Universität Stuttgart
Institut für Elektrische
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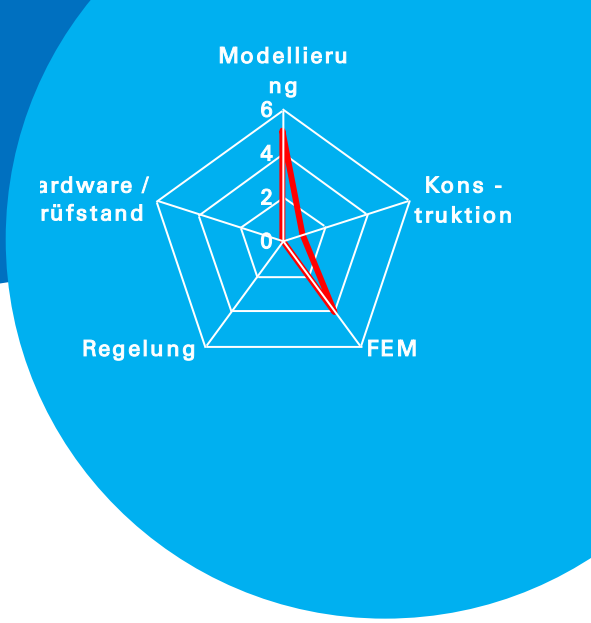

Optimization of the Winding Design of a Transverse Flux Machine

Transverse Flux Permanent Magnet Synchronous Machines (TFPMSMs) are characterized by its transverse flux path, which allows for a low copper loss at higher torques compared to conventional machines. In order to further improve the efficiency, this thesis aims to investigate the effect of different winding design including balancing of parallel paths.

Within this work, an existing Hybrid-FEA-Model for the estimation of AC-Resistance has to be adapted in order to be able to model round and rectangular conductors of the TFPMSM's hoop coil.

Different scenarios with parallel and serial connection of the conductors have to be investigated in order to find an optimal design.

Further, the Hybrid-FEA-Model has to be validated and compared to a transient Full-FEA-Model for selected designs.

Student profile:

- Basic knowledge in the field of electrical machines
- Experience with Matlab / COMSOL / Comsol Livelink / Java is a plus
- Affinity with programming
- Structured, independent and thorough way of working

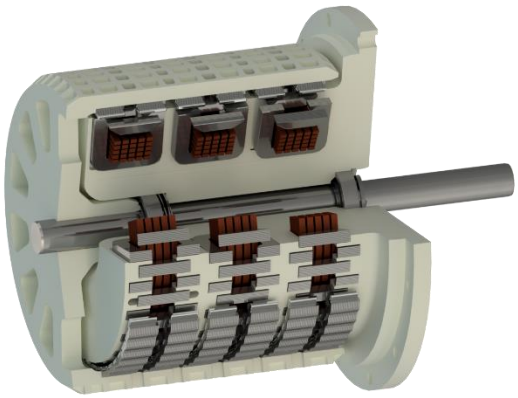

Fig. 1: Sectional View of the Transverse Flux Machine under investigation

Potential work packages:

- Familiarization with the topic, software, and literature
- Definition of design parameters and variants
- Development of algorithms and data structures for the design of windings
- Study on the influence of different design possibilities
- Model validation transient 3D-FEA model
- Sensitivity analysis and derivation of guidelines for an optimal design
- Detailed, orderly documentation, code preparation, documentation

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