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Latest Advancements of a Compact Electro-optical Bunch Length Detector

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Laser-based electro-optic detection (EOD) has been a valuable method to measure the longitudinal electron bunch shape with sub-ps resolution for almost a decade now, but it has always been a tool for expert use. At European XFEL and FLASH, we are advancing the EOD from an expert device to a user friendly tool, with new operator interface and automated, server-based procedures for laser locking, time calibration and online data analysis.

The system at European XFEL is currently used in an electro-optic spectral decoding configuration (EOSD), but the implementation of advanced reconstruction algorithms (Diversity Enhanced EO Spectral Decoding, DEOS) is ongoing to surpass resolution limitations when recording broadband THz radiation over long temporal acquisition windows.

Summary

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