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Study of an anomalous beam profile in the Compact ERL's injector at KEK

Wednesday 4 June 2025 16:00 (2 hours)

The cERL injector objective is to produce and deliver a high-quality electron beam to the recirculation loop. However, a recent observation of an anomalous "triangle beam" profile just after the first solenoid presents significant challenges. This distorted beam profile can lead to inaccurate parameter measurements, reduced focusing and collimation efficiency, and increased sensitivity to injector errors.
This study investigates potential causes, including hexapole field components, misalignment, nonlinearity of air-core steering, and beam kick at cathode. Machine learning techniques are employed to analyze experimental data and simulation results to identify the primary factors. Based on these findings, potential solutions to mitigate the "triangle beam" issue and optimize injector performance are proposed.

Footnotes

Paper preparation format

LaTeX

Region represented

Asia

Funding Agency

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