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Beam Halo Formation with Different Cathode Distributions

Tuesday 12 August 2025 16:00 (2 hours)

Beam halo refers to the low-density distribution of particles extending beyond the beam core, and its generation and mitigation are important topics in particle accelerator design. Effective mitigation of beam halo is essential for the cooler design based on Energy Recovery Linac (ERL), which must deliver an electron beam with average beam current of 100 mA and a charge 1 nC per bunch. In the ERL injector and booster linacs, space charge effects are stronger due to relatively low beam energy (6 MeV). Additionally, the longer bunch length of approximately 100 ps in this regime vs the RF period of 5.08 ns makes the formation of beam halos more likely. Therefore, effective collimation of beam halo is critical to maintaining the required beam parameters. To design an effective collimation scheme, several halo distributions were generated at the cathode and used to study halo formation within the injector-merger. This paper presents different halo distributions and halo formation, providing insights on halo collimation strategy.

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No

Would you like to submit this poster in student poster session on Sunday (August 10th)

No

Footnotes

Funding Agency

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