



ICEM2020 – Gothenburg, Sweden, August 23-26, 2020

Special Session on Application of Electrical Machine in Modern Electric Vehicles

Organized and co-chaired by:

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Call for Papers

Electrical machine is the key technology in the forthcoming Electric Vehicle (EV) revolution of the transportation system. While the introduction of new technologies for energy storage plays a critical role in the development of the EV market, the electrical machine and the whole powertrain remains the final energy user and is responsible for the vehicle performance and efficiency. The switch of the manufacturing lines from the Internal Combustion Engine (ICE) to electric powertrains represents a huge task for vehicle OEM with many challenges and opportunities. The main targets are high specific torque and power, high efficiency, and low manufacturing costs.

Modern EV powertrains are complex systems where the electrical machine is highly integrated with power electronics, transmission, and cooling systems, and where the control algorithm is essential to exploit the performance of the powertrain in terms of acceleration capabilities and efficiency. Vehicle level requirements and characteristics need to be accurately investigated and broken down to powertrain and electrical machine requirements and specifications.

High-speed operations are investigated to enhance the specific power of the powertrain, mainly where the rare earth permanent magnet (PM) is avoided due to costs and supply chain concerns. Design for high speed requires specific design steps and demands for high strength materials (electrical steels) and high-frequency operations in power converters.

The most used energy source is the chemical battery, the electrical machine and the whole powertrain must take care of the varying characteristics of the energy source to maximize the performance of the vehicle and to limit the health degradation of the battery, in particular in braking mode operations.

In this scope, the topics of interest for this Special Session include, but are not limited to:

- Electrical machine design and control for EV application;
- Powertrain integration and High speed operations;
- Electrical machine cooling aspects;
- Electric motor with reduced rare earth materials;
- New materials for electrical machine;
- Application of Multiphase motors in EV;
- Electrical machine under regenerative braking operation;
- Designing for mass production.

Submission of papers: deadline follows the deadline for the regular papers.

All the instructions for paper submission are included in the conference website:

<http://www.icem.cc/2020>