



Universität Stuttgart
Institut für Elektrische
Energiewandlung

Development of a new measuring principle for oil lubrication in hybrid bearings for high-speed electric motors

High-load ball bearings for high-speed applications (e.g., 30,000 rpm, 500 kW) are typically operated with air-oil minimum quantity lubrication. In this method, a small amount of oil is periodically metered into a continuous stream of air. However, if the lubrication film in the bearing breaks down for various reasons, the bearing can be destroyed within a short period of time. The current state of the art involves precise monitoring of the metered oil quantity using optical sensors. However, it is still not possible to directly measure whether a lubrication film is present inside the bearing; it can only be monitored indirectly from the outside. In high-performance motors, ball bearings with ceramic balls are used, which are electrically insulating.

Student profile:

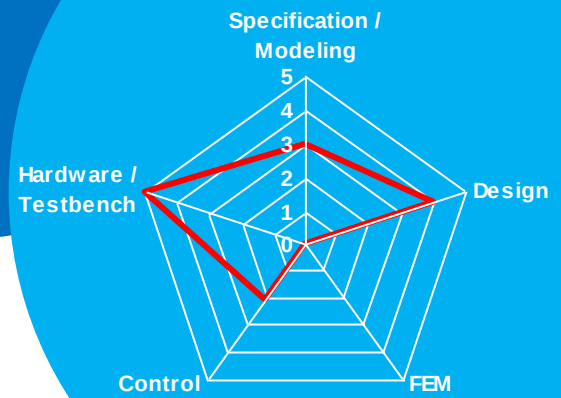
- Basic knowledge of electrical machines and drive technology: Mechanical engineering and electrical engineering
- Experience with laboratory measurement technology for measuring electrical quantities
- Experience with circuit design and microcontroller programming is an advantage
- Structured, independent, and thorough working style; intrinsically motivated
- Enrolled at the University of Stuttgart
- On-site work in Göppingen at Antriebssysteme FAURND AU GmbH

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BA/FA/
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Possible work packages:

- Familiarization with the topic of bearing lubrication and its measurement principles or condition monitoring
- Research and development of possible measurement principles for detecting lubrication film thickness
- Practical preliminary tests to select the most suitable principle
- Validation of the measurement principle on a real electric motor with circuit setup
- Preparation of documentation and presentation of the results

The work is carried out as part of a collaboration with:



FAURND AU
Motion Makers.

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