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## 1 IPAC'22 ABSTRACT

One of the main important topic in the futur hadronic physics program at Jefferson Lab is the new polarized positron source, since the polarization allows to separate the different contributions of the leptonic cross section. The polarized positron program at JLab aim to use high current (1 mA) and high positron duty cycle in CEBAF to generate high polarized positron yield with respect to the polarized mode described by the positron figure of merit.

The polarized positron scheme will present an optimized tungsten target where through the electromagnetic shower, the bremsstrahlung process is responsible for the creation of circular polarized photons inside the target, and then through the pair creation process, the photons and their polarization are converted into longitudinally polarized  $e^-$  and  $e^+$ . This was demonstrated in PEPP0 experiment where (85%) of positron polarization was achieved. A capture system situated after the target will collect the positrons using solenoids. A comparison between a quarter wave transformer and the adiabatic matching device was explored to optimize the positron collection. A beam compressor and cavities are investigated to reduce the longitudinal positron dispersion in order to accelerate them and preserve small emittance along CEBAF accelerator. Other challenges are deeply studied for the positron source design: the spin tracking, positron spin rotator, and other focusing magnets and transverse dispersion supressor will be designed and exposed in the conceptual technical report at JLab, which will presents by the end of 2022 a complete optimized positron source scheme for polarized and unpolarized mode.

**Keywords:** Positron production, Duty-cycle, high current, polarization transfer, tungsten target, particle capture system.