Electro-megneto-thermal modeling and simulation of power electronic components

Component
École Nationale Supérieure d'Électrotechnique d'Électronique d'Informatique d'Hydraulique et des Télécommunications

In brief

- **Ametys Code:** M34HKRB2
- **Open to exchange students:** Yes

Presentation

Objectives

Acquire the knowledge and skills necessary to model, simulate and analyse the electromagnetic and thermal behaviour of power electronic devices. Understand the multiphysical interactions that influence the performance, reliability and design of devices.

Description

This course covers coupled electromagnetic-thermal modelling of power electronics components. It addresses the fundamental principles of electrical conduction, electromagnetic fields, and heat transfer, as well as their integration into comprehensive multiphysics models. Experimental manipulations will be used to characterise components and identify their electrical and thermal parameters, while numerical simulations performed with tools such as COMSOL and Plecs will be used to analyse losses, heating and electromagnetic stresses in power devices.

Pre-requisites

basic knowledge of electrical engineering, magnetism and power electronics.