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SP4: Longitudinal Diagnostics for Beam-based Feedback Systems at the European XFEL

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At modern Free Electron Lasers, the key for time resolved experiments is a high precision regulation of bunch parameters such as arrival time and compression. In order to achieve these requirements on the beam properties, both for single bunches and within a bunch train, it is necessary to combine RF field and beam based feedback loops, optimised for different frequency domains. To correct for slow temporal drifts in the few Hz region a feedback system is implemented based on an inverted multi-dimensional matrix which contains the responses of the bunch properties charge, arrival time, compression and energy with respect to variations of various machine parameters. Here, we present the experimental setup of the Bunch Arrival-time and Bunch Compression Monitors and first results from longitudinal beam response measurements and feedback operation at the European XFEL.

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