

SUGGESTED TOPIC FOR SCIENTIFIC WORK

Development of a Cooling System for the PMSM Motor

In this research opportunity, we are looking for someone who can design, simulate and validate a cooling system for the Permanent Magnet Synchronous Motors (PMSM).
The high power densities of our high-performance motors leads to very heavy losses within the motor components. To effectively remove the heat generated by these losses, we are looking for high-performance, efficient and weight-saving solutions to the cooling system for our motors. The cooling of the motor is often one of the deciding factors for the team with regard to the performance that we can sustain over the course of a race. Unlike most of the formula student teams, Rennteam designs, builds, tests and optimises their motors completely in-house. As our lap-times fall and our motor technologies advance, effective thermal management of the components is becoming an ever-critical part of the car. The topic is merely a suggestion and must be finalised with the institute.



Tasks:

- Design a cooling concept and evaluate its effect on various factors in relation to the car.
- Simulate the design to validate the concept and calculate the temperature of the motor components under racing conditions.
- Research current literature on cooling-concepts in electric machines and established methodologies.

Requirements:

- Currently enrolled in a related engineering field at the University of Stuttgart.
- Experience in the relevant simulation tools.
- Team-spirit and good communication skills in German or English.