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Longitudinal Electron Beam Characterisation at the MAX IV Linac

Thursday, 11 May 2023 16:30 (2 hours)

The MAX IV 3 GeV linac delivers electron beams to two synchrotron rings and to a dedicated undulator system for X-ray beam delivery in the Short Pulse Facility (SPF). In addition, there are plans to use the linac as an injector for a future Soft X-ray Laser (SXL). For both SPF and SXL operations, longitudinal beam characterisation with a high temporal resolution is essential. For this purpose, a transverse deflecting cavity (TDC) system has been developed and installed in a dedicated electron accelerator line located downstream of the 3 GeV linac. This accelerator line consists of two consecutive 3 m long transverse S-band RF structures, followed by a variable vertical deflector dipole magnet used as an energy spectrometer. This conference contribution presents the beam dynamics calculations for the beam transport along the TDC line, and in particular the optics configurations for slice emittance measurements. The operation of an analysis algorithm for use in the control room is presented. The aim is to provide 1 fs temporal measurement resolution to access the bunch duration of highly compressed bunches and slice parameters for sub-10-fs bunches.

Funding Agency

Footnotes

I have read and accept the Privacy Policy Statement

Yes

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