

An overview of the Polarized Electrons for Polarized Positrons (PEPPo) experiment

Recently, the nuclear and high-energy physics communities have shown a growing interest in the availability of high current, highly-polarized positron beams. The Polarized Electrons for Polarized Positrons (PEPPo) experiment planned at the Jefferson Lab (JLab) aims to measure the transfer of polarization from a low energy (< 10 MeV) highly spin polarized electron beam to positrons.

A sufficiently energetic polarized photon or lepton incident on a target may generate, via bremsstrahlung and pair creation processes within a solid target foil, electron-positron pairs that should carry some fraction of the initial polarization. This approach has been successfully tested using polarized photons created with a multi-GeV un-polarized electron beam, resulting in positrons with polarization $\sim 80\%$. Although the pair creation yield is reduced at low energy, recent advances in high current (> 1 mA) spin polarized electron sources at Jefferson Lab offer the perspective of creating polarized positrons from a low energy electron beam. A successful demonstration of this technique would provide an alternative scheme to produce low energy polarized positrons and information useful to optimize the design of polarized positron sources using sub-GeV electron beams.

An overview and status of the PEPPo experiment will be presented, along with some of the motivations in the context of the JLab physics program.

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Classification de thématique: Accelerators