



Universität Stuttgart
Institut für Elektrische
Energiewandlung

Student*in Doktorand*in (w/m/d)

Doctoral thesis (Dr.)
Master's thesis (M.Sc.)
Bachelor's thesis (B.Sc.)
Research thesis
Study thesis
student/scientific
assistant

Multiple positions (Dr., M.Sc., B.Sc.)

„Smart and efficient power electronics for emission-free mobility and heat pumps“

The new research group „Smart Converters for an emission free mobility of the future “ is working on highly efficient electrical energy converters for emission-free mobility of the future. Smart converters with intelligent operating concepts enable flexible and adaptable system integration of electrical sources, storage and loads as well as the coupling of the sectors electricity, heat and mobility.

In order to accelerate sustainable mobility and the energy transition, the group is researching:

- highly efficient power electronics with new topologies and operating concepts,
- compact voltage converters for intelligent charging, storage and driving,
- electrocaloric heat pumps for cooling and heating in mobile applications.

Student theses (MA/BA/FA/SA) and doctoral positions are available for this purpose. An associated future laboratory is being set up at the Institute of Electrical Energy Conversion (IEW), University of Stuttgart, as part of the InnovationCampus Future Mobility (ICM).

www.icm-bw.de

www.iew.uni-stuttgart.de



Topics and applications (selection)

- Power electronics
 - Highly-efficient voltage converters > 99%
z.B. partial power processing, soft-switching, multilevel converter-topologies
 - Reconfigurable, software-defined control
 - Optimization of efficiency and power density
 - 48V to > 1200V, 10W to > 100kW
 - Isolated and non-isolated voltage converters
 - Wide-Bandgap devices and ICs (GaN, SiC)
- Emissions-free energy conversion for
 - Electromobility, battery storage
 - Electrocaloric heat pumps

Work contents (selections)

- Electrical circuit simulation (PLECS, Spice, ADS)
- Design and characterization of power electronics (Transistors, gate drivers, power modules)
- Programming and operation (control technology, rapid prototyping, PSoC, DSpace)
- Measurement techniques for electrical Converters (efficiency with power analyzer, switching characteristics with oscilloscope)
- Setup of Energy Conversion-Future Lab
- Contribution to teaching (depending on position)
- Further tasks depending on position and interests

Topic and duration will be individually defined

- Doktorand*in (w/m/d), 3 years (extension possible)
- Student*in (w/m/d), 3-6 months (BA, MA, SA, FA)
- Stud./wiss. Hilfskräfte (research and/or teaching)

Please send your application or questions to:

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