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Beam parameters studies of the CAEP THz FEL as injector for ERL

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The Energy Recovery Linac (ERL) serves as a primary means to simultaneously achieve high energy utilization efficiency, high average beam current, and high-brightness electron beams. The Chinese Academy of Engineering Physics' Infrared Terahertz Free-Electron Laser (CAEP IR-THz FEL) aims to produce FEL light within the 0.1-125 THz spectrum with updated beam energy and undulators. Another goal of the project is to build Chinese first ERL experimental research platform. The original CAEP THz FEL accelerator will be the injector of the ERL. This paper focuses on the generation and measurement of high repetition rate, low emittance electron beams of the injector, combining numerical simulation optimization with experimental measurements. The beam dynamics of the injector is optimized with ASTRA. The fully beam parameters, including beam transverse emittance, bunch charge, beam energy and energy spread and bunch length are measured and analyzed in detail, which will be used for further ERL beam dynamics design.

Footnotes

Funding Agency

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Yes

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