Call for Papers for the Special Session on

ADVANCED PARTIAL AND DIFFERENTIAL POWER PROCESSING FOR HIGH-EFFICIENCY DC ENERGY CONVERSION

Organized and co-chaired by

Andrii Chub, Tallinn University of Technology, Estonia   andrii.chub@taltech.ee

Neelesh Yadav, ABV-IITM, Gwalior, India   neelesh@iiitm.ac.in

Samir Kouro, Luxembourg Institute of Science and Technology, Luxembourg   samir.kouro@usm.cl

Freddy Flores Bahamonde, Universidad Andrés Bello, Chile   freddy.flores@unab.cl

Technical Outline of the Session and Topics

This special session brings together contributions on partial power processing (PPP) and differential power processing (DPP) for high-efficiency, high-power-density energy conversion. PPP enables architectures that process only a portion of total transferred power to reduce conversion stress and losses, while DPP focuses on processing the mismatch (differential) power among series-connected elements, which is commonly used as voltage/power equalization in PV strings/submodules and battery stacks. Papers are sought on architectures/topologies (including wide-bandgap implementations), modelling and design trade-offs (processed-power ratio, component stress, thermal/EMI), and experimental validation. The session also welcomes reliability- and protection-oriented studies (fault modelling, diagnostics, protection coordination, fault tolerance) and system integration in DC microgrids and energy storage applications.

Topics of the session include, but are not limited to:

- PPP/DPP architectures for processed power minimization and power-routing concepts.
- PPP/DPP converter topologies, incl. multiport and wide-bandgap implementations.
- Modelling, design, and optimization: loss-stress modelling, thermal/EMI constraints, etc.
- Control and coordination of multiple PPP/DPP units: low-level control, droop/hierarchical coordination, stability and robustness.
- Reliability, diagnostics, and protection: fault modelling/propagation in partial power paths, fault detection/isolation, protection coordination, and fault-tolerant operation.
- PPP/DPP applications in renewables, energy storage, and high-power DC systems (data centres, telecom, electrified transportation): modularity, efficiency, and design constraints.

Timeline for Authors

All the instructions for paper submission are available on the conference website. Please visit www.iecon2026.org or scan the QR code for the timeline.