University of Stuttgart
Germany

SUPER – Stuttgart University Program for Experiencing Research
Project Information

Institute's Information

Name of Institute	Institute of Robust Power Semiconductor Systems
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Duration of Project/Number of Students

June/July	
June/July/August	X
Number of Students	1-2

Name of Project Electric – Electromagnetic–Thermal (E^2T) Optimization

Beneficial Skills & Knowledge

Background in electrical engineering and simulation of electrical circuits

Basic knowledge in power electronics, metrology and thermodynamics

Description of Work

The ILH researches in high power density power modules in switched-mode converters for electromobility and renewable energies based on the usage of Wide-Bandgap power semiconductors.

In power electronics applications, the goal is the development of circuits for high electrical power conversion that require a minimum of space and material and do not cause electromagnetic interference (EMI) in adjacent circuit parts during their operation. New manufacturing techniques allow the arrangement of the components and the structuring of the carrier substrate in any three-dimensional configuration. The task of this course is the simulation-based development of a spatial substrate structure for a single-stage DC-DC converter with the objective of finding the electrical, thermal and electromagnetic optimum by varying different geometric shapes. The substrate body should have a volume of 3x3x3 cm^3 and be made of ceramic material.
The specific project description and definition of objectives will be defined together with the student, depending on the student's preferences and competences.

During the work, which is in the field of the latest developments by using state-of-the-art simulation methods for the design of power electronic circuits, the students will gain valuable experience and knowledge to advance their engineering career.