



SFB Computational Electrical Machine Laboratory

TU Darmstadt and TU Graz want to decisively improve electrical machines through computer simulations. The German Research Foundation (DFG) and the Austrian Science Fund FWF are funding the project with more than eight million euros.

Christoph Pelzl

In the coordinated programme with the long title Computational Electrical Machine Laboratory, the Technical University of Darmstadt (TU Darmstadt) and Graz University of Technology (TU Graz) will advance their joint research work on the simulation of electrical machines.

For decades, electrical machines have played a central role in energy conversion, not only as generators for producing electrical energy, but also as motors, e.g. for electric vehicles. They account for more than half of total energy consumption. Modern power electronics have brought about numerous new operating and application possibilities for such motors, and together with new materials and manufacturing techniques, as well as advances in design optimization and control technology, they hold enormous potential for achieving climate targets.

PARADIGM SHIFT IN DESIGN AND DEVELOPMENT

Current design methods for electrical machines are based on a limited number of parameters and operating modes, typically at constant speed or constant torque. Optimization potential thus falls by the wayside. “We want to make use of this potential and achieve a paradigm shift with the research work towards new inte-

grated simulation and design approaches,” say Sebastian Schöps and Annette Mütze (Electric Drives and Machines Institute at TU Graz), who head the SFB together.

Modelling, simulating and optimizing such a complex system poses extreme challenges for computational engineering (CE). Schöps and Mütze have been working together in this field for several years. CE is an interdisciplinary scientific discipline with links to applied mathematics, computer science and engineering sciences, and has established itself as the third pillar of gaining knowledge in engineering alongside theory and experiment.

“SPYCoDE” WITH TU GRAZ PARTICIPATION

The Austrian Science Fund FWF has also approved another Special Research Programme (SFB) with TU Graz participation. Under the leadership of Vienna University of Technology (TU Wien), researchers from Graz University of Technology (TU Graz), the Universities of Vienna and Klagenfurt as well as IST Austria are working together in the special research programme “SPYCoDE” on technological foundations for realizing the principle of security and privacy by design. ■