Contribution ID: **328** Contribution code: **THPB093** Type: **Poster Presentation**

Impact of coherent synchrotron radiation effect on generalized longitudinal strong focusing insertion unit

Thursday 29 August 2024 16:00 (2 hours)

The generalized longitudinal strong focusing (GLSF) scheme is a potential approach for a steady-state microbunching (SSMB) storage ring, leveraging the ultra-low vertical emittance in the storage ring. It achieves active vertical-longitudinal coupling through an inser-tion unit, further compressing bunch length from the hundreds of nanometers scale in the main ring to the nanometers scale, thus emitting radiation. Due to the extremely short bunch length, coherent synchrotron radi-ation (CSR) effect may significantly impact beam dynam-ics. We developed a particle tracking program based on one-dimensional CSR model to preliminarily evaluate the influence of CSR effect in the GLSF scheme under current design parameters. Our work contributes to the future optimization of the GLSF scheme.

Footnotes

Funding Agency

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Session Classification: Thursday Poster Session

Track Classification: MC1: Beam Dynamics, Extreme Beams, Sources and Beam-Related Technologies: MC1.1 Beam Dynamics, beam simulations, beam transport