



Call for Papers

IEEE Transactions on Industry Applications

Special Issue on

Advanced design and control of high-speed motors

This special issue focuses on the recent new progress at design and control level of high-speed motors due to the implementation of advanced materials and techniques. Topics of interest include, but are not limited to:

- Applications of new materials
- Innovate motor structures
- Advanced design methods
- More efficient cooling and thermal management
- Loss reduction
- Mechanical optimization
- Vibrations and noises
- Wide bandgap semiconductor device-based motor drives
- Advanced control algorithms for high-speed motor drives

Currently, high-speed motors are required in a variety of applications, including turbochargers and electrified superchargers, flywheel energy storage systems, turbomolecular pumps, aero-engines, high-speed spindles, gas compressors, and microturbines. They typically operate at speeds higher than 10 krpm with a power varying from around 0.1 to hundreds of Kilowatts, and the product of speed and power square root is larger than $1 \times 10^5 \text{ rpm}\sqrt{kW}$. Due to their high speeds, there are more challenges, for instance, higher frequencies, larger losses, higher temperature rise, stronger mechanical stress, and vibrations, to be overcome for high-speed motors. Fortunately, recent advancements in materials and motor drives provide new solutions to tackle these challenges, and outstanding results are being achieved: high-performance materials, such as superconductors with high current-carrying capacity, ferromagnetic materials with higher magnetic saturation capacity, permanent magnet materials with the high remanent magnetic field, and dual-phase ferromagnetic materials are emerged and investigated in high-speed motors; wide bandgap semiconductor device-based motor drives enable higher switching frequency, higher temperature operation, and lower losses, therefore, their application to the high-speed motor system can improve the efficiency, dynamic and steady-state control performance. In addition, new techniques, such as artificial intelligence methods and 3D printing technique, bring more opportunities for addressing the challenges. Implementation of advanced materials and techniques in high-speed motors asks for progress at the design and control level, including but not limited to innovative motor structures, a new generation of design methods, more efficient cooling and thermal management, loss, noise, and vibration reduction methods, mechanical optimization, wide-bandgap-semiconductor-based motor drives, and advanced control techniques and algorithm. The goal of this special issue is to address the advancement in this area.



Submission Guidelines

Authors who wish to submit a paper for consideration must submit an extended abstract (2 pages, free format, PDF version) to Professor Jing Ou (E-mail: jing.ou@hit.edu.cn). The extended abstract should also include the manuscript title and author's information. The Guest Editors will use the abstracts to select the manuscripts that will be reviewed for this Special Issue by the IEEE Industry Applications Society. Authors of the manuscripts selected for review will receive a formal invitation with detailed instructions for submission of the complete manuscript to the IAS ScholarOne Manuscripts review site. Please refer to <http://www.ias.org> for general information about electronic submission through ScholarOne Manuscripts.

Important Dates

- October 01, 2024: Call for papers announcement
- January 01, 2025: Deadline for extended abstract submission
- February 01, 2025: Decision notification for inviting full paper submissions
- May 01, 2025: Deadline for full paper submission for review in ScholarOne Manuscripts
- December 01, 2025: Notification of final decisions
- January 01, 2026: Due date for submission of final files
- May/June 2026: Publication on IAS Transactions

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