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A 100kV Nanosecond Pulse Generator Based on Magnetic Pulse Compressor

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Magnetic Pulse Compressor (MPC) is an efficient solution to obtain high compress gain, high repetition rate and high voltage output. A 100kV nanosecond pulse generator based on MPC is presented. For an improved efficiency of compress, a gas switch, a pulse transformer and a saturable pulse transformer are combined to compress the pulse width; meanwhile, the voltage output is amplified as well. Unlike the traditional magnetic switch, a saturable pulse transformer has two functions, first it works as a step-up transformer, and at the same time it acts as the magnetic switch. Thus, the overall magnetic cores volume is reduced, and it allows the pulse transformers and magnetic switches to operate at very low losses. The pulse generator consists of two compress units, while a freewheeling diode is used for reducing the reverse pulse occurred in the resistive load. The proposed pulse generator can deliver pulses of around 100 nanoseconds in width with the amplitude of 100kV, and the highest repetition frequency of about 1 kHz.

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