

Pulse Generator for Bipolar Stepwise Arbitrary Waveform Generation

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For sweeping a bunched electron beam across a test object, a pulse source for the generation of a bipolar stepwise arbitrary pulse voltage for driving a kicker magnet is currently being developed. Each stage comprises SiC-MOSFETs as switches in H-bridge configuration, a capacitor bank, a capacitor charger, and a local control unit. The capacitor charger allows tuning of the charging voltage for each stage individually. It provides a voltage of up to 800 V. The stages are supplied by a 100 kHz AC current source via transformers. Each stage is connected to the main control unit via a fiber-optic link. During pulse generation, the main control unit distributes a clock signal among the stages, which operate the MOSFETs of all H-bridges per stage according to pre-configured sequences of switching patterns. The patterns can be configured individually for each stage. Operation of the MOSFET switches under hard-switching conditions at a step sequence frequency of 1 MHz has been demonstrated successfully. Individual signal propagation delays in the signal paths to the stages are equalized by means of a configurable delay unit on each stage. In the contribution selected design details and first measurements will be presented.