Special Session on

AI for Incipient Faults and Health Monitoring in Electrical Drives

Organised and co-chaired by:

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Abstract

This special session is dedicated to Artificial Intelligence (AI) methods involved in incipient fault detection and health monitoring in electrical machines and their driven systems. This domain represents a critical frontier in predictive maintenance, aiming to identify faults at their earliest stages—long before they evolve into catastrophic failures.

The topic is inherently multidisciplinary, spanning from high-fidelity physical modeling and advanced signal processing techniques to data-driven approaches leveraging AI. This session will showcase the latest innovations, with a particular interest in contributions where AI is the key enabler. This includes modeling for data generation, the use of unsupervised and semi-supervised AI for anomaly detection, and novel AI-enhanced signal processing methods. The scope covers both electrical and mechanical incipient faults, including those from the connected load or transmission system.

Topics of interest include, but are not limited to:

- High-Fidelity Modeling for Data Generation.
- Unsupervised and Semi-Supervised AI for Anomaly Detection and Diagnostics.
- Advanced Signal Processing and Non-Conventional Sensing Techniques, with a focus on AI integration.

Important dates

- Full Paper Submission: February 1, 2026
- Full Paper Notification: May 1, 2026
- Final Paper Upload: June 1, 2026

Submission of papers

Paper submission follows the rules of regular papers. All the instructions for paper submission are included in the conference website:
https://icem2026.ubi.pt/submission.html