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Transport of 12 GeV positron beams at Ce+BAF

Thursday 14 August 2025 16:00 (2 hours)

Jefferson Lab (JLab) is developing a concept to upgrade the Continuous Electron Beam Accelerator Facility (CEBAF) to additionally deliver spin-polarized continuous-wave positron beams for its nuclear physics program users (Ce+BAF 12 GeV). The concept involves repurposing the Low Energy Recirculator Facility (LERF) at JLab as a dual injector, first producing 100-300 MeV spin-polarized electron beams which are subsequently used for the generation and formation of 123 MeV continuous-wave positron beams. The positron beams are transported to CEBAF and injected for acceleration up to 12 GeV, tailored to the requirements of its four experimental halls. Given the higher emittance of the secondary positron beams, the CEBAF optics are optimized for low dispersion and low beta functions to enhance transmission within the Ce+BAF acceptance limits and with an R56 to manage the positron beams bunch length and energy spread. Potential bottlenecks are being investigated through both optical modeling and measurements using an electron beam, as well as degraded electron beams, to map the 6d acceptance of CEBAF as it is today. This presentation shares preliminary results from multi-particle tracking simulations of the positron beam up to 12 GeV, including spatial, momentum, and spin characteristics, and explores the feasibility of delivering beams simultaneously to multiple experimental halls via extraction optics.

Please consider my poster for contributed oral presentation

Yes

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

No

Footnotes

Funding Agency

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I have read and accept the Privacy Policy Statement

Yes

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