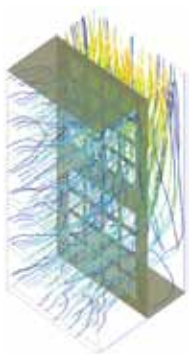


Research Interests

The Power Electronics Laboratory (PEL) research interests are in the broad area of the electrical energy generation, conversion and storage. In particular, we are interested into high power electronics technologies for medium voltage applications, those operating with voltages in kV range, currents in kA range and powers in MW range. We believe that power electronics is one of the key-enabling technologies for the future energy systems, as it offers unprecedented flexibility for the integration and control of various electrical sources, storage elements or loads into the grid. This is equally valid for the present-day AC grids as well as for emerging concepts of DC grids, or inevitable mix of both in the near future.

To achieve controllable, reliable and efficient electrical energy conversion by means of advanced power electronic converters, we optimally use, but also influence and drive forward, advancements in different areas. These multidis-

ciplinary considerations include: power semiconductors (e.g. Si, SiC, GaN), passive components (e.g. magnetics), insulation materials, mathematical modeling, simulations



Cabinet thermal simulations



and optimization of power electronic systems, advanced control methods and tools (e.g. RT-HIL simulators), etc.

Facilities

To effectively support research activities, both low voltage and medium voltage experimental research facilities are available as integral part of the Power Electronics Laboratory. These include different low and medium voltage variable AC and DC sources, AC grid emulator, high power loads, electrical energy storage elements, medium voltage electric machines, partial discharge test setup, cooling units and several test bays with protective cages.

Collaborations

Our research activities are supported through various funding schemes from the public sector (e.g. SNSF, CTI, SFOE) as well as from industrial partners who seek

research support in the field of power electronics.

Keywords

- Electrical energy generation, conversion, storage
- Medium voltage applications
- High power electronic converters
- Modelling, simulation, design, optimization, control
- Power semiconductors, advanced magnetics
- High performance variable speed drives



MMC sub-module