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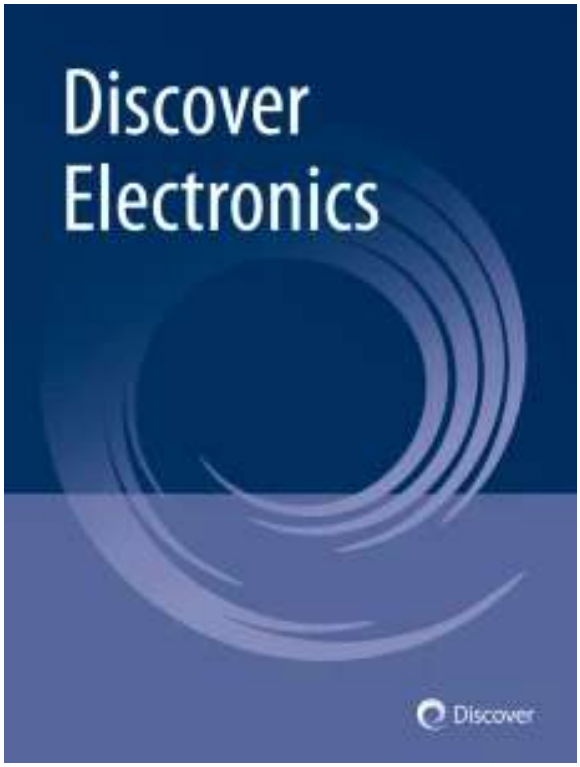
Call For Papers

Modern Power Electronics and Energy Conversion Solutions for Stable and Scalable Renewable Integration



The collection highlights the central role of modern power-electronic hardware in enabling reliable, scalable and high-performance renewable energy integration. As today's grids shift toward converter-dominated architectures with large shares of solar, wind, electric-vehicle interfacing and distributed storage, the design, operation and robustness of power-electronic converters have become fundamental engineering priorities.

This collection focuses on innovations in converter topology development, wide-bandgap device utilization, modulation techniques, thermal and reliability optimization, multi-port interfaces, and high-efficiency power conversion architectures that directly support large-scale renewable penetration. Emphasis is placed on how these hardware-driven advancements shape system dynamics, influence stability margins, and enable secure operation under low-inertia and highly variable conditions.

While advanced control, grid-support functions, and AI-assisted supervisory strategies remain complementary aspects, the primary objective is to explore how power-electronic interfaces form the backbone of next-generation grids. Relevant studies may include hardware-in-the-loop validation, real-time testing of converter behavior under disturbances, device-level modeling, and system-level approaches where converter functionalities determine grid-forming, protection and resiliency characteristics.

By strengthening the connection between power-electronic technology, converter-centric architectures and robust operational strategies, the collection aims to provide a comprehensive reference for researchers and engineers working toward clean, efficient and resilient electrical infrastructures.

Guest Editor:

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