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Numerical analysis on the output characteristics of a linear switch array pulse modulator

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A linear switch array pulse modulator (LSAPM) including gas switches, transmission lines and matched load was proposed to produce a pulse with a L wave band pulse, the frequency of output pulse could be adjusted by changing the length and impedance of transmission line, and interelectrode capacitance. In this paper, an electric circuit model of a 12-stage LSAPM was built and analyzed, and the electric field distribution of the LSAPM was calculated. The influences of switch parameters including spark inductance spark resistance and interelectrode capacitance, on the amplitude-frequency characteristics of output voltage waveform. The results showed that a pulse with oscillation frequency of 1.2-1.6GHz, duration of 14ns and output amplitude of 130kV was generated by establishing a 12-stage LSAPM at an input square-pulse of 100kV. The output voltage decreased with increasing of spark resistance. And the pulse amplitude at above frequency band was relatively higher at the interelectrode capacitance of 6pF and the spark inductance of 1nH.

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