Calibration of the Tagger Spectrometers with GlueX Commissioning Data[1]

The GlueX experiment at Jefferson Lab uses a linearly polarized photon beam to search for mesons with gluonic excitations and measure their spectrum and couplings. This polarized photon beam is created using a 12 GeV electron beam incident on a 20μm thick diamond radiator, where it undergoes coherent bremsstrahlung to produce an intensity enhancement in the region of 9 GeV with a linear polarization around 40%. The energy of the photon is inferred by analyzing the post-bremsstrahlung electron energy in the tagging spectrometers at rates up to 3 x 10^8 γ/s. A highly segmented tagging detector called the microscope will intercept the electrons to permit tagging of photons in the region of the coherent peak 8.4-9.0 GeV. These electrons are incident on a two-dimensional array of scintillating fibers which are read out using multi-photon pixel counters (MPPC). Post-bremsstrahlung electrons outside of the coherent peak region corresponding to photon energies of 3.0-11.78 GeV are incident on plastic scintillators which are read out by photomultiplier tubes (PMTs) in the hodoscope tagging detector. The calibration results of the tagger microscope and hodoscope using commissioning data will be presented.

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