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A Development of Nanosecond Pulse Power Modules

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A nanosecond multi-bunch mode in FEL extends the laser capabilities. There are several critical components to be added to a baseline of the multi bunch FEL (for example, LCLS/LCLS-II). One of the components is the system that properly control the individual bunch orbit in the linac. The individual bunch orbit control based on the RF amplitude and phase modulation is limited by the bandwidth. Powerful and fast solid-state switches driving a transmission line kicker are needed to breakthrough these limitations. They must be stable working in the pulse mode and capable of generating power from MW to GW and rise/fall time from 10x psec to 100 nsec. The pulse dynamic processes in ferromagnetic and semiconducting materials can support a 1 MW/ns switching speed stably, reliable, and efficiently. We will present developments and our results of such modules.

Footnotes

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