

CHRISTIAN-ALBRECHTS-UNIVERSITY OF KIEL

In 2015 the Chair of Power Electronics comprised 20 people among PhD and Post-doc supervised by Prof. Marco Liserre, Head of the Chair, and Prof. Friedrich W. Fuchs. The Chair has already collected more than 7 million euro in new projects (in the last two years). The Chair is also member of CE Wind (Kompetenzzentrum Windenergie Schleswig-Holstein) and KLSH (Kompetenzzentrums Leistungselektronik Schleswig-Holstein).

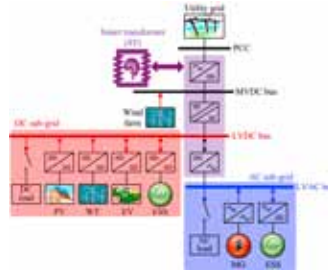
Key research fields

The Chair of Power Electronics main focus areas are:

- DC/DC converters and Inverters for MW applications, with special focus on wind systems.
- Design for reliability and Active Thermal Control.
- Smart Grid: Grid identification, Smart Transformer and HVDC.
- DC/DC converters and drives for electric vehicles, aerospace and high-speed appliances.



DC/DC Converters: 20 kW dual active bridge and quadruple active bridge



Smart Transformer concept

The Chair has two large projects running in the following fields:

- Medium voltage impedance analysis for optimal power feed-in (BMBF grant, 2.300.000€, 2015-2018). The goal is the design and development of a 2 MW power converter to measure the impedance of the MV grid.
- Smart transformer (ERC consolidator grant, 2.000.000€, 2014-2019). The goal is to design a solid-state-transformer for distribution grid. A modular structure is studied to guarantee high efficiency and reliability.

In both projects, the Chair develops modular power converters with focus on high power density, efficiency and reliability.

Chair Laboratory Highlight

The **power electronics laboratory** features are:

- electric drives and power electronics test benches up to 90 kW;
- special thermal characterization setup for power electronics equipped with an IR Camera with positioning system and an optic fiber temperature measurement system;
- power electronics system test benches equipped with electronic loads, AC and DC sources up to 4 kV and 60 kW, oscilloscopes and power analyzers.
- electrical grid HIL and Power-HIL capabilities by means of Real Time Digital Simulator with power amplifier.
- Micro-grid and FACT facilities.

A new **medium voltage laboratory** is under development with facilities to test converter up to 1 MW of circulating power, 3 test cells with 10 kV connection and air/water cooling.



1 MW NPC Power stack for wind system