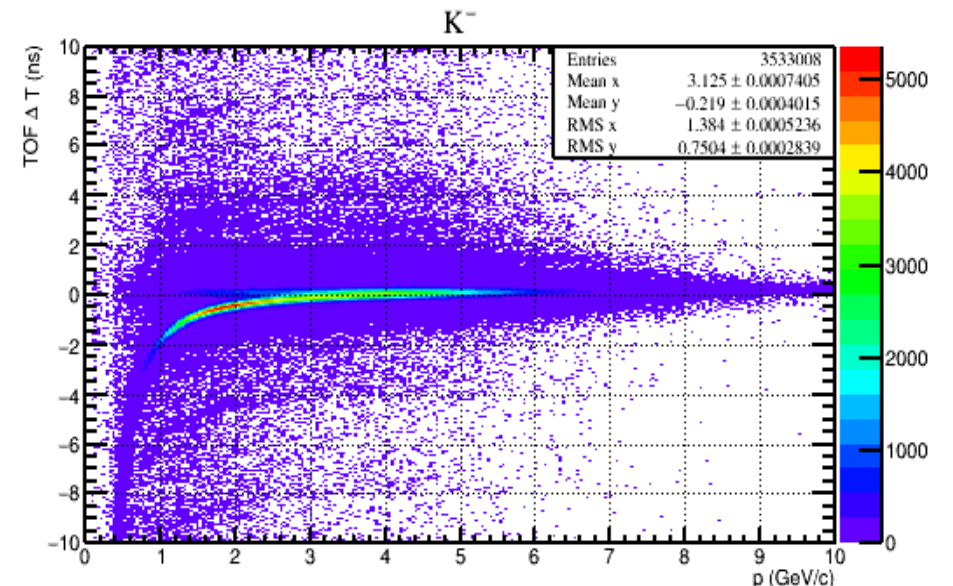
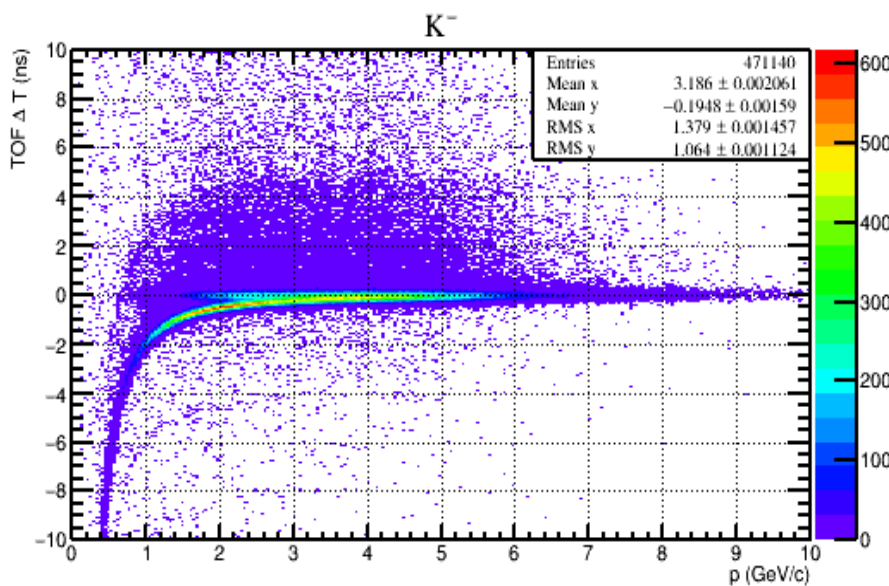
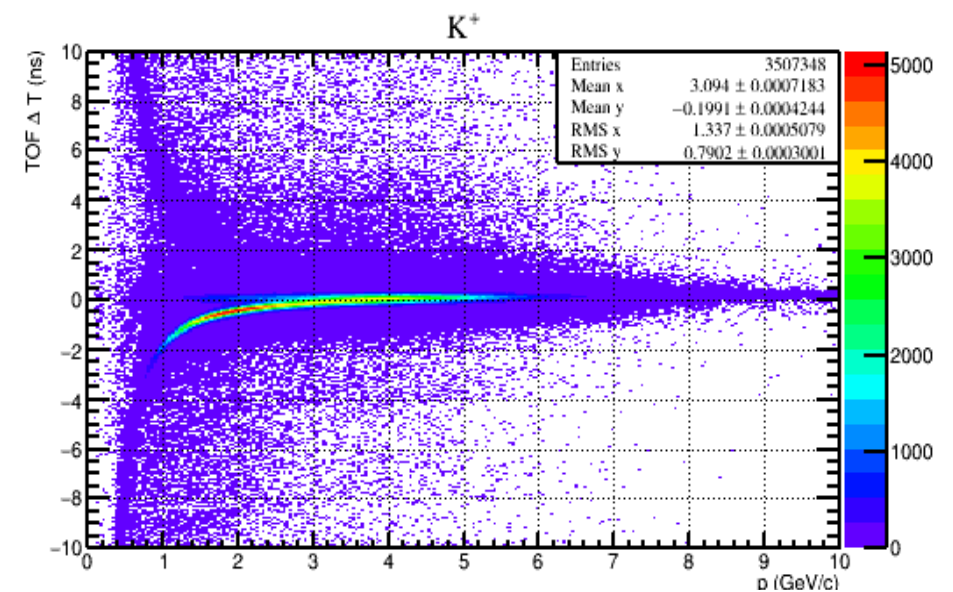
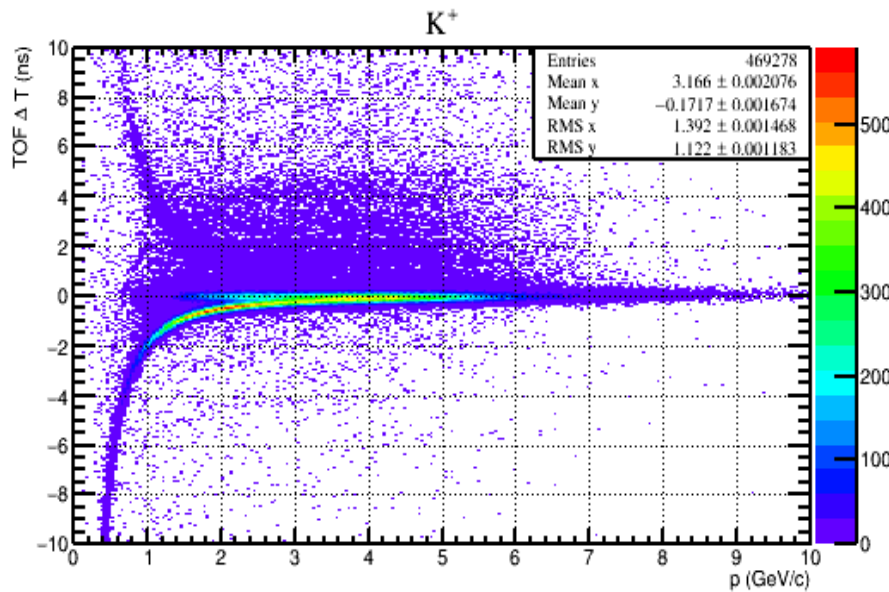


Phi Meson Acceptance Study

- Purpose: Investigate the acceptance of the Phi meson and to analyze:
 - Kaon distributions in Lab Frame
 - BG distributions in Lab Frame
- Basic Cuts: PhiMass [0.95-1.1] GeV, MissingMassSquared [-0.08,0.08], Kinematic Fit must converge, dEdX and timing of Proton

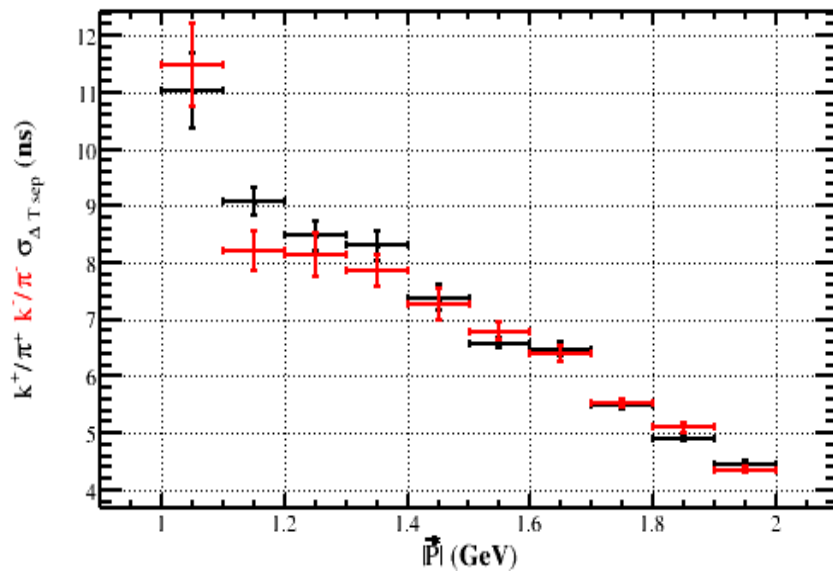
K⁺/K⁻ Candidates Delta T vs P Distributions; MC(left) Data(right)



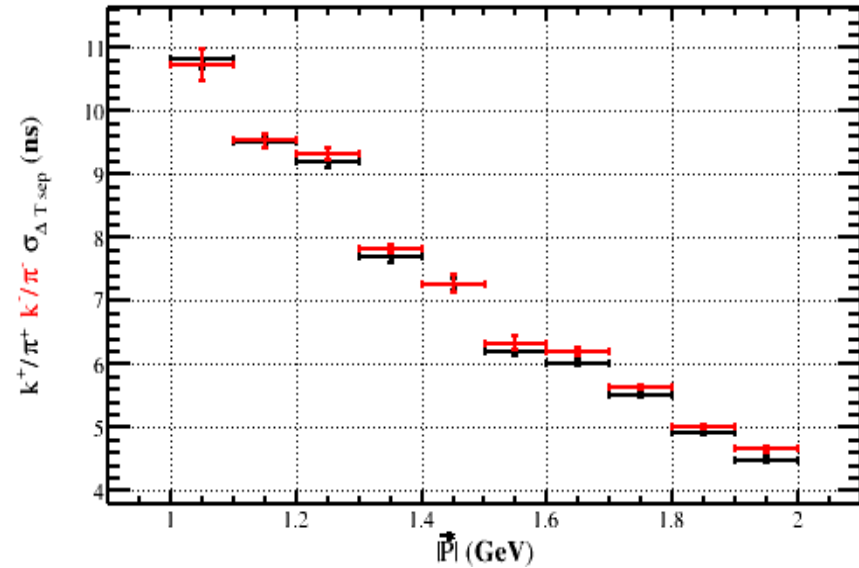
K/Pi Sigma Separation in TOF & PhiMass

MC(left) Data(right)

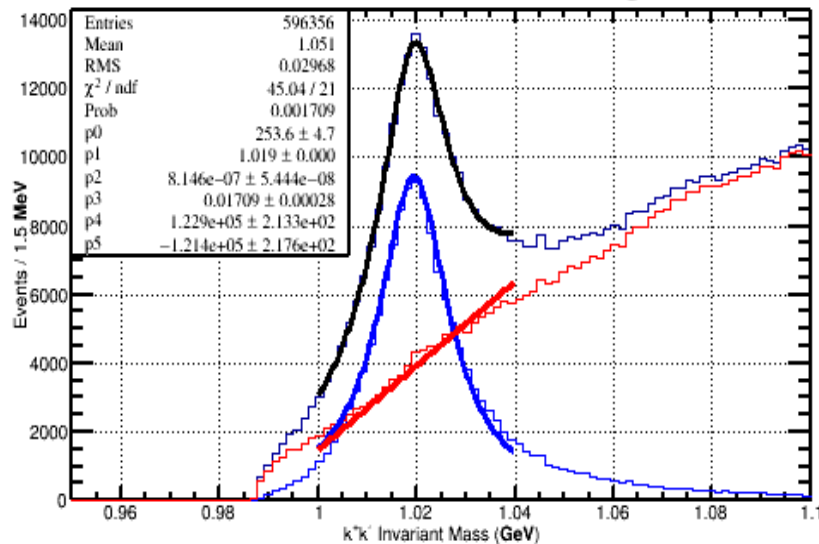
$k^+/\pi^+ \quad k^-/\pi^- \quad \sigma_{\Delta T \text{ sep}}$ vs $|\vec{p}|$ (Monte Carlo)



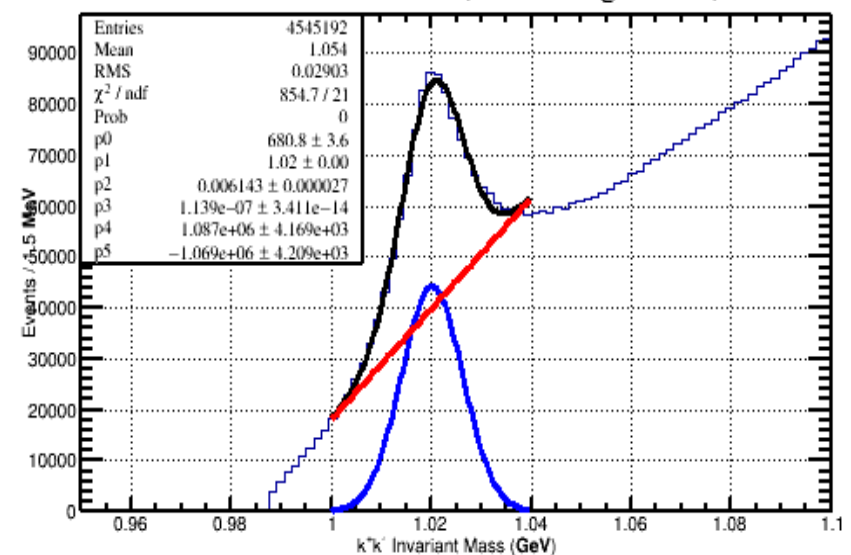
$k^+/\pi^+ \quad k^-/\pi^- \quad \sigma_{\Delta T \text{ sep}}$ vs $|\vec{p}|$ (Data)



k^+k^- Invariant Mass (Monte Carlo: Voigtian Fit)



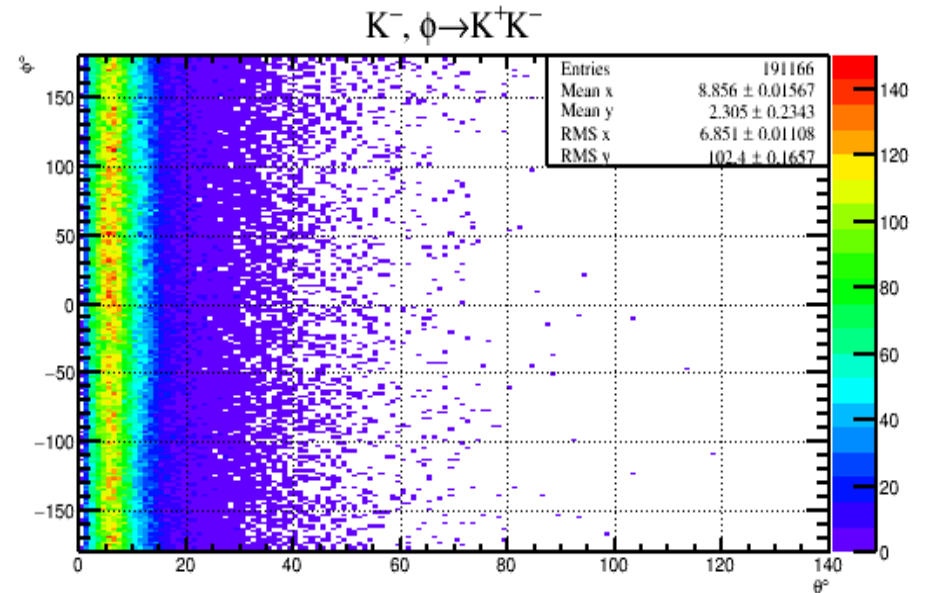
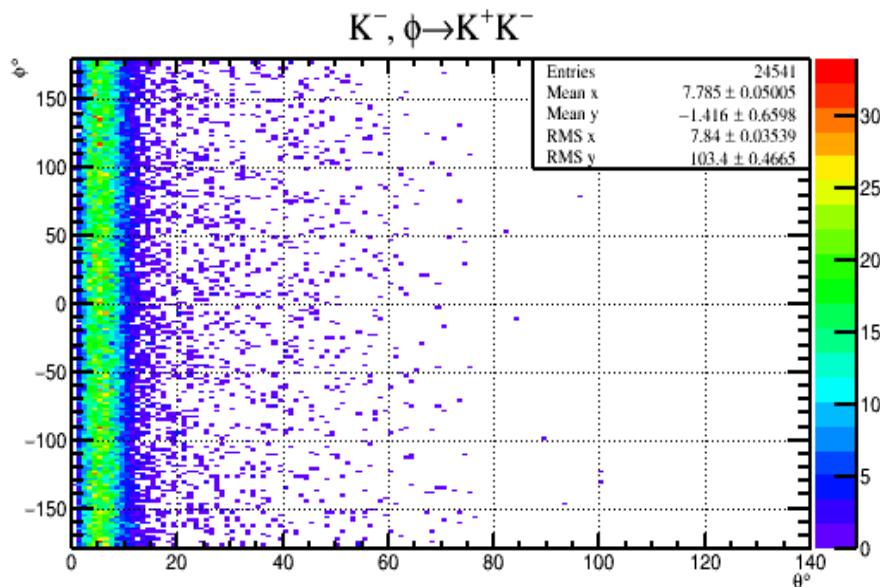
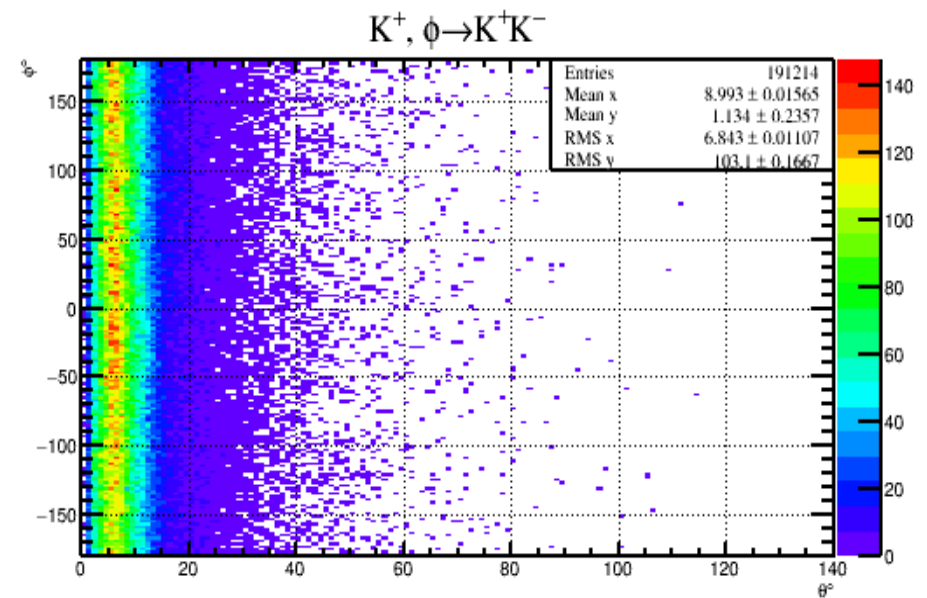
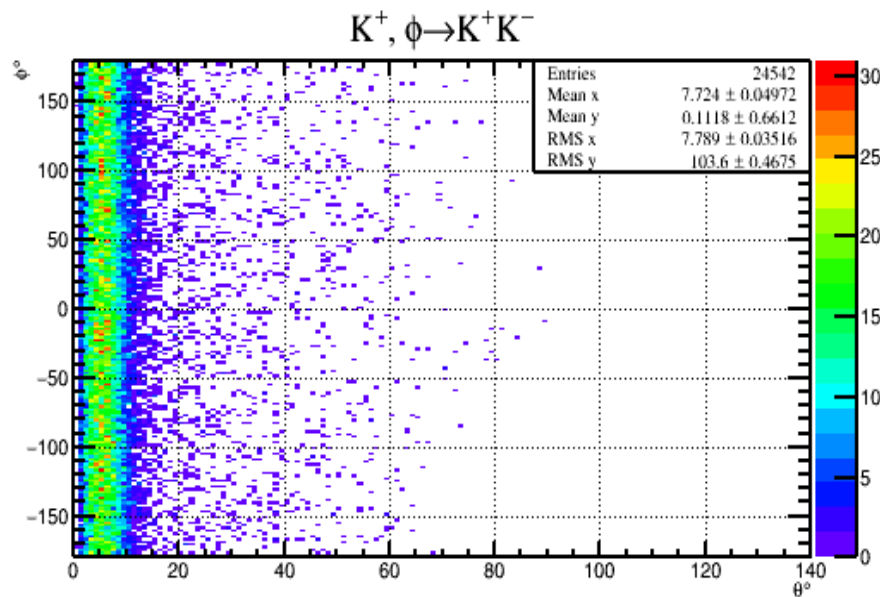
k^+k^- Invariant Mass (Data: Voigtian Fit)



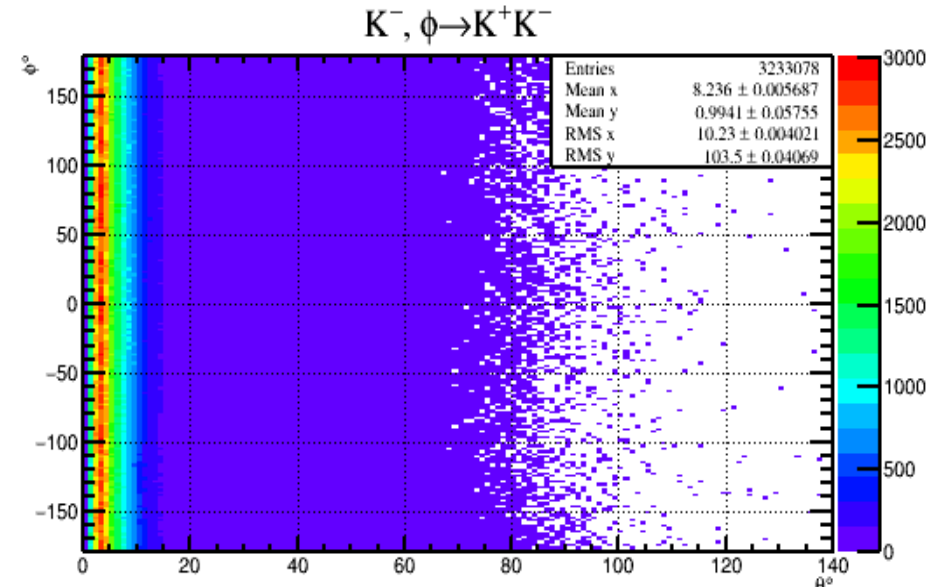
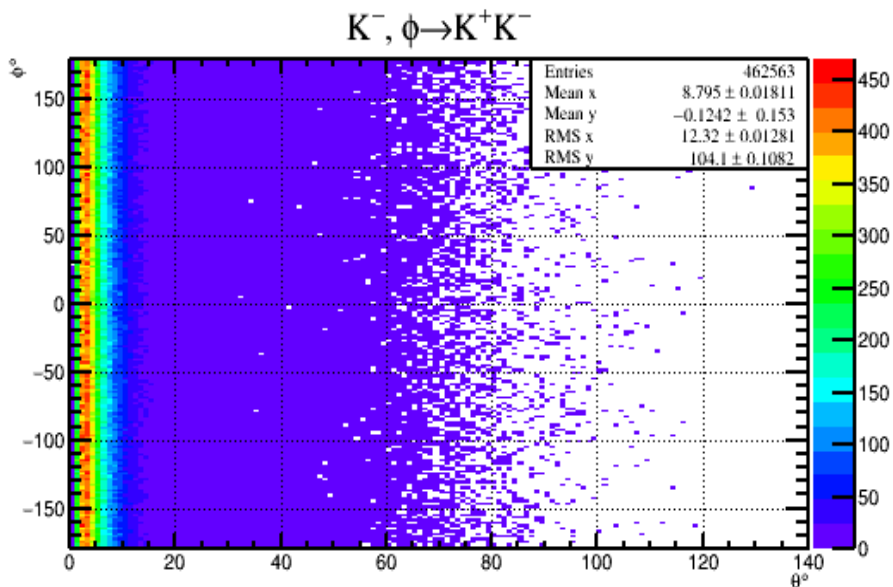
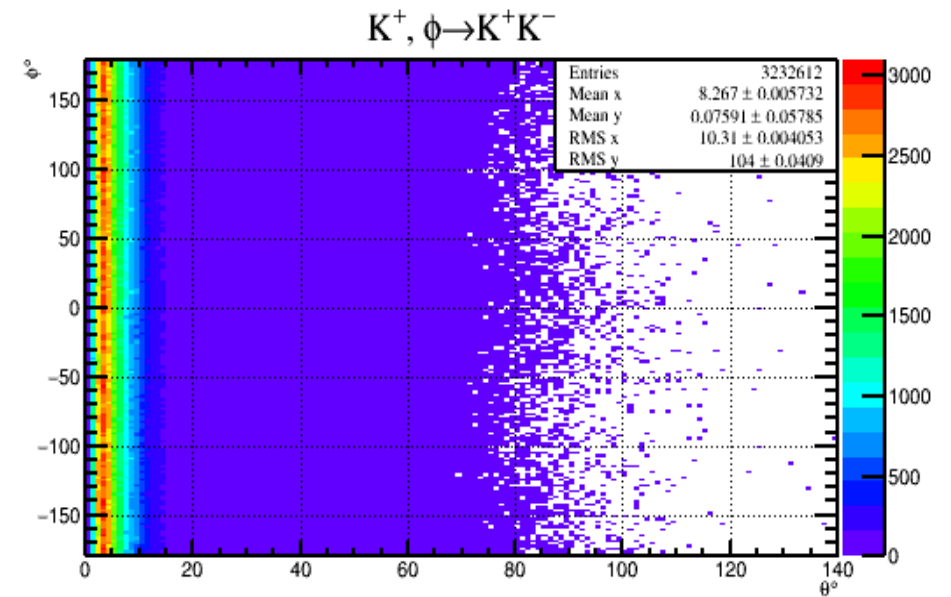
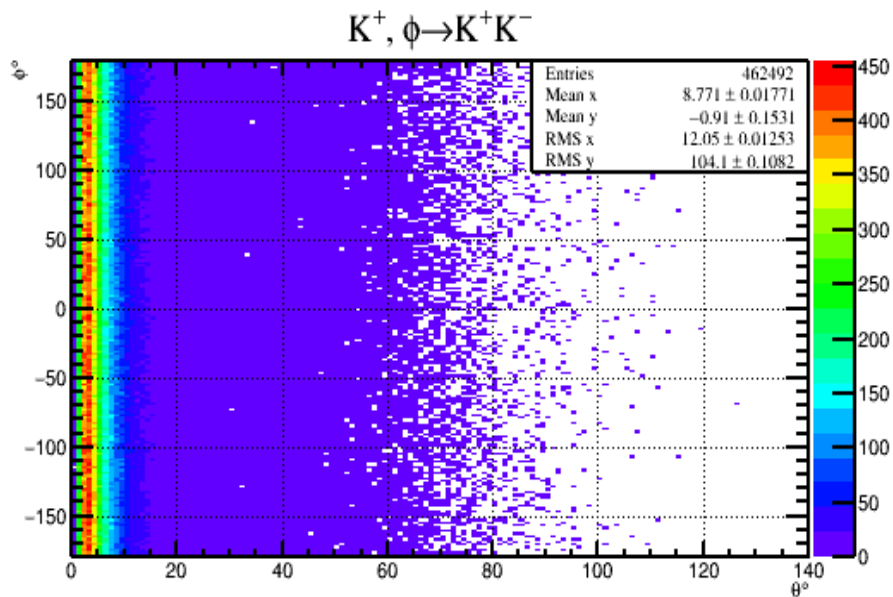
Kaon PID CUT:

- For Both K^+ & K^- :
 - $-0.2 \leq \Delta T_{TOF} \leq 0.2$ (ns)
 - $P_{Mag} < 3.0$ GeV
- This study will be divided into two sets:
 - “Good Cut”: (using PID Kaons)
 - “Bad Cut”: (not using PID Kaons)

“Good” Phi vs Theta Distributions; MC(left) Data(right)

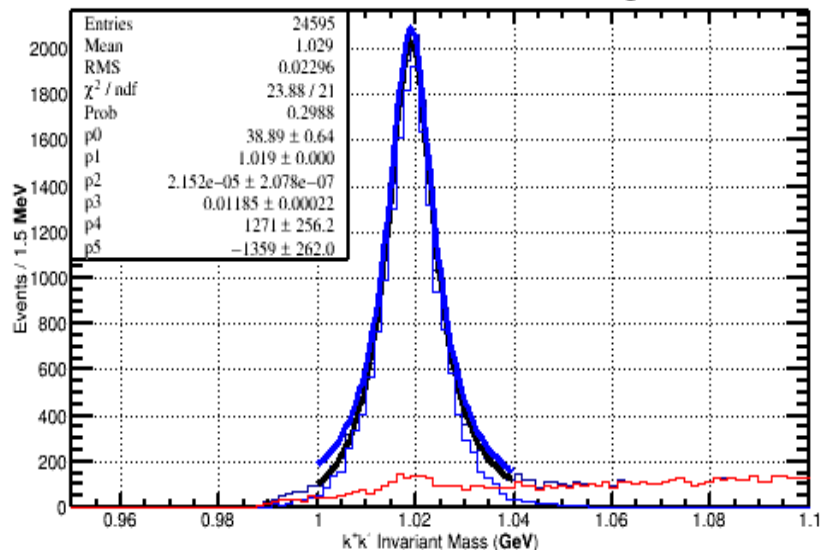


“Bad” Phi vs Theta Distributions; MC(left) Data(right)

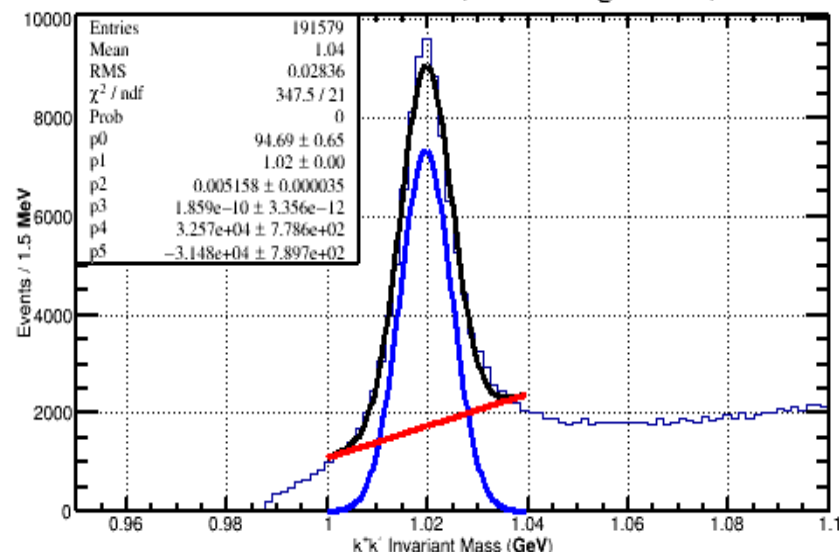


PhiMass: Good_MC Good_Data Bad_MC Bad_Data

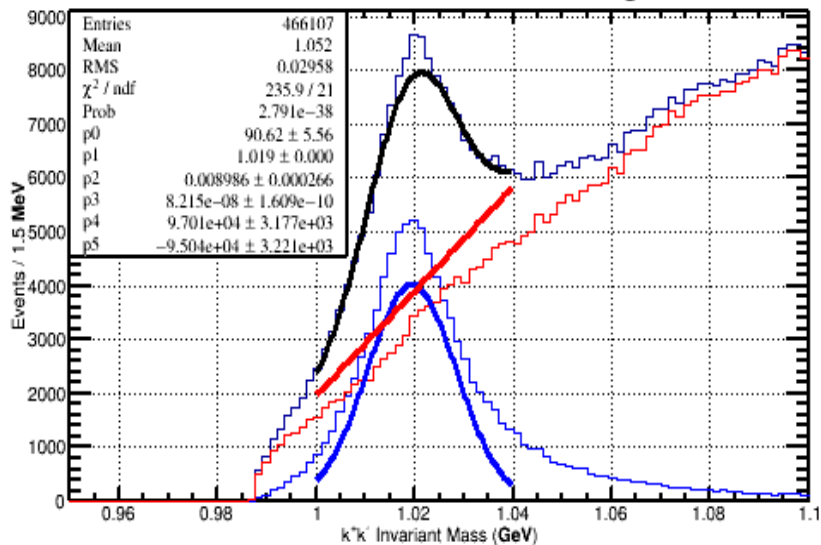
k⁺k⁻ Invariant Mass (Monte Carlo: Voigtian Fit)



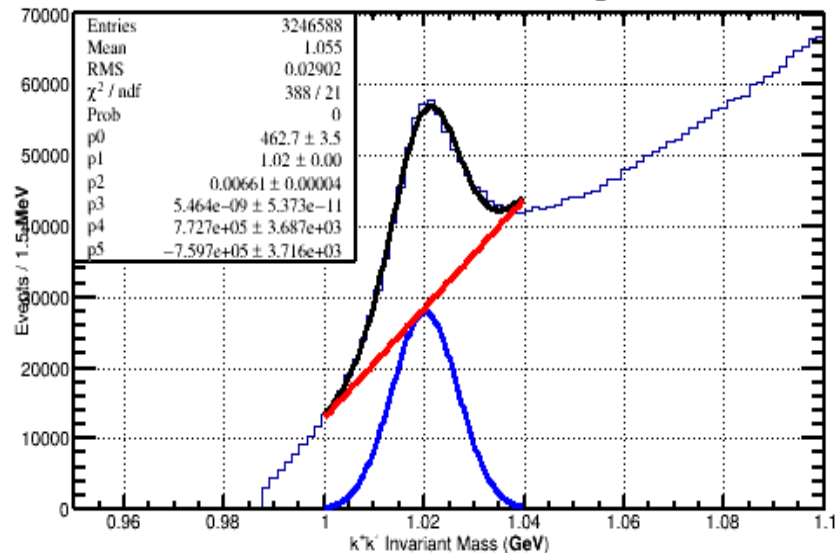
k⁺k⁻ Invariant Mass (Data: Voigtian Fit)



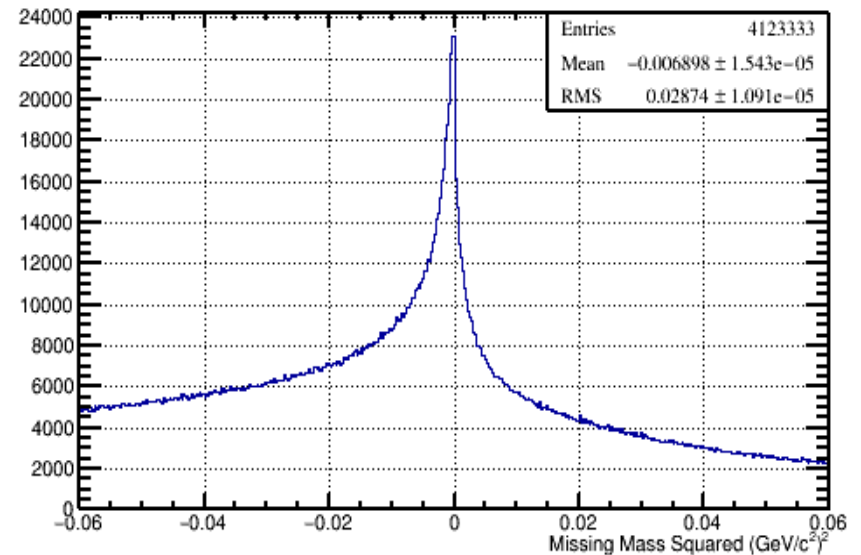
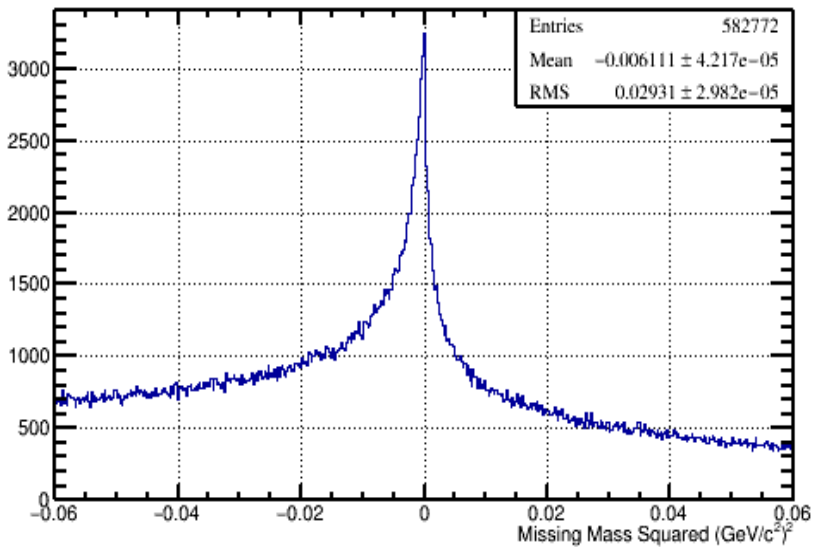
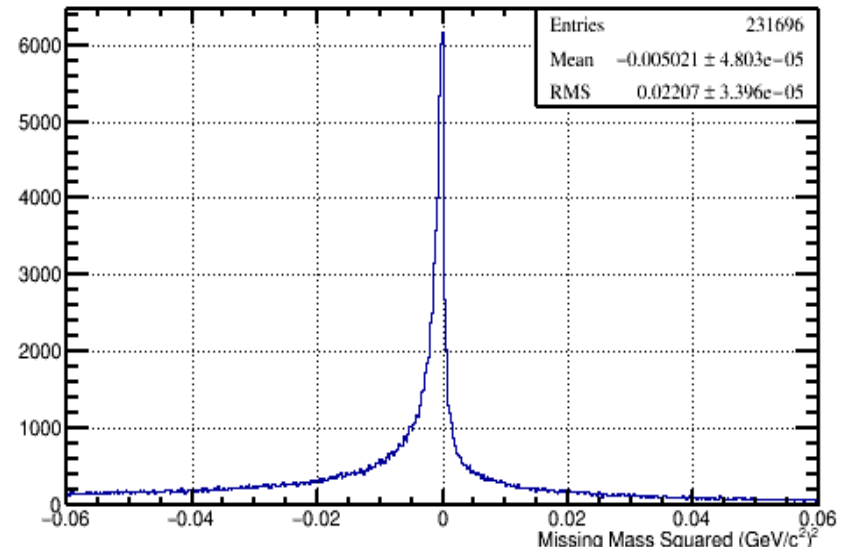
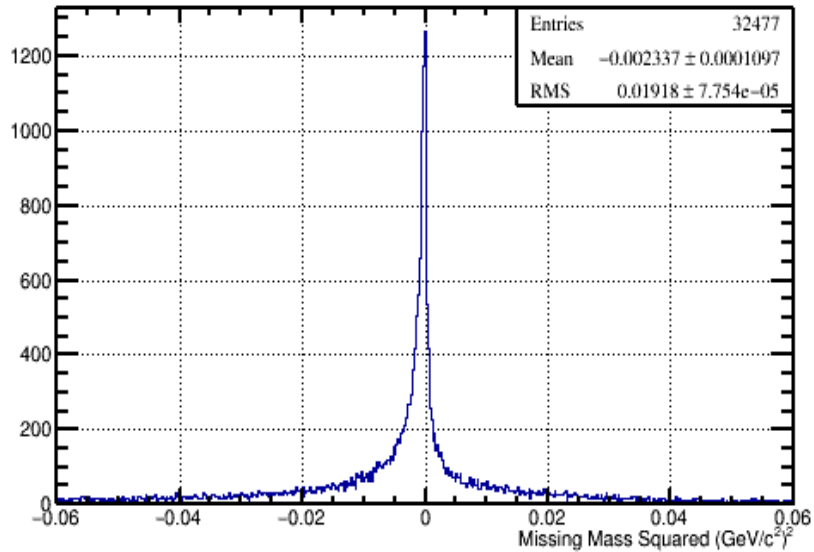
k⁺k⁻ Invariant Mass (Monte Carlo: Voigtian Fit)



k⁺k⁻ Invariant Mass (Data: Voigtian Fit)

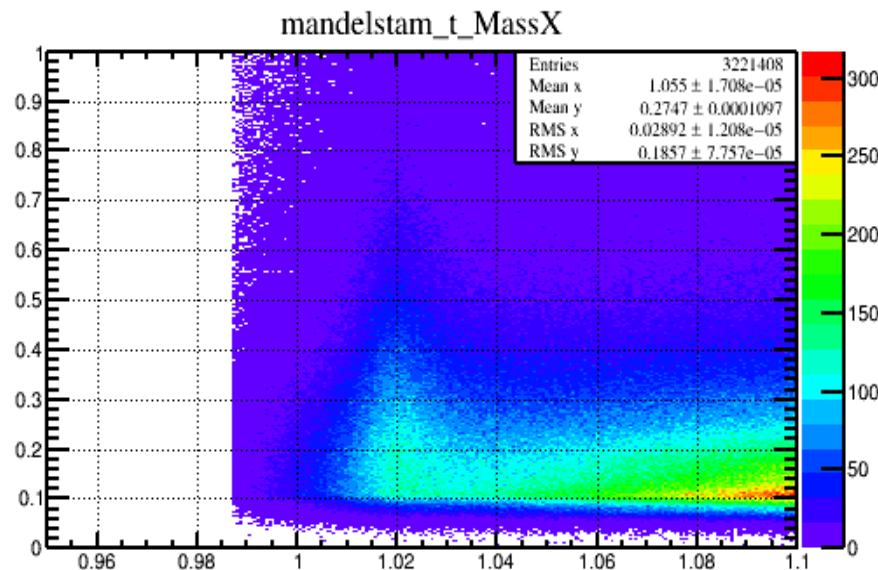
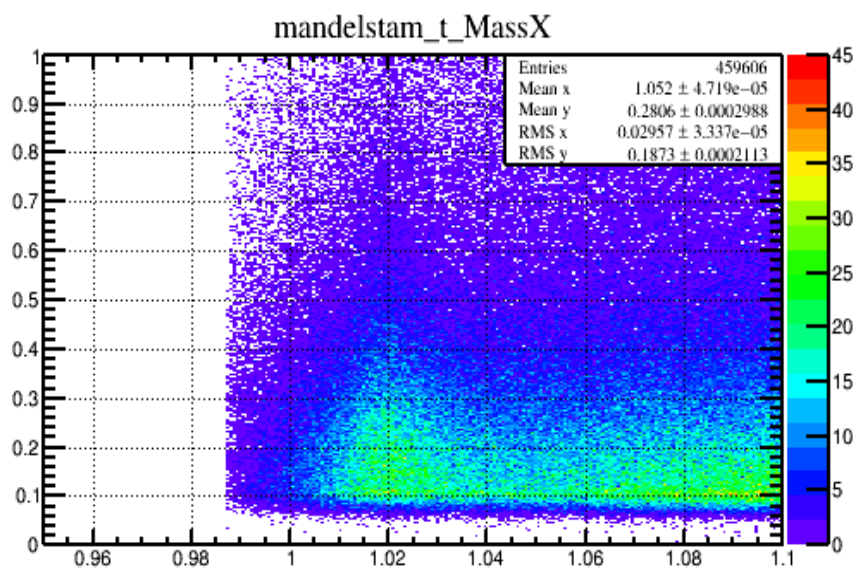
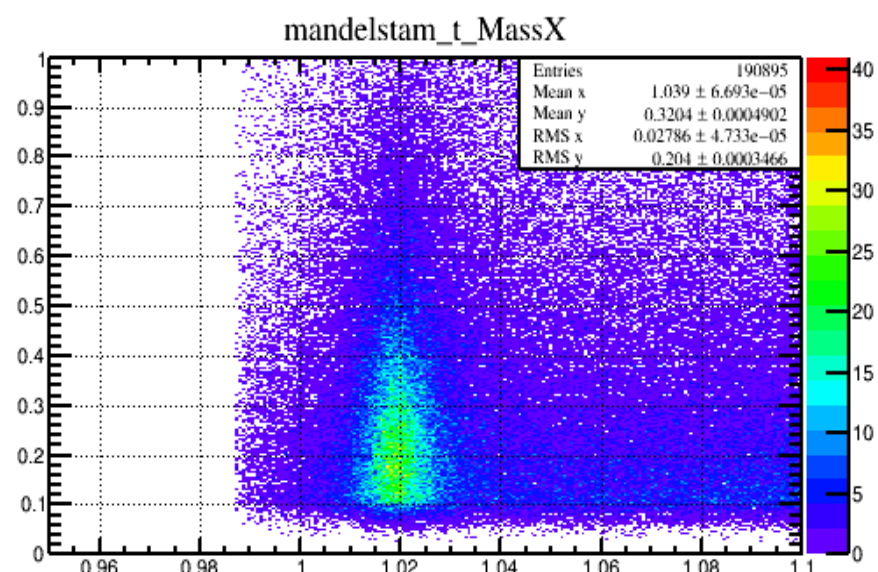
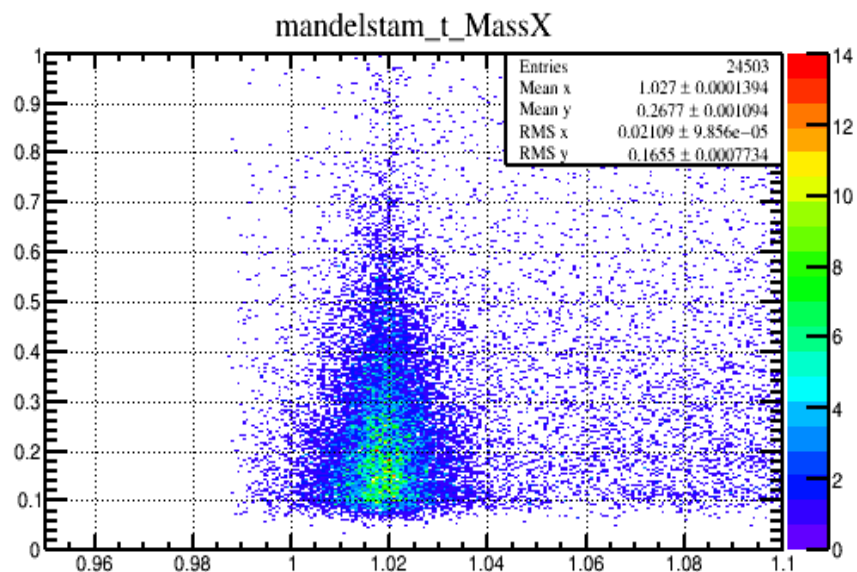


MM²: Good_MC Good_Data Bad_MC Bad_Data



T vs Mass X: Good_MC Good_Data

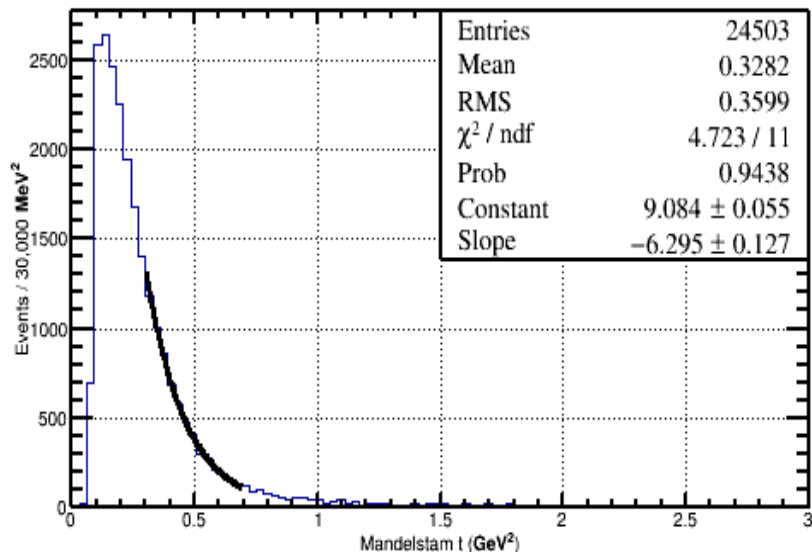
Bad_MC Bad_Data



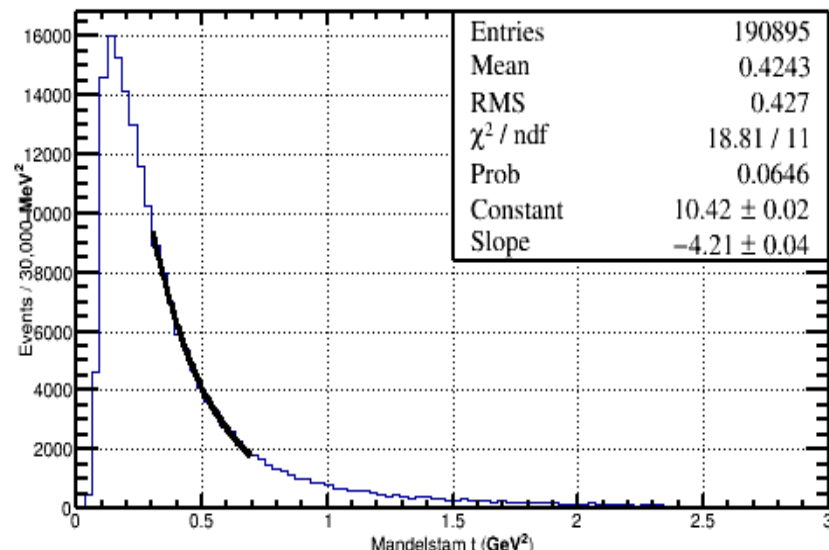
t: Good_MC
Bad_MC

Good_Data
Bad_Data

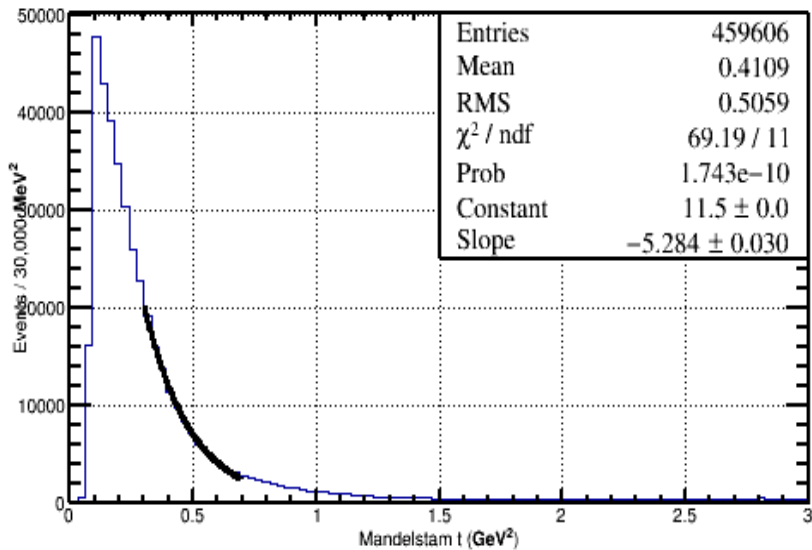
Mandelstam t Distribution (Monte Carlo: Exponential Fit)



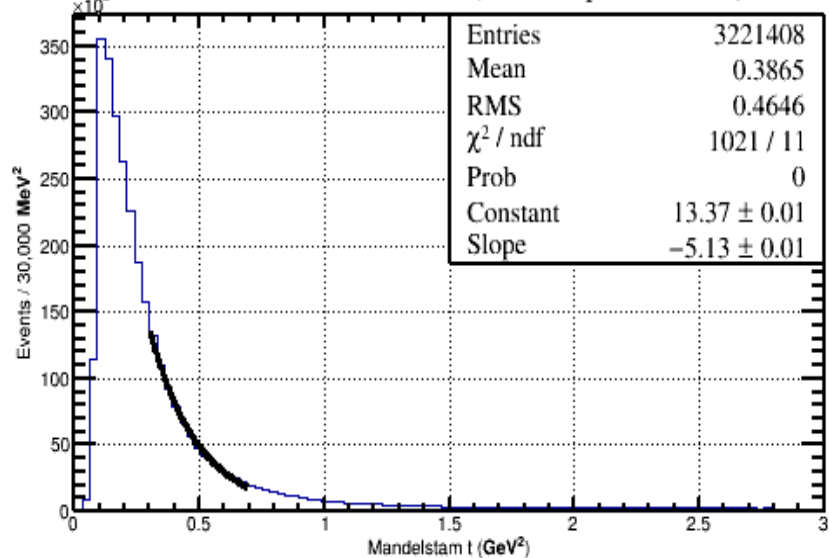
Mandelstam t Distribution (Data: Exponential Fit)



Mandelstam t Distribution (Monte Carlo: Exponential Fit)



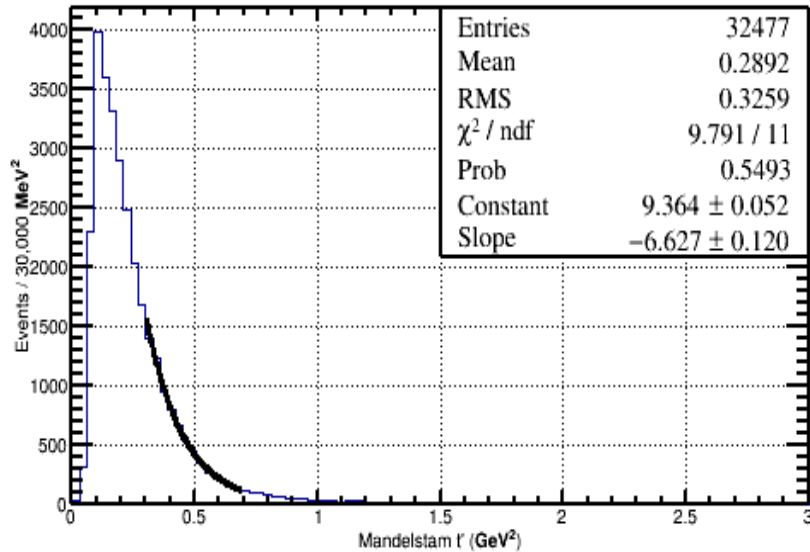
Mandelstam t Distribution (Data: Exponential Fit)



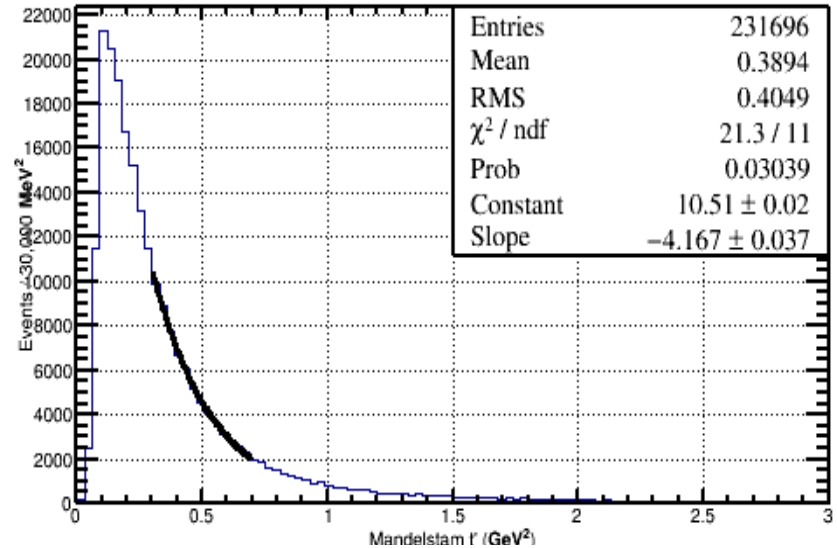
t': Good_MC
Bad_MC

Good_Data
Bad_Data

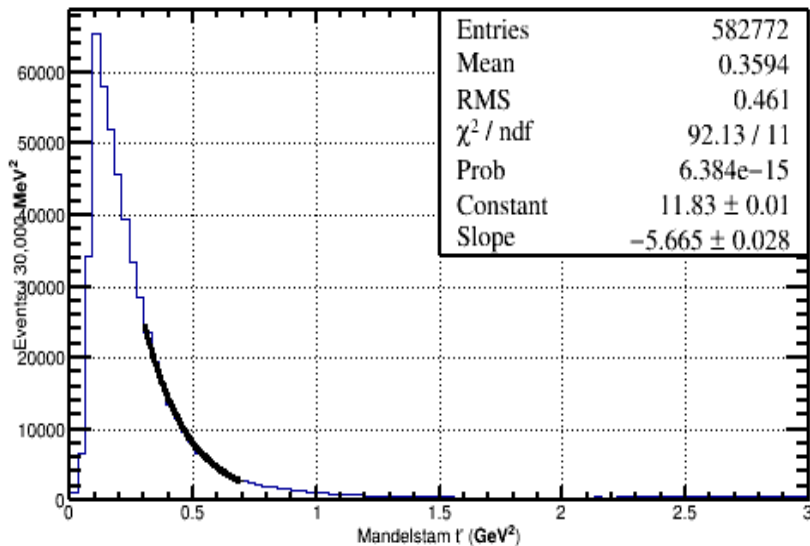
Mandelstam t' Distribution (Monte Carlo: Exponential Fit)



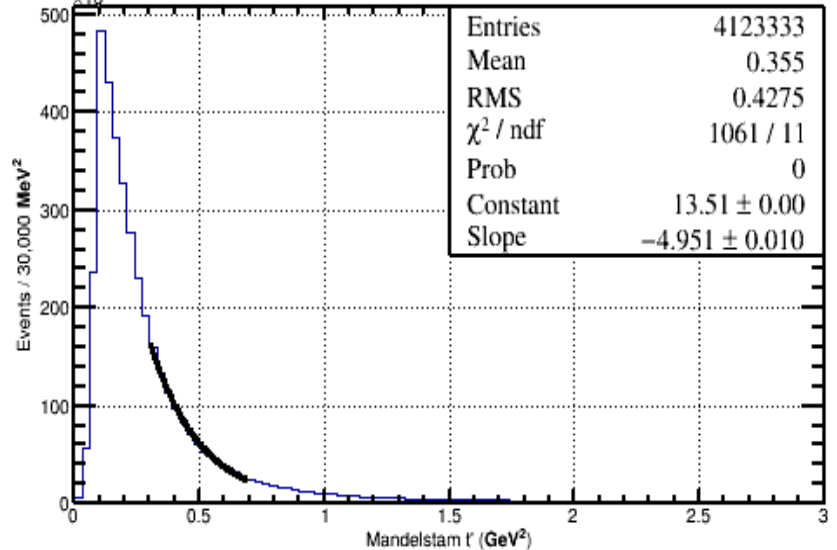
Mandelstam t' Distribution (Data: Exponential Fit)



Mandelstam t' Distribution (Monte Carlo: Exponential Fit)

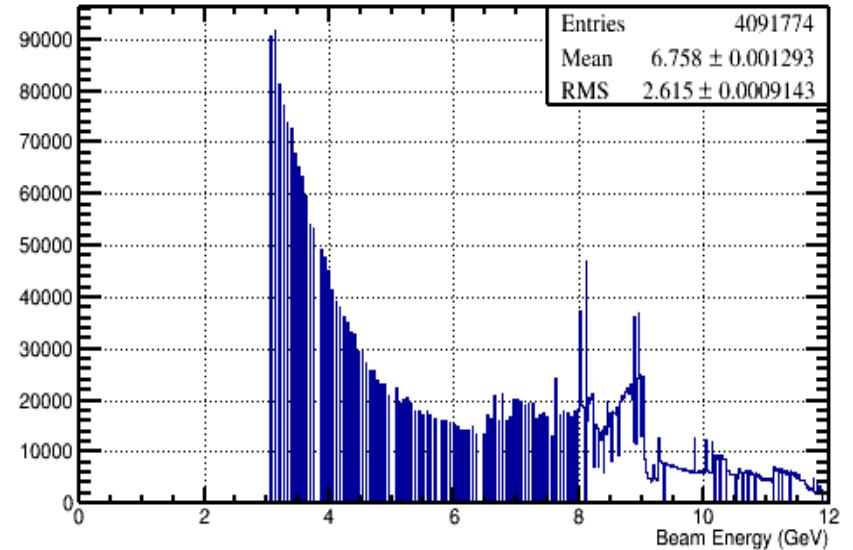
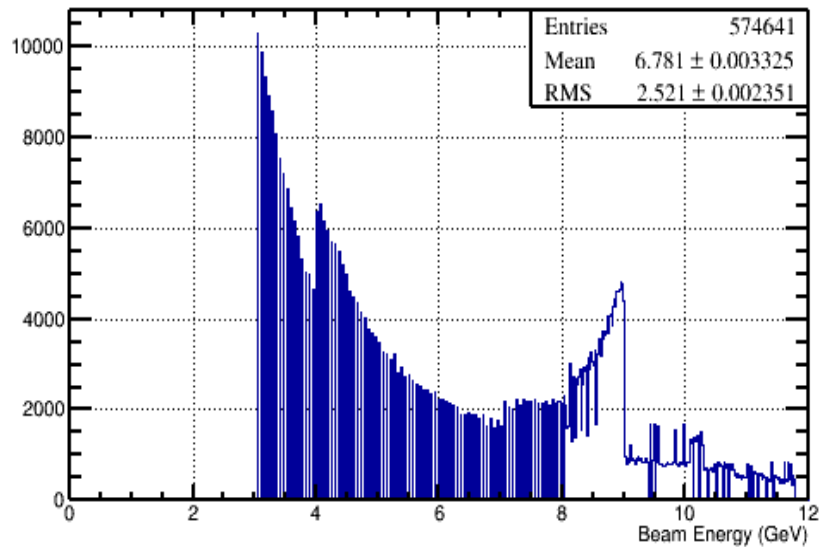
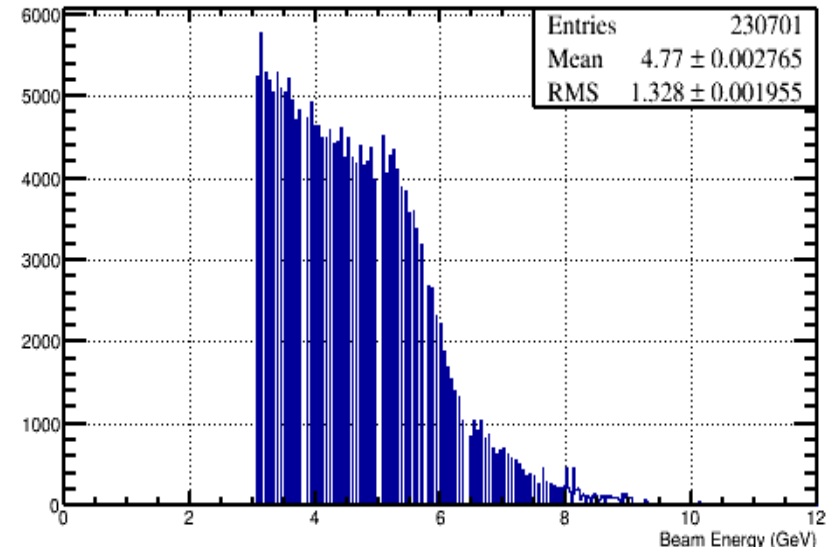
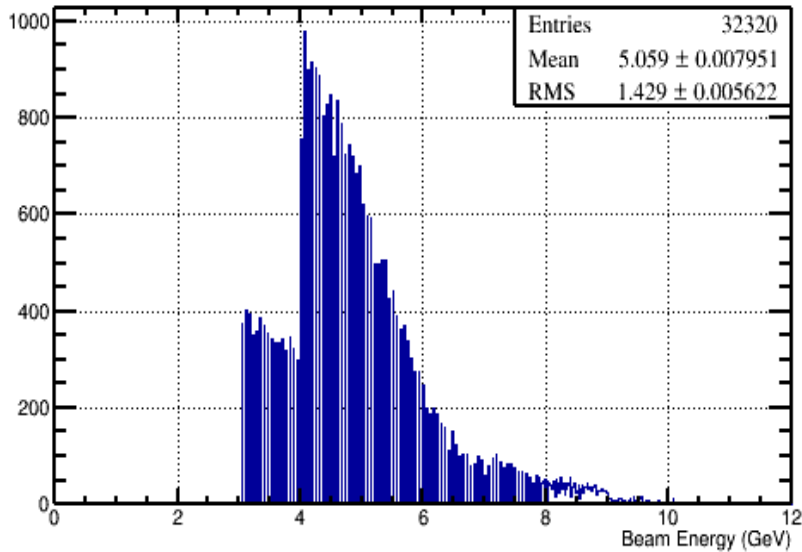


Mandelstam t' Distribution (Data: Exponential Fit)



Beam E: Good_MC Good_Data

Bad_MC Bad_Data



Conclusions/Observations

- Signal to background for the Phi (before cuts) seems to have gotten much worse
- TOF “sigma separation” is in excellent agreement
- I am losing some Phi's with my momentum cut
- MM^2 has an asymmetry with “bad” cut
- Mandelstam t distributions are completely backwards between data and MC