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Current profile and longitudinal phase space measurement using a corrugated structure

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We present preliminary experimental results on the measurement of the current profile and longitudinal phase space (LPS) of an ultrarelativistic electron beam using a corrugated structure at the Pohang Accelerator Laboratory X-ray Free-Electron Laser (PAL-XFEL). The electron bunch is streaked by the transverse wakefield induced by the corrugated plates, resulting in a correlation between the transverse and longitudinal beam distributions. By analyzing the transverse distribution of the streaked beam, we reconstructed the current profile and the LPS. Tracking simulations were performed to validate the reconstruction method, showing good agreement between the reconstructed and actual beam profiles. Based on these simulations, we applied the method to experimental data and characterized the longitudinal beam properties at PAL-XFEL. This paper presents our preliminary results on current profile reconstruction and LPS characterization with the high temporal resolution.

Footnotes

Funding Agency

I have read and accept the Conference Policies

Yes

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