

# Master Thesis

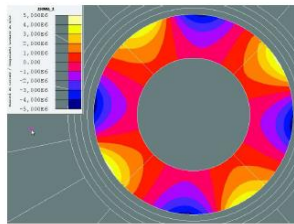
## Measurement of rotor losses in brushless motors

### Description

MOVING MAGNET TECHNOLOGIES is a French company in engineering services and R&D specialized in electromagnetism. The team of 40 employees develops innovative solutions for electromagnetic position sensors, electric motors and direct drive actuators, all of them using permanent magnets.

For several years, MMT has been developing high speed and high frequency brushless motors, for example for air management in automotive or industry applications. Here, high rotor losses can occur (both in the rotor yoke and in the permanent magnets). Such losses may lead to overheating of the rotor and eventually may lead to a demagnetization of the permanent magnets and thereby destroy the drive itself.

While MMT has developed several calculation models, measurement of the rotor losses as precisely as possible to validate the models is of high interest. So far, such loss measurement, and notably the separation of the different losses, has shown to be very challenging. MMT seeks to address this problem by the design of a corresponding test bench and identification of a measurement of such losses.



*Repartition of eddy currents in the permanent magnets of a high speed brushless motor*



*Electrically-assisted turbocharger  
A possible application of high speed motors*

### Tasks

- Understanding of the origin of the rotor losses in brushless PM motors.
- Identification of different approaches to measure such rotor losses, including design of a suitable test rig and identification of appropriate test protocols.
- Realization of the test bench at MMT.
- Rotor loss measurement on one (or several) prototype(s); comparison with the results provided by the existing tools developed by MMT.

### Contact

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