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Damping ring and transfer lines for FCCee Injector complex

Monday 2 June 2025 16:00 (2 hours)

A novel damping ring design and related transfer lines for the FCCee are proposed. The presented damping ring layout is optimized for operation at 2.86 GeV to efficiently cool both electron and positron beams and should cool down the transverse emittance of the positron beams by four orders of magnitude. The system accommodates beam trains consisting of 4 bunches separated by 25 ns, with a repetition rate of 100 Hz. Different layouts, including triangular and hexagonal geometries, have been investigated, utilizing various base arc-cell configurations such as FODO, six-bend achromat, and 10-bend structures. In addition to the damping ring, this contribution presents the design of transfer lines from the positron and electron sources to the damping ring, and the extraction lines from the damping ring to the high-energy LINAC. The design ensures rapid damping while maintaining beam quality, leveraging advanced lattice configurations. This work outlines the conceptual design, beam dynamics studies, and the technical challenges addressed to meet the demanding operational requirements of the FCCee injector system.

Footnotes

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