

## List of Cuts applied

**BeamEnergy > 6.5 GeV**

**52 cm < Zvertex < 78 cm and radius < 1**

**$dE/dX > ((e^{-3.8x + 3.3} + 2)$  for Proton**

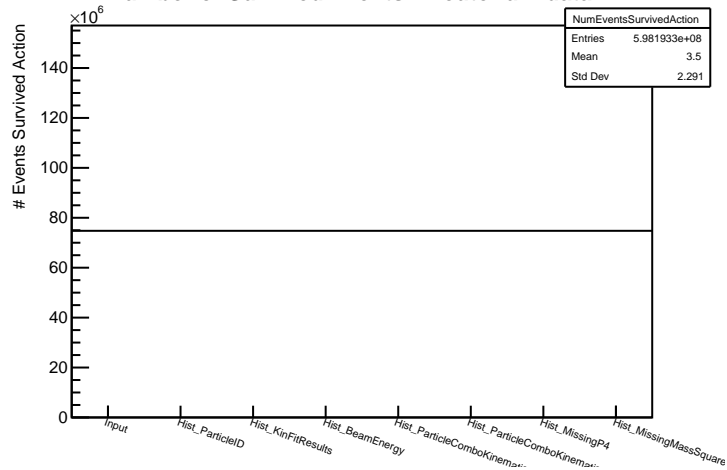
**$dE/dX < ((e^{-4x + 2} + 2.5)$  for Pions**

**Proton Momentum > 0.3**

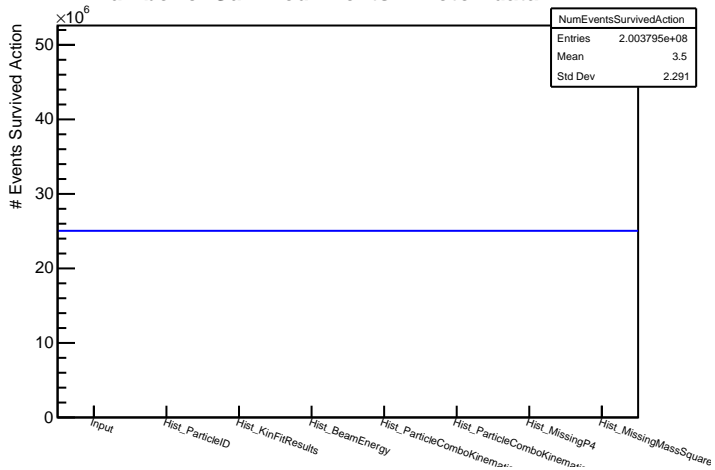
**PiPlus Momentum > 0.11**

**Piminus Momentum > 0.11**

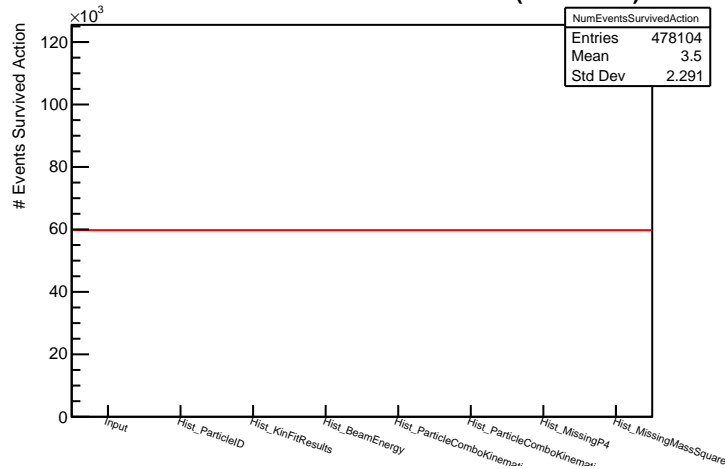
### Number of Survived Events:: Deuterium data



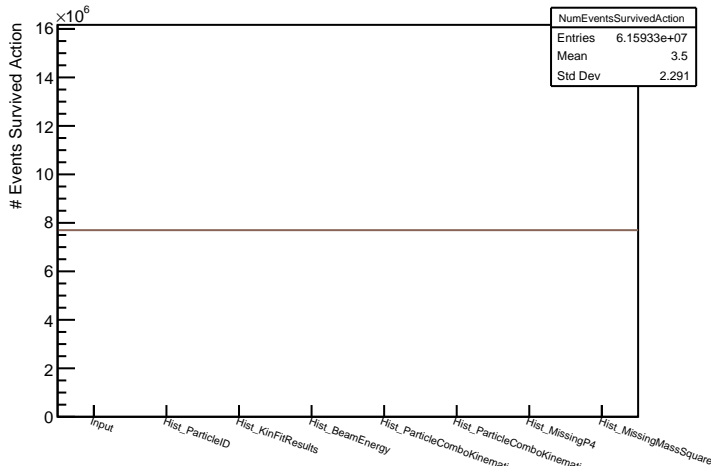
### Number of Survived Events:: Proton data



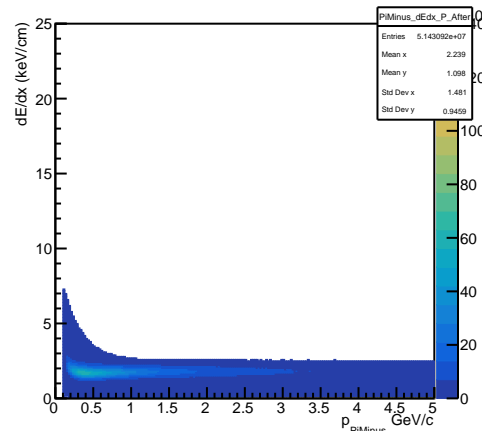
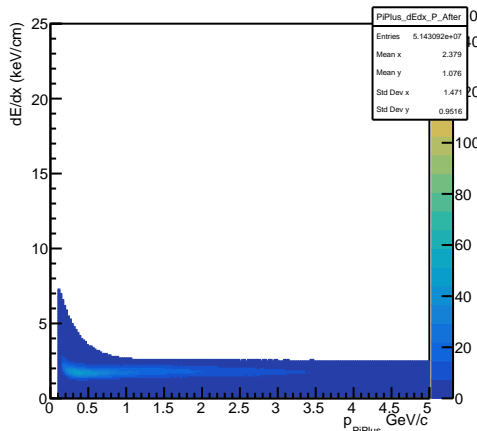
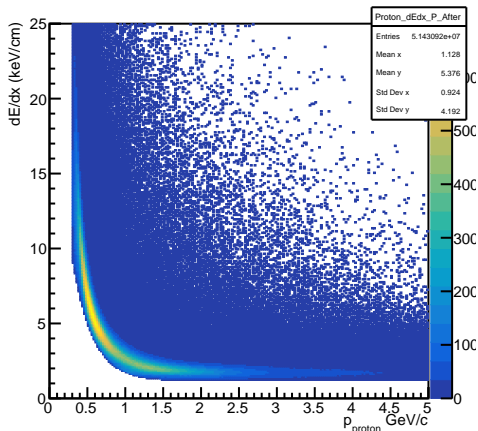
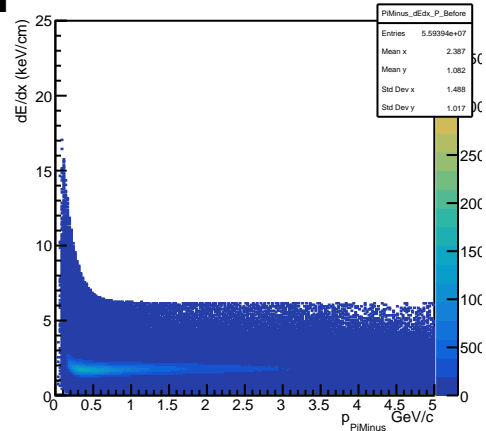
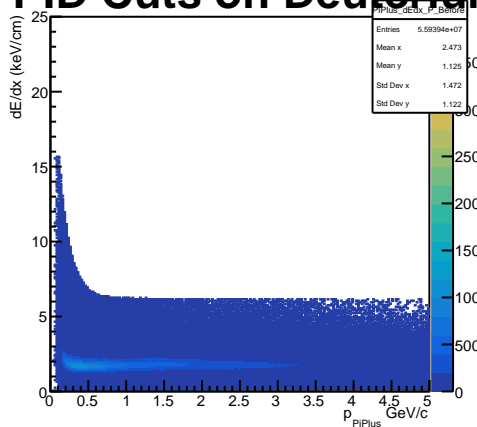
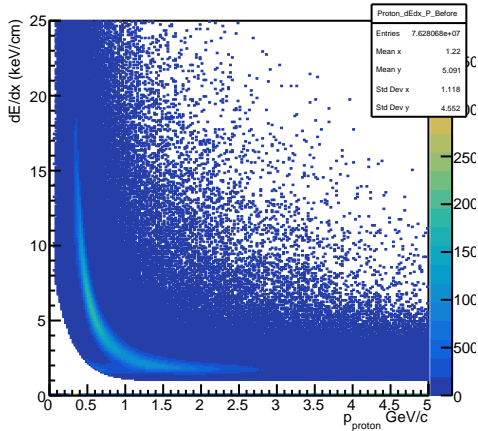
### Number of Survived Events:: MC data(deuterium)



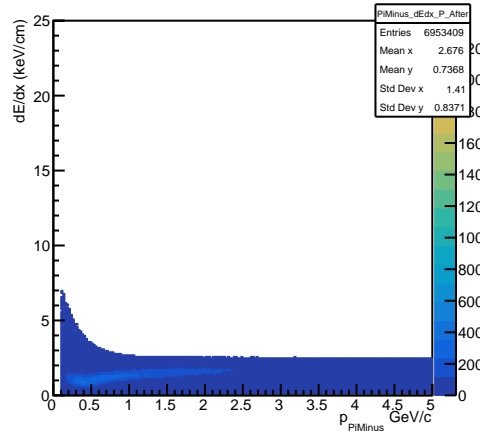
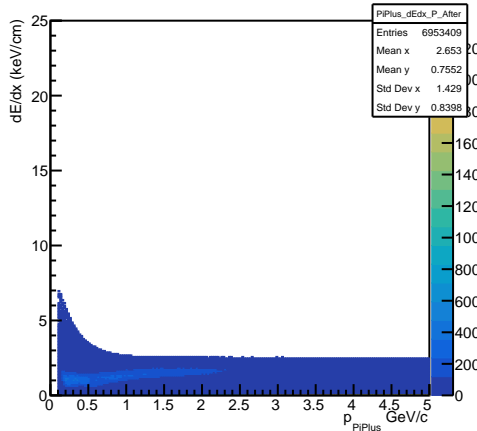
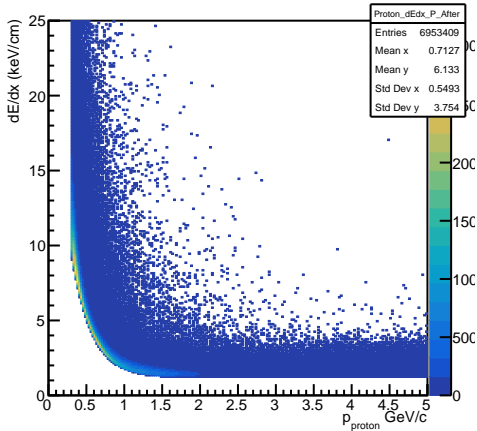
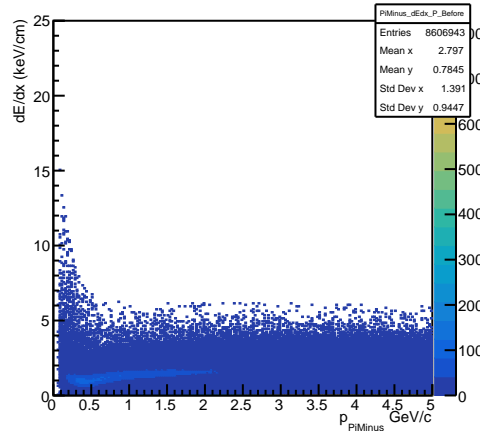
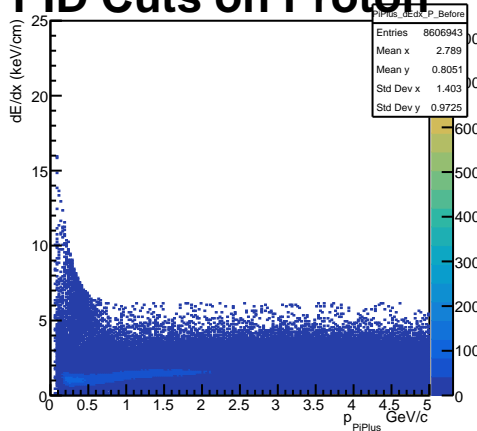
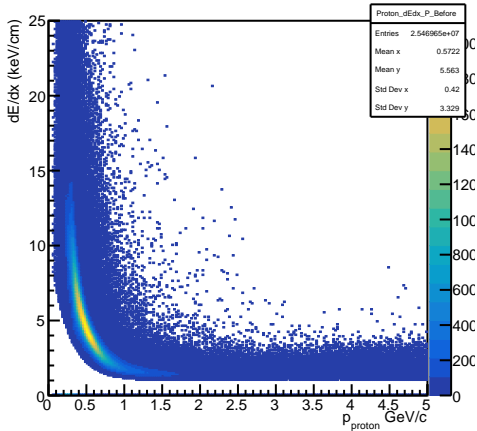
### Number of Survived Events:: Deuterium data



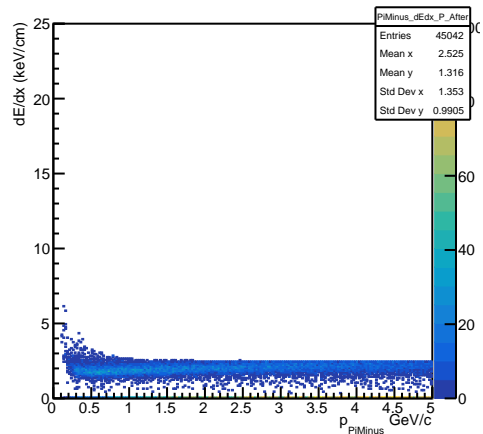
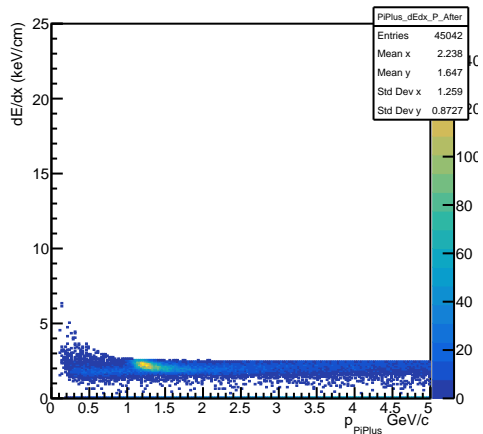
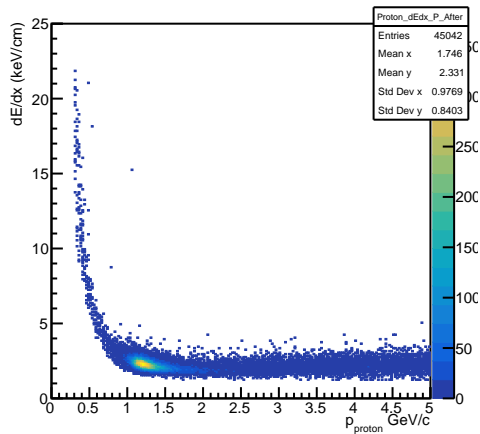
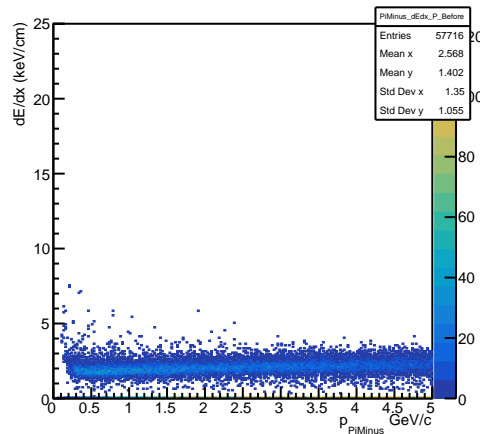
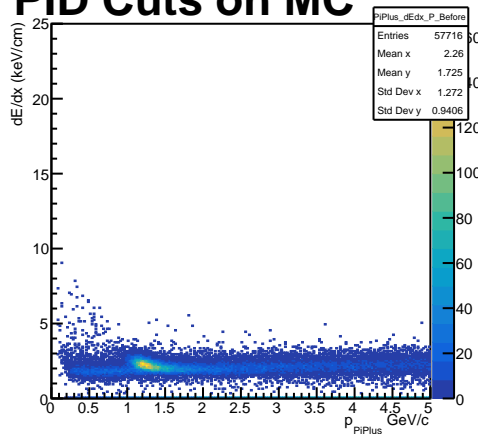
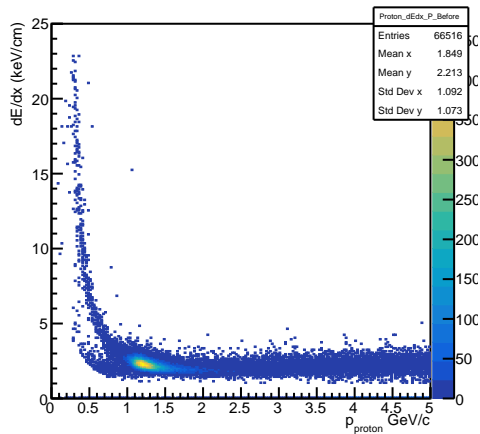
# PID Cuts on Deuterium



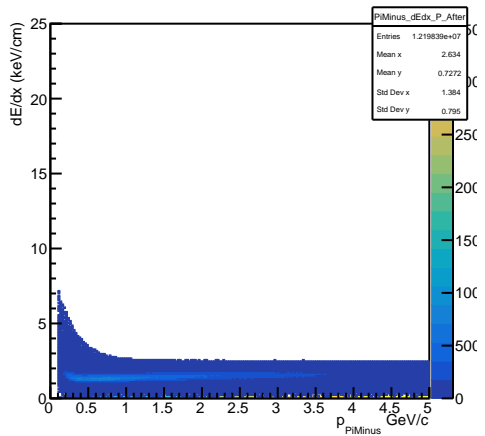
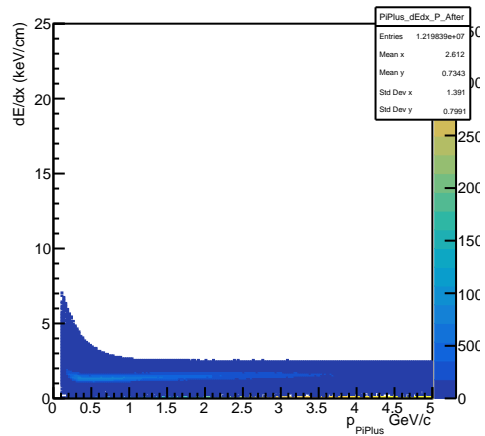
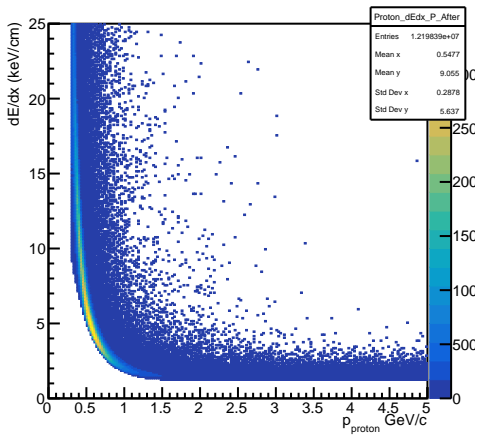
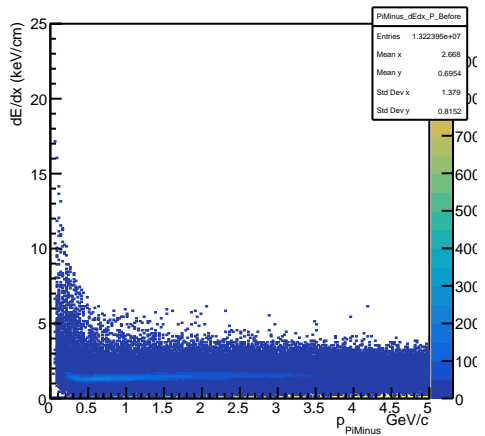
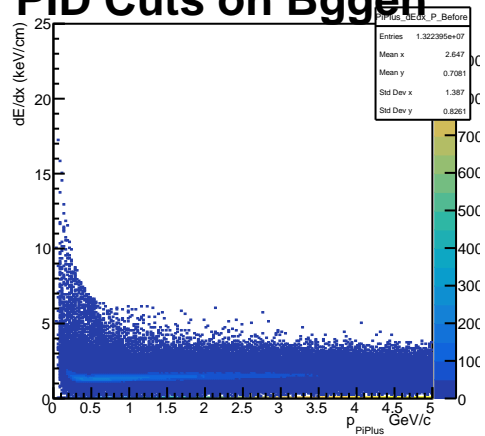
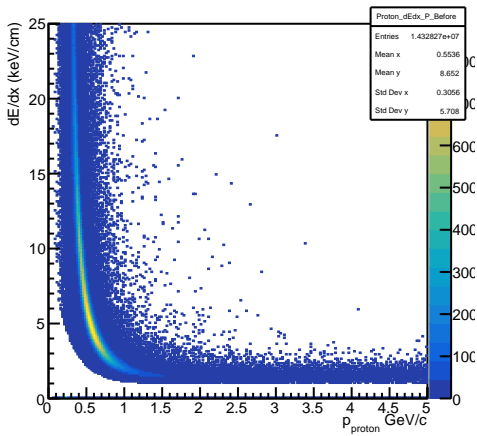
# PID Cuts on Proton

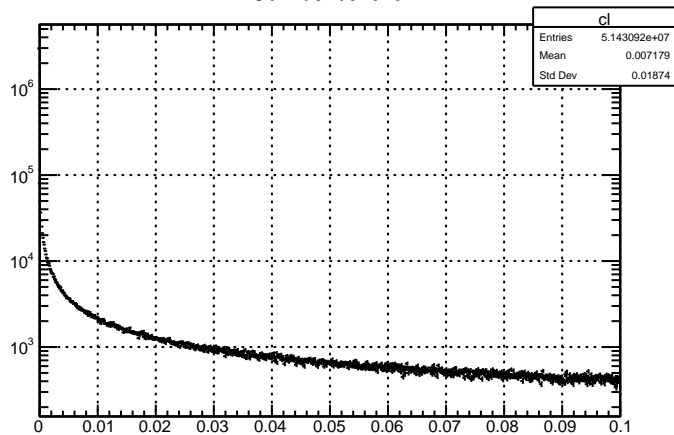
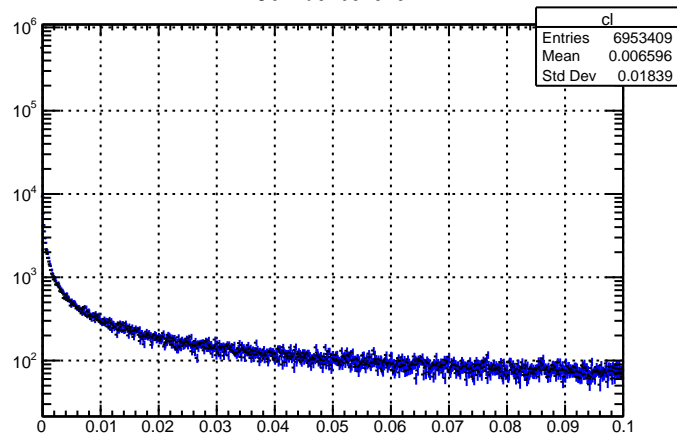
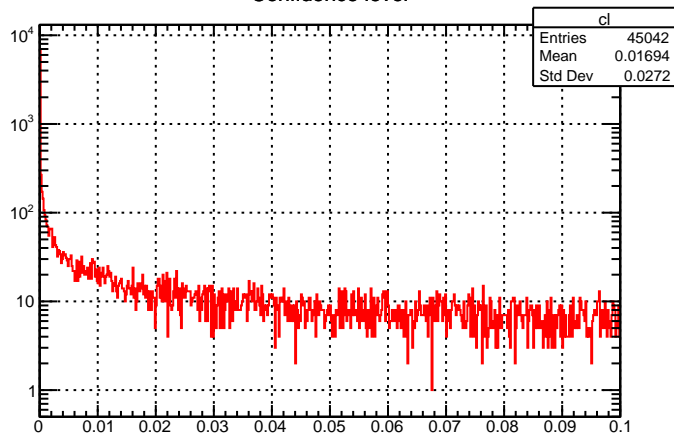
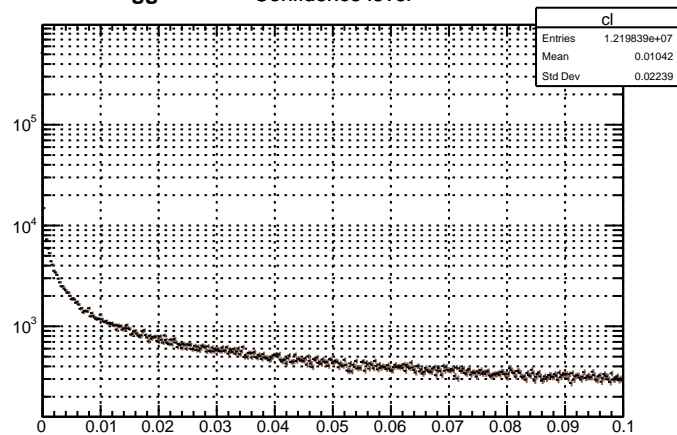


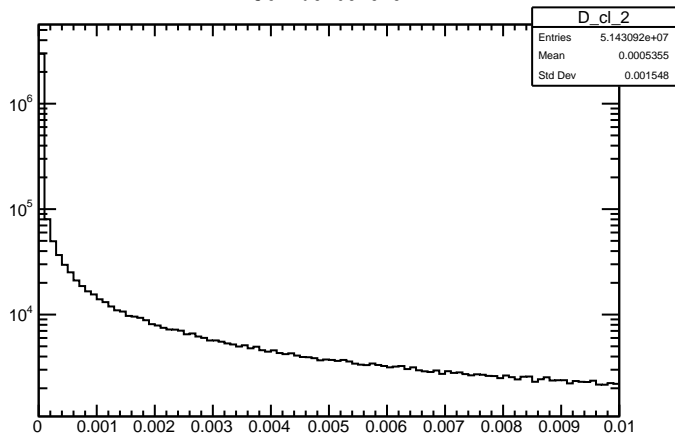
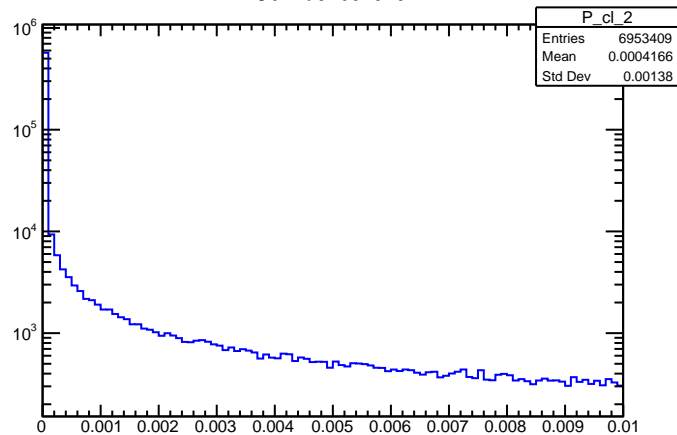
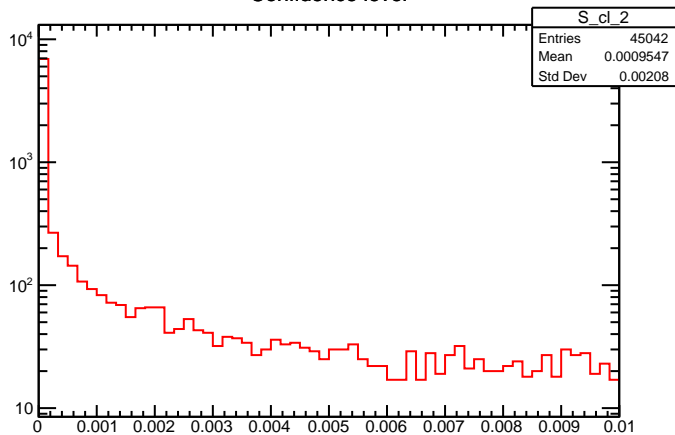
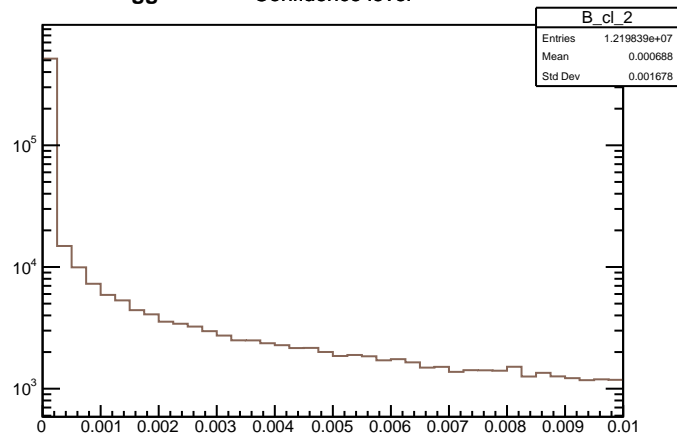
# PID Cuts on MC



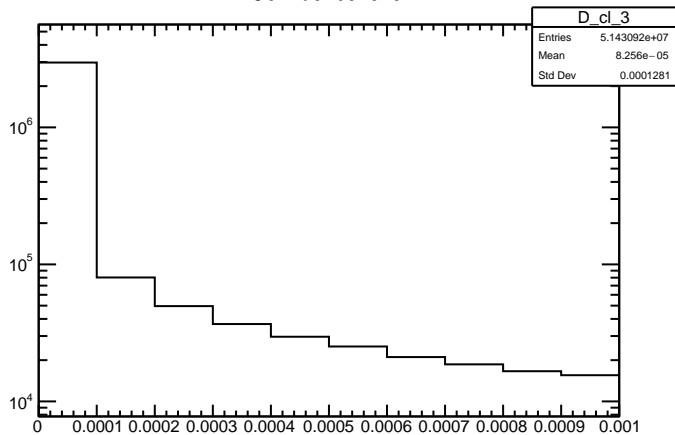
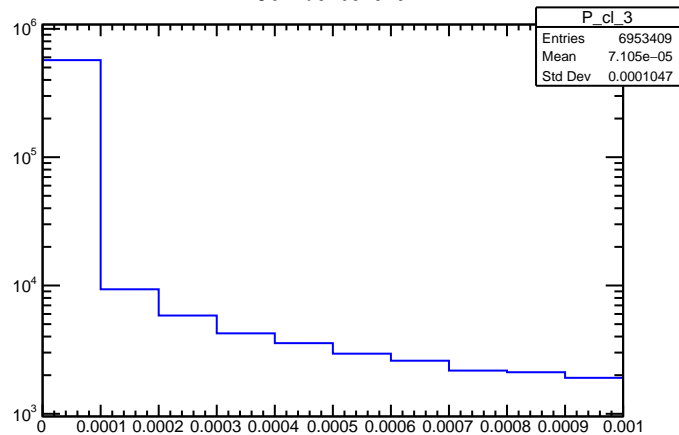
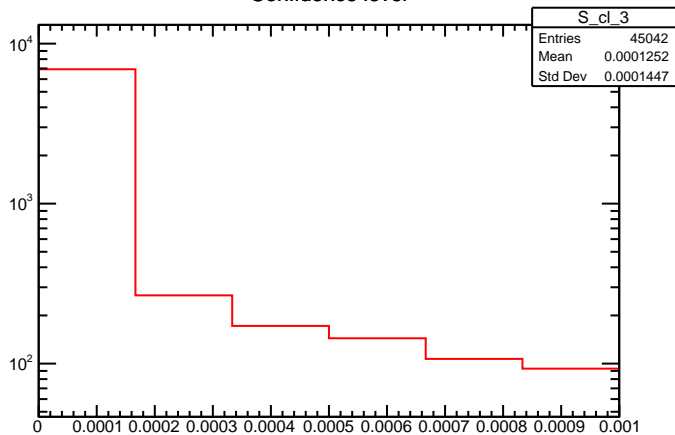
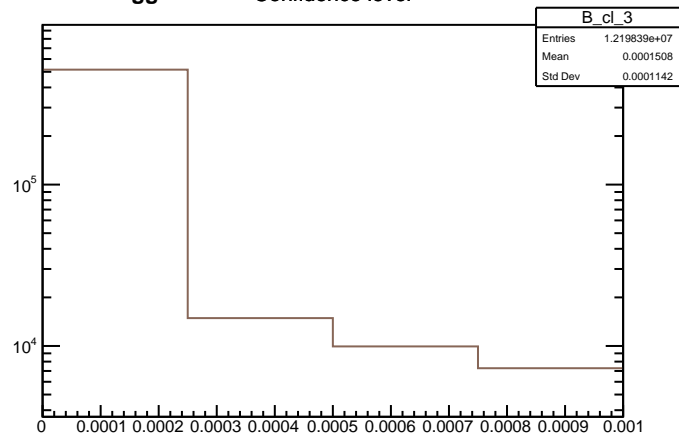
# PID Cuts on Bggen

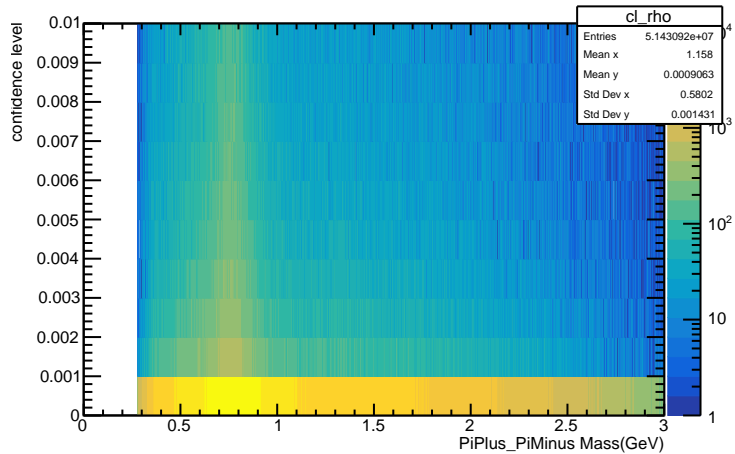
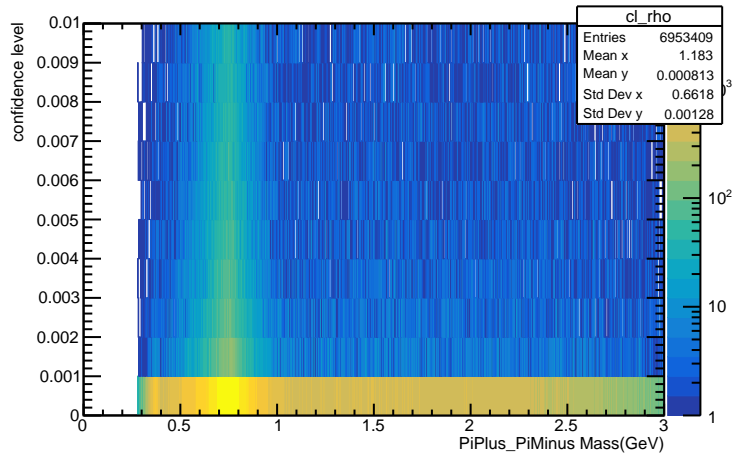
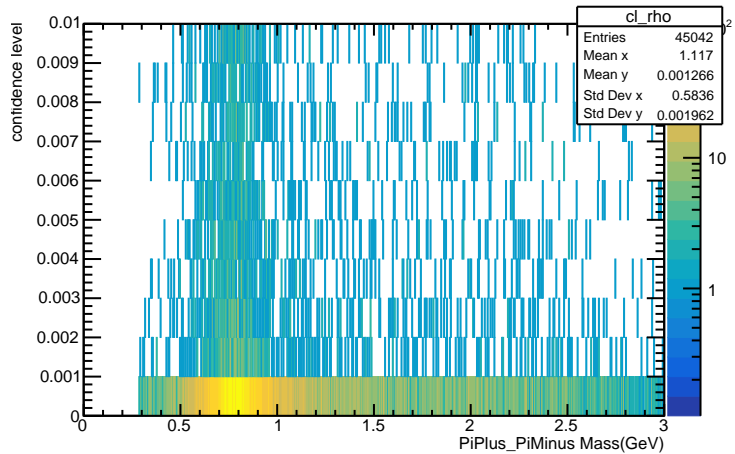
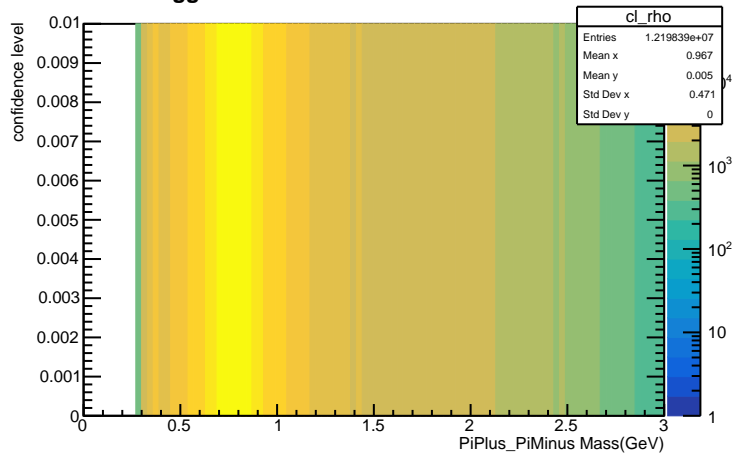


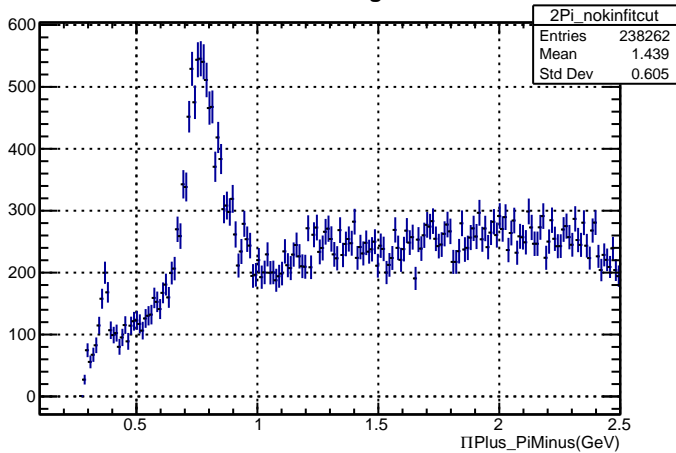
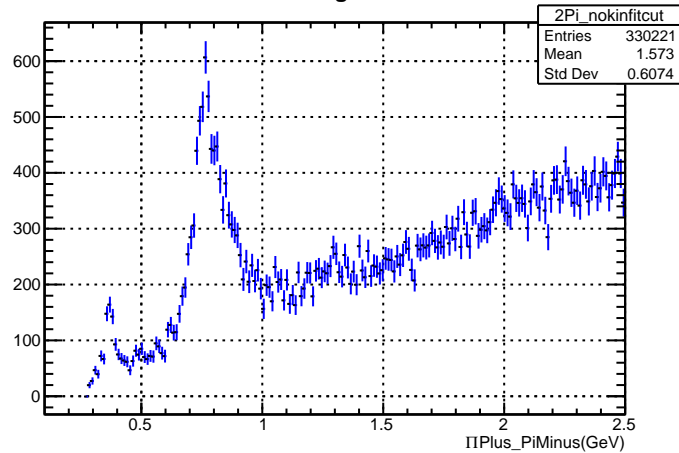
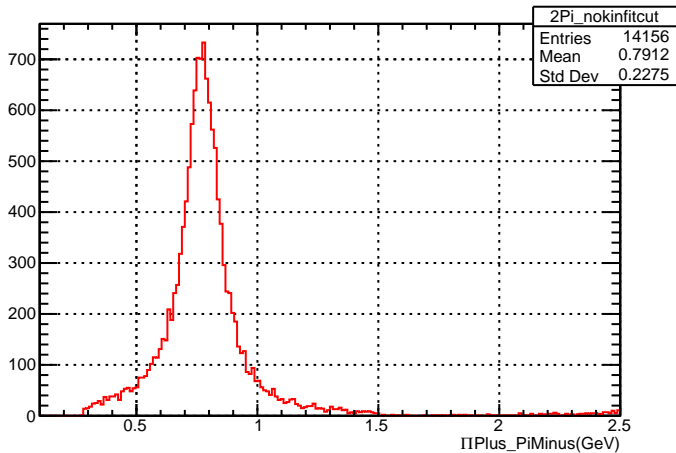
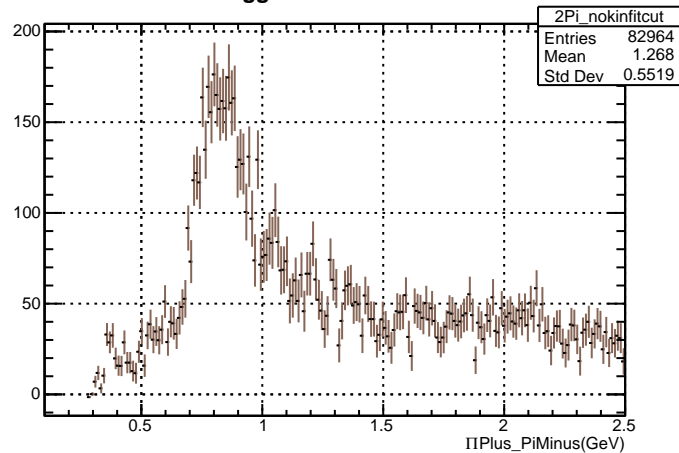
**C.L Deuterium** Confidence level**C.L Proton** Confidence level**C.L MC** Confidence level**CL Bggen** Confidence level

**C.L Deuterium** Confidence level**C.L Proton** Confidence level**C.L MC** Confidence level**CL Bggen** Confidence level



**C.L Deuterium** Confidence level**C.L Proton** Confidence level**C.L MC** Confidence level**CL Bggen** Confidence level

**C.L Deuterium****C.L Proton****C.L MC****CL Bggen**

**Deuterium target without KinfIt****Proton target without kinfIt****MC without kinfIt****Bggen without kinfIt**

## **Additional cuts that need to be optimized**

**C.L > 0.005**

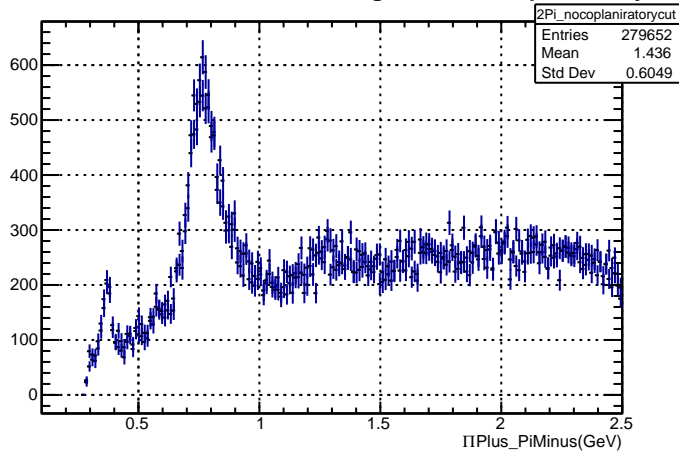
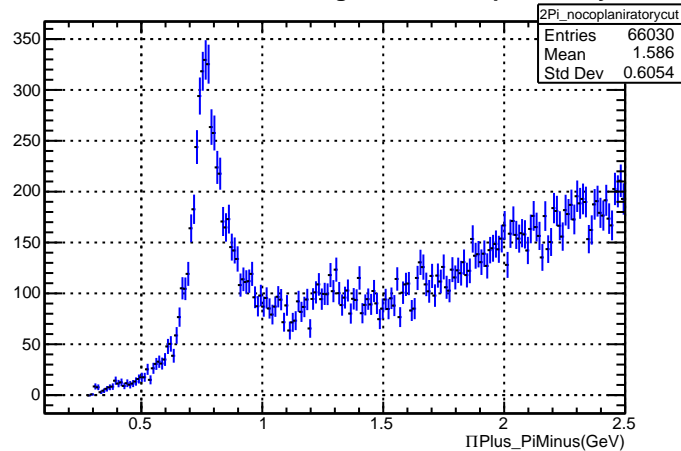
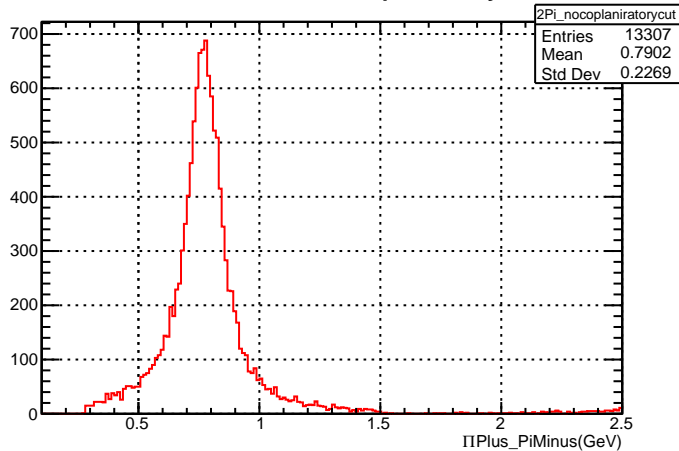
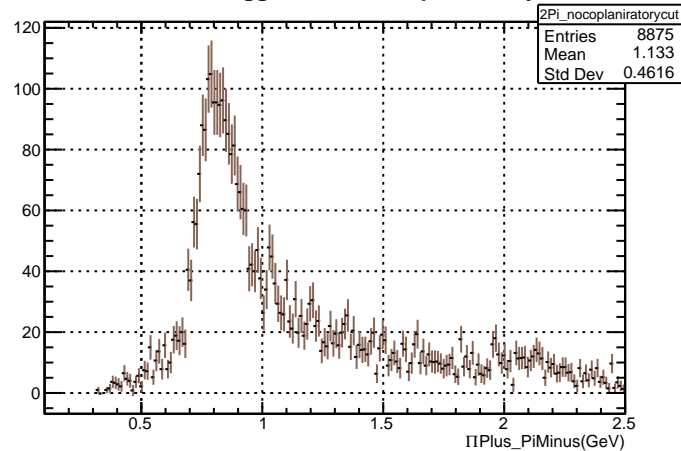
**Coplanarity between Rho and proton: (165 ,195) degree**

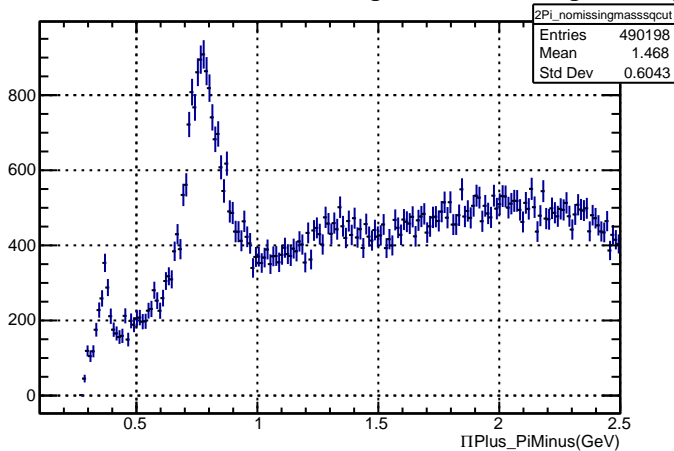
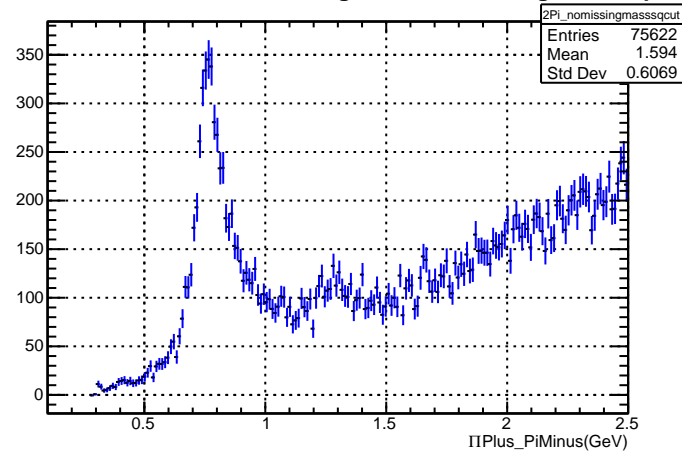
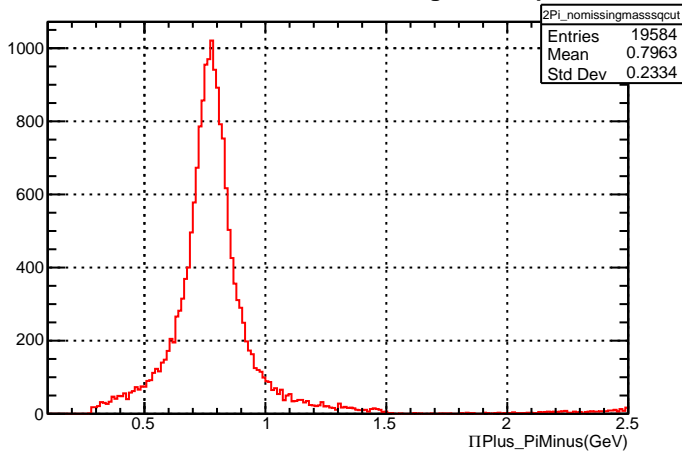
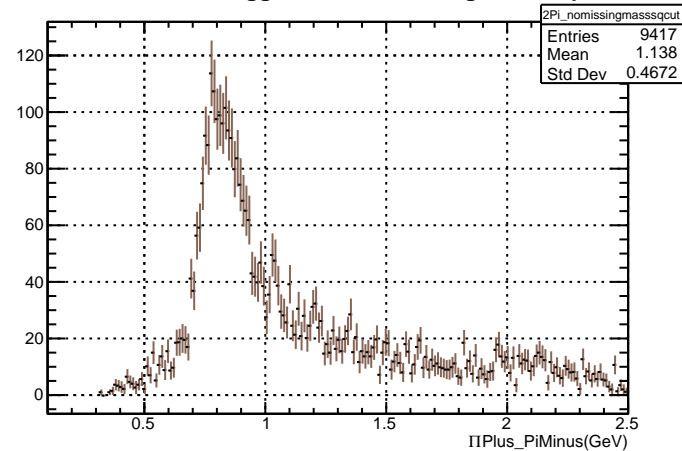
**PipProt Invariant Mass > 1.8 && PimProt Invariant Mass > 1.8**

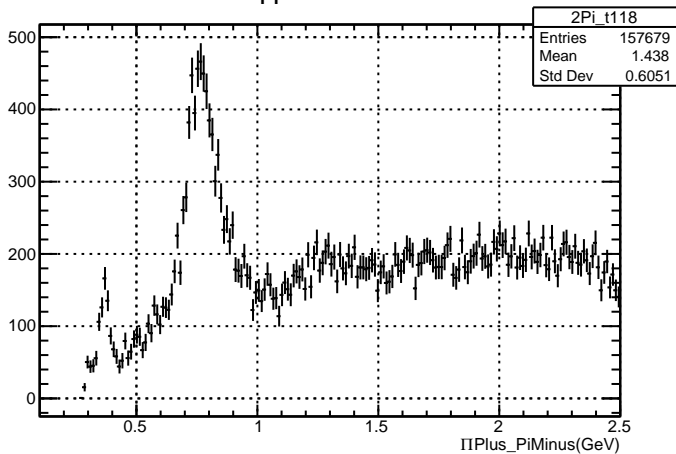
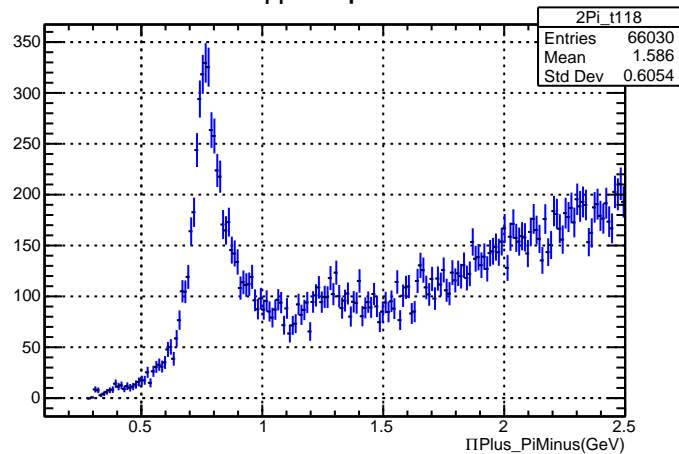
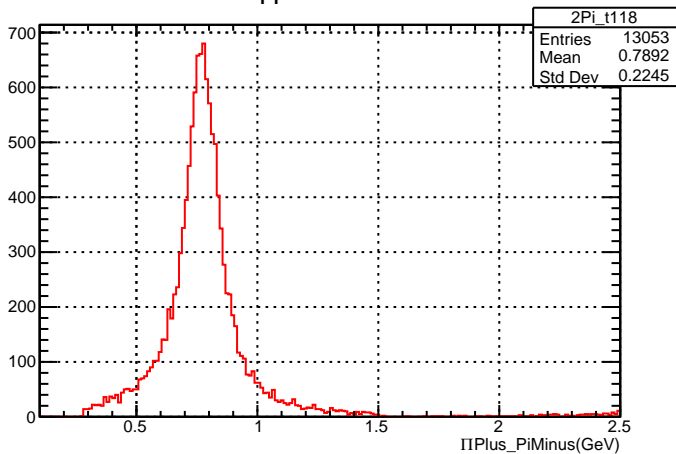
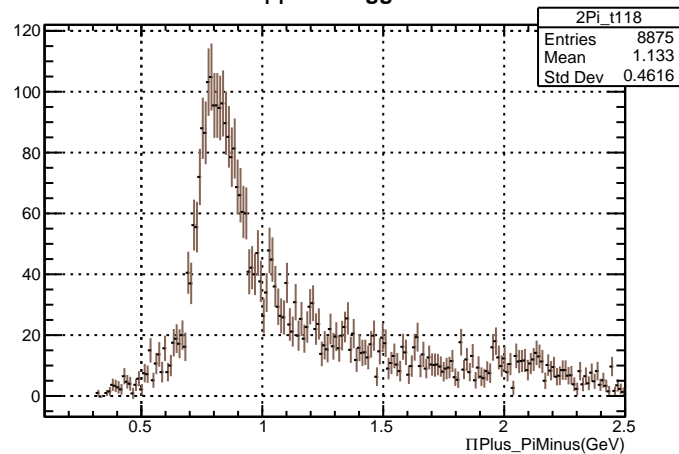
**|t| >1 and |u| >1**

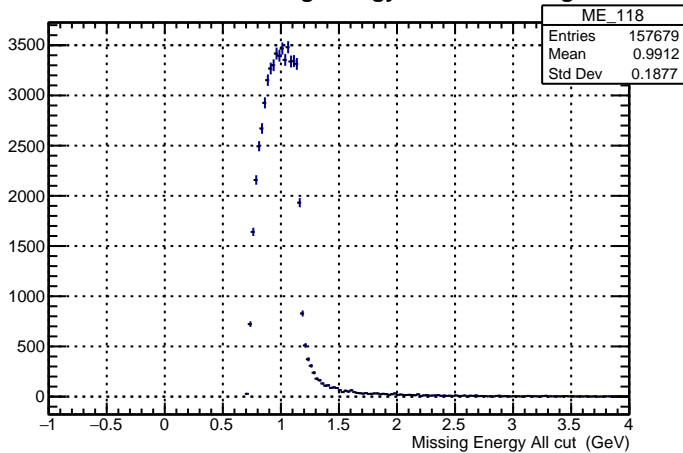
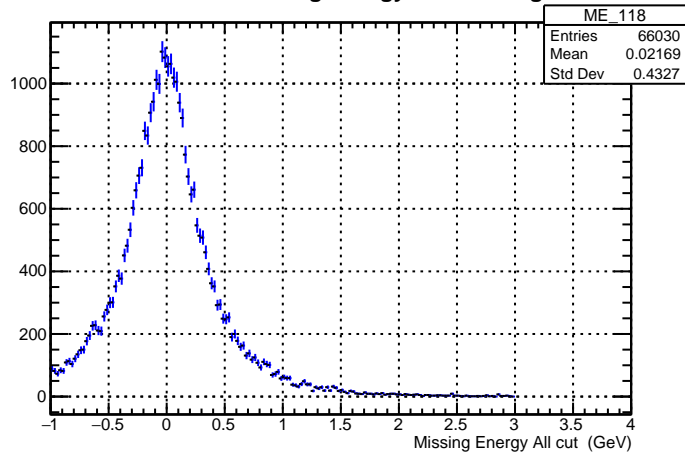
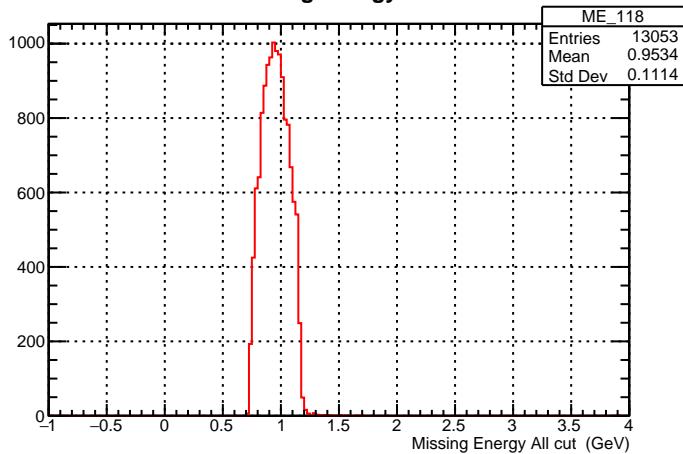
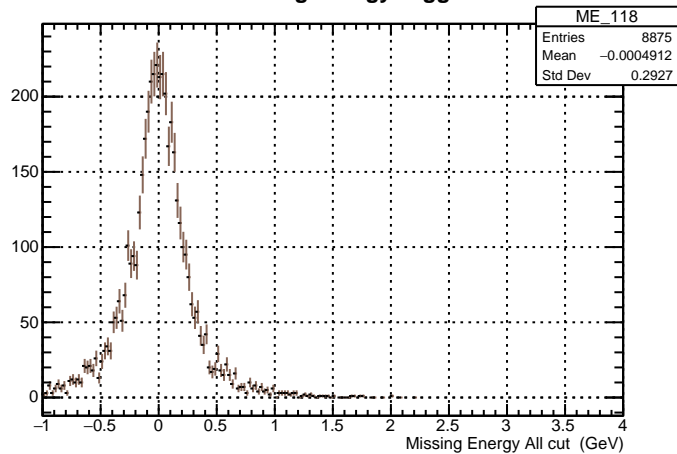
**0.5 < MM2 < 1.3 (Missing Mass Squared) Deuterium**

**-0.02 < MM2 < 0.02 ; Proton**

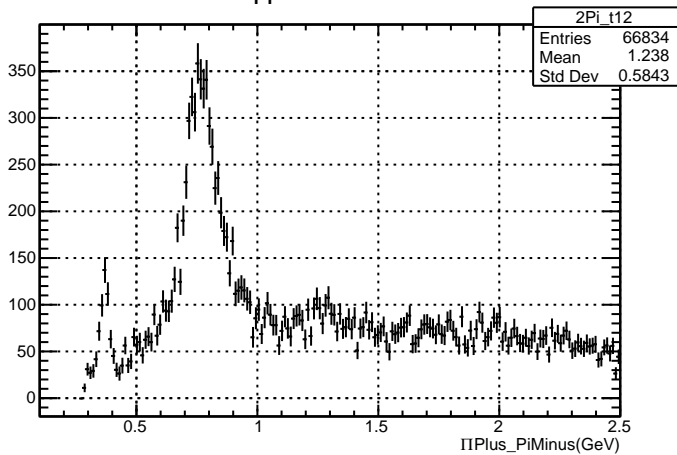
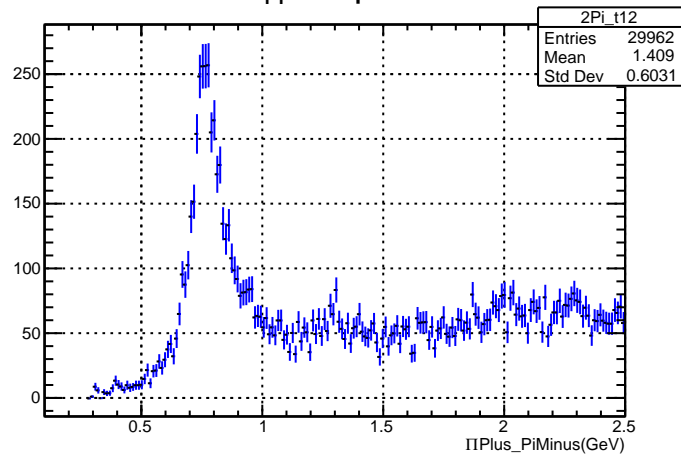
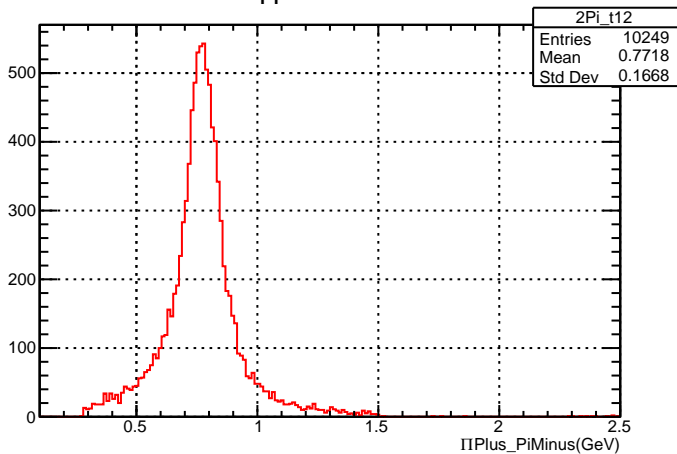
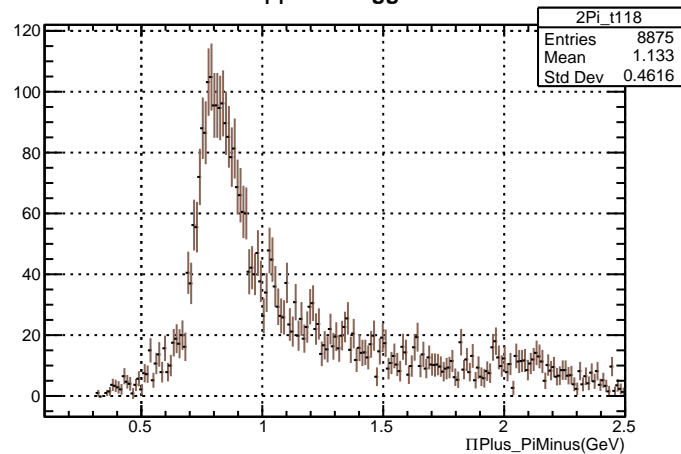
**Deuterium target without Coplanaritycut****Proton target without Coplanaritycut****MC without Coplanaritycut****Bggen without Coplanaritycut**

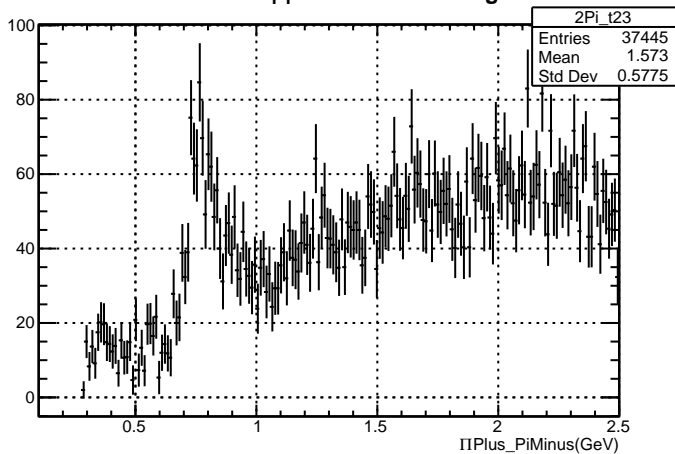
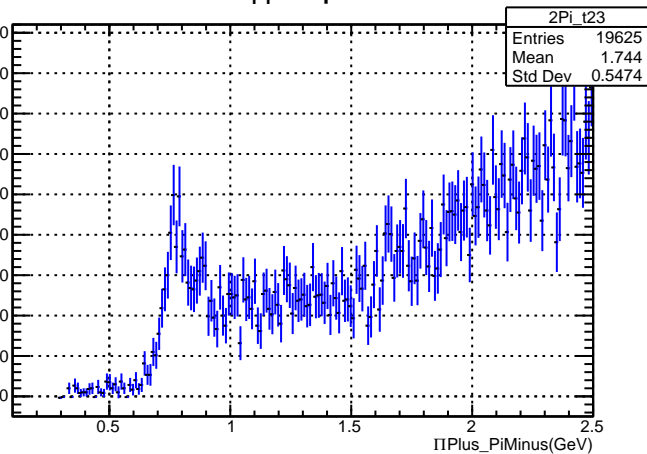
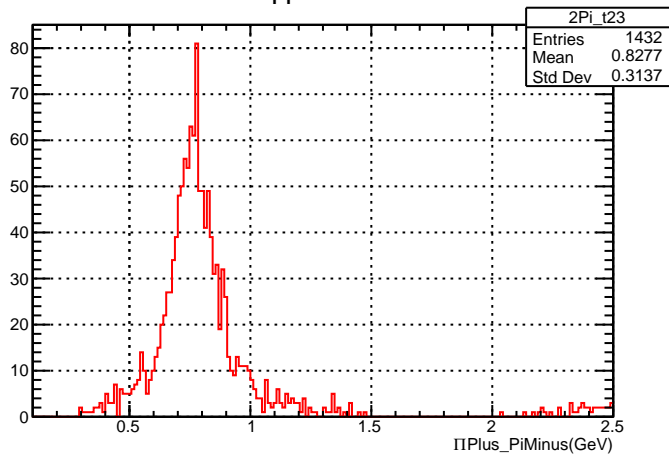
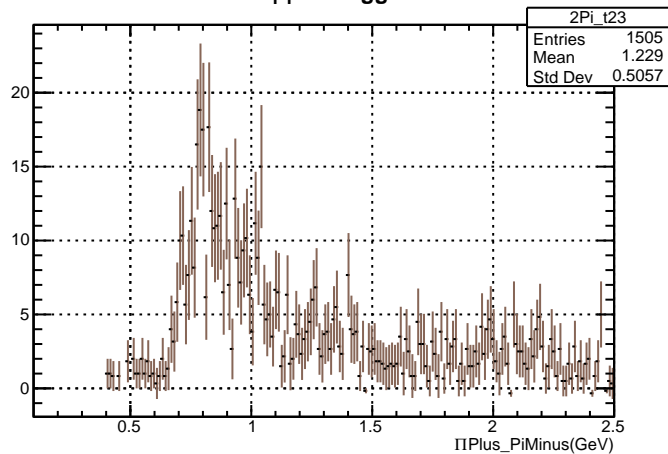
**Deuterium target without Missing Mass Sq. Cut****Proton target without Missing Mass Sq. Cut****MC without Missing Mass Sq. Cut****Bggen without Missing Mass Sq. Cut**

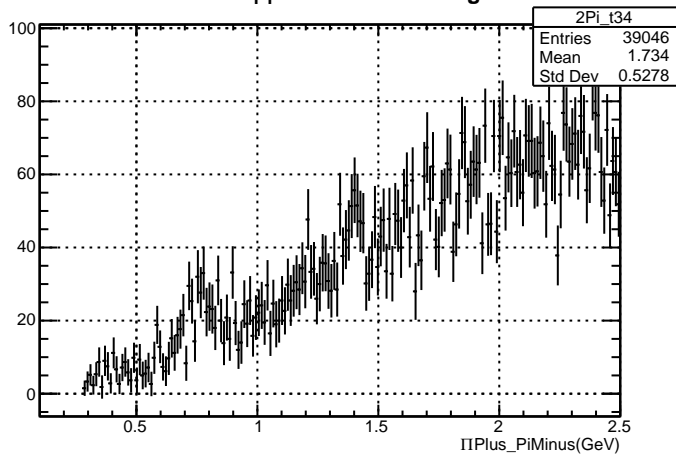
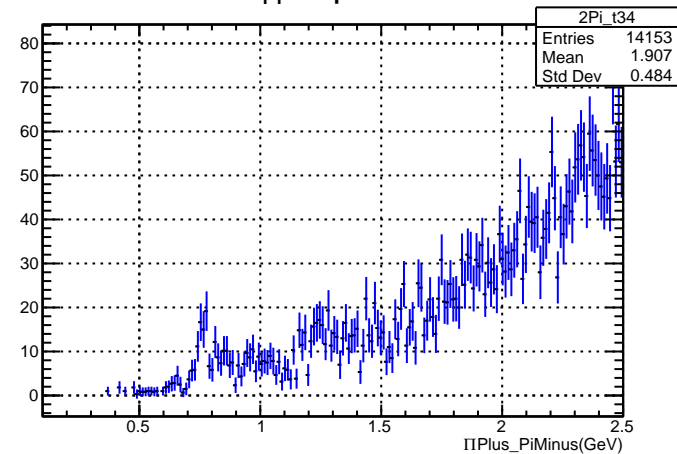
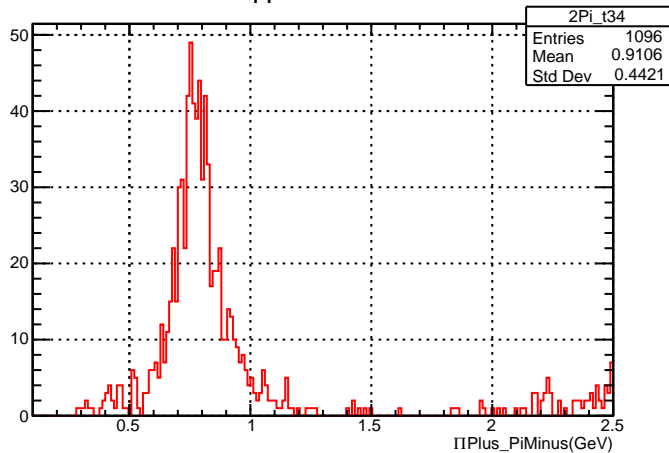
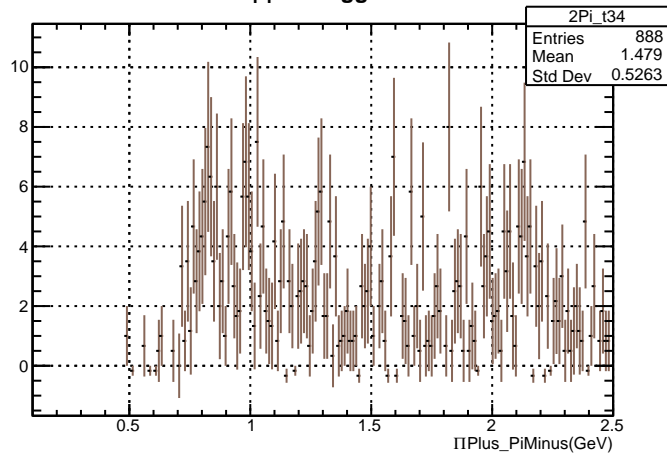
**1 < |t| < 18 Deuterium All cuts****1 < |t| < 18 proton All cuts****1 < |t| < 18 MC All cuts****1 < |t| < 18 Bggen All cuts**

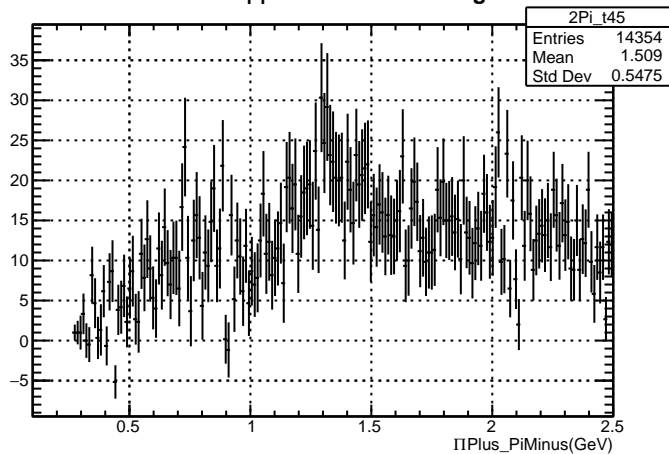
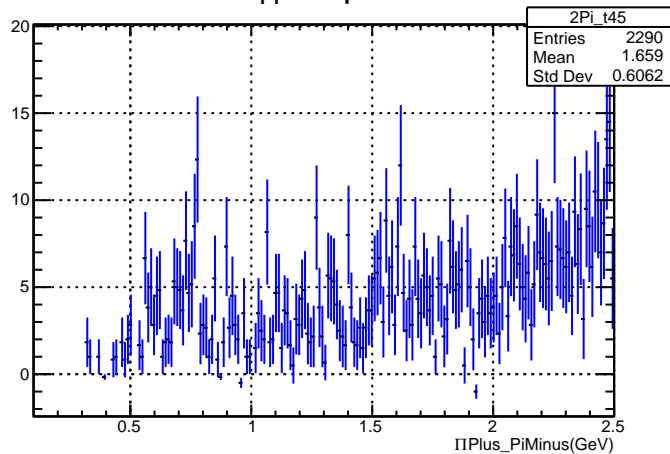
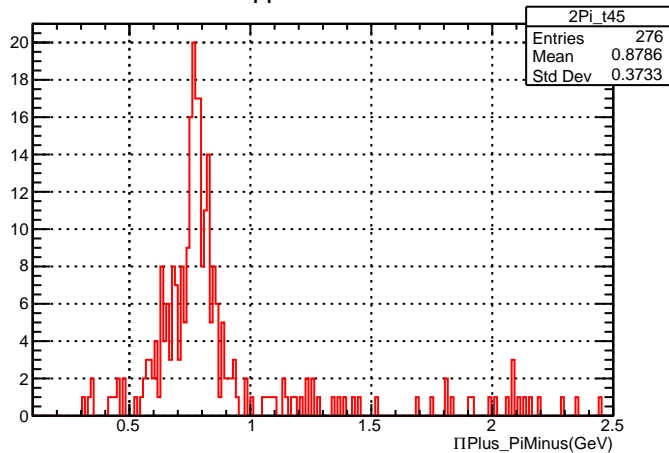
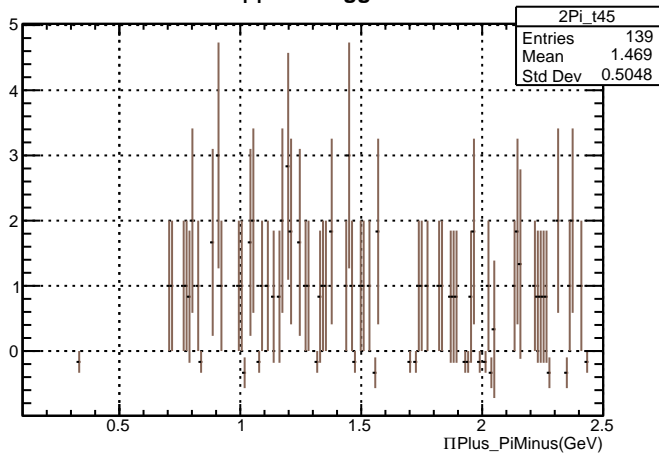
**Missing Energy: Deuterium target****Missing Energy: Proton target****Missing Energy: MC****Missing Energy: Bggen**

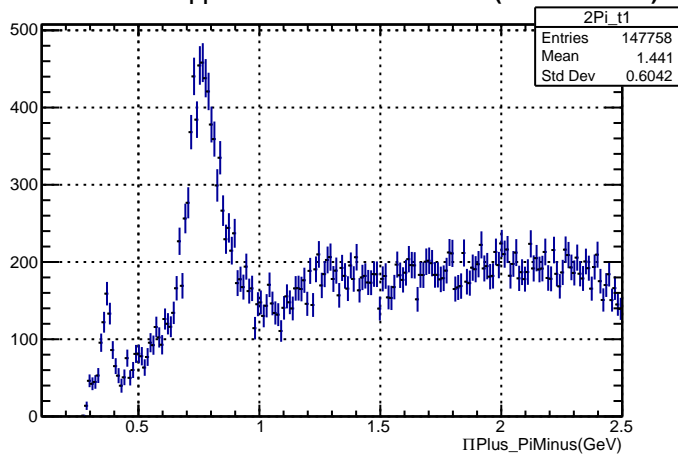
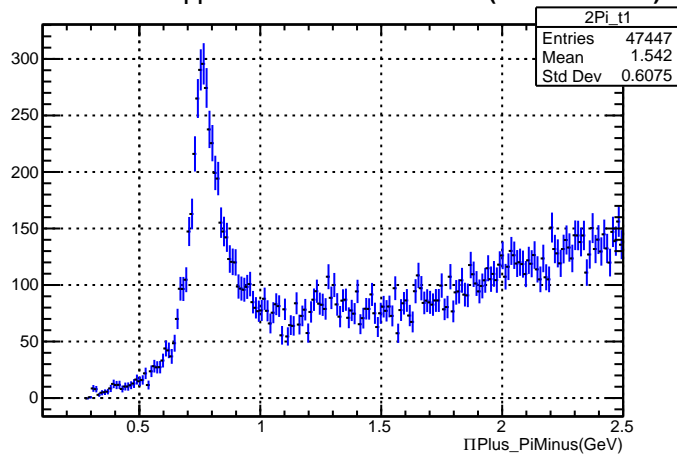
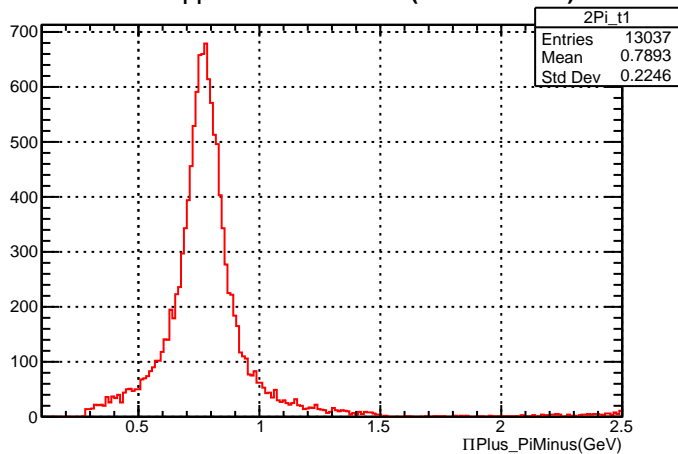
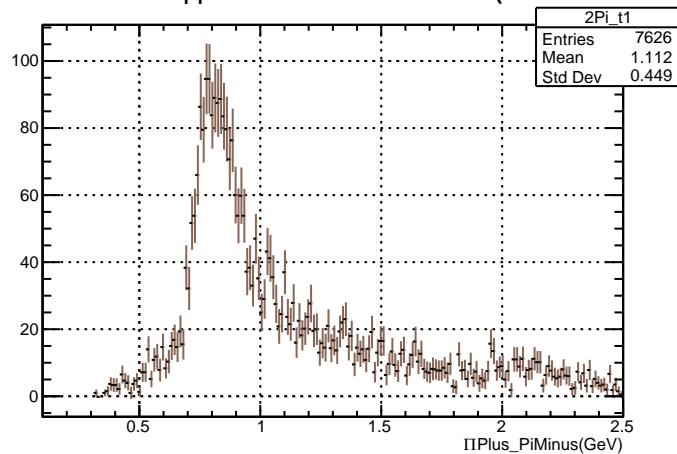


**1 <|t| < 1.5 Deuterium All cuts****1 <|t| < 1.5 proton All cuts****1 <|t| < 1.5 MC All cuts****1 <|t| < 1.5 Bggen All cuts**

**1.5 <|t| < 2 Deuterium target All cuts****1.5 <|t| < 2 proton All cuts****1.5 <|t| < 2 MC All cuts****1.5 <|t| < 2 Bggen All cuts**

**$2 < |t| < 4$  Deuterium target All cuts** **$2 < |t| < 4$  proton All cuts** **$2 < |t| < 4$  MC All cuts** **$2 < |t| < 4$  Bggen All cuts**

**4 <|t| < 18 Deuterium target All cuts****4 <|t| < 18 proton All cuts****4 <|t| < 18 MC All cuts****4 <|t| < 18 Bggen All cuts**

**1 <|t| < 18 Deuterium All cuts + (0.6 < ME < 1.3)****1 <|t| < 18 Deuterium All cuts + (-0.5 < ME < 0.5)****1 <|t| < 18 MC All cuts + (0.6 < ME < 1.3)****1 <|t| < 1.5 Deuterium All cuts + (-0.5 < ME < 0.5)**

## Directory

Bggen-> /cache/halld/luex\_simulations/REQUESTED\_MC/2017\_bggen\_batch01\_ver03\_31\_20220210010210pm/hddm/(030835-031057)

Proton Data-> /mss/halld/offline\_monitoring/RunPeriod-2017-01/ver19/REST/(030274-030600)

Deuterium->/cache/halld/offline\_monitoring/RunPeriod-2021-11/ver04/REST/(090207-090249::090558-090601)

MC-> /work/halld2/home/jrpybus/simulation/bhesha/

DSelector\_script -> /work/halld2/home/bhesha/script/DSelector\_missing.C

DReaction\_Job -> /work/halld2/home/bhesha/Analysis2/ReactionFilter/Submit\_Job/Job\_2/jobs\_recon.config

DReaction\_config -> /work/halld2/home/bhesha/Analysis2/ReactionFilter/Submit\_Job/Job\_2/jana.config