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Abstract

Title: Solid-State Circuit Breakers for Low-Voltage DC Distribution Systems

Solid-state circuit breakers (SSCBs) are a promising solution for enhancing safety and reliability in low-voltage DC distribution systems. However, their realization presents challenges, including the need for robust avalanche capability, device paralleling for low conduction losses, and reliable operation under repetitive interruption. This presentation will discuss recent research advancements in SSCB technology. First, a novel SSCB design utilizing paralleled SiC MOSFETs with an integrated SiC MPS diode for avalanche voltage clamping will be introduced, along with experimental results demonstrating its improved performance and reliability. Furthermore, future research directions and the potential for wide adoption of SSCB technology in applications such as electric vehicles and DC microgrids will be explored, emphasizing the importance of module-level implementation and high-density packaging techniques.