Sub-nanosecond rise time, variable pulse length Blumlein-generator for electron extraction in thermionic guns

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Thermionic guns are the workhorse electron sources of numerous pre-accelerators for synchrotron radiation sources in the world. At DESY in Hamburg, the thermionic gun of LINAC-II is serving user operation routinely since 10’s of years. Modifications in the subsequent circular accumulator ring PIA and a possible complete bypass of this machine necessitate significantly shorter electron bunches from the linear accelerator than the current minimum length of ca. 10ns. To facilitate this reduction, new extraction electronics based on a two-switch Blumlein-generator are being developed. Switching times of down to 0.7ns have been achieved using GaN HEMTs as main switches for up to 600V pulse voltages. Here, we present results of the generator operating with a test load and details on the implementation into the actual electron gun setup.

2025 IEEE Pulsed Power & Plasma Science (PPPS) | 979-8-3315-4376-1/25/$31.00 ©2025 IEEE | DOI: 10.1109/PPPS56198.2025.11248144