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A modified round to flat beam transformation lattice for angular dispersion induced microbunching technique

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Due to the beam in the storage ring has a very low vertical emittance. The angular dispersion induced microbunching (ADM) scheme is used to generate high brightness coherent synchrotron radiation. To apply a similar scheme in a linear accelerator, it is necessary to reduce the vertical emittance of the beam in the linear accelerator. Generally, angular-momentum-dominated round beams can be generated by immersing the cathode into the axial solenoid magnetic field, the angular momentum is then removed by skew quadrupoles downstream of the solenoid, resulting in a flat beam with low vertical emittance. In this paper, on the basis of the existing basic structure, considering the chromatic effects in the round-to-flat beam transformation, we propose an achromatic scheme that uses chicane to generate dispersion segment, inserts skew quadrupoles in the dispersion segment for matching, and uses sextupole to correct chromatic aberration. The numerical simulation results of ASTRA and ELEGANT show that the transverse emittance ratio of the beam has been further improved.

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Footnotes

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Yes

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