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Implementation of flat-top output pulse of RF pulse compressor for SXFEL

The adaptive control-based low-level radio frequency (LLRF) algorithm was developed for the two-bunch operation of the Shanghai Soft-X-ray Free Electron Laser Facility (SXFEL), needing to generate flat-top radio frequency (RF) power pulses at the output of an RF pulse compressor. The adaptive algorithm optimized for the compressor system can achieve a better convergence rate and domain. The algorithm has already modulated the flat-top-accelerating gradient in the SXFEL's RF cavity, and the energy of the electrons accelerated at the field's different longitudinal locations is within 0.8% (rms) of the mean value. This study presents the algorithm's theory, and test results before and after the improvement.

Keyword

SXFEL, Pulse Compressor, Flat-top

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