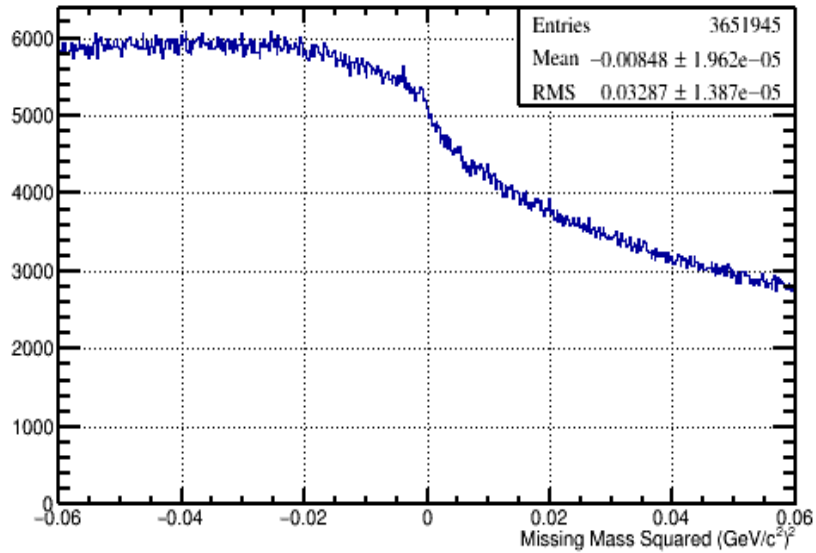


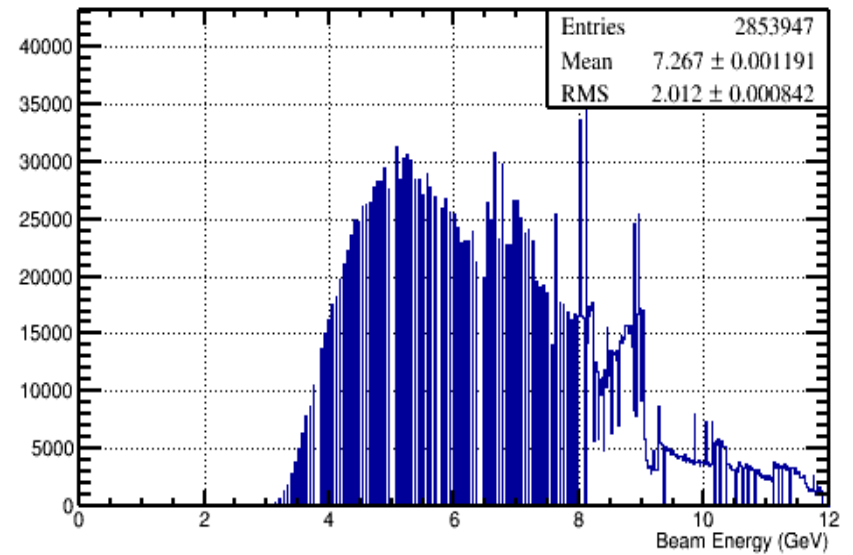
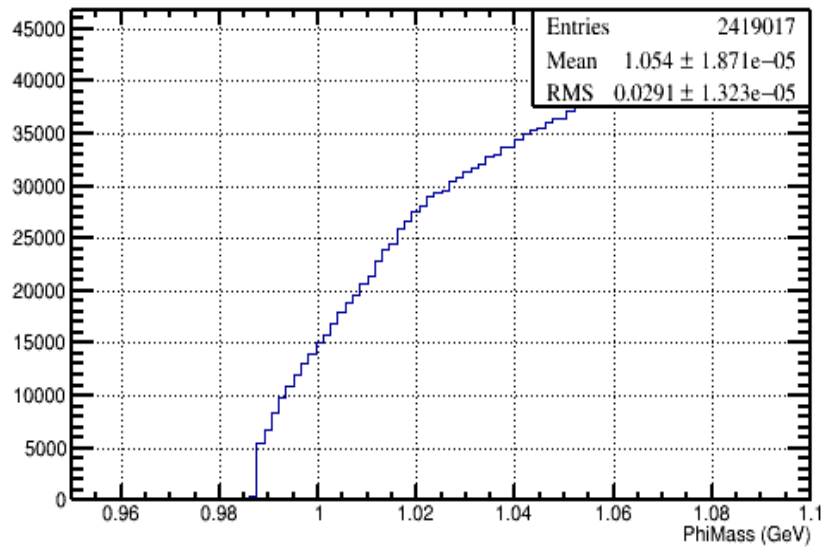
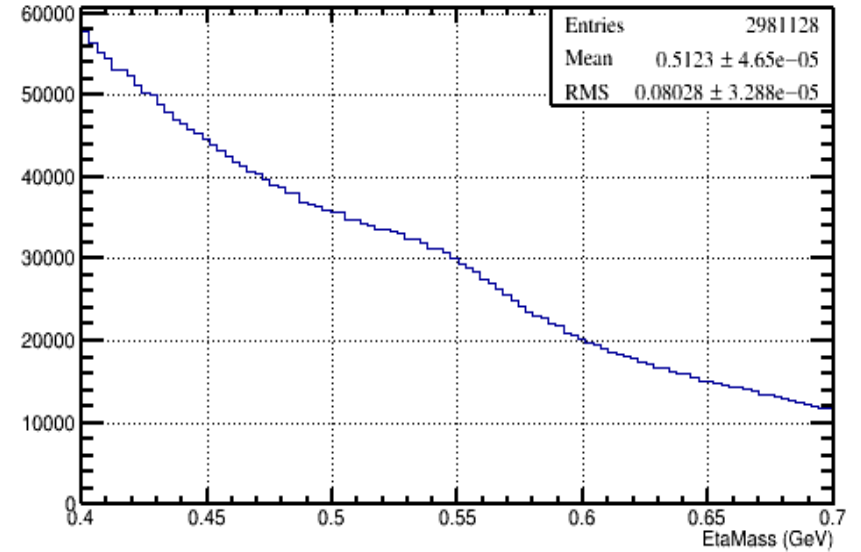
Phi Eta Study

- Purpose: Investigate the Phi Eta at GlueX and to see look at some first results.
- Basic Cuts: PhiMass [0.95-1.1] GeV, EtaMass [0.4-0.7] GeV, MissingMassSquared [-0.08,0.08], Kinematic Fit must converge (0.0), dEdX of Proton and Kaons, 2 ns timing cut for all particles in all timing detectors.

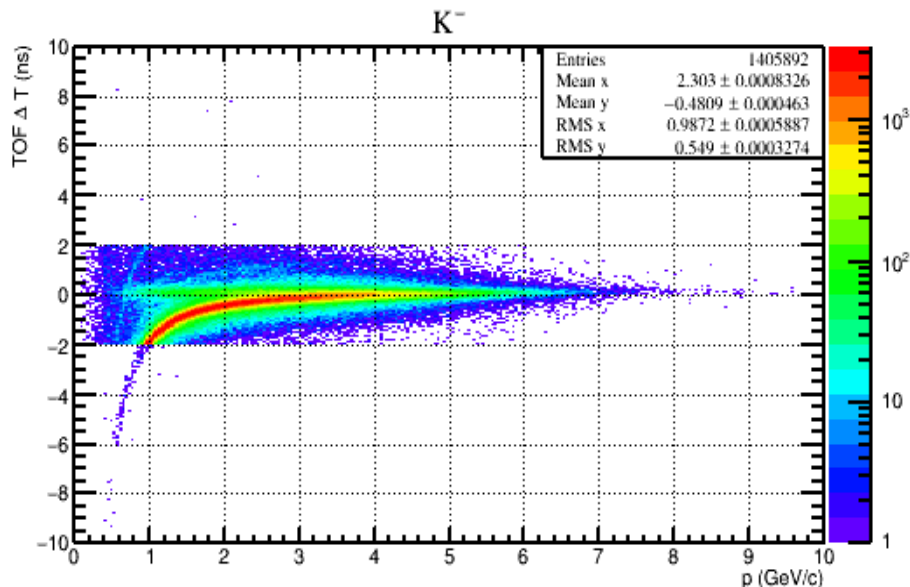
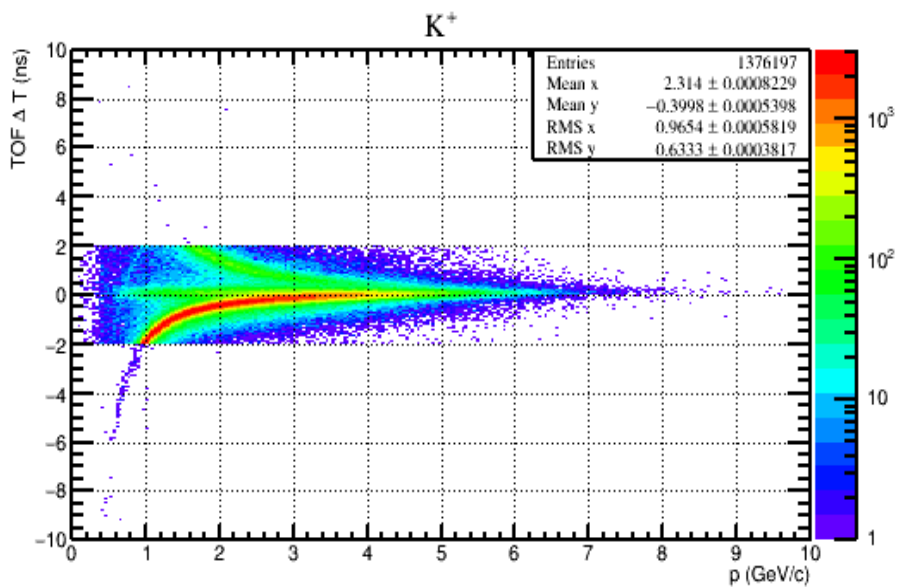
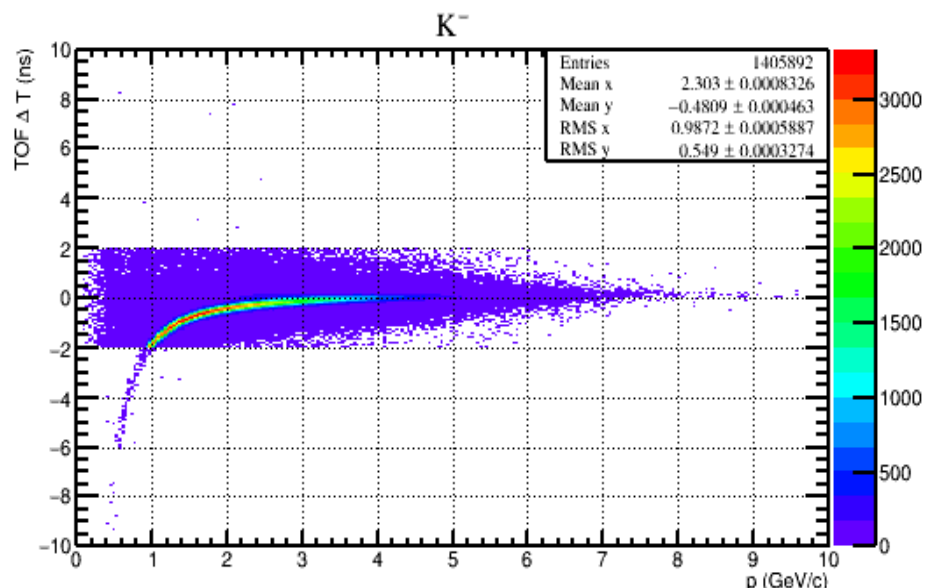
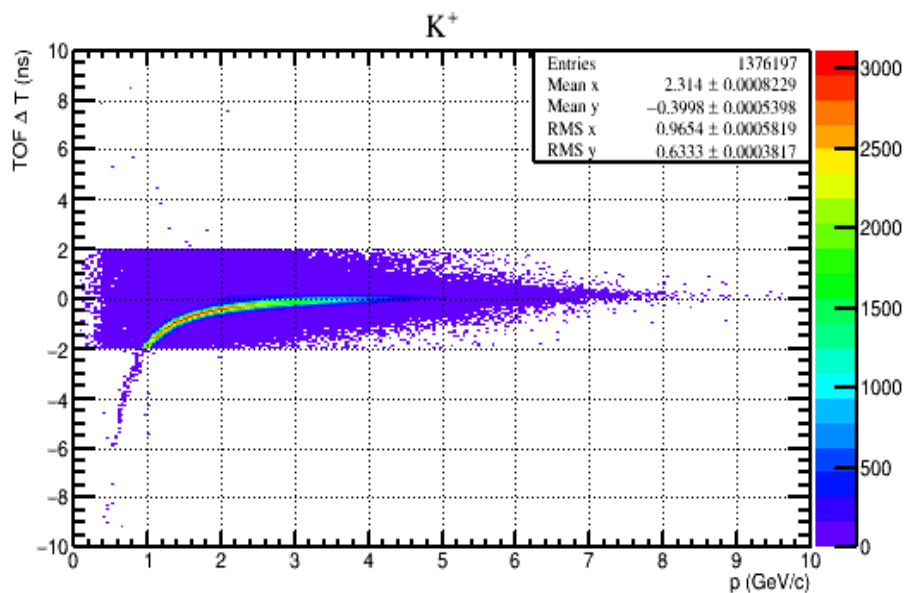
MM² Phi_Mass



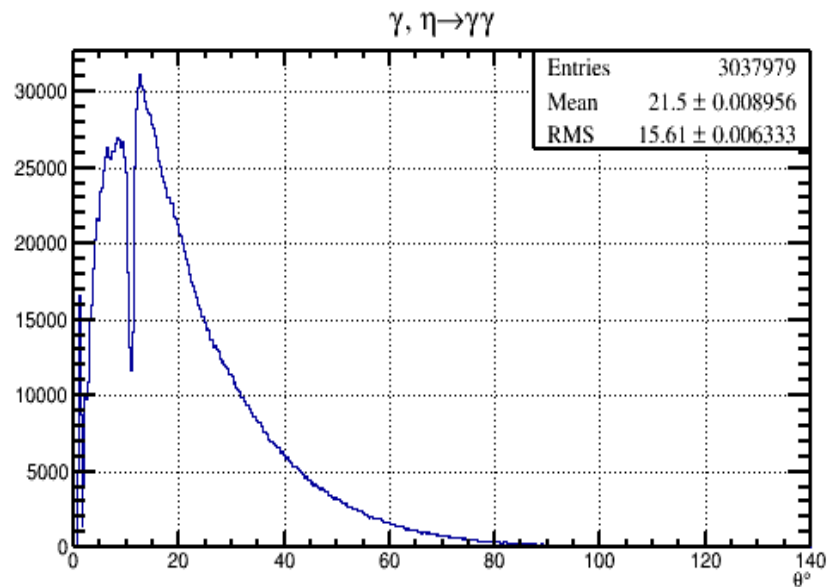
Eta_Mass Beam_E



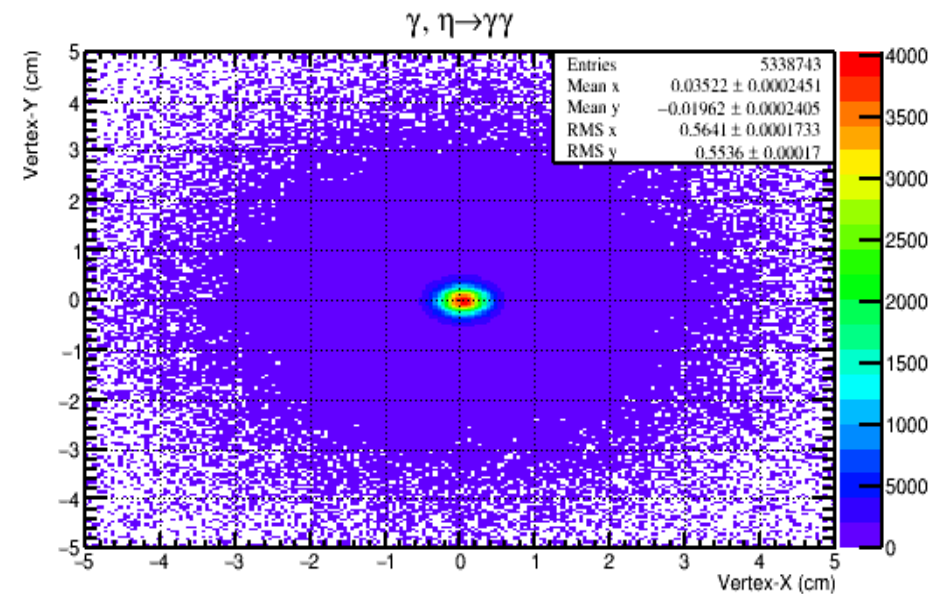
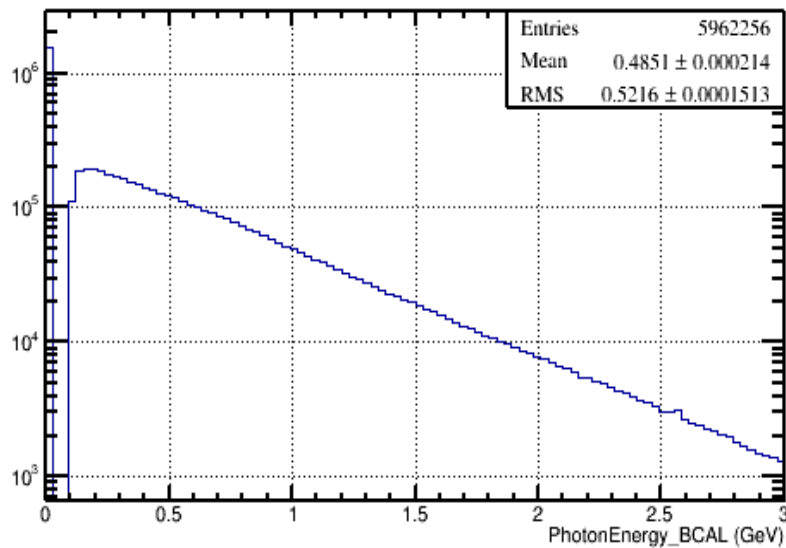
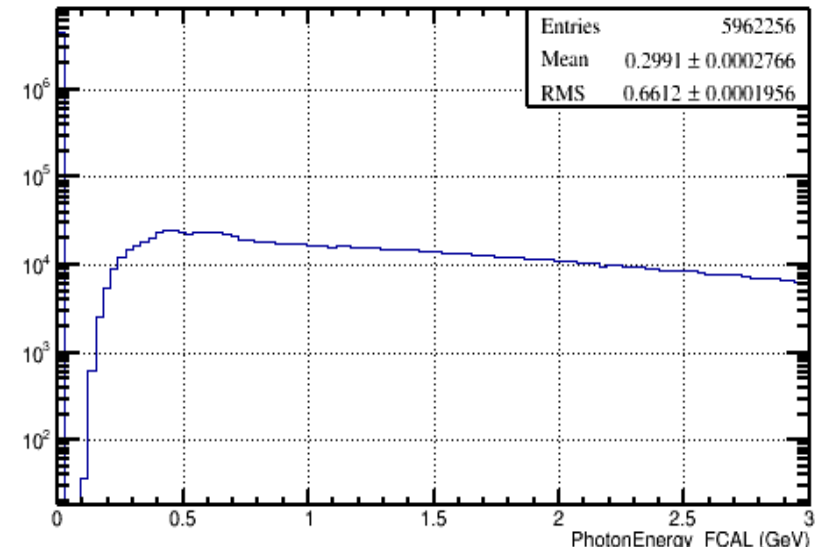
K⁺/K⁻ Candidates Delta T vs P Distributions; linz(top) logz(bot)



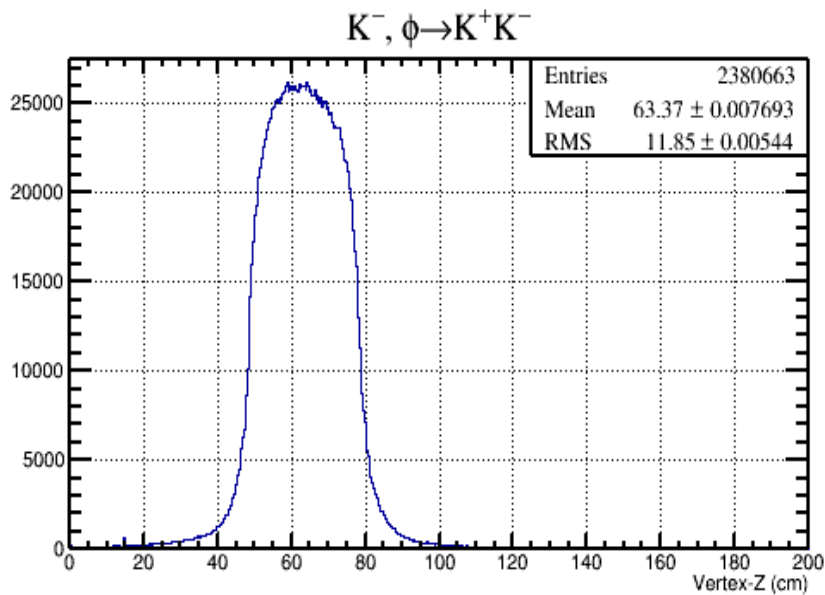
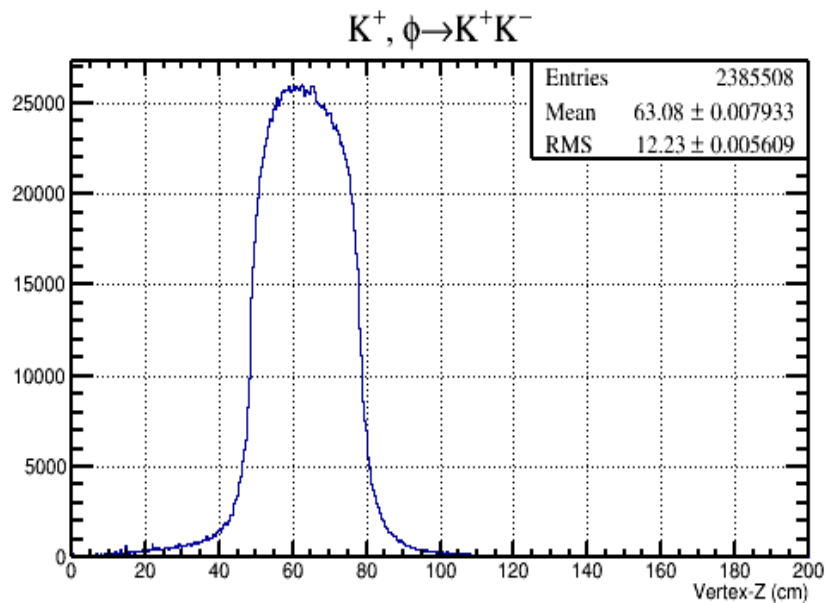
Photon_Theta Photon_BCAL



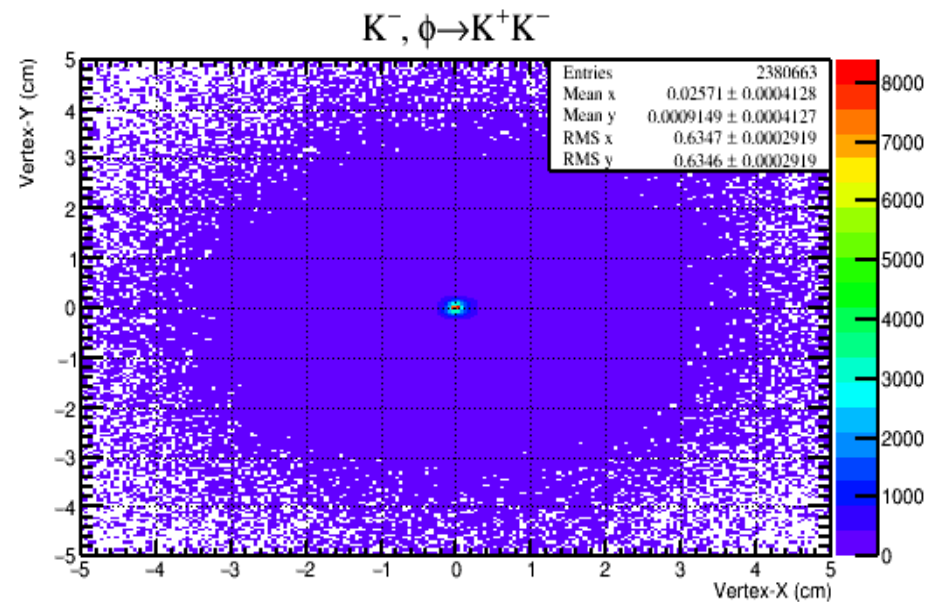
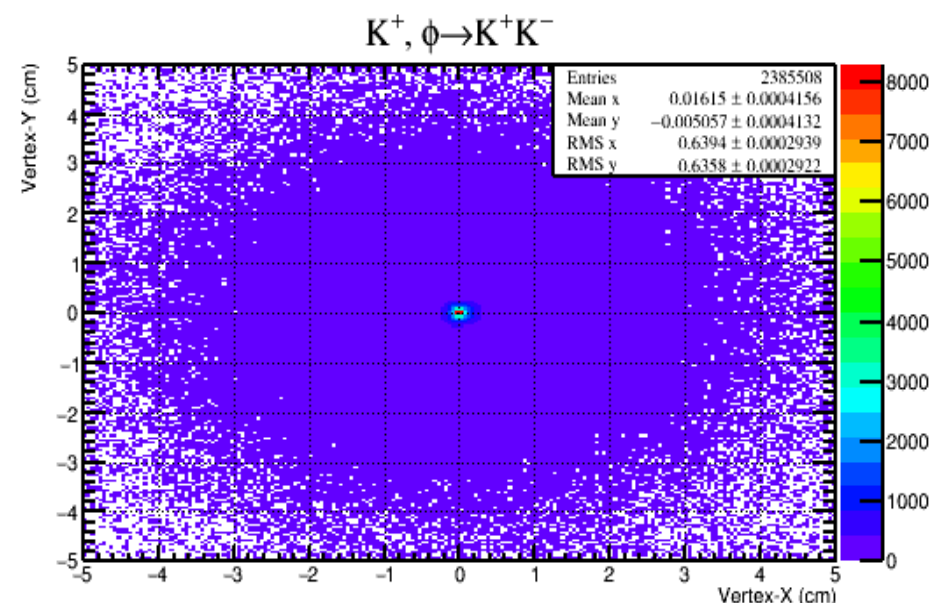
Photon_FCAL Photon_XvsY



KPlus_Z KMinus_Z



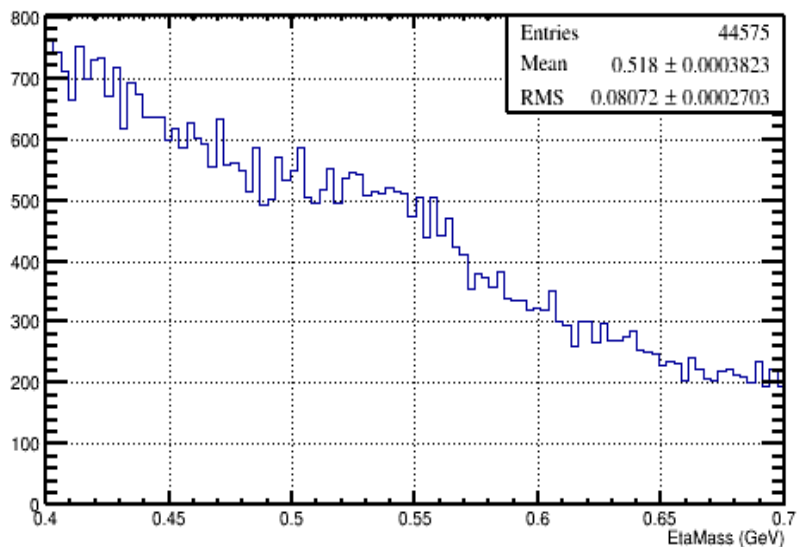
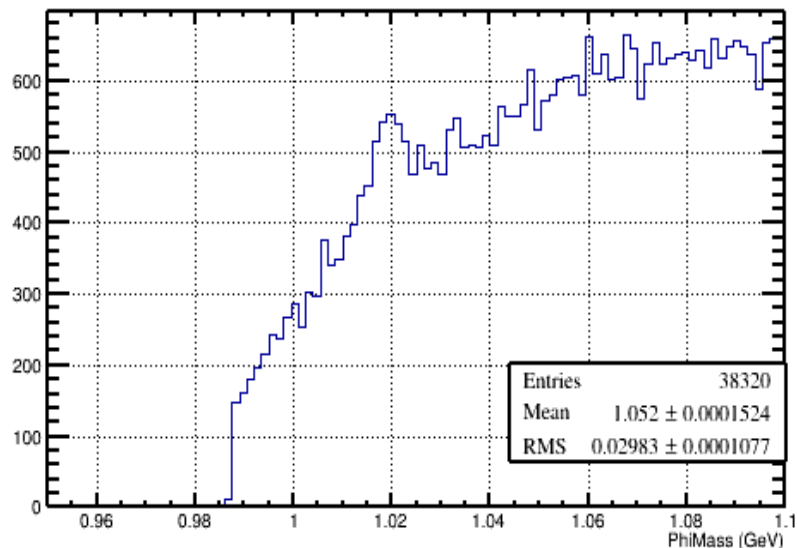
KPlus_XvsY KMinus_XvsY



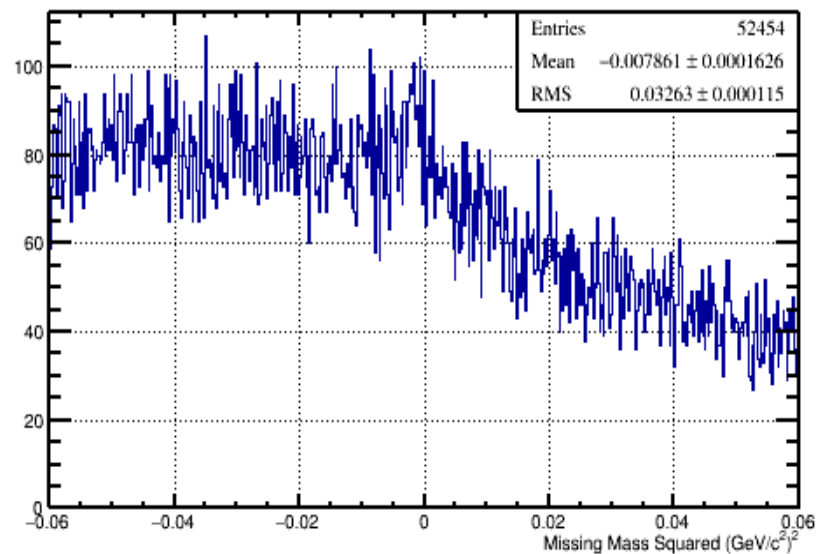
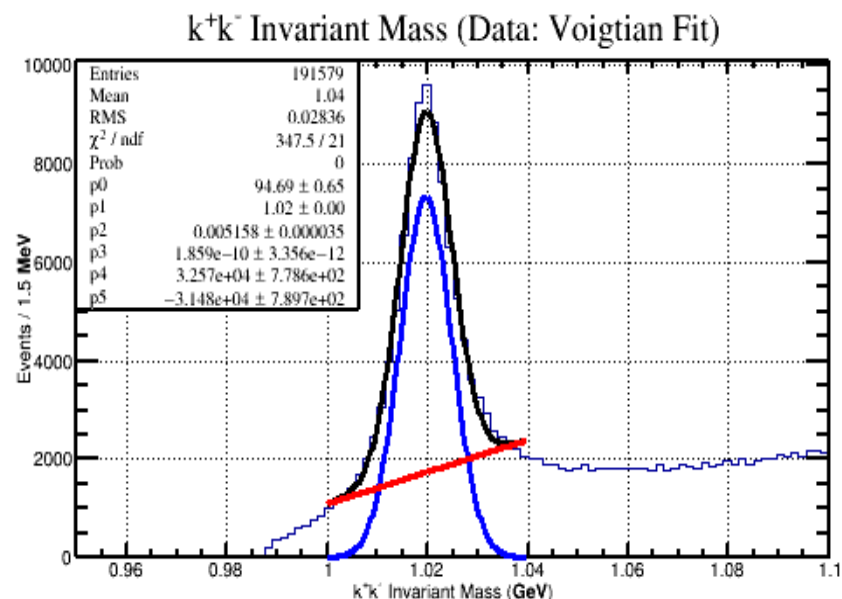
Kaon and Photon CUTs:

- For Both K^+ & K^- :
 - $-0.2 \leq \Delta T_{\text{TOF}} \leq 0.2$ (ns)
 - $P_{\text{Mag}} < 2.5$ GeV
- Minimum Photon energies:
 - 0.3 GeV in BCAL
 - 0.5 GeV in FCAL
- Exclude Photons:
 - $\Theta < 2.5$ deg (beam hole)
 - $10.3 < \Theta < 11.5$ deg (FCAL-BCAL Gap)

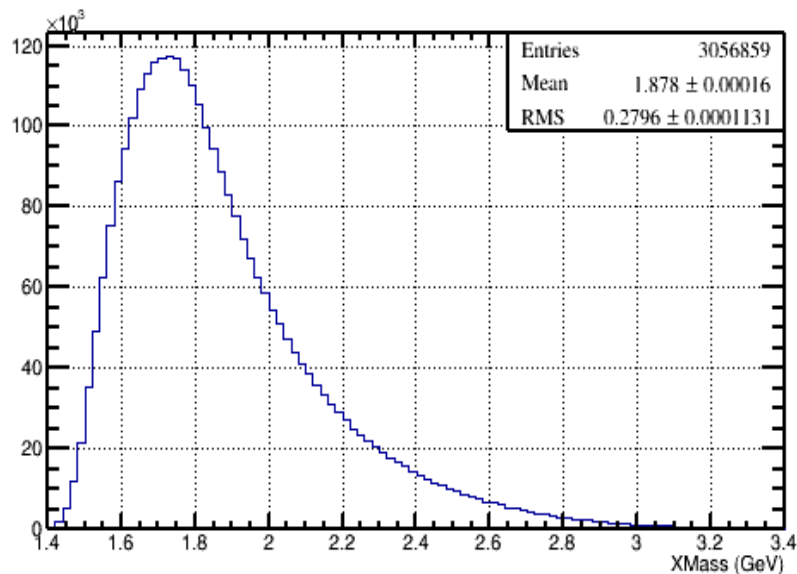
PhiMass_Cut EtaMass



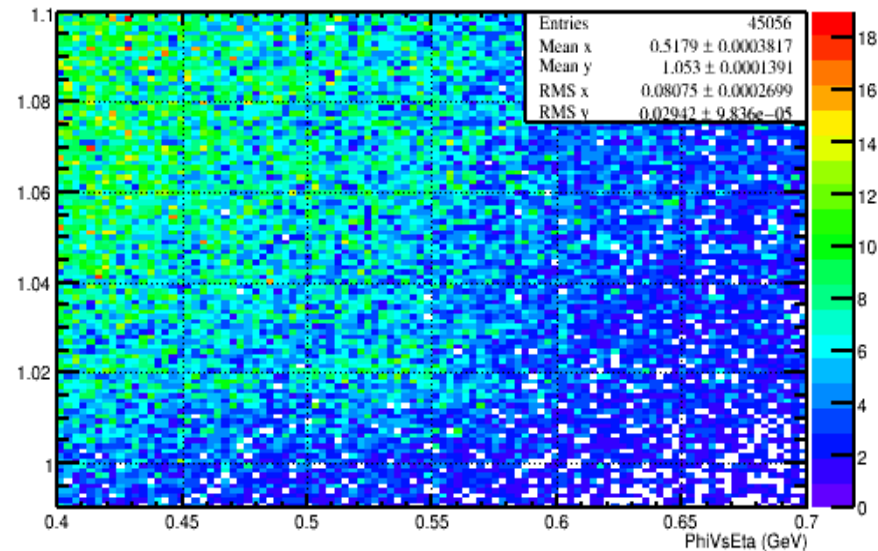
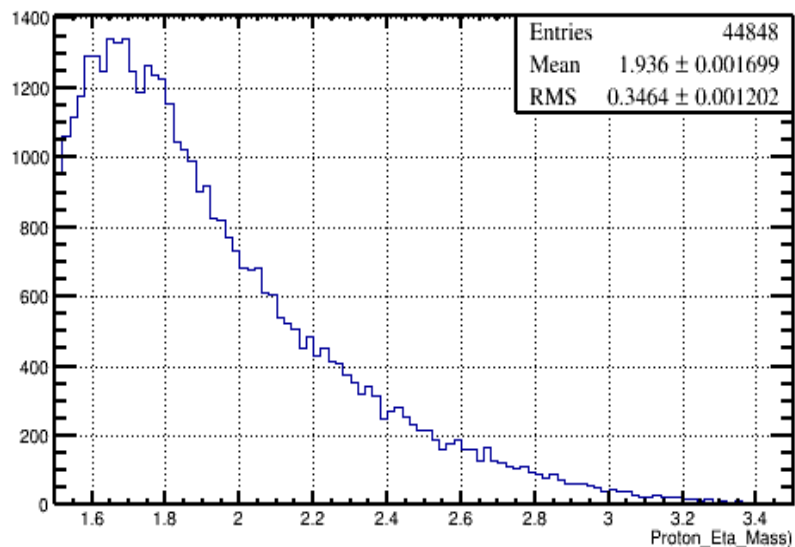
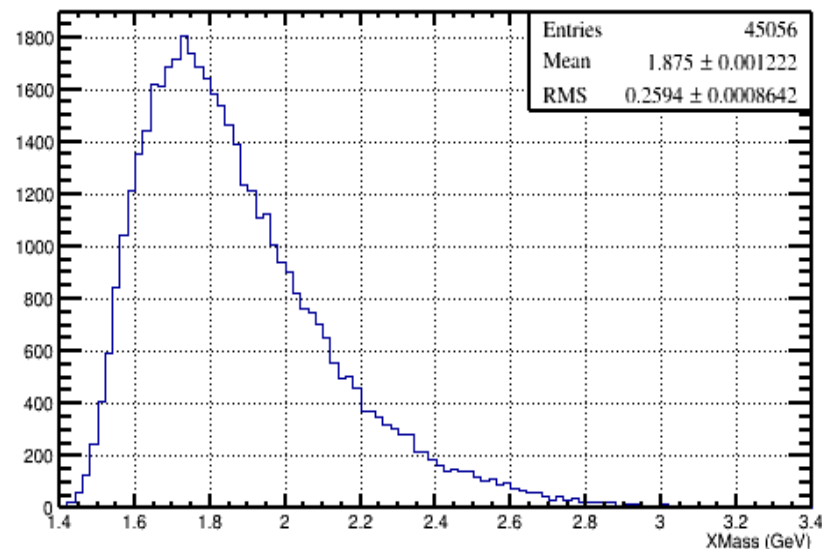
PhiMass_Old MM^2



Xmass_NoCut Proton_Eta

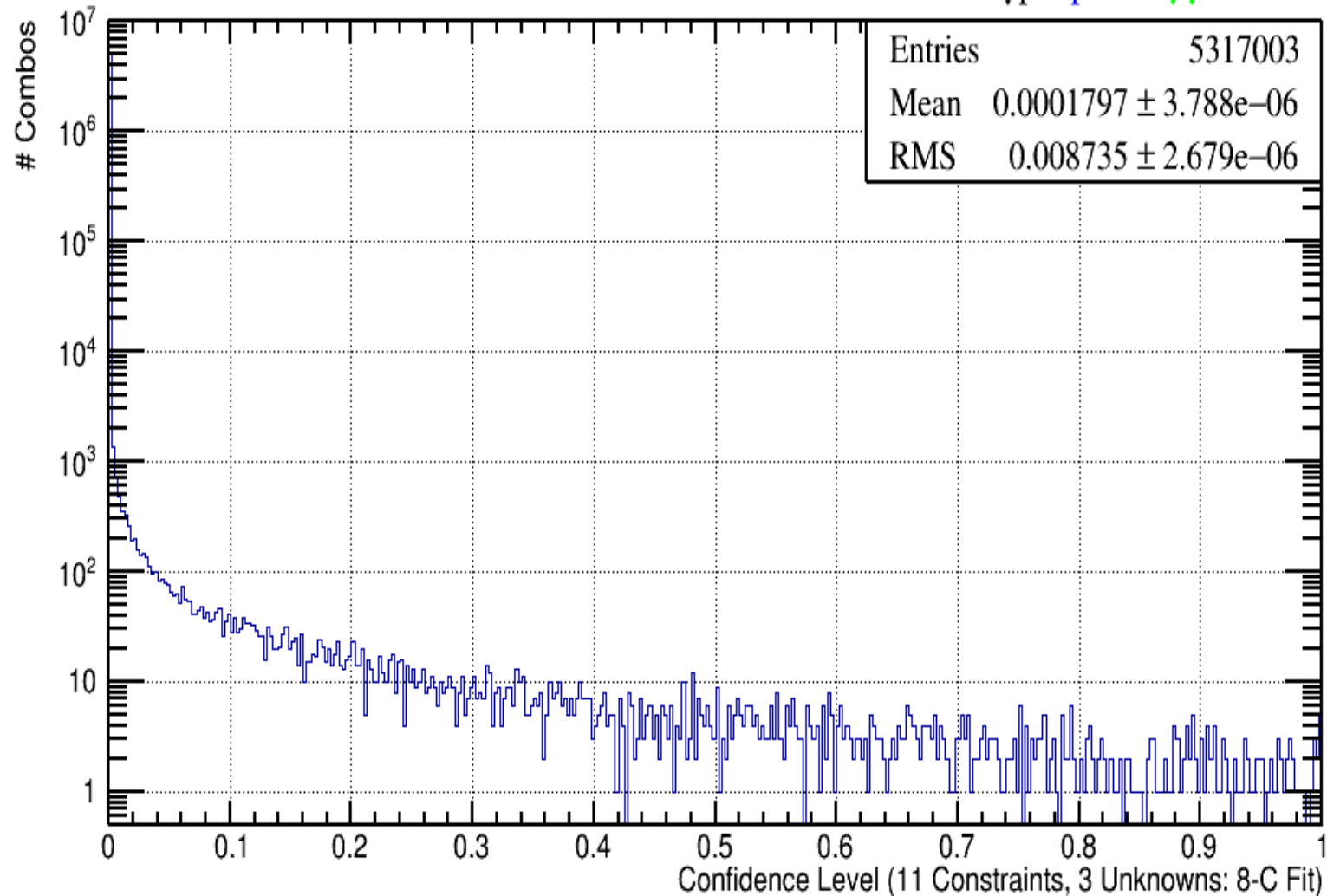


Xmass_Cut PhiVsEta



Kinematic Fit Confidence Level

Kinematic Fit Constraints: p^4 , m_η , $x_{\gamma p \rightarrow pK^+K^-\gamma\gamma}^3$



Conclusions/Observations

- Signal to background for the Phi after cuts did not reduce as much as the exclusive Phi study; WHY?
- The photon ID cuts helped the Eta a little bit, but there is still a large amount of lower mass (photon) background that needs to be dealt with
- One future plan that I have is to do a tight Kinematic Fit Confidence Level cut (~ 0.02). I will lose $\sim 99\%$ of my statistics, but what is left over should be a much cleaner sample.
- Thoughts/Suggestions?