Contribution ID: **232** Contribution code: **TUP232-WEB** Type: **Poster Presentation**

Analytical study of wakefields of short beams with large transverse size in planar corrugated structures

Tuesday 20 August 2024 20:40 (20 minutes)

Planar corrugated wakefield structures are widely used in X-ray FEL facilities for passive dechirping and transverse deflecting. The wakefields of these structures have previously been analytically studied, assuming the electron beam is short and has a small transverse beam size. However, the transverse beam size can be notably large in some practical cases, for example, when a slotted foil is inserted upstream. We present analytical formulas, based on the existing wakefield theory, that are valid also for large transverse charge distributions. We find good agreement with ECHO2D simulations.

Footnotes

Funding Agency

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Presenter: HU, Wenxiang (Paul Scherrer Institut)

Session Classification: Poster session

Track Classification: Electron beam dynamics