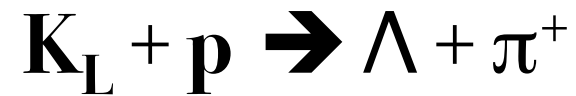




HDGEANT

Mar. 29, 2017

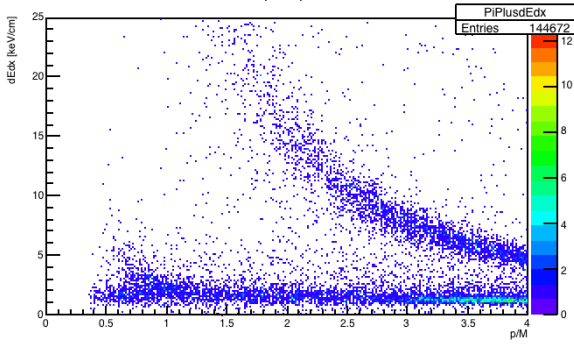
K. Park



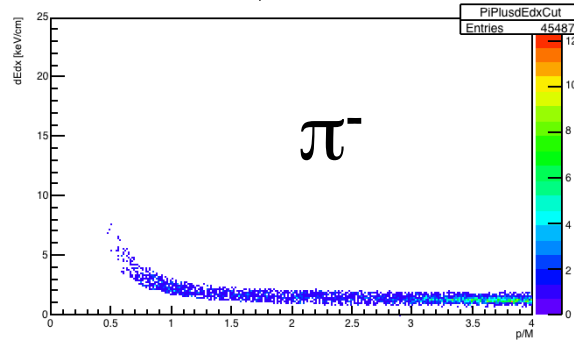
$K_L p \rightarrow \Lambda \pi^+$ full MCSIM in Hall-D

Nick's

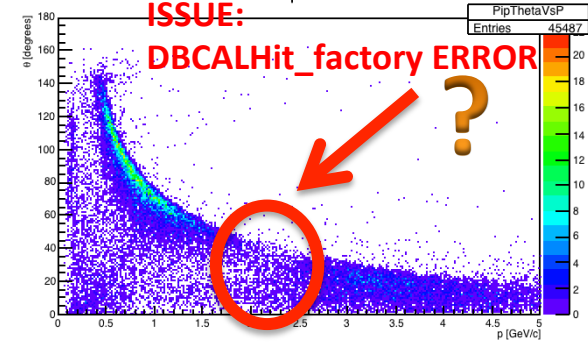
dEdx vs p/M, π^- cands.



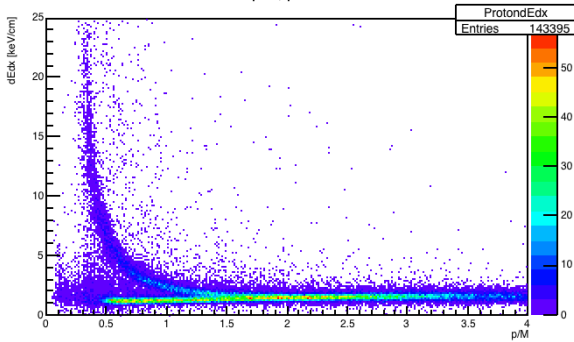
dEdx vs p/M, π^- cands., cut



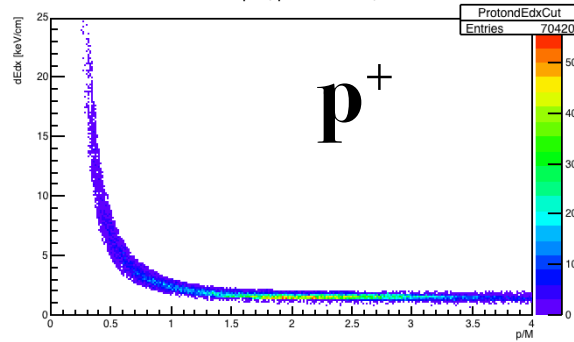
θ vs p for π^-



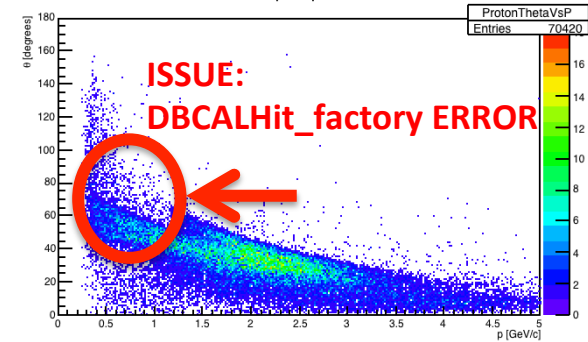
dEdx vs p/M, proton cands.



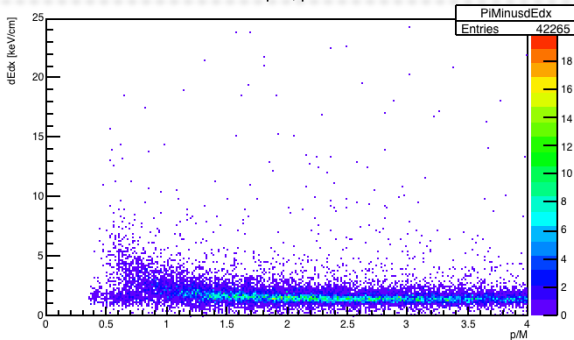
dEdx vs p/M, proton cands., cut



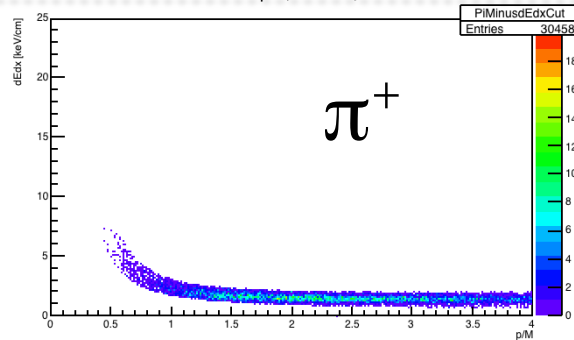
θ vs p for proton



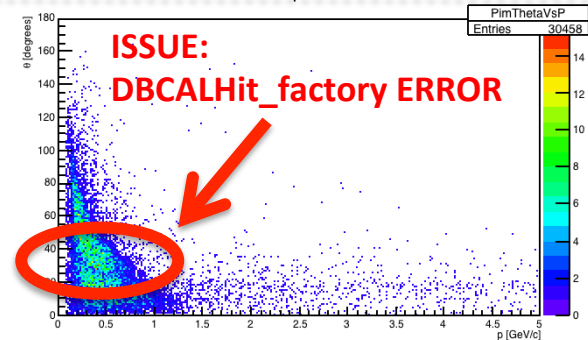
dEdx vs p/M, π^+ cands.



dEdx vs p/M, π^+ cands., cut

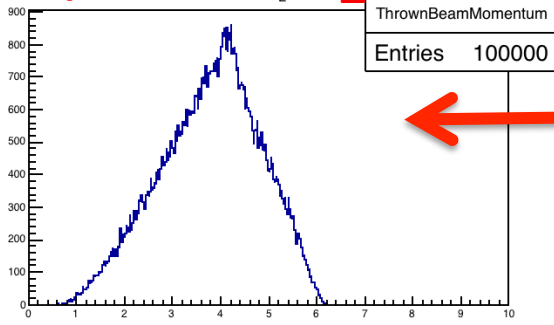


θ vs p for π^+



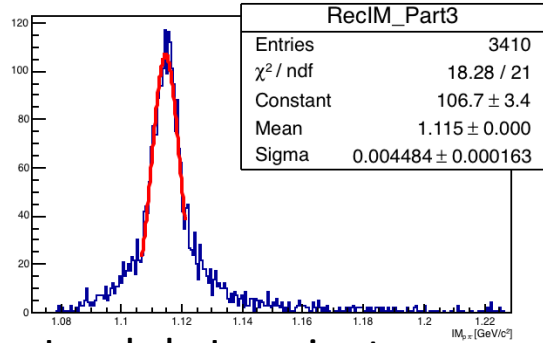
$K_L p \rightarrow \Lambda \pi^+$ full MCSIM in Hall-D

`./nickZachriou_OS6-M100000-Fgenerated_event_lampip.hddm-Rk14`

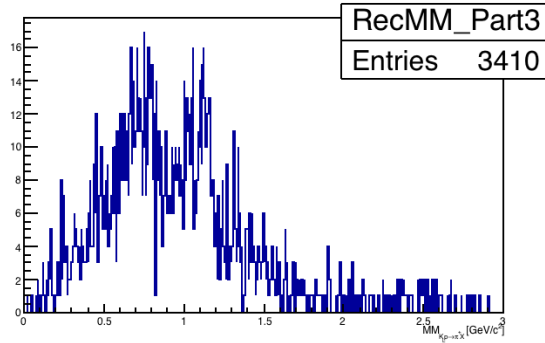


Thrown:
Similar KL momentum
distribution from PYTHIA6

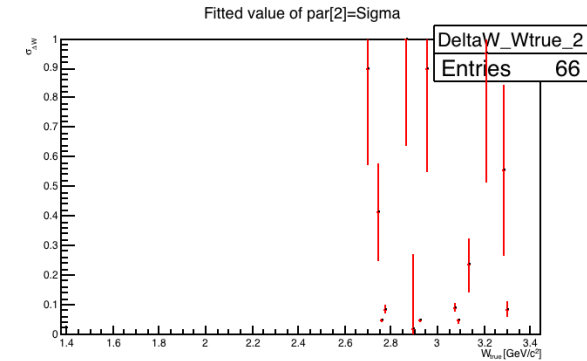
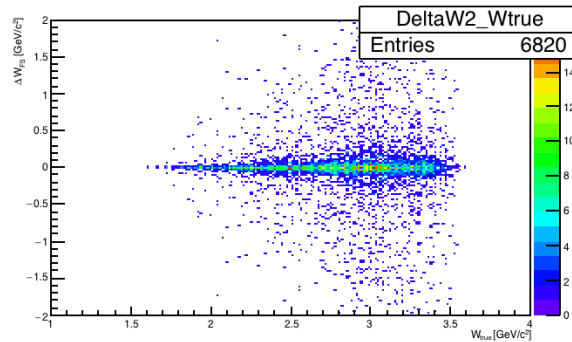
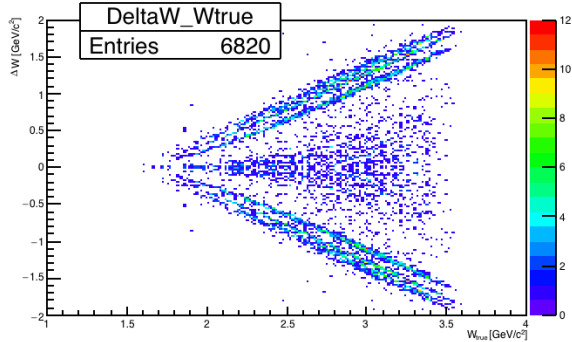
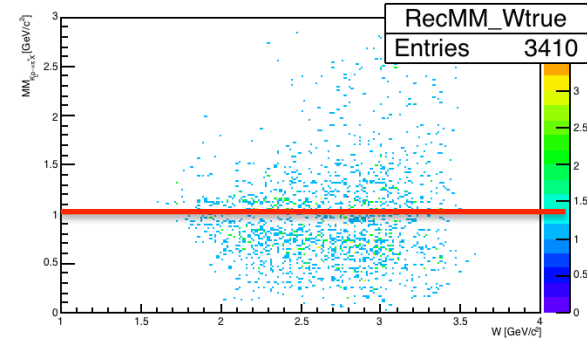
K_L thrown



Lambda Invariant mass



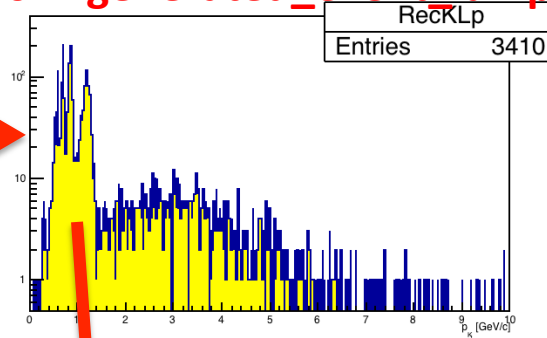
Missing mass of π^+



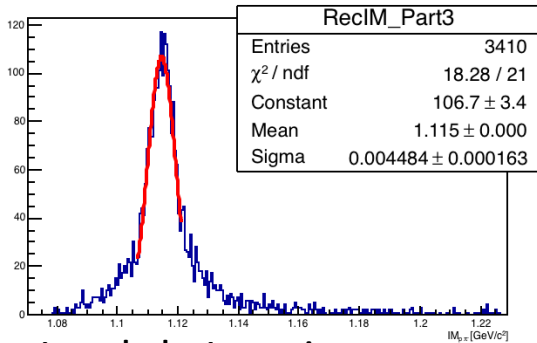
$K_L p \rightarrow \Lambda \pi^+$ full MCSIM in Hall-D

./nickZachriou_OS6 -M100000 -Fgenerated_event_lampip.hddm -Rkl4

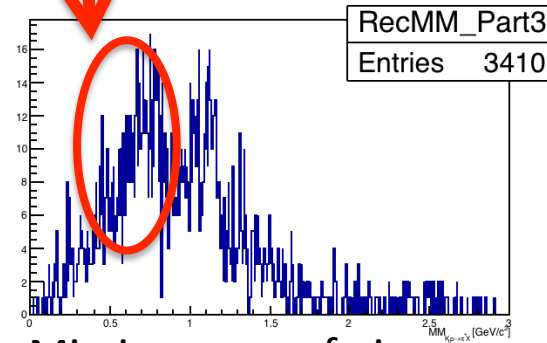
Reconstructed:
Low KL momentum has
structure ...



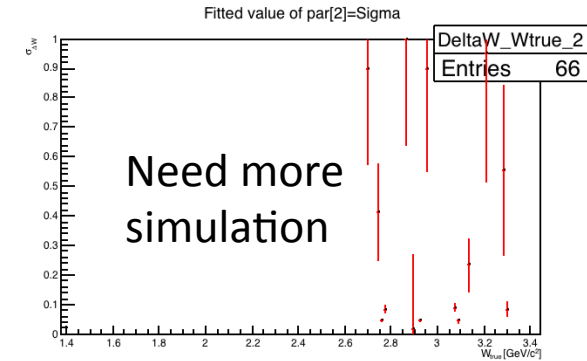
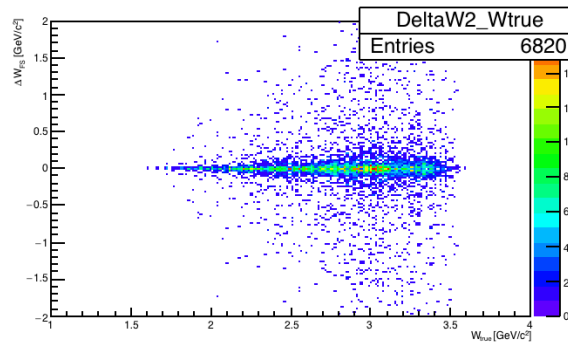
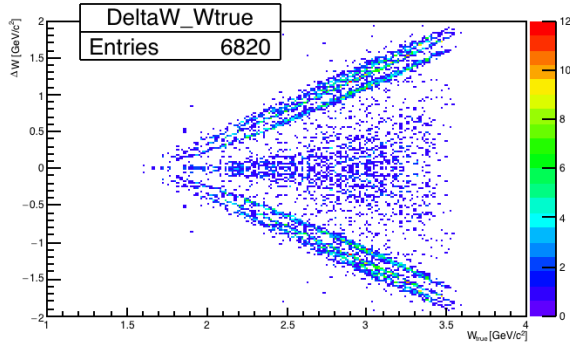
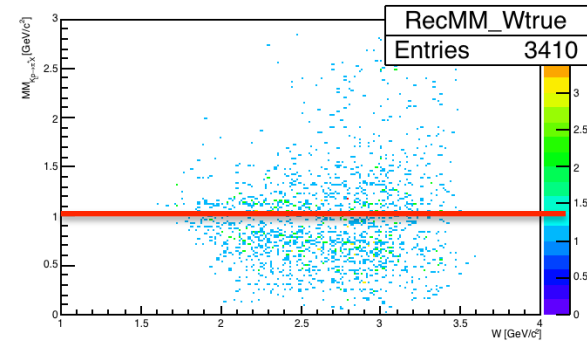
K_L reconstruct



Lambda Invariant mass

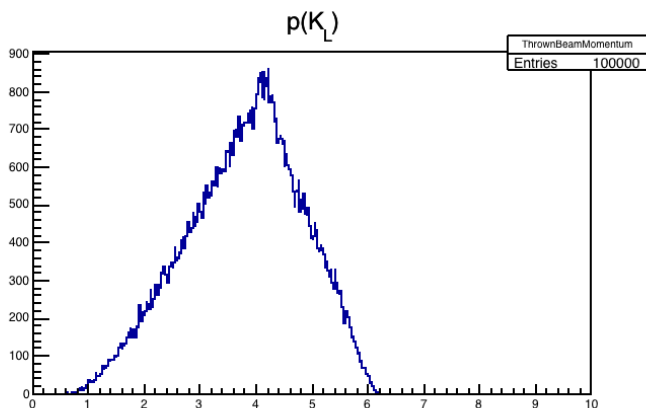


Missing mass of pi+

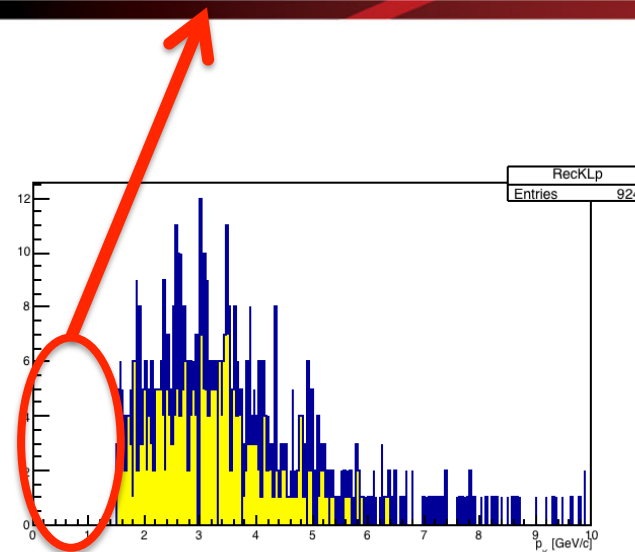


Need more
simulation

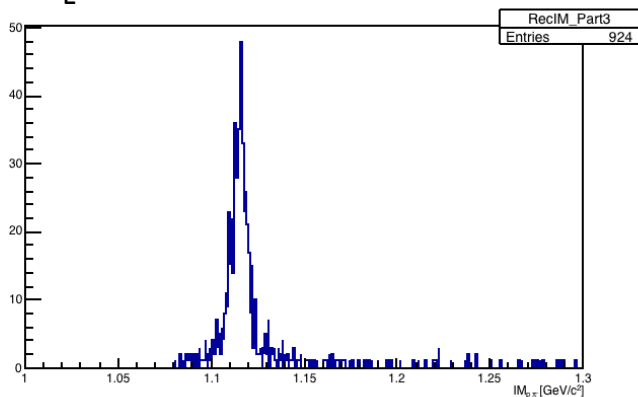
K_L momentum cut



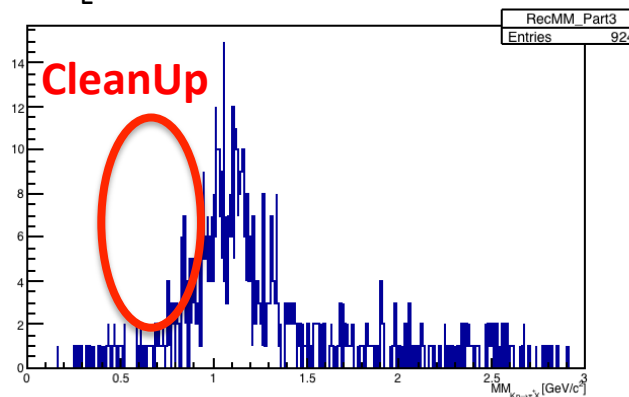
K_L thrown



K_L reconstruct



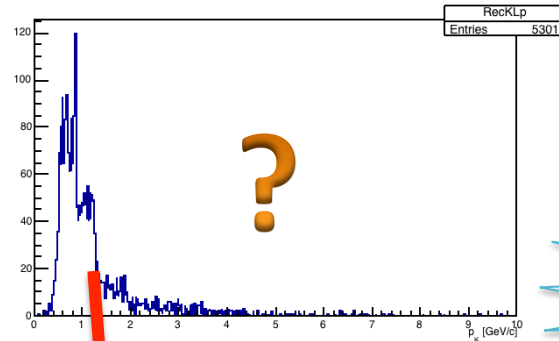
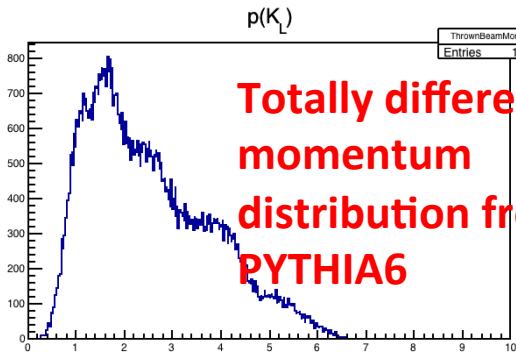
Lambda Invariant mass



Missing mass of π^+

$K_L p \rightarrow \Lambda \pi^+$ full MCSIM in Hall-D

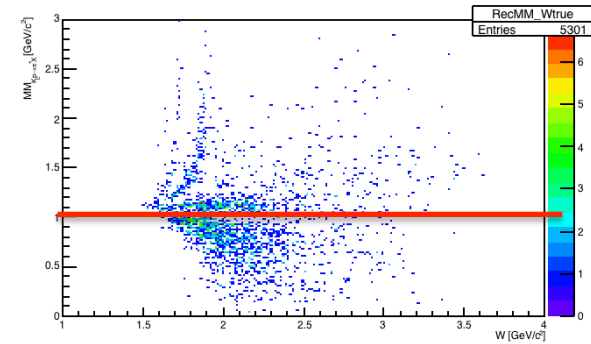
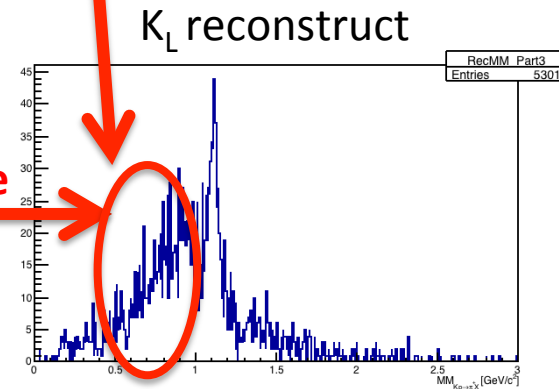
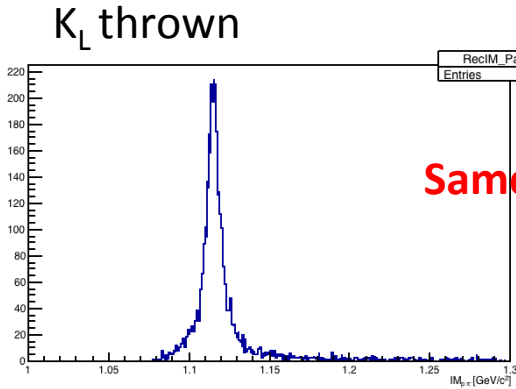
Simon's



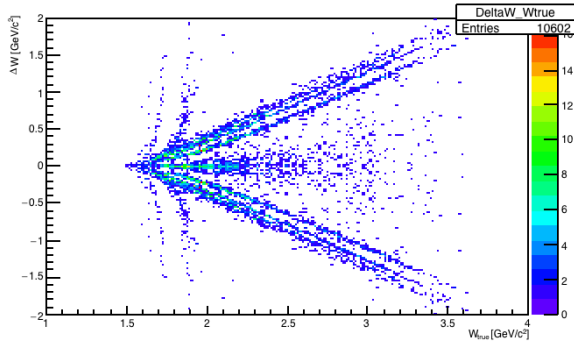
1/ Parameterize the old exp. data

Simon's LambdaPip EG, Then gen8_2 -P4.0

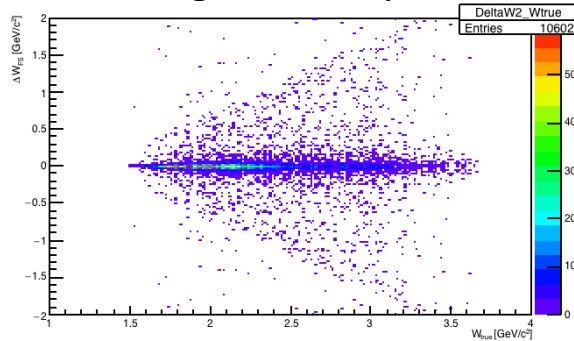
Robert J. Yamartino, Jr.
SLAC-177 report Sep. 1974,



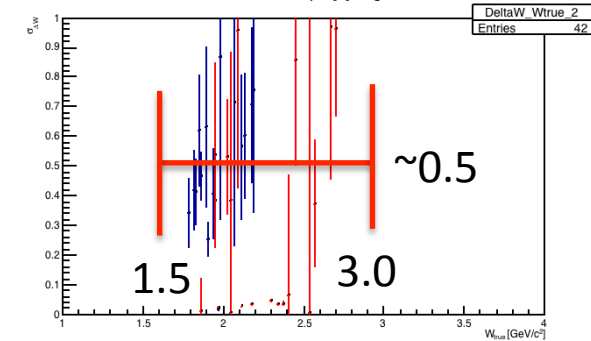
Lambda Invariant mass



Missing mass of pi+



Fitted value of par[2]=Sigma



Summary

- 1. Manage two event generators for $K_L + p \rightarrow \Lambda + p$ reaction**
- 2. Full simulation of GlueX has been carried out from both event generators**
- 3. Need to optimize codes**
 - fix minor bugs (short term)
 - implement cross-section or parameterization (long term)

Plan

For proposal:

1. **Resolve the K_L reconstructed momentum issue**
2. **Good statistics MC run**
3. **tFlight_ST=300ps/150ps/100ps**
4. **Estimate total event for given beam time and K_L luminosity (100days, 3×10^4 KL/sec)**
5. **Estimate uncertainty budget**

For future:

1. **Test/verify parameterization of Robert Yamartino, SLAC-177 report**
2. **Fixed K_L beam profile in the reaction of $\Lambda + p \rightarrow \pi$**