PPPS 2019



Contribution ID: 745

Type: Either

5P15 - Design of Modular High-Voltage Nanosecond Pulse Generator with Adjustable Rise/Fall Time Based on MMC Topologies

Friday 28 June 2019 13:30 (1h 30m)

In order to study the influence of the rise/fall time of high-voltage nanosecond pulses on cell killing effect, a high-voltage nanosecond pulse generator with adjustable rise/fall time is needed. A novel generator topology based on half-bridge modular multilevel converter (HB-MMC) is proposed. Several HB-MMC submodules are connected in series as two arms to generate unipolar/bipolar high voltage nanosecond pulses. MOSFETs are used as v solid-state switches. By controlling the switching sequence of the MOSFETs, the rise/fall time of the pulse can be adjusted. In this paper, the proposed topology as well as its operating principle are introduced in detail and verified by PSpice simulation software. A 5-stage generator is implemented and tested. The test results show that the generator can output nanosecond pulses with adjustable amplitude of $0^{-}\pm4$ kV, pulse width of 100⁻500 ns and frequency of 0⁻5 kHz. The rise time of the pulse can be smoothly adjusted in the range of 15-65 ns, and the fall time of the pulse can be smoothly adjusted in the range of 30-100 ns.

Authors: Prof. MI, Yan (Chongqing University); WAN, Hui (Chongqing University); LIU, Lulu (Chongqing University); GOU, Jiaxi (Chongqing University); CHEN, Jiacheng (Chongqing University)

Presenter: WAN, Hui (Chongqing University)

Session Classification: Poster - Compact and Explosive Pulsed Power and Pulsed Power Systems

Track Classification: 7.3 Compact Pulsed Power