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Wide range and high precision grid-cathode modulation of beam current for High Energy Photon Source electron gun

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High Energy Photon Source (HEPS) is the fourth-generation light source under construction in China. The electron gun system is the origin of beam acceleration. This article introduces the wide range and high precision grid-cathode modulation of beam current for the HEPS electron gun system. Its grid-bias voltage adjustment is as fine as 0.01V. Cathode filament current and voltage ripple $< 0.1\%$. Its grid-bias voltage adjustment accuracy reaches 0.01V. The cathode filament current and voltage ripple $< 0.1\%$. The beam test results show that the beam current amplitude stabilization of 2.37% (small current), 0.13% (high current), beam current time jitter 12.459ps. Meets physical requirements for a wide range of injector from 2.8nC to 7nC.

Footnotes

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