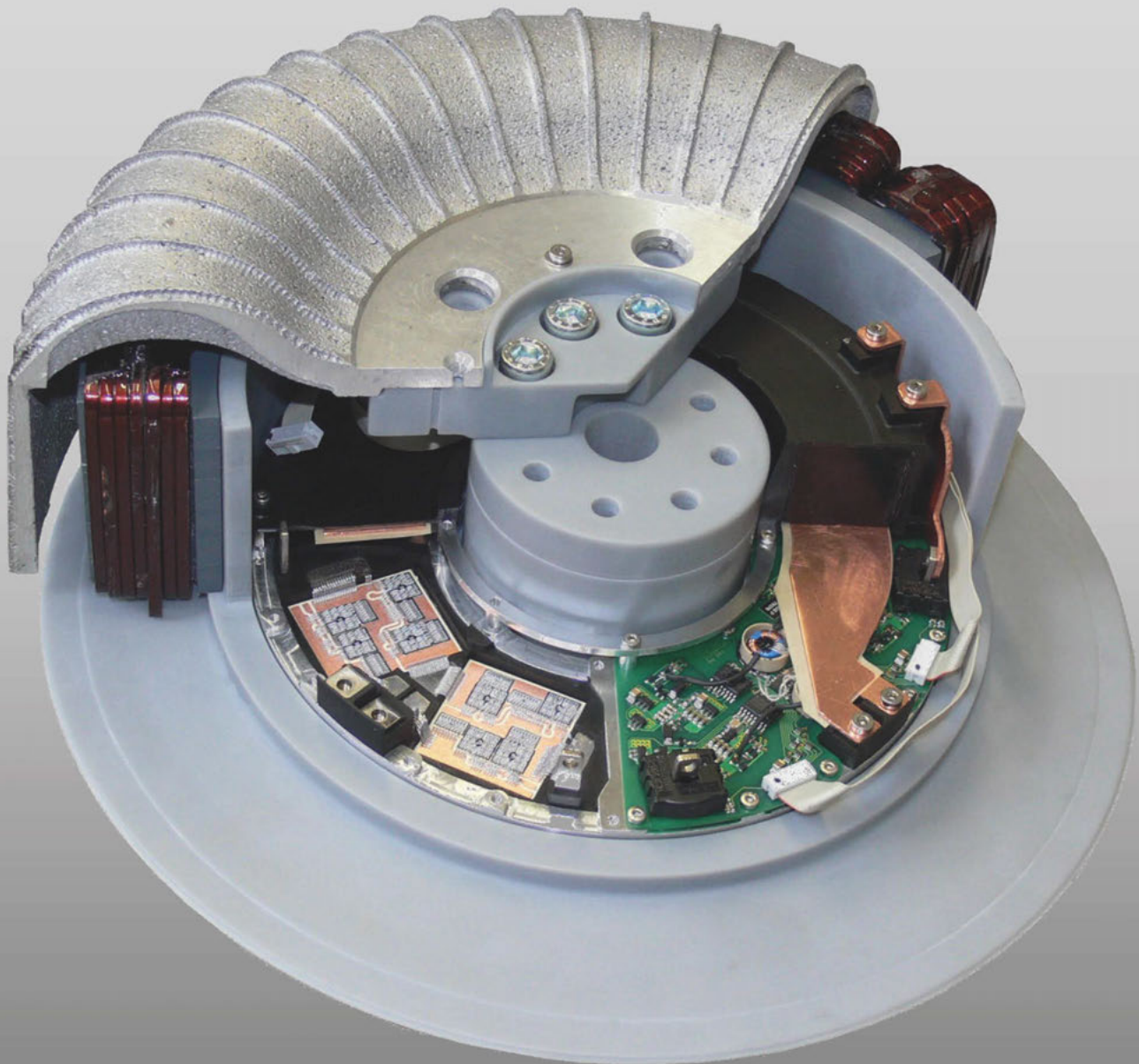
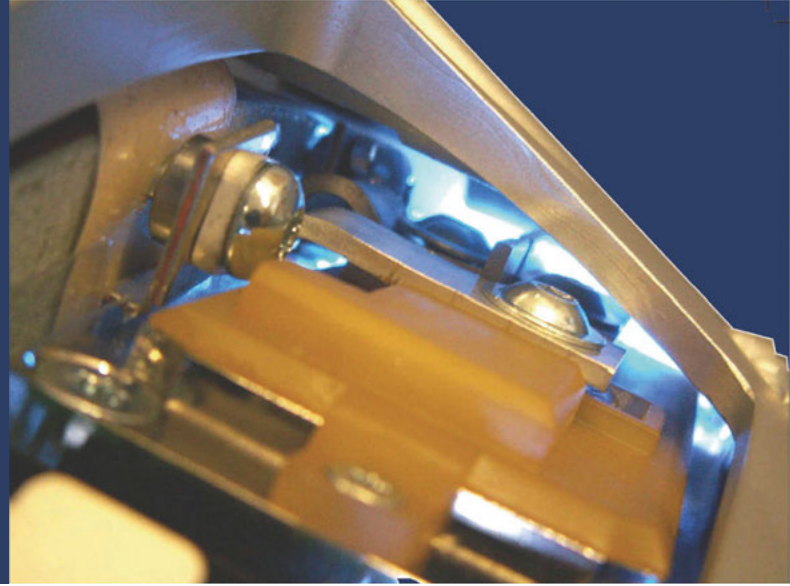


Integrated Inverter Solutions for Hybrid- and Electric-Vehicles





Integrated Inverter Solutions

Fraunhofer-IISB is developing customized solutions for the integration of drive-inverters into or attached to electric machines. Each design is individually adapted to the locations of the e-drive within the drive-train, e.g.:

- Axle drive units
- Wheel-hub motors
- Gearbox-integrated hybrid drives

Our design approach leads to numerous advantages compared to separated motor and inverter systems:

- Avoidance of expensive cables and failure prone connectors
- Reduction of EMI filter efforts (no external AC-cables!)
- Significant reduction of costs and additional weight!

Fraunhofer Institute for Integrated Systems and Device Technology IISB

Schottkystrasse 10
91058 Erlangen, Germany

Contact

Dr. Maximilian Hofmann
Tel.: +49 9131 761-385
maximilian.hofmann@iisb.fraunhofer.de

www.iisb.fraunhofer.de

Mechatronic Integration Process

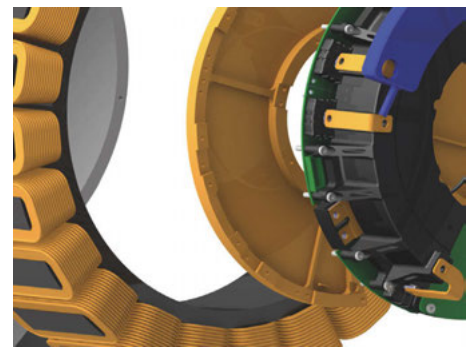
A mechatronic inverter integration requires more than just increasing power density. We are working on innovative integration concepts as well as on new device, interconnection, and cooling technologies that foster a 3D integration, increase ruggedness, and decrease costs of power electronics.

Experience with air, water/glycol and oil cooling is available. Vehicle-specific requirements, such as coolant temperatures up to 115°C and high vibrational loads are taken into consideration.

Design Example: Wheel-Hub-Motor



The picture shows an IGBT-inverter system completely integrated into the stator of a 6-phase wheel-hub-motor. Available space was about 2 liters. The external-rotor PMSM has a continuous power of 30 kW and a peak-power of 65 kW at a nominal DC-link voltage of 400 V.



Contact Us!

The Fraunhofer IISB is your research and development partner for power electronic system solutions.

We develop and realize complete drive-units for any output-power, voltage class and machine type (e.g. PMSM, IM, SSM) according to your specifications:

- **Inverter design**
 - Innovative mechatronic integration concepts (3D CAD)
 - Power modules design (IGBT/MOSFET)
 - Gate-driver development
 - Thermal simulations (FEM)
- **Motor control HW/SW**
 - Control electronics
 - Motor-control algorithms
 - Model based design flow
- **Prototype realization and testing**
 - Complete in-house equipment for power module, circuit board and mechanical part prototyping
 - Comprehensive in-house testing capabilities (e.g. motor test bench)