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A novel design of a magnetic chicane with positive R56

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It has been attracting attention that the energy chirp, which is formed by the space-charge effect of the electron beam and the beam wake field when the beam passes through the accelerator tube, can be used to generate short-pulse XFELs. Since the energy chirp produced by this phenomenon is such that the energy of electrons in the rear of the bunch is lower than at the front, compression requires a magnetic chicane with a positive R56, which shortens the path of the lower energy electrons. On the other hand, a normal simple electromagnetic chicane would have a negative R56, not applicable to this bunch compression. In this presentation, we report on the idea of a compact R56-positive magnetic chicane that can be inserted in a straight section and the results of its design study.

Footnotes

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