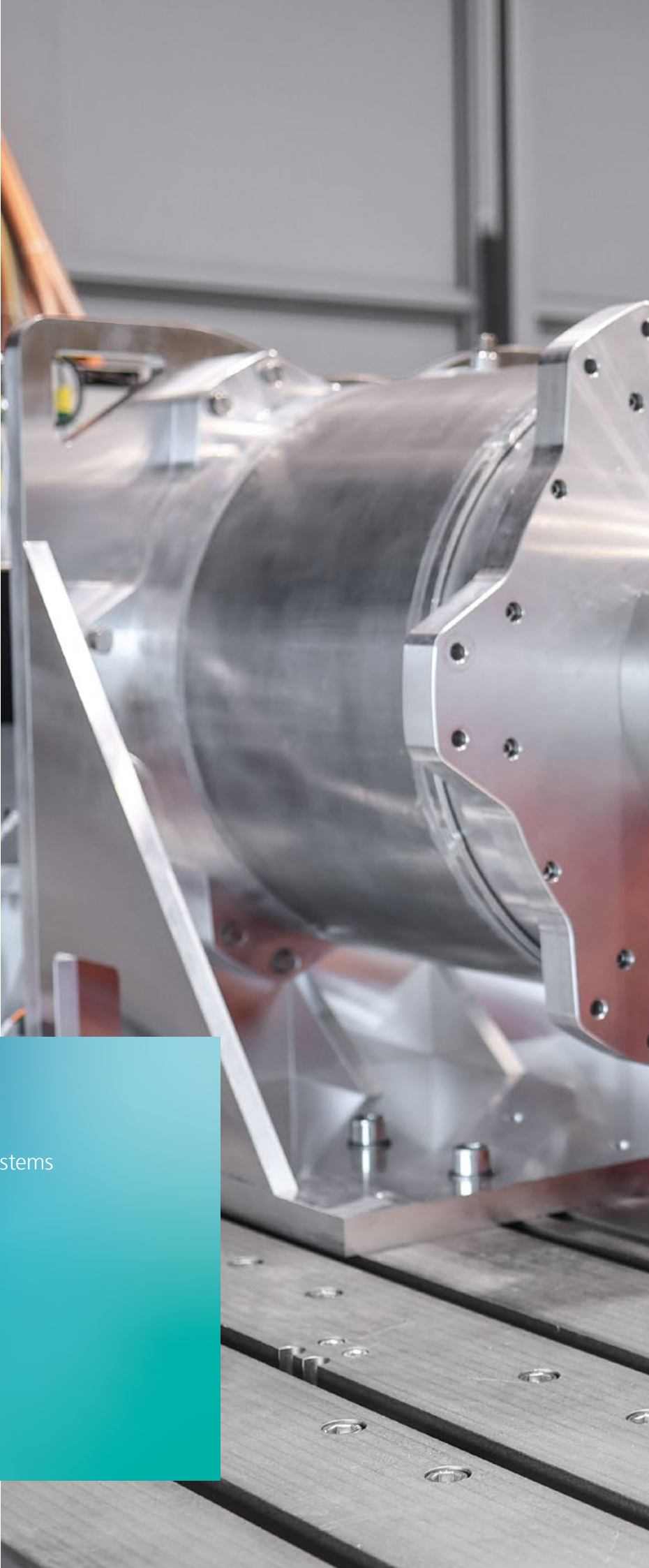
Institute Director Jörg Schulze surprised the entire Fraunhofer IISB team with an unconventional year-end event on December 17, 2025. Instead of a presentation with a lectern and PowerPoint, employees found themselves as invited guests in a talk-show setting. Renowned business coach Martin Permantier joined Jörg Schulze as co-host, guiding the audience and a series of live guests through the entertaining afternoon
© Thomas Richter / Fraunhofer IISB



Our expert and group leader for SiC epitaxy / deputy head of materials department, Dr. Birgit Kallinger, was honored with the LZE Prize 2025 on December 17, 2025 for outstanding transfer to industry in the field of SiC epitaxy. The award recognizes her strategic, scientific, and transfer-promoting dedication to our joint lab on silicon carbide epitaxy with AIXTRON SE, which Birgit has been leading since 2023
© Thomas Richter / Fraunhofer IISB



For Fraunhofer IISB's Christmas celebration on December 17, 2025, our trainees created something special: atmospheric star-shaped lights of their own design. The cross-disciplinary training project brought together trainees in microtechnology and electronics, who independently managed the complete small-series production process through to commissioning. Their work covered every step, from circuit layout and PCB design to optimizing the housing for 3D printing and programming the microcontroller for multiple operating modes
Thomas Richter / Fraunhofer IISB



The Wide-Bandgap Experts
for Sustainable Mobility and Energy Systems

**Fraunhofer Institute for
Integrated Systems and Device Technology IISB**

Schottkystrasse 10
91058 Erlangen
Germany

info@iisb.fraunhofer.de
www.iisb.fraunhofer.de