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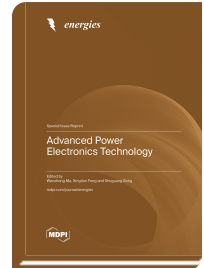
Advanced Power Electronics Technology

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Power electronics have become indispensable in modern life, enabling the integration of large-scale renewable energy sources—such as photovoltaic and wind power—flexible power transmission, and highly efficient power distribution and utilization. Continuous advancements in competitive topologies, next-generation switching devices, and innovative control strategies are driving the field forward. Several typical examples illustrate these technological advancements in practice: First, modular high-voltage, high-power DC/DC converters have emerged as a crucial solution for renewable energy systems and future DC grids, addressing the growing need for efficient direct DC/DC conversion in applications ranging from utility-scale solar farms to electric vehicle charging infrastructure. Second, the adoption of wide-bandgap devices, such as GaN and SiC, is revolutionizing power conversion efficiency, offering superior performance through reduced switching losses, higher voltage tolerance, and more compact designs. Third, advanced control algorithms (e.g., fuzzy control, model predictive control, and AI-driven techniques) continue to enhance system performance, opening new possibilities in power electronics. This reprint compiles cutting-edge research from the Special Issue "Advanced Power Electronics Technology," presenting recent achievements that support the evolution of modern power grids. We hope these contributions will inspire further innovation and development in the field.



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