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Measurement of first and second order longitudinal dispersion in the MAX IV bunch compressor

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The MAX IV linac is used to provide sub-100 fs pulses for a Short Pulse Facility (SPF). In order to form this beam, two bunch compressors at 245 MeV and 3.0 GeV are used. The properties of these compressors have been studied and simulated in the past, but lacking longitudinal diagnostics in their proximity, measurements of their effect on the beam have been limited. We seek to ascertain the R_{56} and T_{566} of the transfer through the compressor, which we measure as the resulting variations in the time-of-flight as dependent on changes to the incoming energy. In this study, the raw waveforms of two BPMs situated before and after the first bunch compressor have been used to extract the time-of-flight through the compressor. Investigating the dependence of time-of-flight on the changes in energy provides the sought R_{56} and T_{566}. The results of these new measurements have been compared with the design values and elegant simulations for the bunch compressor.

Footnotes

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