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Noninterceptive beam energy measurement of high-frequency free electron lasers

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Free electron lasers (FEL), which can generate ultra-high brightness radiation are working horses for radiation science research over the world. For FEL, the higher the repetition frequency of the beam in the device, the higher the user's experimental efficiency, and more experimental stations can conduct experiments simultaneously. Therefore, there is a trend to increase the repetition frequency in its development process. Therefore, it is necessary to develop relevant technologies for high repetition frequency FEL. Beam energy is one of the most fundamental and critical parameters in FEL. This paper developed a fusion algorithm based on beam position monitor (BPM) in the dispersion structure of a FEL, which extracts the transverse position of the beam using both the arrival time and amplitude information of the beam, to achieve high-precision and noninterceptive measurement of beam energy. Provide powerful diagnostic, operational, and maintenance tools for high-frequency free electron laser devices.

Footnotes

Funding Agency

I have read and accept the Conference Policies

Yes

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