

Compact source of low-energy, high-current electron beams

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A compact source of low-energy (up to 30 keV), high-current electron beams (tens of kA) of microsecond duration (2–4 μs), which can be used in hybrid multifunctional scientific-applicable facilities, for example, projected Siberian Ring Source of Photons (SRSP) has been developed. Beam production is performed in a diode with explosive-emission cathode in which 25 arc plasma sources initiated by dielectric surface flashover are built-in. The use of arc plasma sources allows one to excite explosive emission at relatively low accelerated voltages (from 7 kV). It provides a possibility to vary the beam energy density in a wide range (from 1.5 to 10 J/cm²). The beam transportation onto the collector through the distance of 2–3 cm is performed in a guide magnetic field provided by a single ring permanent magnet.

Keywords: high-current electron beams, explosive emission, multi-channel initiation, dielectric surface flashover, permanent magnet.

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