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Design of compact and repetitive pulsed e-beam source

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We report on the design of a compact and repetitive pulsed e-beam source. This pulsed e-beam source, which can work stably for long time, was built based on Marx technology. The designed output voltage, current, pulse width and repetition frequency of this e-beam source is 1 MV, 20 kA, 180 ns and 1⁵⁰ Hz, respectively. In contrast, the volume and weight of this source is limited to 2.5 m³ and 2.2 ton. The energy density of a pulse forming network model in this source attains 23 kJ/m³. When working at single shots, this e-beam source gives an output voltage of 0.98 MV, current of 18 kA and power of approximate 20 GW. On the other hand, this e-beam source realizes an output voltage of 0.9 MV, current 18 kA and power 16 GW at a repetition frequency of 30 Hz. The source works very stable, with a jitter of 6 ns.

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