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Longitudinal phase space diagnostics with a non-movable corrugated passive wakefield streaker

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Time-resolved diagnostics at Free-Electron Laser (FEL) facilities, in particular electron beam longitudinal phase space (LPS) and FEL power profile measurements, provide information highly valuable for users, machine development studies, and beam setup. We investigate the slice energy resolution of passive streaker setups, in particular the effect of an energy chirp on the measured slice energy spread. Downstream of the hard X-ray SASE2 beamline at the European XFEL, these measurements are enabled by a single-plate non-movable passive wakefield streaker, essentially a rectangular corrugated plate placed inside a vacuum chamber. We show measurements with a time resolution down to a few femtoseconds, and an energy resolution down to a few MeVs.

Footnotes

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