

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

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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 insertion 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 radiation (CSR) effect may significantly impact beam dynamics. 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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