

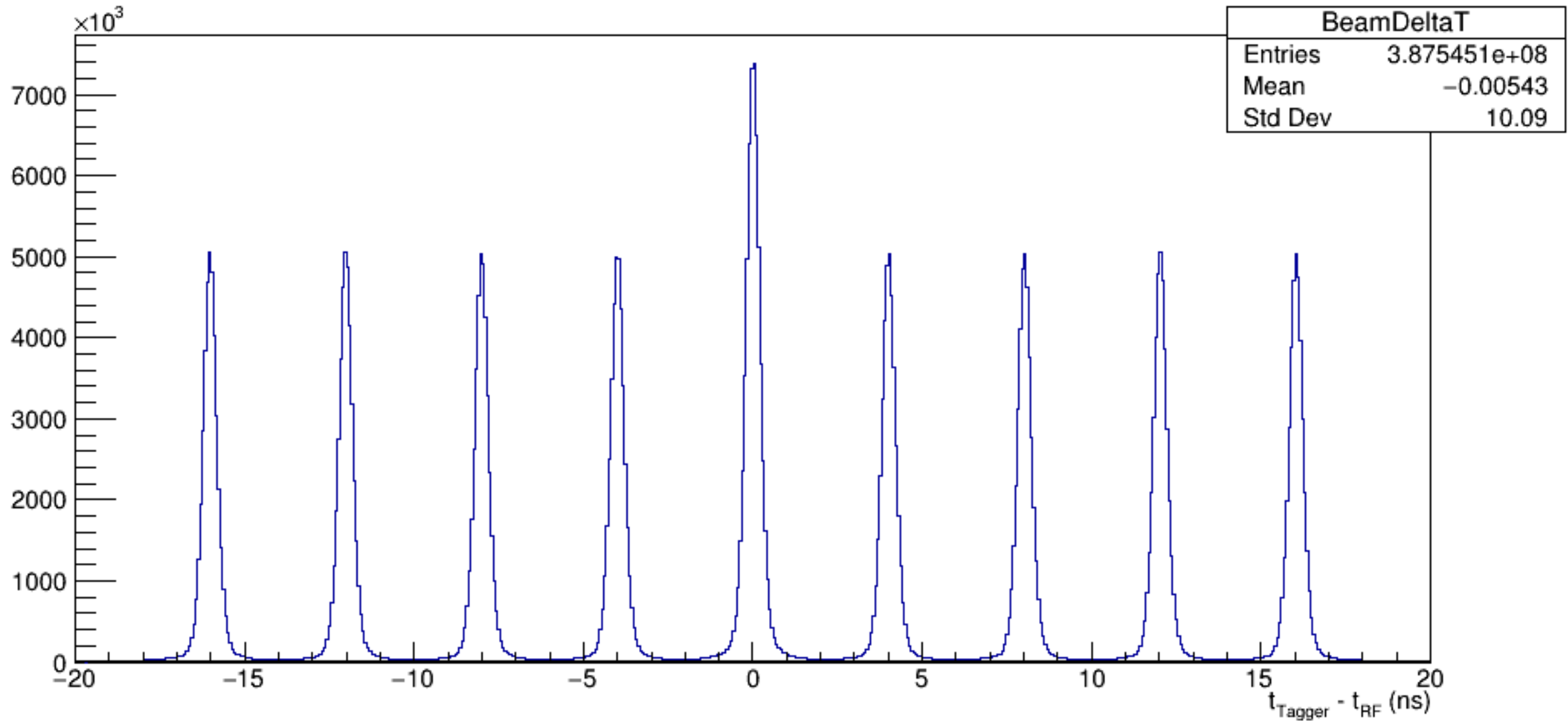
Prelim Analysis for Rho0 Candidate in Deuterium.

- ReactionFilter plugin is used to find the events for Rho0 channels to make an Analysis Trees.
- $\gamma + d \longrightarrow \pi^+ + \pi^- + p + (n)$
Reaction 1_45__8_9_m13 Flag: F4B4 (P4 and Vertex Constraint) with 4 Beam Bunches
- Dselector is used for analyzing of “Analysis Trees” produced from Reaction Filter Plugin.
- Location: /cache/hald/offline_monitoring/RunPeriod-2021-11/ver04/REST
- Available Deuterium Productions runs have been selected.

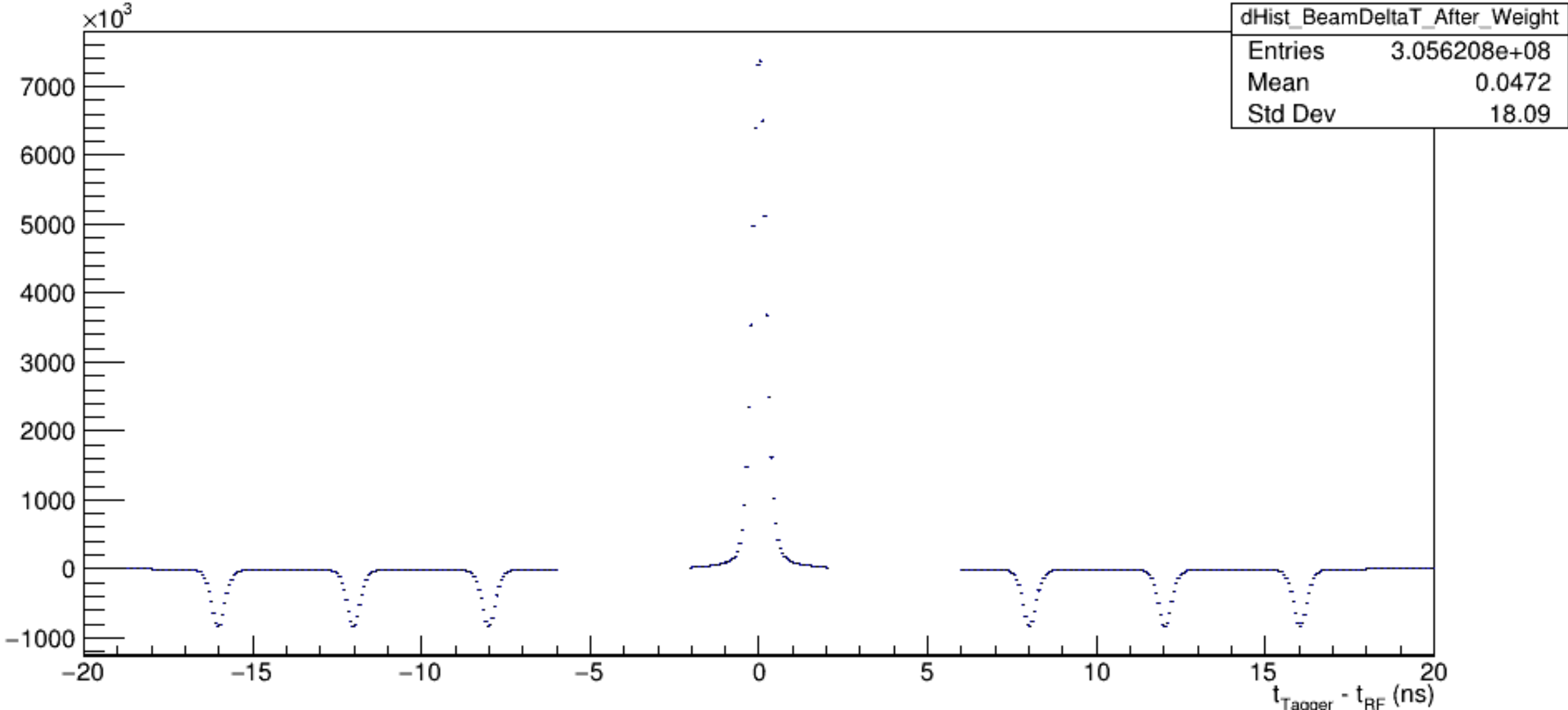
Applied Cuts

- $E_\gamma > 7.5 \text{ GeV}$
- $52 \text{ c.m} < Z_{\text{vertex}} < 78 \text{ c.m}$
- $CL > 0.001$ (Confidence level cut)
- $0.8 < MM2 < 0.96$ (Missing Mass Squared)
- $|t| > 1$ and $|u| > 1$
- $M_{\pi^+ p} > 1.4$ && $M_{\pi^- p} > 1.4$

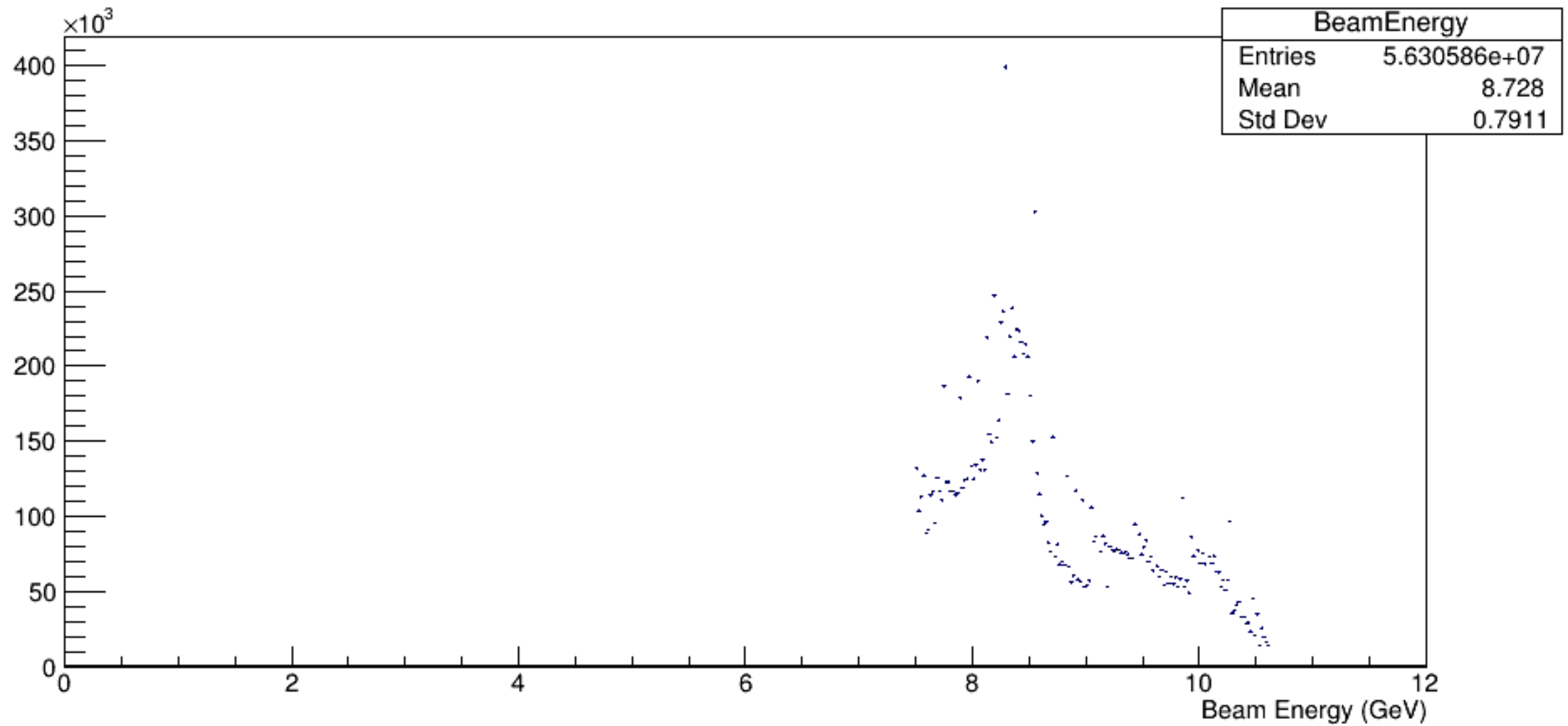
BeamDeltaT



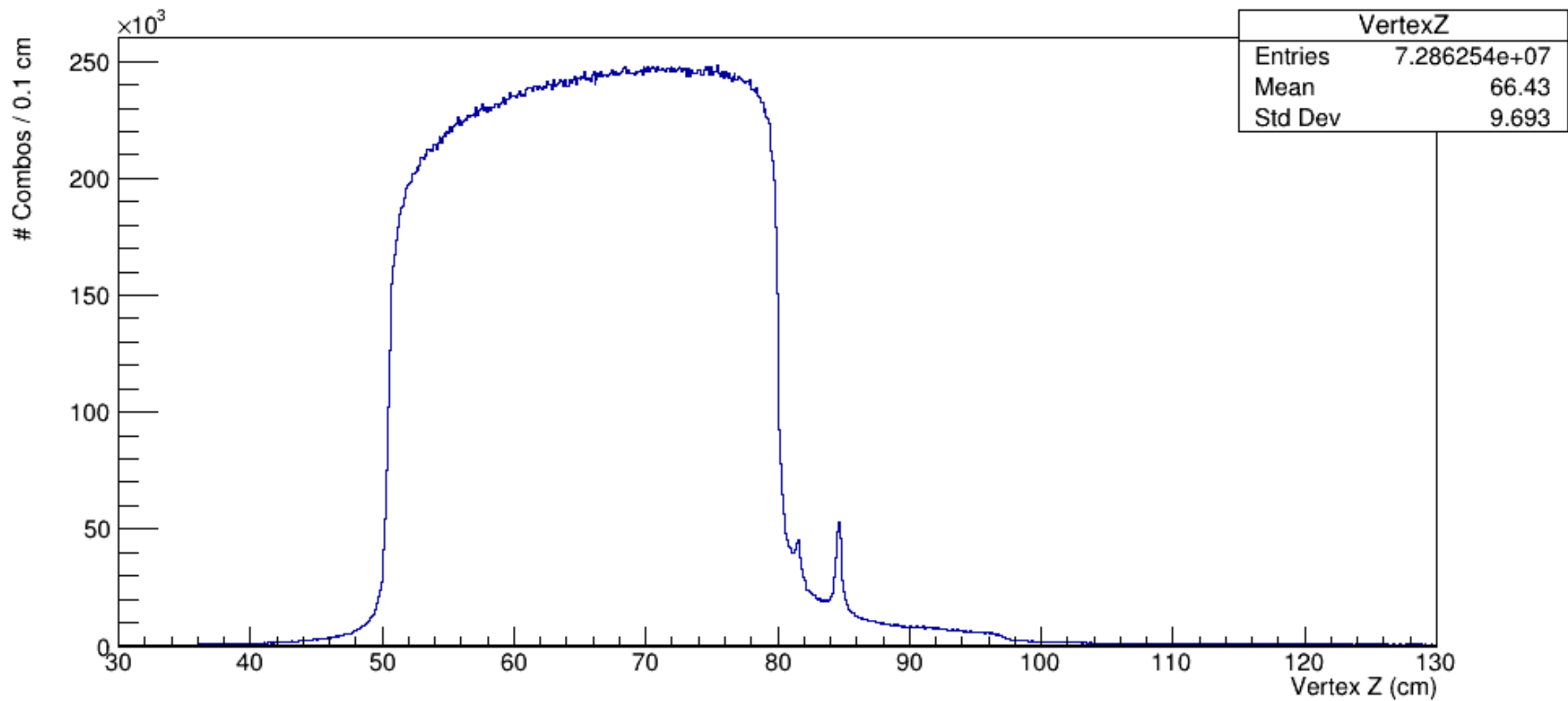
Beam Delta T Accidental Subtracted.



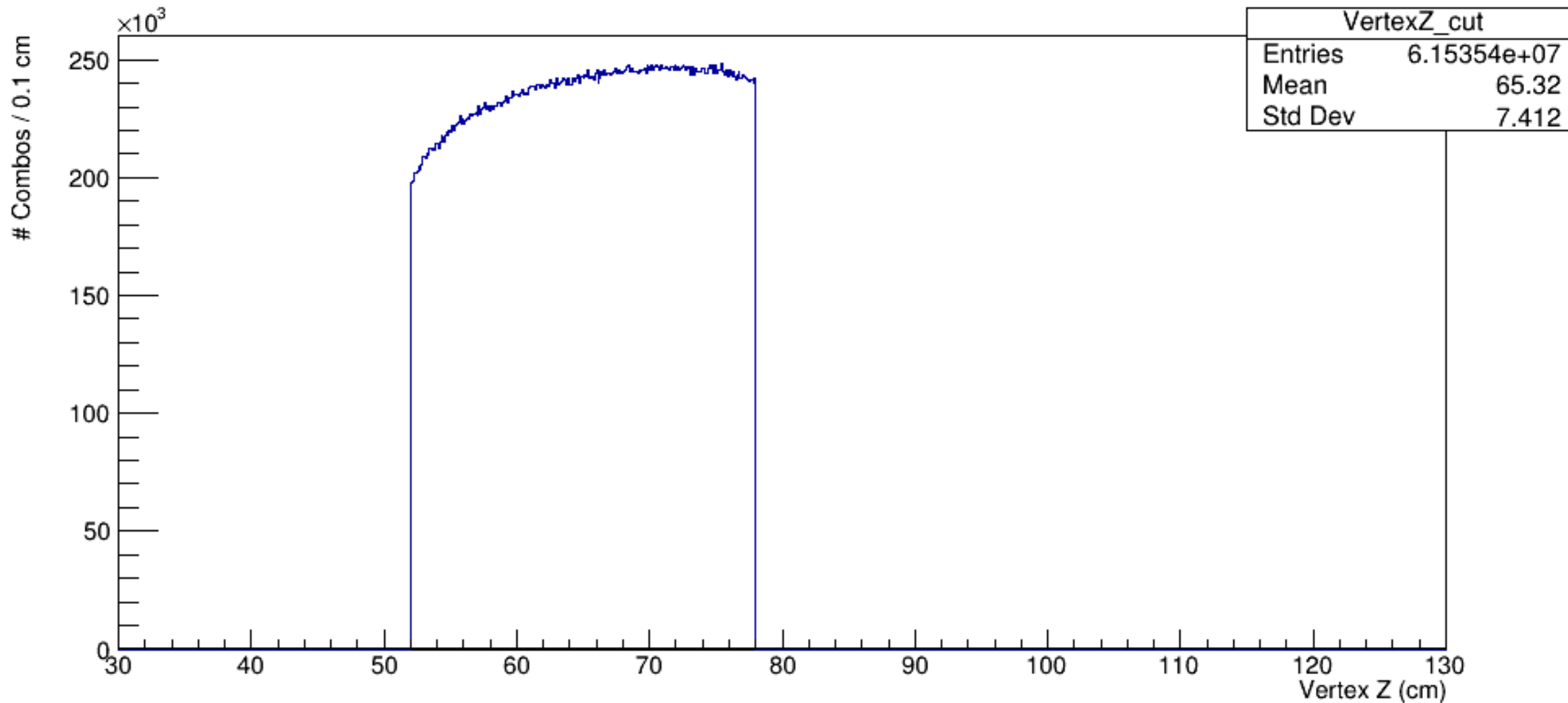
Beam Energy



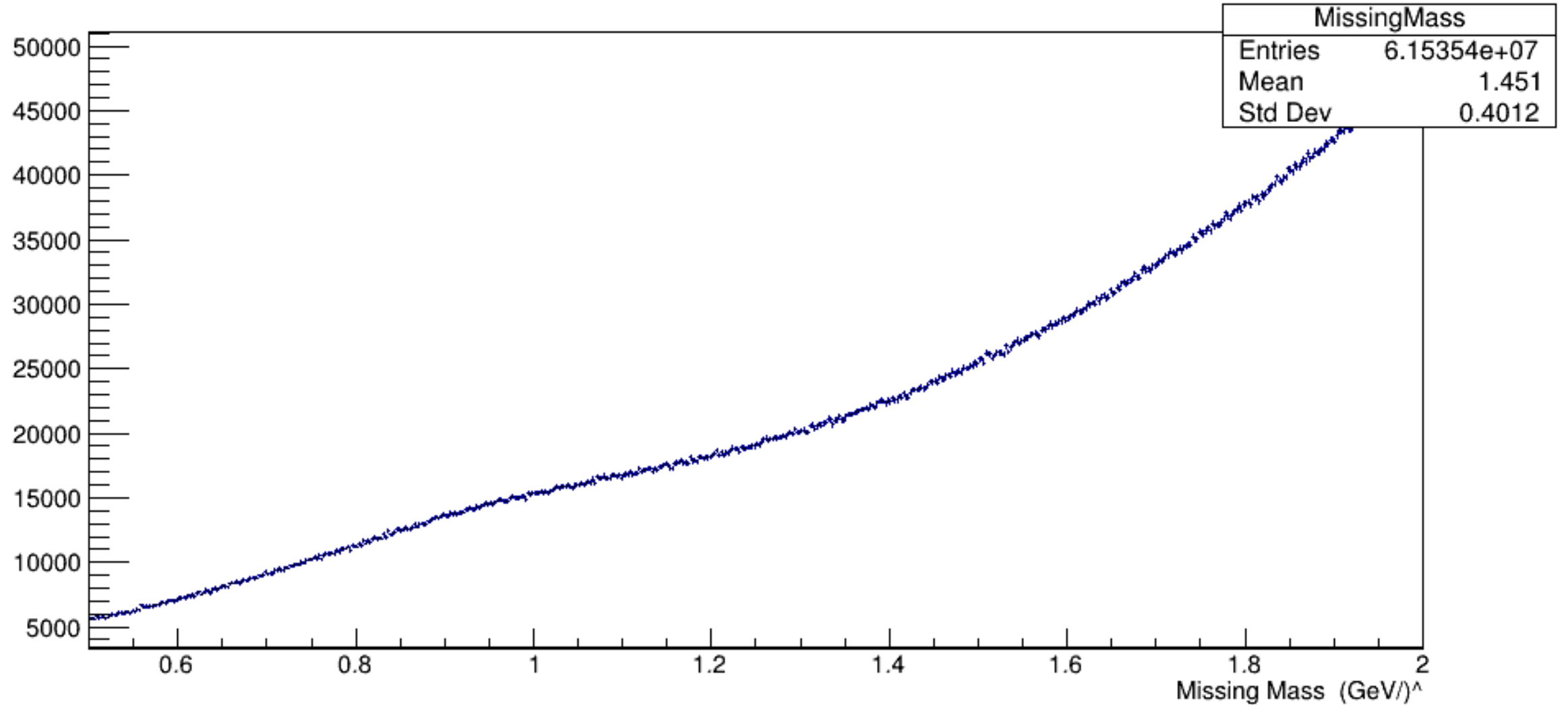
Vertex Z



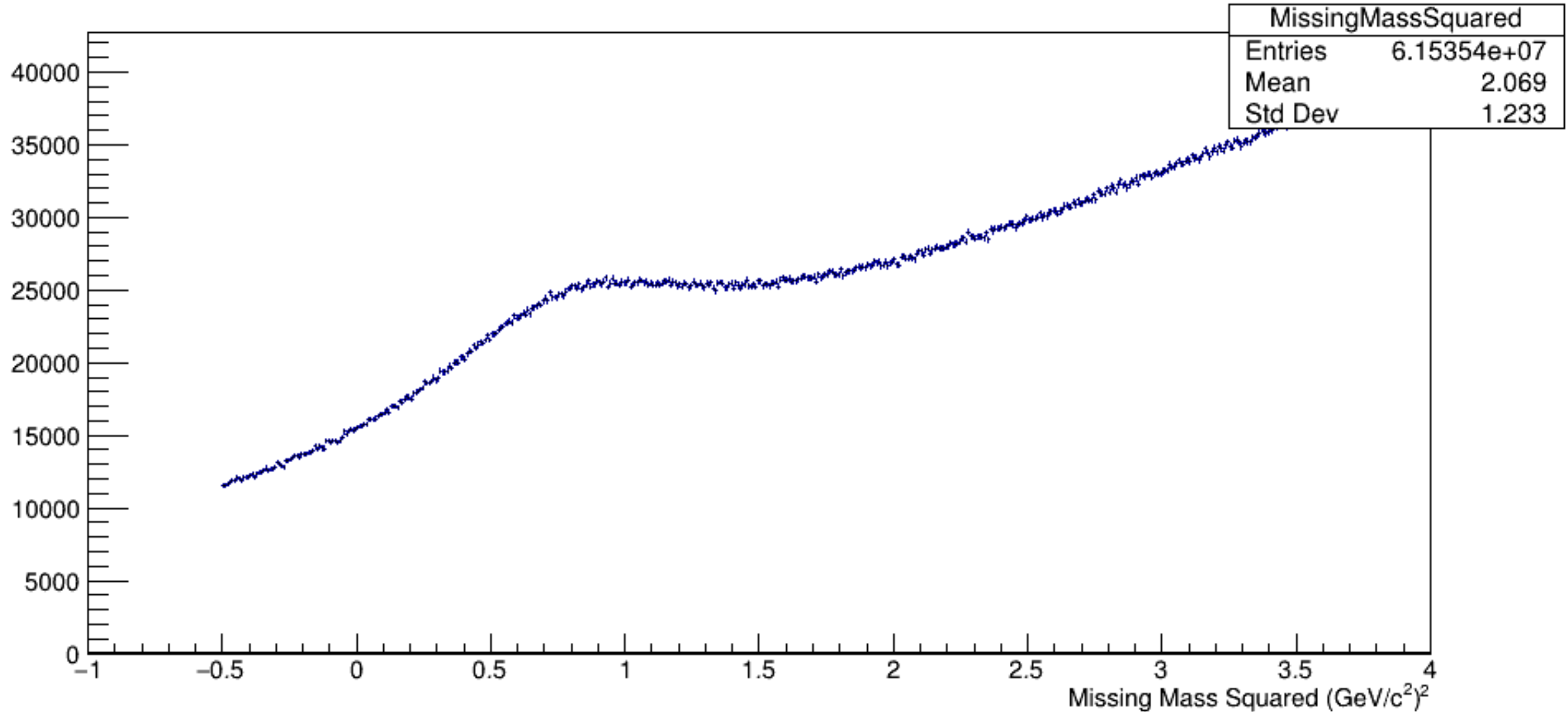
Vertex Z ($52 \text{ c.m} < Z_{\text{vertex}} < 78 \text{ c.m}$)



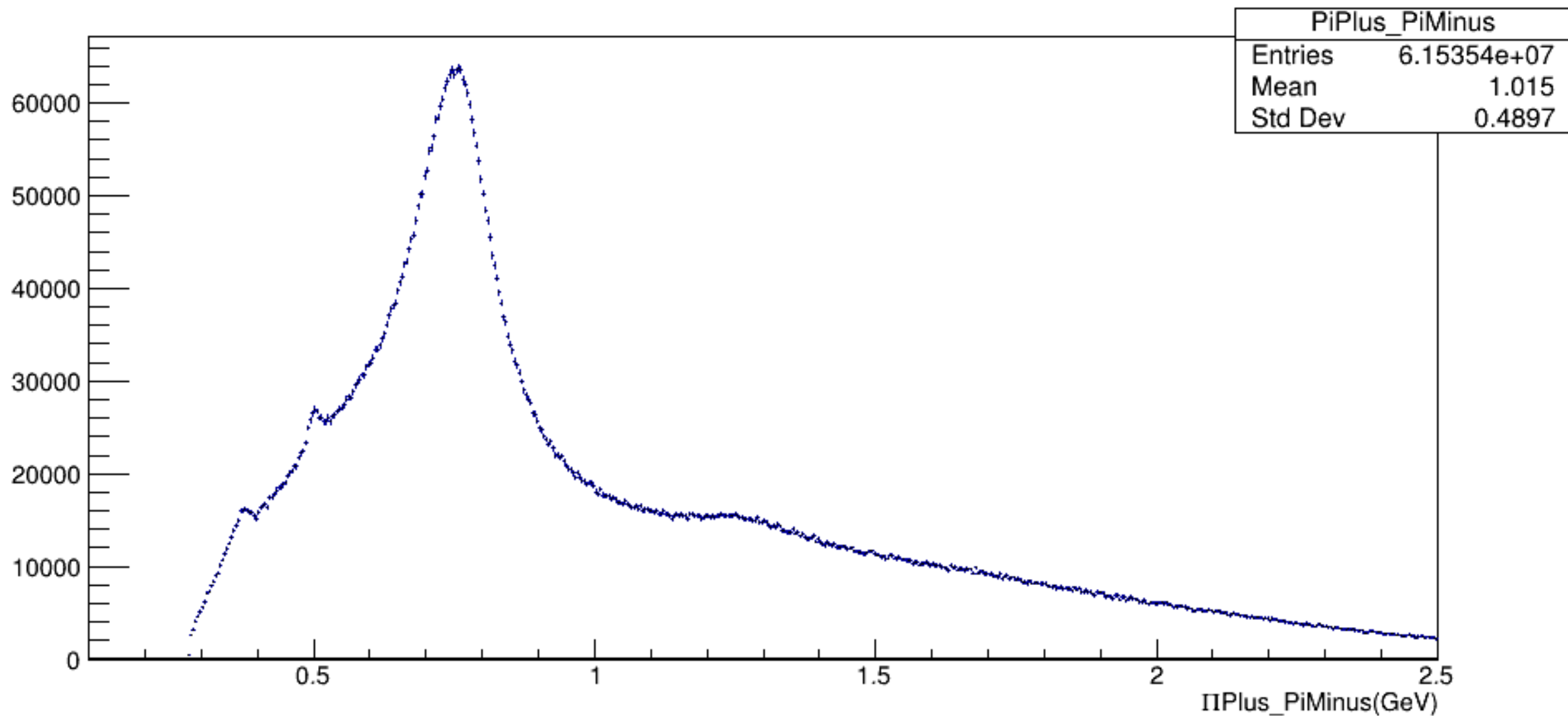
Missing Mass



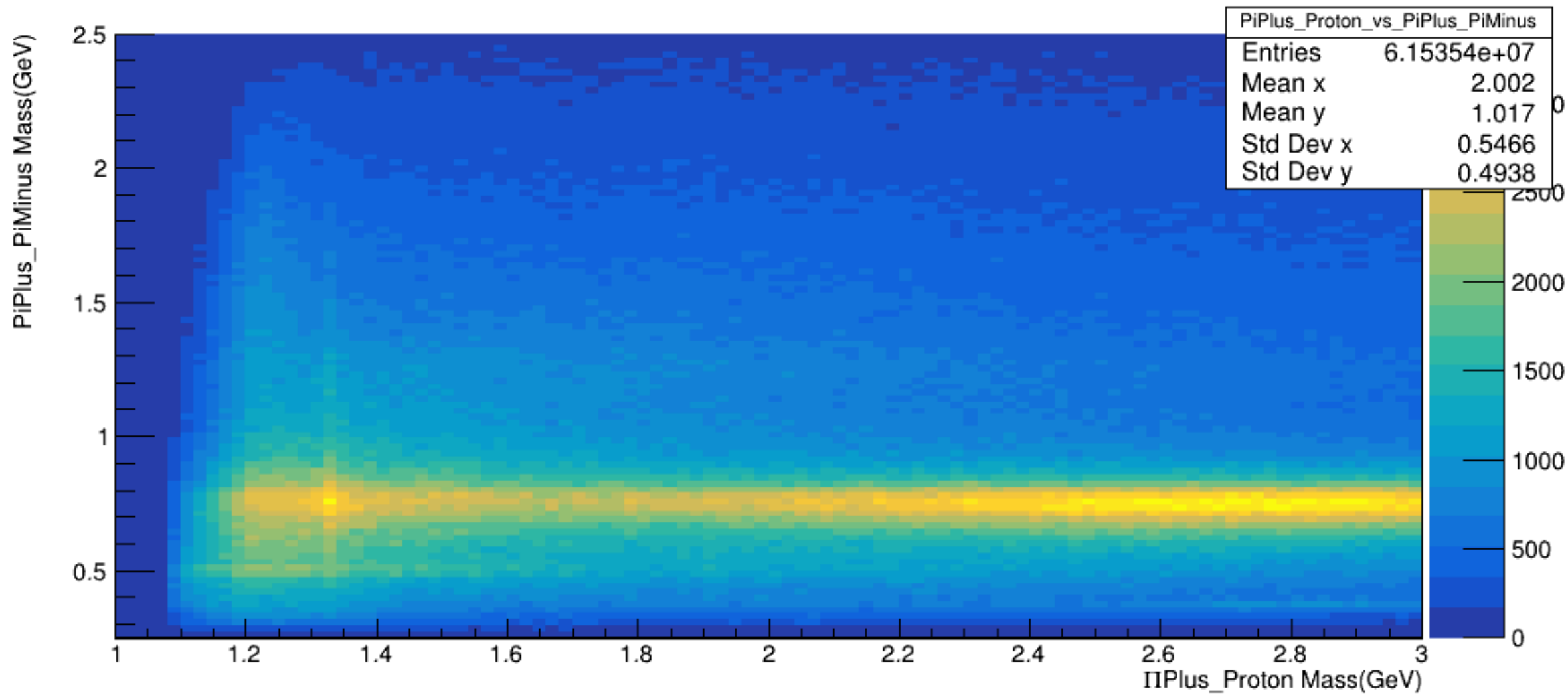
Missing Mass Squared



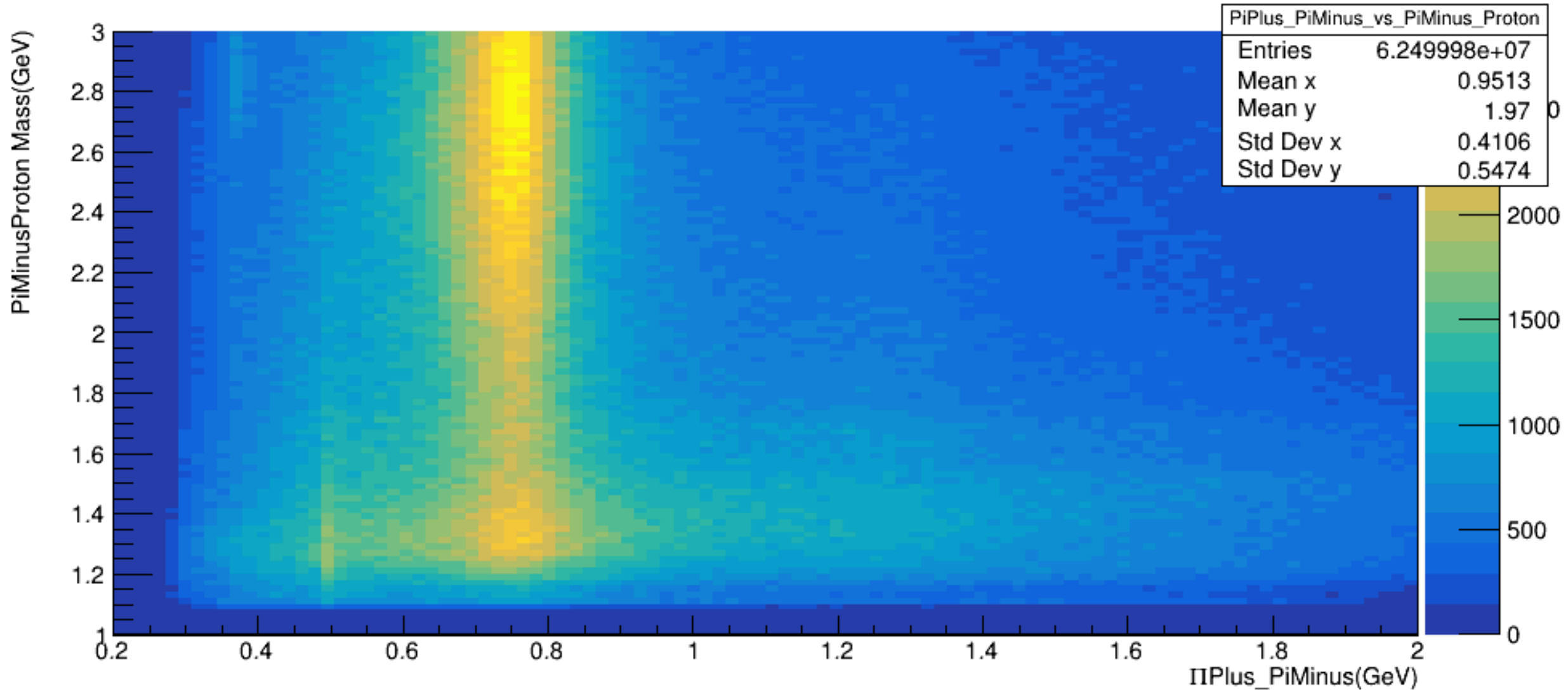
PipPim Invariant Mass



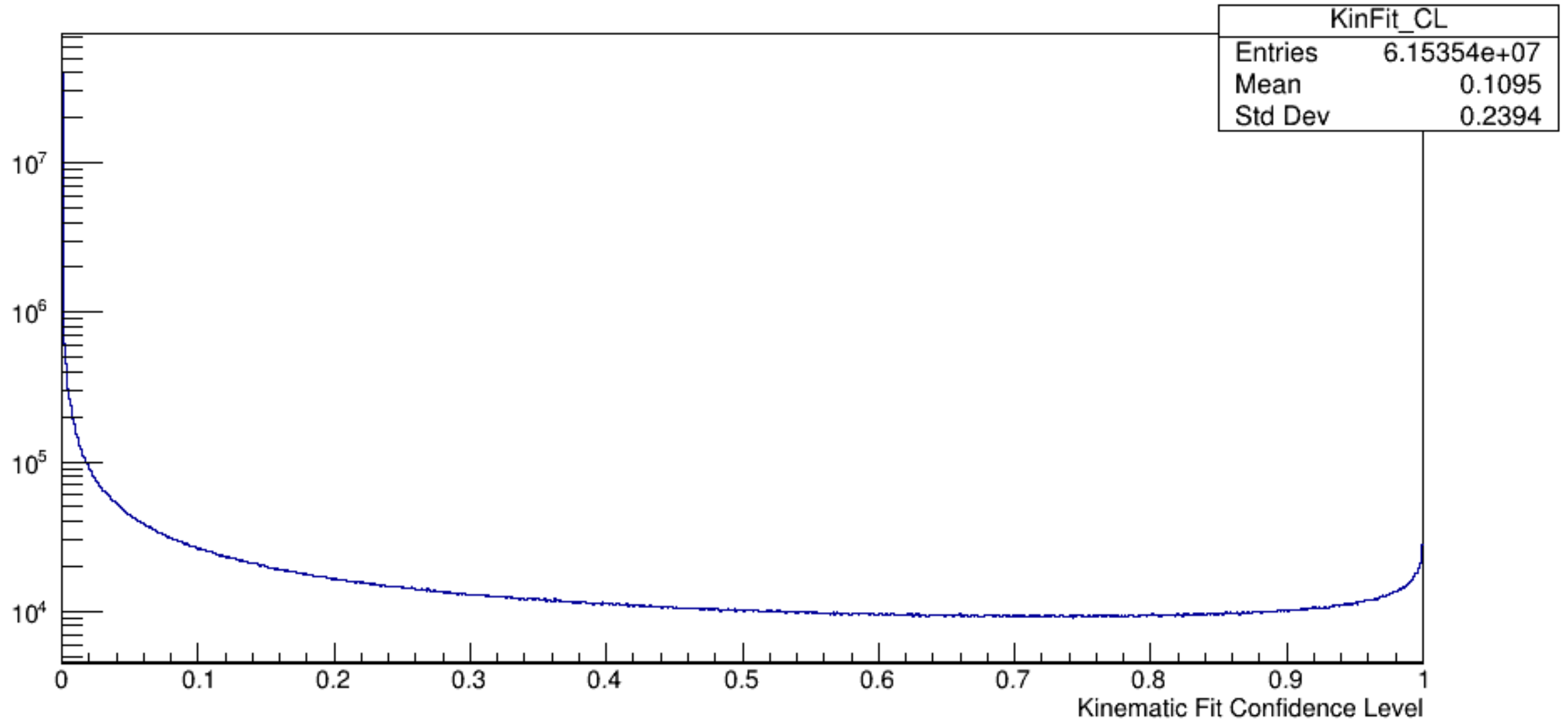
2D Invariant Mass



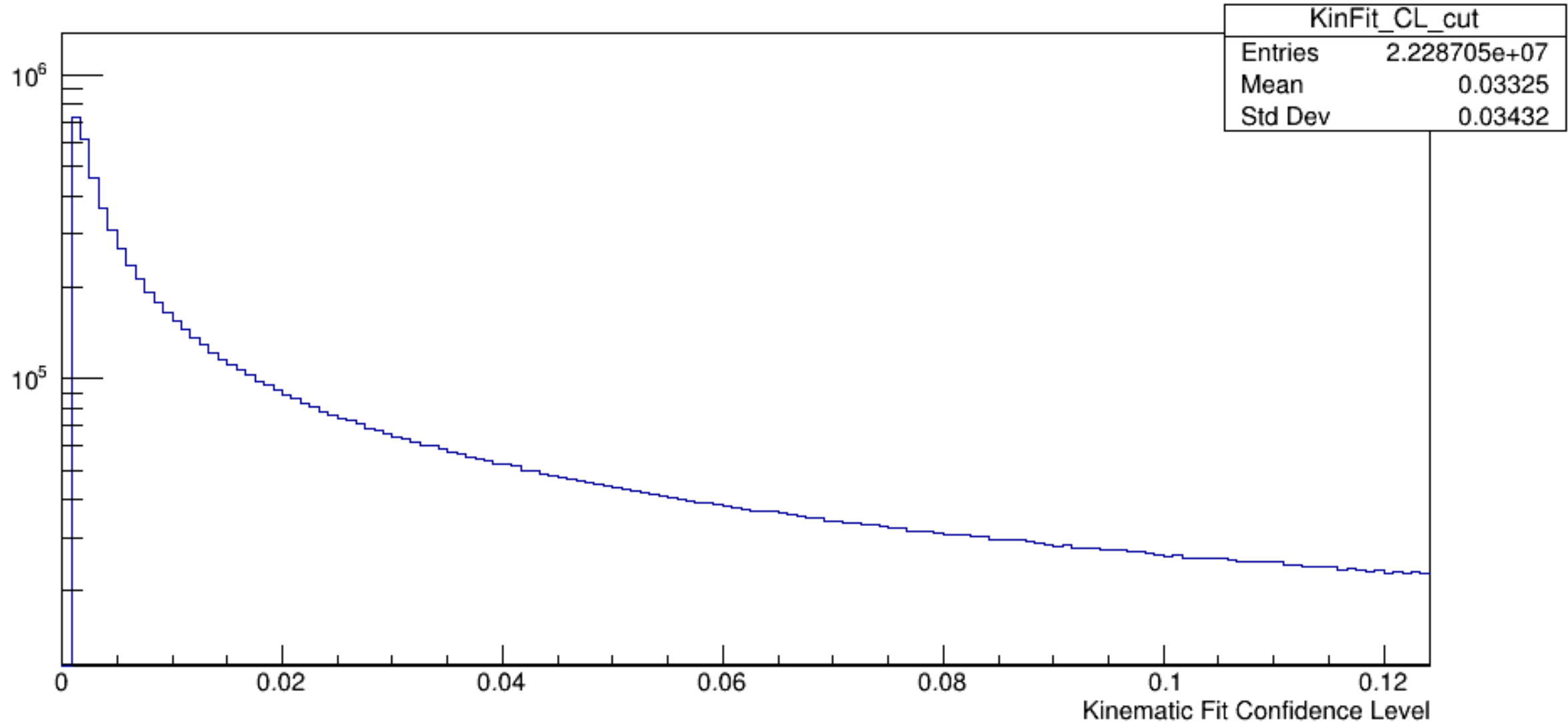
2D Invariant Mass



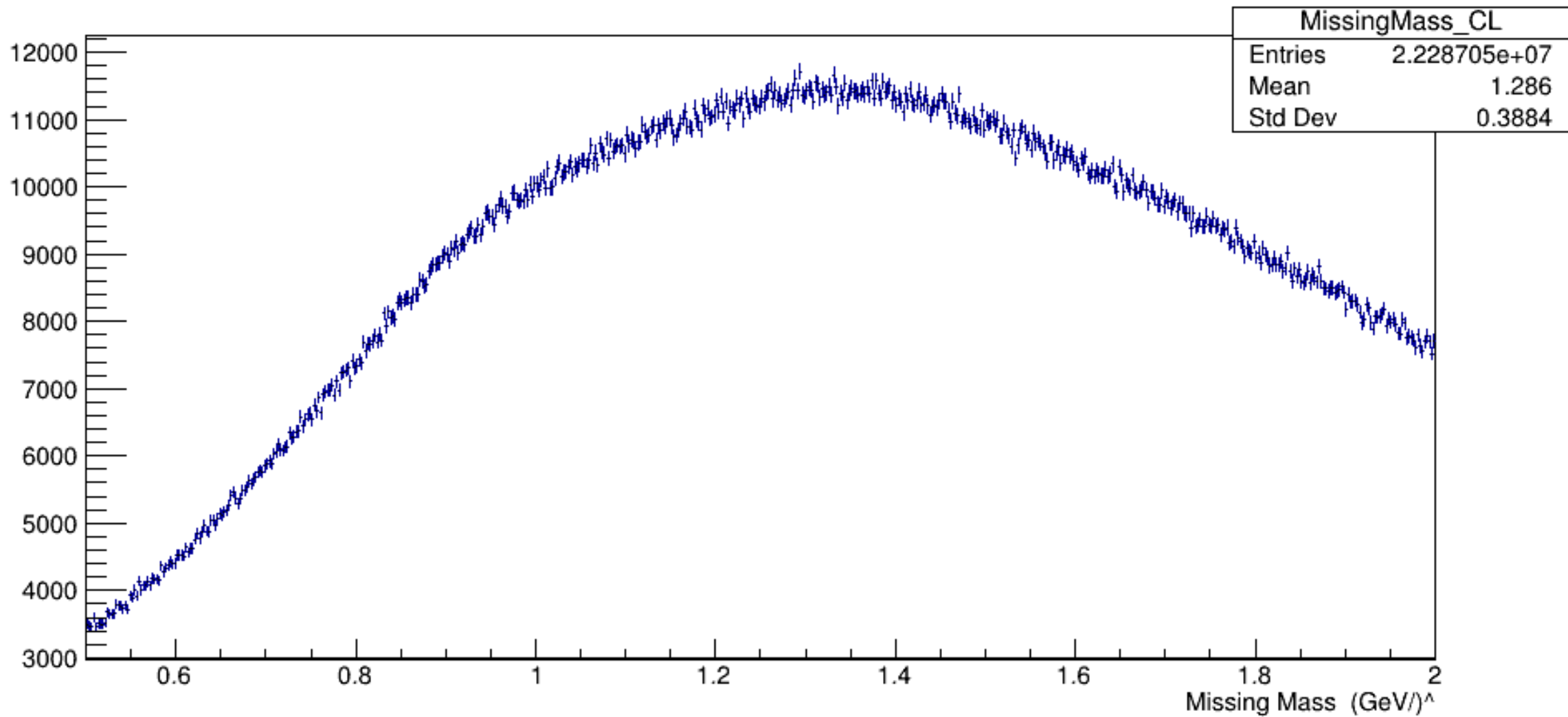
Kinematic Fit Confidence Level



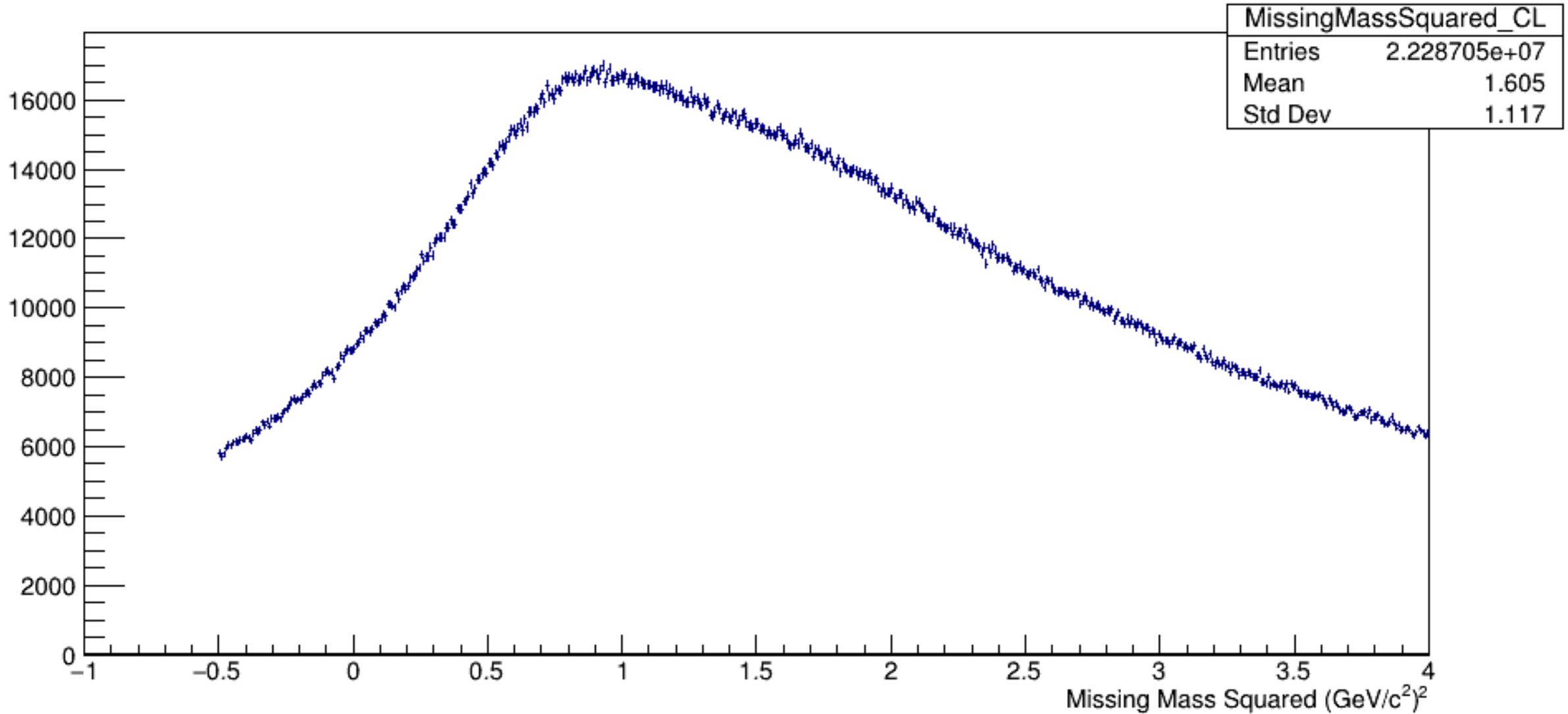
Confidence level cut >0.001



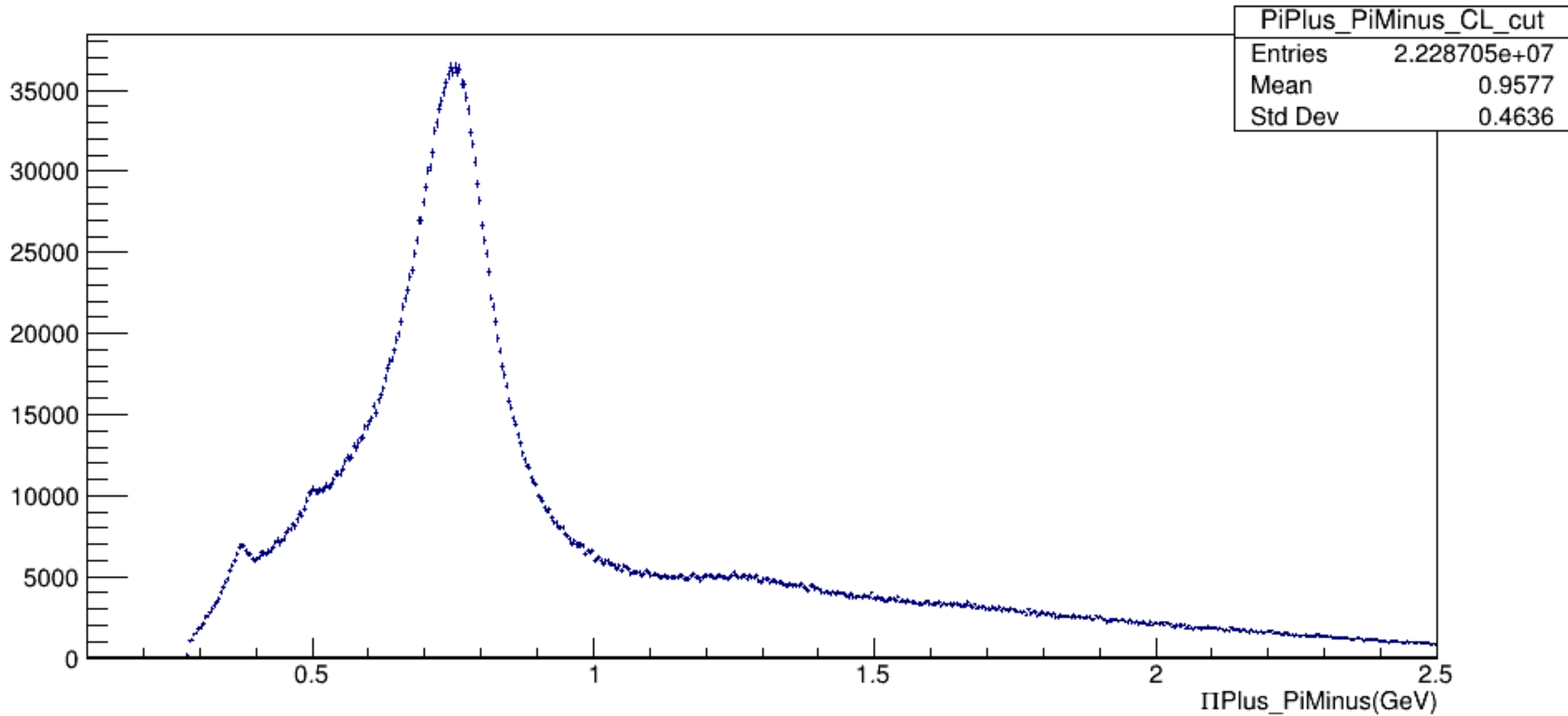
Missing Mass After CL cut



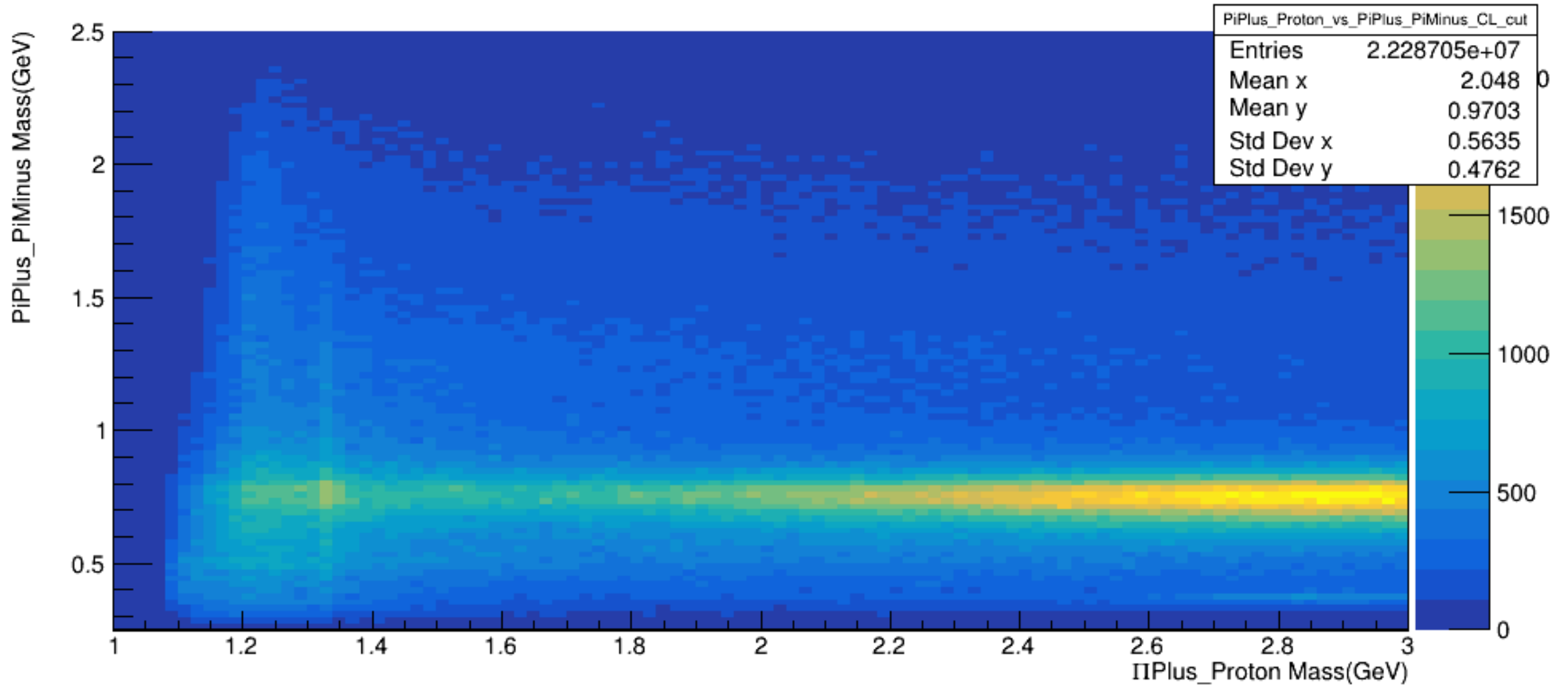
Missing Mass Squared After CL cut



PipPim Invariant Mass After CL cut >0.001

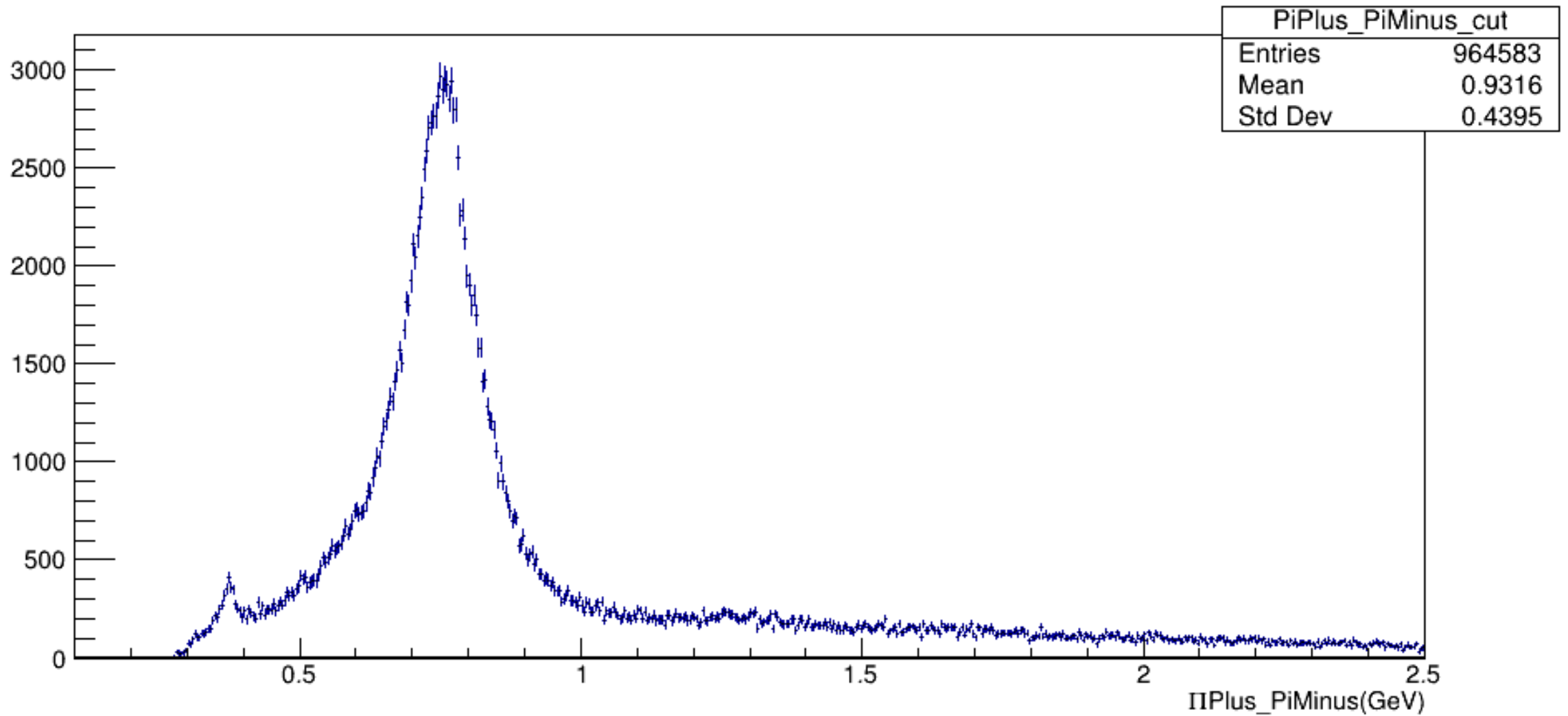


2D Invariant Mass after CL cut

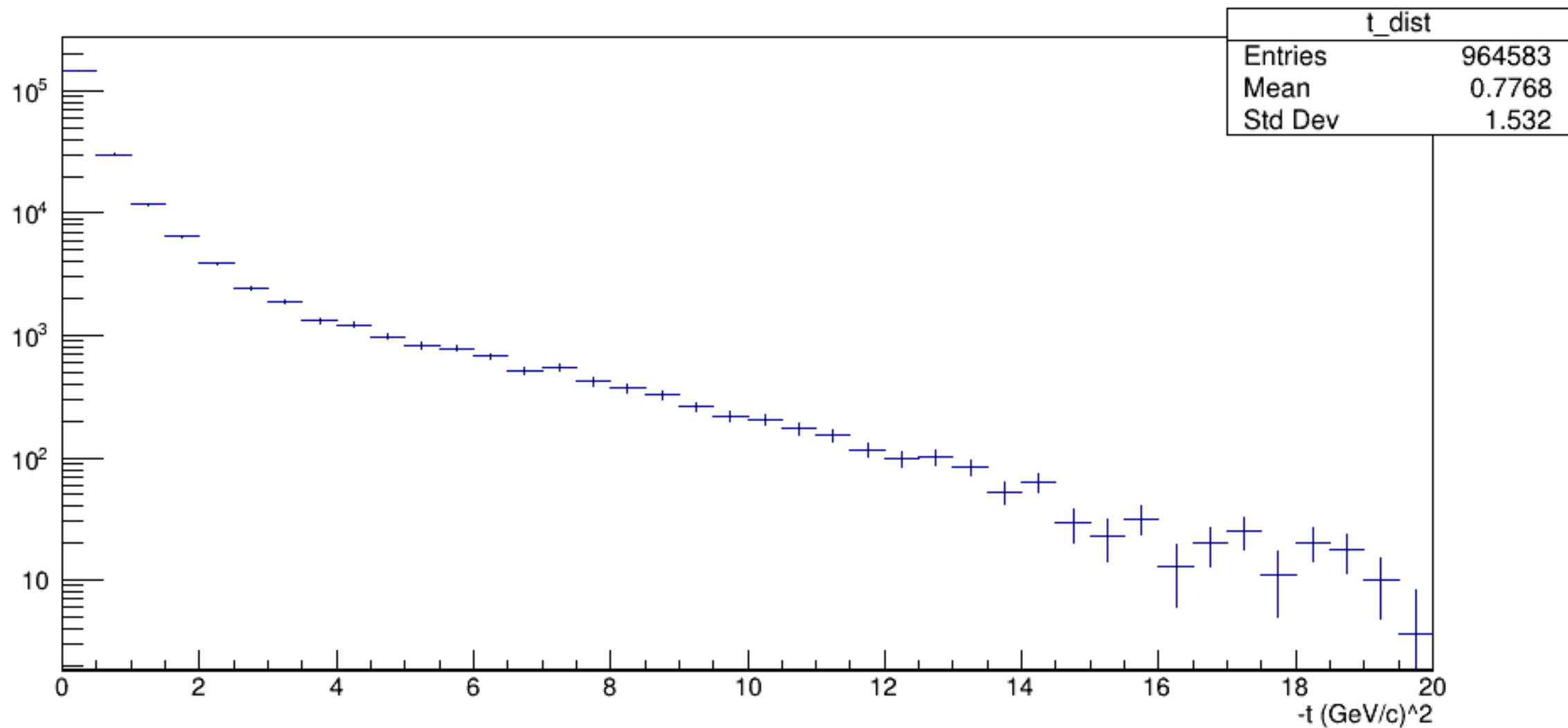


PiPPim Invariant Mass

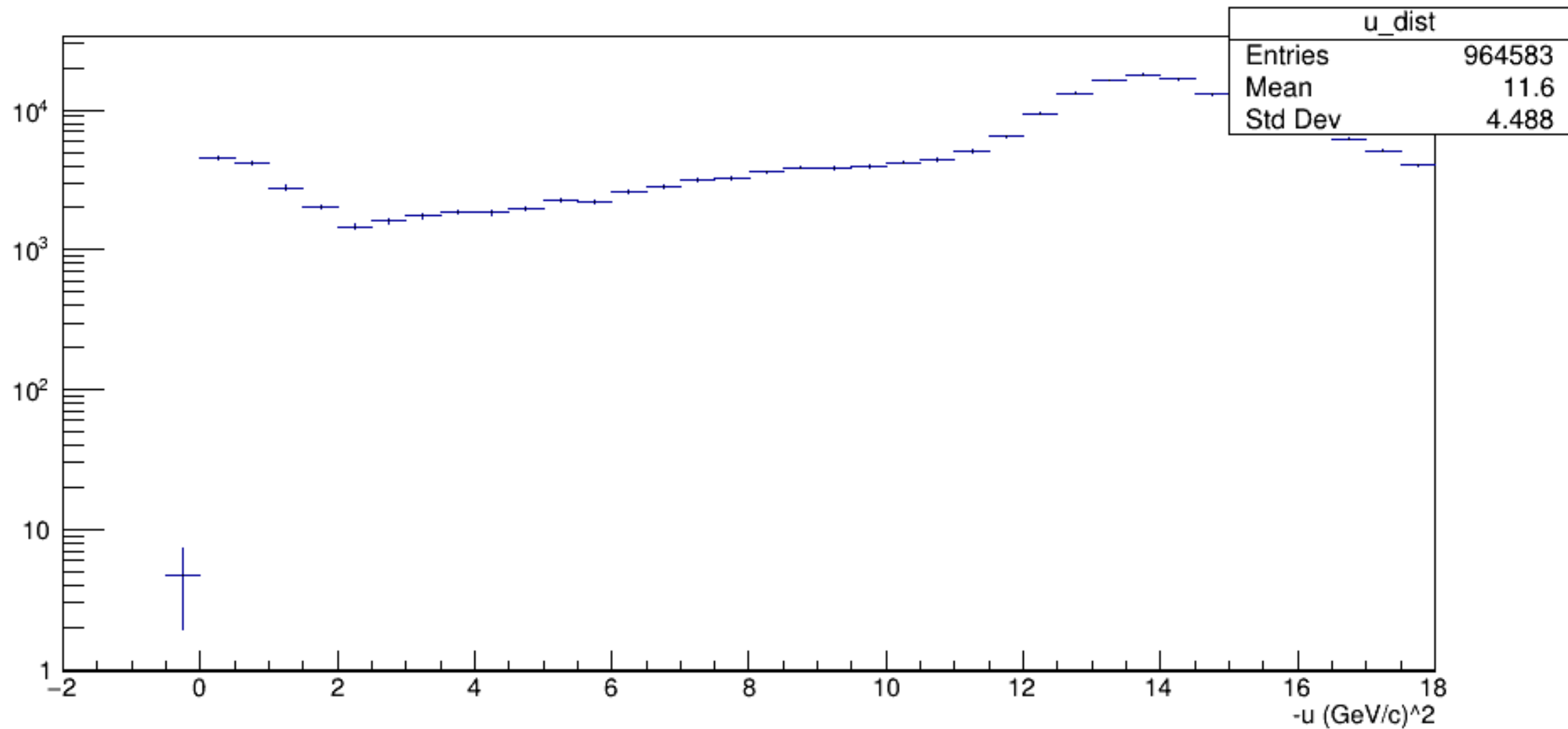
Missing Mass Squared Cut: $0.8 < MM^2 < 0.96$



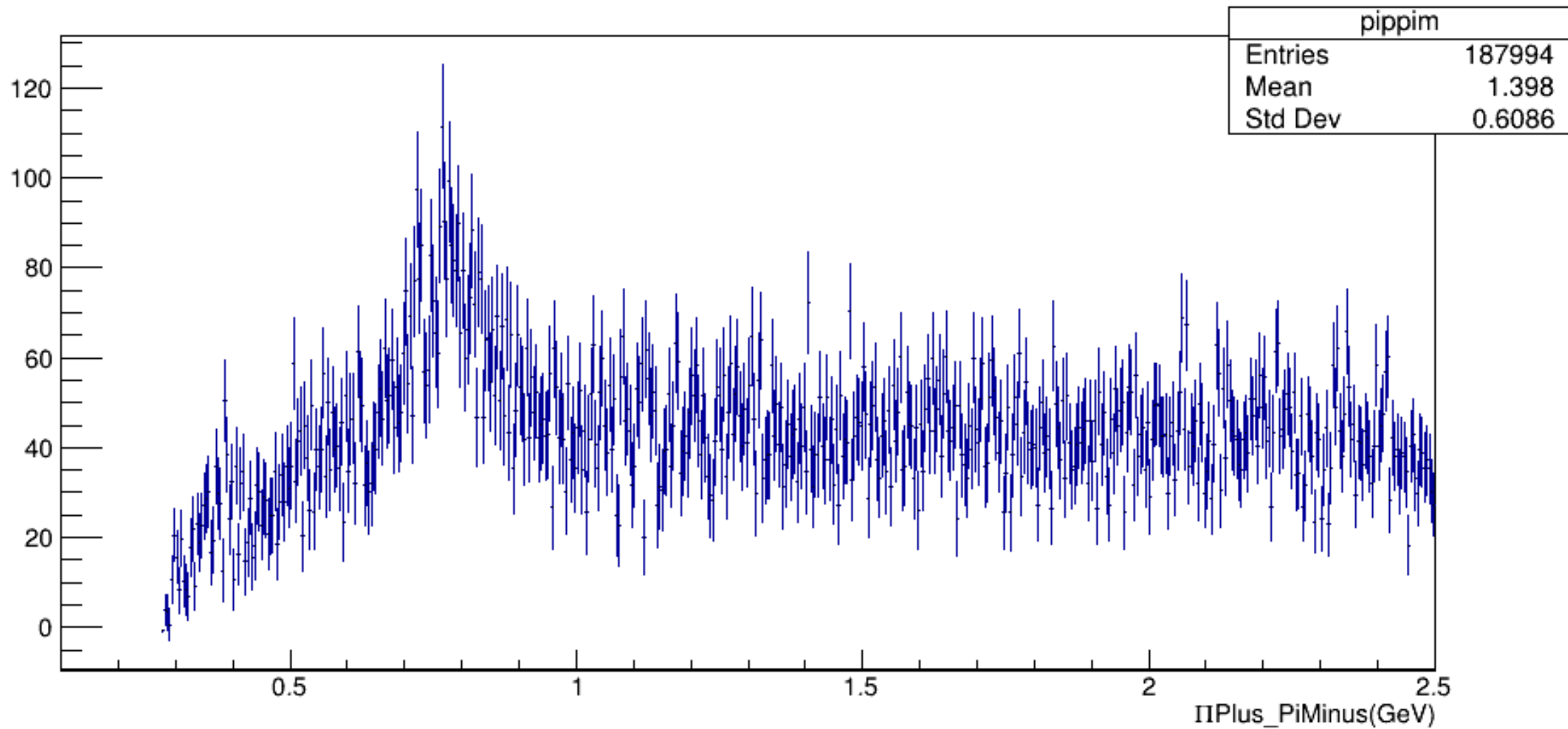
|t| distribution



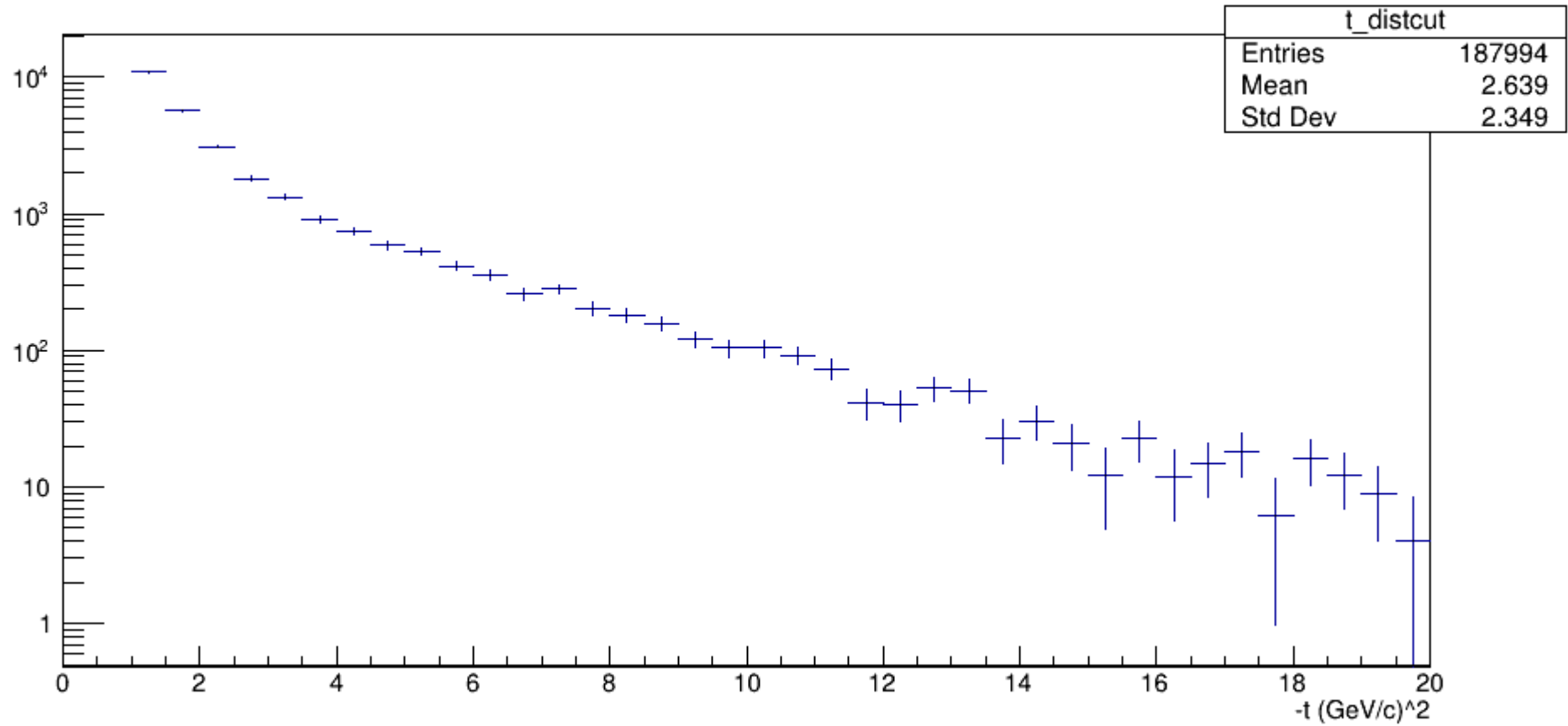
|u| distribution



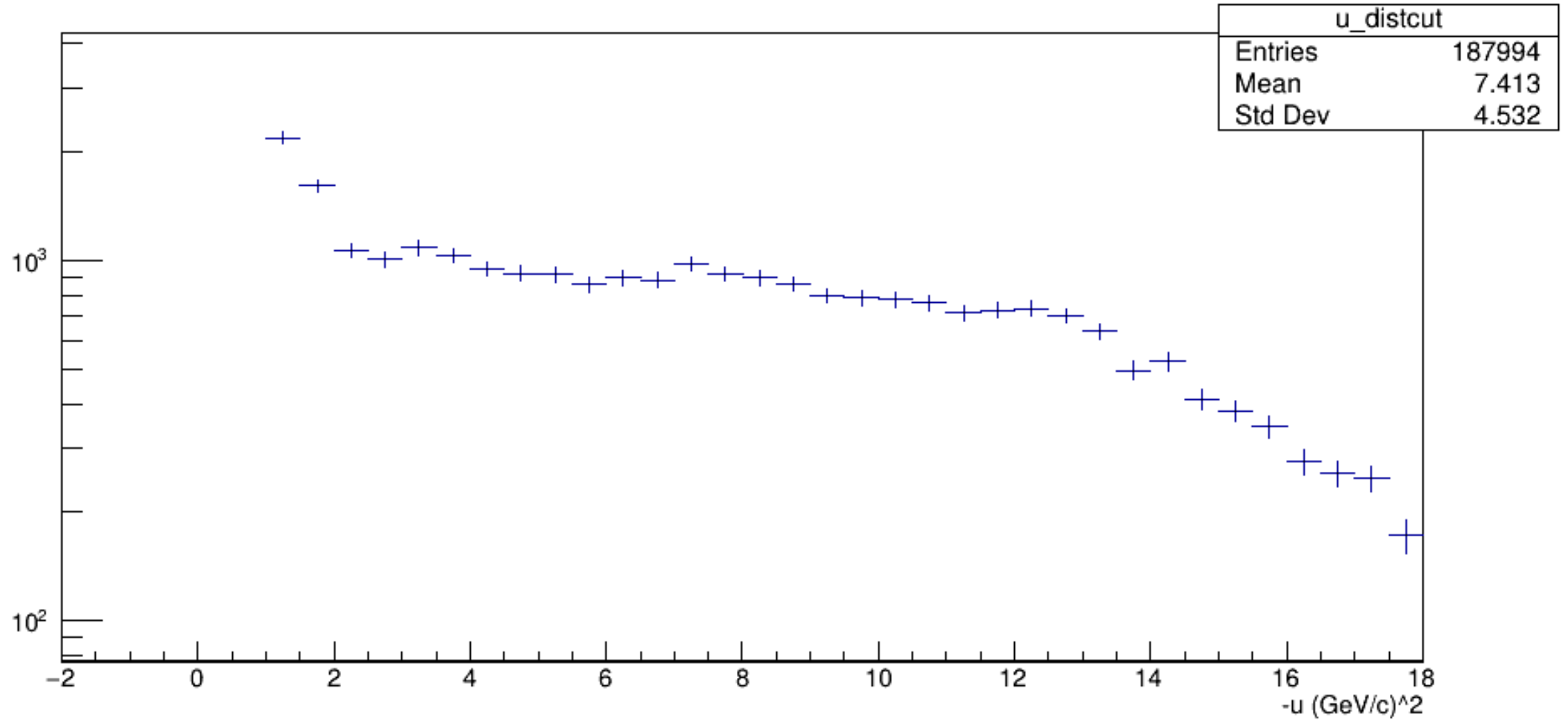
Invariant Mass of PipPim after cut: $|t| > 1$, $|u| > 1$



$|t|$ distribution after $|t| > 1$, $|u| > 1$

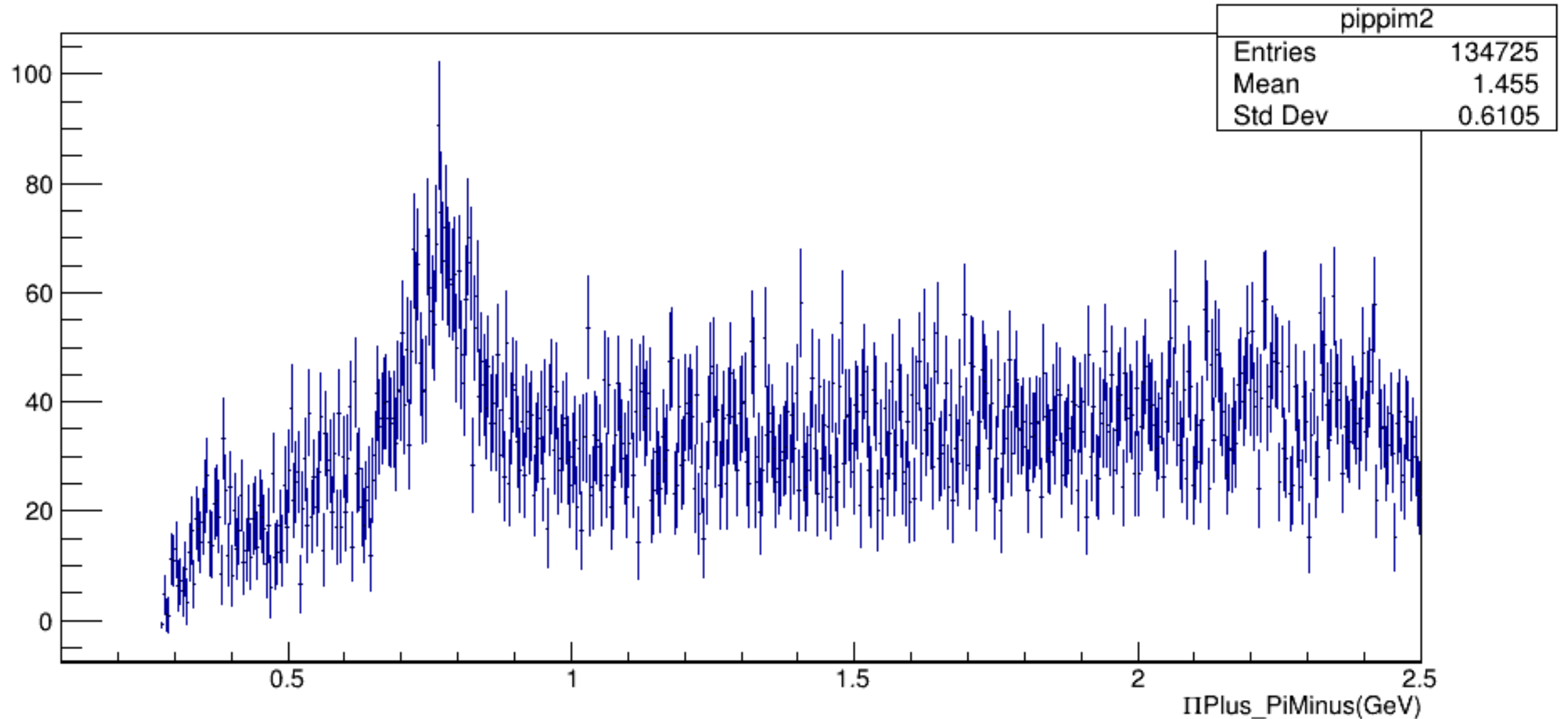


$|u|$ distribution after $|t| > 1$, $|u| > 1$



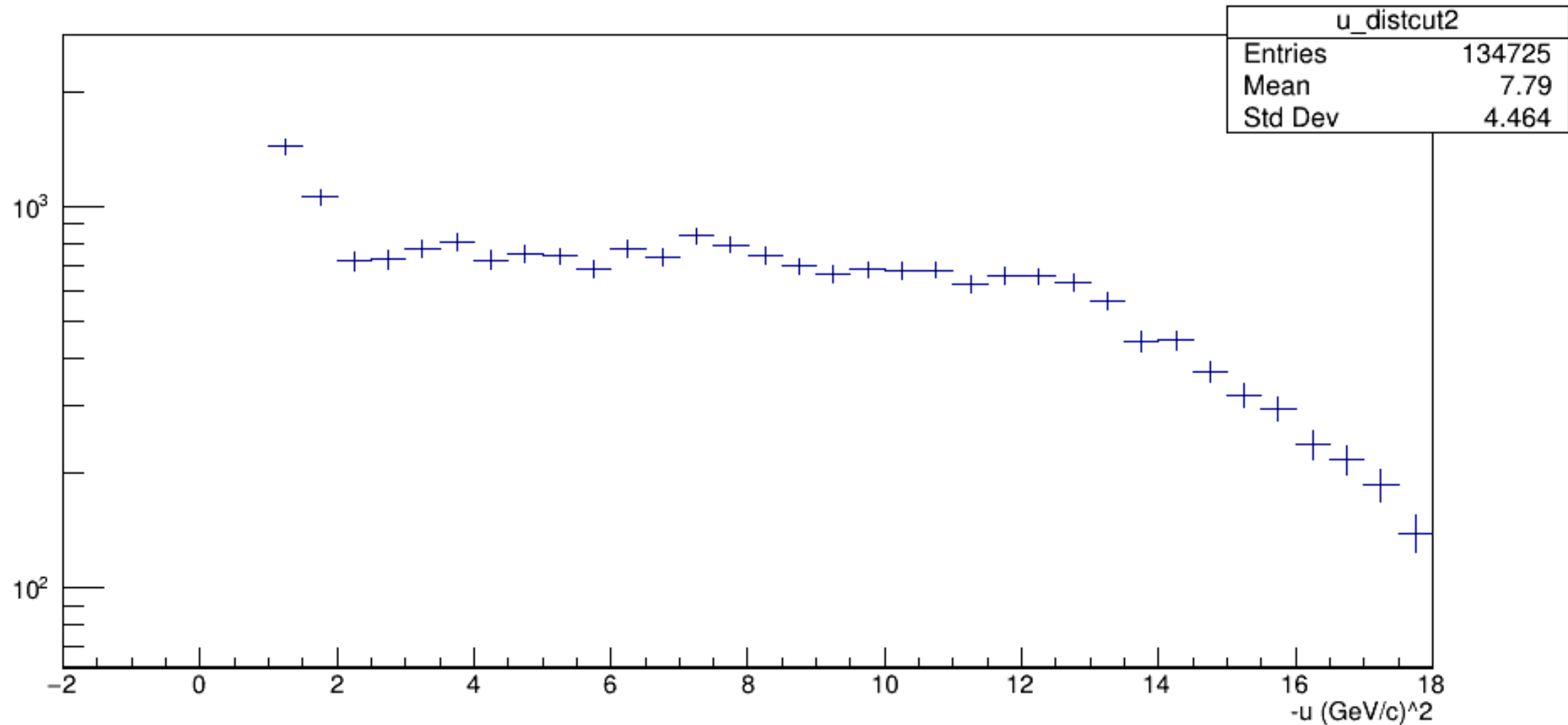
PipPim Invariant Mass

Cut on Invariant Mass: $M_{\pi^+\rho} > 1.4$ && $M_{\pi^-\rho} > 1.4$



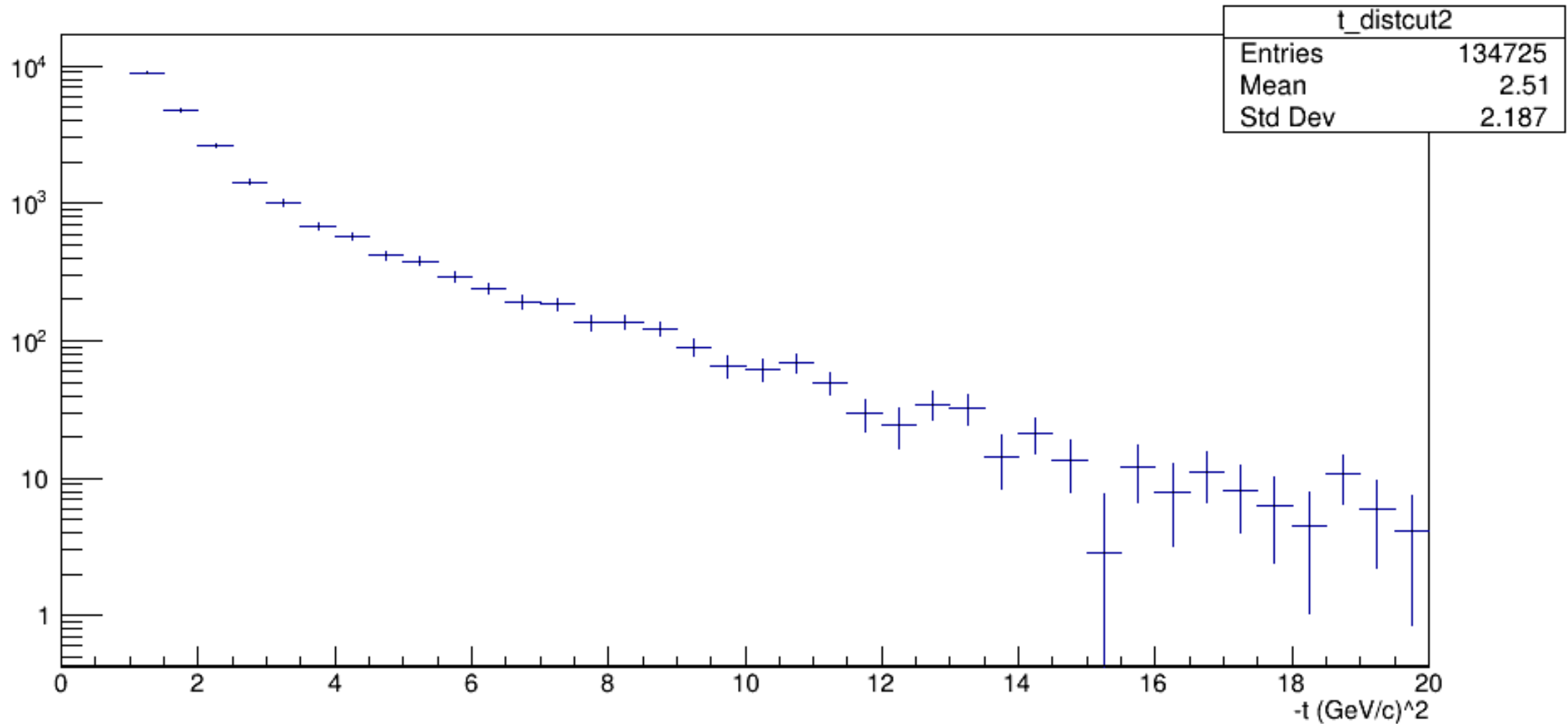
|u| distribution

Cut on Invariant Mass: $M_{\pi^+\rho} > 1.4$ && $M_{\pi^-\rho} > 1.4$



|t| distribution

Cut on Invariant Mass: $M_{\pi^+\rho} > 1.4$ && $M_{\pi^-\rho} > 1.4$



Summary of cuts applied

- $E_\gamma > 7.5 \text{ GeV}$
- $52 \text{ c.m} < Z_{\text{vertex}} < 78 \text{ c.m}$
- $CL > 0.001$ (Confidence level cut)
- $0.8 < MM2 < 0.96$ (Missing Mass Squared)
- $|t| > 1$ and $|u| > 1$
- $M_{\pi^+ p} > 1.4$ && $M_{\pi^- p} > 1.4$