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Simulations of an X-band transverse deflection structure with variable polarization

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Transverse deflection structures (TDS) have been widely used as diagnostic devices to characterize longitudinal properties of electron bunches in a linear accelerator. However, the conventional TDS can only measure either the horizontal or the vertical slice envelopes of electron bunches. In order to give full control of the angles of the transverse streaking field inside of the TDS to characterize the projections of the beam distribution on different transverse axes, we numerically investigate an X-band TDS with variable polarization in this paper. Through variable streaking direction, the orientation of the streaking field of the TDS is adjusted to an arbitrary azimuthal angle. This helps facilitate the development of next-generation TDS for the characterization of electron bunches, such as slice emittance measurement on different planes.

Footnotes

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