

IEEE 34th International Symposium on Industrial Electronics (IEEE ISIE 2025)

Special Session on “Advanced DC/DC Converters and control for Hybrid Vehicles and Microgrids”

Session Organizer:



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Call for Papers

This technical session will spotlight the latest advancements in DC-DC converter technologies, including non-isolated, isolated, and modular converters, as well as Dual Active Bridge (DAB) and Triple Active Bridge (TAB) topologies and their associated control techniques. The session will delve into their versatile applications across hybrid vehicles, efficient battery charging systems, and renewable microgrid integrations. Participants will gain insights into innovations in DC-DC converter topologies and validation control methodologies, which are critical for achieving high-efficiency power conversion and enhanced performance in hybrid electric vehicles (HEVs) as well as sustainable, resilient energy systems like microgrids. Building on this foundation, the session will cover advanced topologies and control strategies of converters, focusing on enhancing voltage regulation, minimizing switching losses, and improving overall system reliability. It will explore the role of these converters in hybrid powertrains, showcasing how they enable seamless power flow between energy storage systems and electric drives, thereby optimizing energy efficiency and performance. For microgrid applications, special emphasis will be placed on integrating these converters into distributed renewable energy sources, such as solar and wind, to enhance grid stability and ensure robust energy management, further advancing the goals of a sustainable energy infrastructure. Moreover, special attention will be given to fault detection and fault-tolerant design techniques, critical for maintaining operational integrity in dynamic and high-power environments. The implementation of digital control frameworks will also be discussed, showcasing their impact on real-time system responsiveness and precision in both vehicular and microgrid contexts.

The session will also highlight how advance converters and control technique contribute to achieving key global sustainability goals, including SDG 7 (Affordable and Clean Energy) and SDG 13 (Climate Action), by supporting efficient, scalable, and resilient power solutions. Through in-depth analysis and case studies, participants will gain insights into how these advanced DC-DC converter technologies are driving the transition towards a smarter, cleaner, and more sustainable energy future.

Topics of interest include, but are not limited to:

- Advanced DC-DC Topologies
- Dual Active Bridge (DAB) and Triple Active Bridge (TAB) Converters
- Modular DC-DC Converters for Scalable Energy Systems
- Fault-Tolerant Design Techniques for High-Power DC-DC Converters
- Digital Control Frameworks for Real-Time Optimization
- Bidirectional DC-DC Converters for Battery Management Systems (BMS)
- Non-Isolated/Isolated DC-DC Converters: Performance and Efficiency
- Integration of DC-DC Converters with Renewable Energy Sources
- Minimizing Switching Losses in High-Frequency DC-DC Converters
- Applications of Artificial Intelligence (AI) in Converter Control

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Submissions Procedure:

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

<https://ieee-isie-2025.org/call-for-papers/>

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Deadlines:

Full paper submission:	March 31, 2025
Paper acceptance notification:	April 15, 2025
Camera-ready paper submission:	May 14, 2025