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Beam energy measurement at the European XFEL with high-performance trajectory fitting

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Knowledge of the beam energy is important for practically all particle accelerators. This contribution presents the method used at the European XFEL since more than 8 years. It relies on high-performance trajectory fitting of beam position monitor data against an online model of the accelerator lattice. Unlike most other methods, it can be applied to virtually any section of the lattice with sufficient dispersion without the need for manual adaptation. Our implementation is fast enough to measure the energy of many thousands of bunches per second in realtime on conventional x86 server hardware shared with other processes. A short outline of the technique is presented and illustrated with data from the accelerator.

Footnotes

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