

CW polarized positron beams for 12 GeV CEBAF

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Positron beams would provide new and meaningful probes for the experimental program at the Thomas Jefferson National Accelerator Facility (JLab), including but not limited to future hadronic physics and dark matter experiments. Critical requirements involve generating positron beams with a high degree of spin polarization, sufficient intensity and a continuous-wave (CW) bunch train compatible with acceleration to 12 GeV at the Continuous Electron Beam Accelerator Facility (CEBAF).

To address these requirements, a polarized positron injector based upon the bremsstrahlung of an intense CW spin polarized electron beam is considered [1]. First a polarized electron beam line provides >1 mA of polarized electrons at ~120 MeV to a high-power target for positron production. Next, a second beam line collects, shapes and aligns the spin of positrons for users. Finally, the positron beam is matched into the CEBAF acceptance for acceleration and transport to the end stations with energies up to 12 GeV. An optimized layout to provide positrons beams with intensity >100 nA (polarized) or intensity >3 μ A (unpolarized) will be discussed in this poster.

Keywords: High duty-cycle positron beams, high positron beam polarization, PEPPo polarization transfer technique.

[1] D. Abbott et al., "*Production of Highly Polarized Positrons Using Polarized Electrons at MeV Energies*", [Phys. Rev. Lett., 116, 214801 \(2016\)](#)

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