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Electric machine having a passive axial electrodynamic bearing

KEYWORDS

- Self-bearing motor
- High spin speed
- Low losses
- Passive

Technology Market:

Self-bearing motors for high-speed applications

Self-bearing motors are under development to respond to issues related to compactness and high spin speed operation. To date, their structures are based on the active control of the currents as a function of the rotor position. As a result, these motors require power electronics, controllers and sensors, thus reducing the reliability and increasing the cost and complexity.

The UCL invention

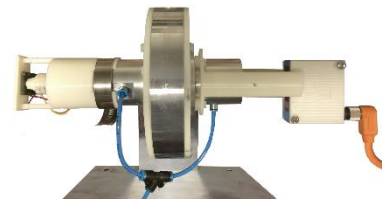
Our new device consists in a passively self-levitated axial flux permanent magnet motor in which the permanent magnets and the windings interact, as in classical machines, to produce a driving torque. However, the windings also present a short-circuited path within which currents are passively induced when there is a rotor axial out-centering. By their interaction with the permanent magnets, these currents generate a restoring thrust force in the absence of any control regarding the axial position.

Applications

- High-speed motors
- Reaction wheel for satellites
- (Vacuum) pumps

Main features

- Compactness
- Reliability
- High-speed operation
- Passive thrust force
- No additional control electronic for bearing



Prototype on test bench

Technology status

TRL 4 Prototype has been tested and functionality has been demonstrated over a limited range of operating conditions.

IPR This work was the subject of a PCT patent application filed on the 18th of May 2018 (PCT/EP2018/063174).

Preferred partnership

Joint developments, licensing opportunities

Interested to develop and / or commercialize this technology?

 **UCLouvain**


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