Polarized Electrons for Polarized Positrons  
ERICA FANCHINI, Laboratoire de Physique Subatomique et de Cosmologie CNRS/IN2P3, Universite Joseph Fourier, INP, PEPPo COLLABORATION — Recently, the nuclear and high-energy physics communities have shown a growing interest in the availability of high current, highly spin-polarized positron beams. The Polarized Electrons for Polarized Positrons (PEPPo) experiment at the Thomas Jefferson National Accelerator Facility (Jefferson Lab) 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 may generate, via bremsstrahlung and pair creation processes within a target foil, electron-positron pairs that will carry a fraction of the initial polarization. This approach has been successfully tested using polarized photons created with a multi-GeV unpolarized electron beam, resulting in positrons with polarization of 80%. Although pair creation yield is reduced at lower energy, recent advances in high current milliampere spin-polarized electron sources at Jefferson Lab offer the perspective of creating polarized positrons using a low energy electron beam. A successful demonstration of this technique would provide an alternative scheme to produce low energy polarized positrons, as well as useful information to optimize the design of a polarized positron source using sub-GeV electron beam. An overview and status of the PEPPo experiment will be presented, along with some of the motivations in the context of the Jefferson Lab nuclear physics program.

Joseph Grames  
Thomas Jefferson National Accelerator Facility

Date submitted: 06 Jan 2012