



# Bachelor or Master Thesis

## *Next Generation E-Drive Production – Development and testing of innovative production technology for continuous Hairpin winding*

### Initial Situation:

The ongoing electrification of the global vehicle fleet is leading to an increasing importance of electric traction drives. A central field of innovation for E-Drives is the stator production in Hairpin design, a coil structure made of solid electrical conductors and is increasingly replacing conventional wire-wired technologies. In the continuous Hairpin winding technique, a solid enamelled copper wire is bent into so-called winding mats and then mounted in the slots of a laminated core. This process requires a high degree of technical precision in order to avoid damage to the conductors and to achieve a maximum copper filling factor. In the medium term this technology has a high potential to increase the economic efficiency of electromotive production. In terms of production technology, however, this manufacturing process is still in its infancy.

### Your tasks:

Your task is the development and testing of innovative devices and equipment for the prototypical production of continuous hairpin windings as well as the construction of a first prototype stator. Give your engineering creativity free rein and help to develop the production technology of tomorrow. At our institute you will find an extensive technical centre for the production of electric motors as well as a fully equipped

workshop with conventional and additive production equipment.

The concrete tasks include:

- Research on the state of the art in winding technology
- Development of functional principles for continuous hairpin winding
- Preliminary tests for function identification
- Selection of the optimal solution concept according to requirements
- Development and construction of a prototype device for continuous hairpin winding
- Installation and commissioning
- Testing and evaluation based on a prototype stator

### Your profile:

- Study of mechanical engineering, economic engineering, automotive engineering (or comparable)
- Interest in product and production engineering systems in the electric drive train
- CAD knowledge
- Independent and structured working
- Communication & teamwork skills
- Motivation and commitment
- Business fluent written and spoken English or German is mandatory

### Offered:

- Extensive support
- Collaboration in an exciting and highly topical field of research
- Development of expert knowledge for future technologies in e-mobility
- Cooperation in a motivated team
- Delimited tasks, fast processing possible
- Possibility of jointly writing a paper
- Modern offices with free coffee and water

### Are you interested?

Please send a current grade sheet, curriculum vitae and certificates together with a letter of motivation to the e-mail address below.

### Your Contact at PEM:

Christian Stäck  
Bohr 12  
D-52074 Aachen  
[c.staeck@pem.rwth-aachen.de](mailto:c.staeck@pem.rwth-aachen.de)