

SUPER – Stuttgart University Program for Experiencing Research Project Information

Institute's Information

Name of Institute Institute of Robust Power Semiconductor Systems (ILH)

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Duration of Project/Number of Students

June/July _____

June/July/August >= 2.5 months

Number of Students 1-2

Name of Project Efficiency Optimization of GaN-based Inverters for low-power Motors

Beneficial Skills & Knowledge

- Basics of Semiconductors
- First Contact Points with Microcontroller Programming
- Electrical Motor Principles
- PCB Design

Description of Work

This project provides an opportunity for students to engage in the practical application of advanced power electronics, focusing on improving the efficiency of low power Brushless DC (BLDC) motors using GaN-based inverters. The primary objective is to achieve improved motor performance and efficiency through higher switching frequencies enabled by new GaN-based semiconductors. Participants will be involved in programming STM32 microcontrollers to control these GaN-based inverters. A significant part of the project will be dedicated to experimenting with different commutation schemes, with a particular focus on sinusoidal commutation, to determine the most efficient method for motor operation. This is an excellent initiative for students who wish to deepen their understanding of power electronics, motor control and microcontroller programming.

