

## Call for Papers for the Special Session on

### Innovations in DC-DC Converter Topologies and Control for Sustainable Energy Systems

#### Organizers and Co-chairs

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#### Technical Outline of the Session and Topics

This technical session highlights emerging trends in DC-DC converter technology, focusing on innovations that improve efficiency, compactness, and reliability. Topics include recent breakthroughs in converter topologies, such as switched-inductor designs, reduced voltage stress techniques, and minimal component configurations. The session will cover various converter types, including non-isolated, isolated, modular, and bridge converters, along with advanced control methods. Key areas of focus are DC-DC converters for hybrid vehicles, efficient battery charging, and renewable microgrid integration. Emphasis will be placed on minimizing switching losses, reducing thermal stress, and enhancing system reliability. Also, the role of advanced converters in hybrid powertrains and microgrids enables optimized energy flow and stable distribution.

The session will cover digital control frameworks, fault detection, and fault-tolerant design strategies for robust real-time operation, the role of AI and machine learning in optimizing converter control and improving precision and adaptability in vehicular systems and renewable energy networks. Aligned with SDG 7 (Affordable and Clean Energy) and SDG 13 (Climate Action), the session will highlight innovations in scalable, efficient, and resilient power solutions, supported by case studies on driving the transition to a sustainable energy future.

#### Topics of this Special Session Include but are not limited to

- Non-Isolated and Isolated DC-DC Converters
- Innovations in switched-inductor and minimal-component designs.
- Efficiency enhancements and advanced control techniques.
- Modular Converters for Scalable Power Systems
- Fault-Tolerant Design and Thermal Management
- Improving reliability in high-power converters.
- Digital Control and Real-Time Optimization
- Bidirectional DC-DC Converters for Battery Management
- Integration with Renewable Energy Sources
- Minimizing Switching Losses in High-Frequency Converters
- AI and Machine Learning in Converter Control
- Predictive control and optimization techniques.

#### Timeline for Author

Deadline for submission of special session papers

March 15, 2025

Notification of acceptance

March 31, 2025

Deadline for submission of final manuscripts

April 15, 2025

All the instructions for paper submission are available on the conference website.

