

## Development of a Data Transmission System for Rotor Telemetry of an Inductively Electrically Excited Synchronous Machine

In comparison to conventional electrically excited synchronous machines (EESMs), it is not possible to directly measure the rotor current in inductively electrically excited synchronous machines due to the inductive energy transmission path. However, this rotor current is crucial for the operation of the machine and must be determined. Therefore, the objective of this work is to develop a system that can measure the rotor current on the shaft and wirelessly transmit this information to the stator using a data transmission system. The same approach should be applied to measure the temperature of the rotor windings. Existing solutions will be analyzed, and a suitable technology will be selected to realize such a system. Following this, a prototype will be designed and set up outside the machine. Finally, this prototype will be tested at appropriately high speeds for functionality and reliability.

### Student Profile:

- Basic knowledge in electrical engineering, power electronics, and control systems
- Basic knowledge of PCB design is desirable
- Basic knowledge of microcontroller programming is desirable
- Structured, independent, and thorough work approach

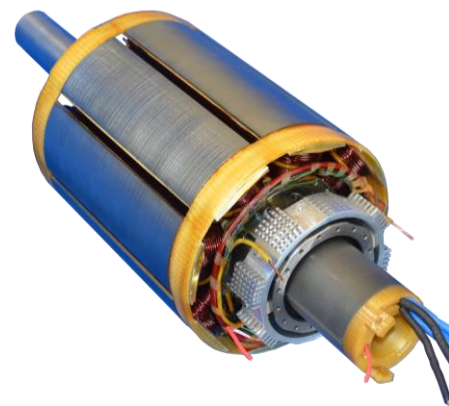


Abb. 1: Rotor shaft of the existing iEESM prototype

### Work Packages:

- Familiarization with the topic and relevant literature
- Identification of existing solutions for such data transmission systems
- Comparison and selection of various technologies
- PCB design of the transmission system considering EMC (electromagnetic compatibility) and mechanical stress
- Mechanical integration of the system with existing CAD models
- Programming of the transmission path with a standardized interface
- Static and dynamic hardware testing on the test bench
- Detailed and well-organized documentation and code preparation

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