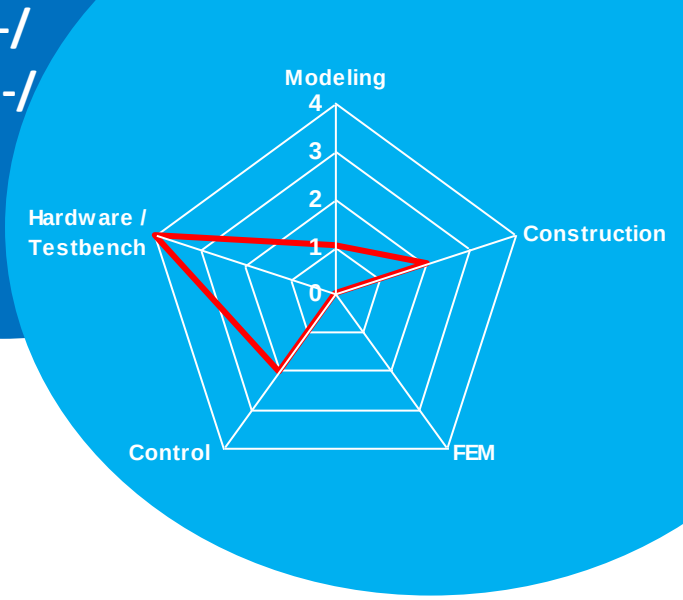
Universität Stuttgart
Institut für Elektrische
Energiewandlung

Bachelor-/ Research-/ Student-Thesis



Further development and validation of a magnetic measuring device

As part of a research project, a new type of soft magnetic material is to be investigated that can save > 80% energy and CO2 compared to the conventional process.

In order to characterize this material, a mount for the material cube will first be designed and then produced using a 3D printer. The 3D-printed mount is to be wound with copper wire and have a suitable plug connection for the wire. This plug-in connection is also to be examined with regard to the measurement reproducibility and the measurement of the cube in each of the six orientation directions. Methods of statistical design of experiments (DoE) are to be applied.

Initial magnetization curves, hysteresis curves and iron losses are to be measured during the survey. The aim is to analyze and further develop existing measurement routines.

Optional: Fitting of the measured data of the iron losses to various iron loss models such as the loss model of Bertotti or Jiles-Atherton

Student-profile:

- Basic knowledge in the field of electrical engineering, measurement technology and control theory
- Experience with Matlab/ Simulink/ Stateflow
- Basic design knowledge and experience with CAD software
- Experience with dSPACE MicroLabBox desirable
- Structured, independent and thorough way of working
- High degree of self-motivation

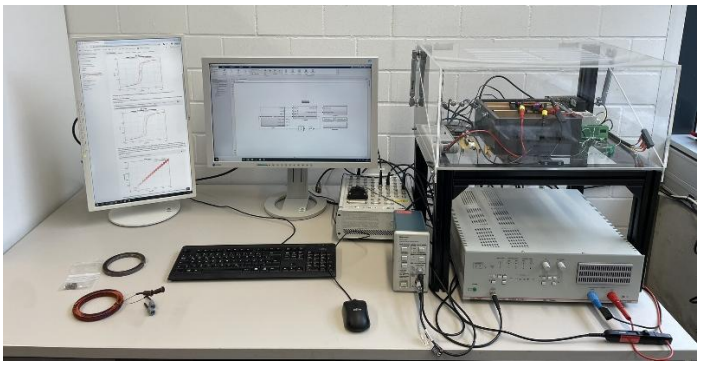


Fig. 1: IEW Ringcore material testbench

Work packages:

- Familiarization with the subject matter, literature and dSPACE Control Desk, Matlab/ Simulink/ Stateflow and test bench environment
- CAD design and rapid prototyping of the measuring system
- Test planning
- Carrying out several series of measurements to measure three-dimensional material properties
- Detailed documentation and code preparation

Project framework:

Active material from compacted chips (AmagS)

DBU
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