



The Institute of Electrical Power Engineering at the University of Rostock is engaged in extensive research in the area of medium and high power semiconductors and their application in inverters for electrical drives and energy transmission. An excellent equipped laboratory with newest test benches, measuring techniques and state-of-the-art simulation tools offers research on emerging topics like Silicon Carbide, Reverse-Conducting IGBTs, multilevel inverters, HVDC grids and inverters, grid stability and control and hybrid vehicles. Currently fifteen scientific employees are exploring exciting topics in the area of power electronics. Some research topics are:

- Power Semiconductors: electrical and thermal characterization of Reverse-Conducting IGBTs, detailed analysis of the switching behavior of IGBTs like self-turn on/off, short-circuit behavior of IGBTs and diodes especially in inverter operation, switching behavior of Silicon Carbide MOSFETs/JFETs and their application in modules, lifetime estimation in wind power applications, device simulation
- HV gate drive units: design of special high-voltage (up to 6,5 kV) gate drive units, advanced gate drives with FPGAs for Reverse-Conducting IGBTs, gate drives for improved short-circuit behavior
- Multilevel/HVDC: hardware-based inverter control with scaled low-voltage test benches of multilevel inverters (3L-(A/AA)NPC, 3L-T-Type, C5LC, Hybrid 7L), modulation of modular multilevel converters
- Influence of inverters on the grid: improved inverter control for offshore grids, Fault Ride Through behavior of wind generators with 50 kW test bench, grid oscillations with electronic loads, scaled low-voltage grid with several wind generators and HVDCs
- Automotive drive test bench: 400 V hybrid test bench with dSpace engine/inverter control and load machine, 48 V/15 kW test bench for mild hybrid engines
- Education and training of succeeding electrical engineers (B.Sc., M.Sc., PhD)