THE GEORGE WASHINGTON UNIVERSITY
WASHINGTON, DC

$K^0_L + p \rightarrow \pi^+ + \Lambda$

MARSHALL B. C. SCOTT

HTTPS://WWW.LINKEDIN.COM/IN/MARSHALL-SCOTT-PH-D-17AB191B9

K LONG FACILITY

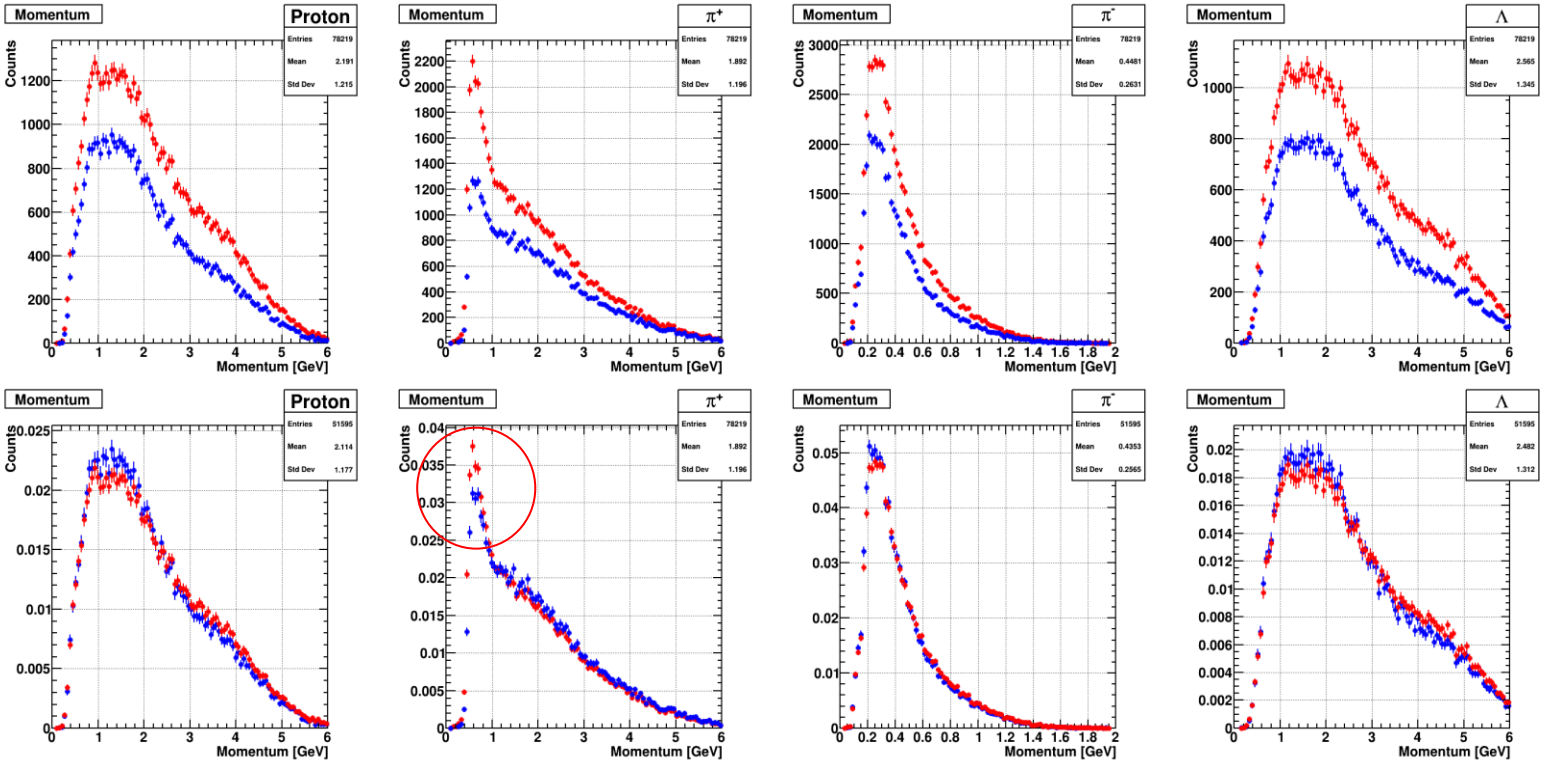
Jefferson Lab

KL4 RXN AND GENERATING STEPS

- Kl4 : $K^0_L + p \rightarrow \pi+ + \Lambda$
  - $\Lambda \rightarrow p + \pi^-$ (63.9%) ; Current priority
  - $\Lambda \rightarrow n + \pi^0$ (35.8%)
- Generated histograms/root files (Monitoring Histograms, ReactionFilter, mcthrown_tree)
  - hd_root --nthreads=8 -PPLUGINS=PEVENTRFBUNCH:USE_TAG=KLong -PVERTEX:USEWEIGHTEDAVERAGE=1 -PPLUGINS=monitoring_hists foo_smeared.hddm
  - hd_root --nthreads=8 -PPLUGINS=PEVENTRFBUNCH:USE_TAG=KLong -PVERTEX:USEWEIGHTEDAVERAGE=1 -PPLUGINS=ReactionFilter –PReaction1=10_14__8_18 foo_smeared.hddm
  - hd_root --nthreads=8 -PPLUGINS=PEVENTRFBUNCH:USE_TAG=KLong -PVERTEX:USEWEIGHTEDAVERAGE=1 -PPLUGINS=mcthrown_tree foo_smeared.hddm

Momentum Distributions Comparison : Measured distributions

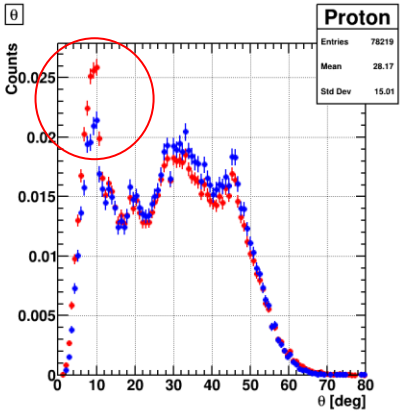
Default(F0) files are depicted in Blue(Red)

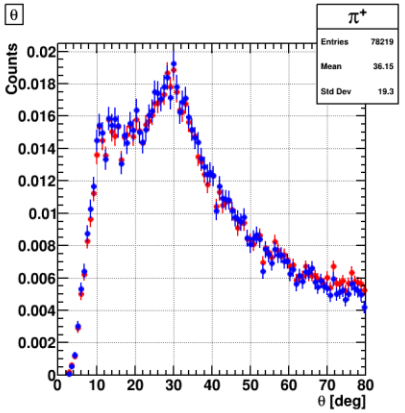


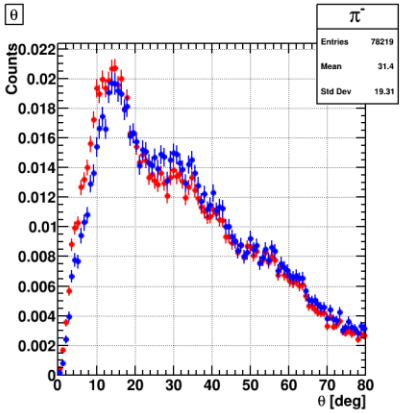
Theta Distributions Comparison : Measured distributions

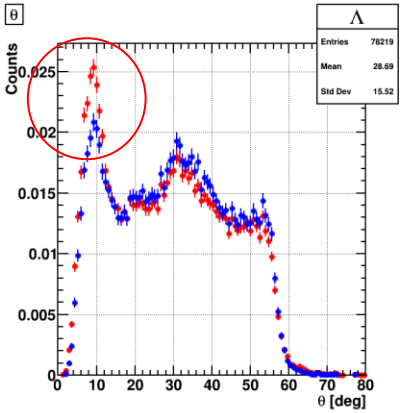
Default(F0) files are depicted in Blue(Red)

- There seems to be a sizable difference between the two distributions at low theta for the proton and consequently the lambda.





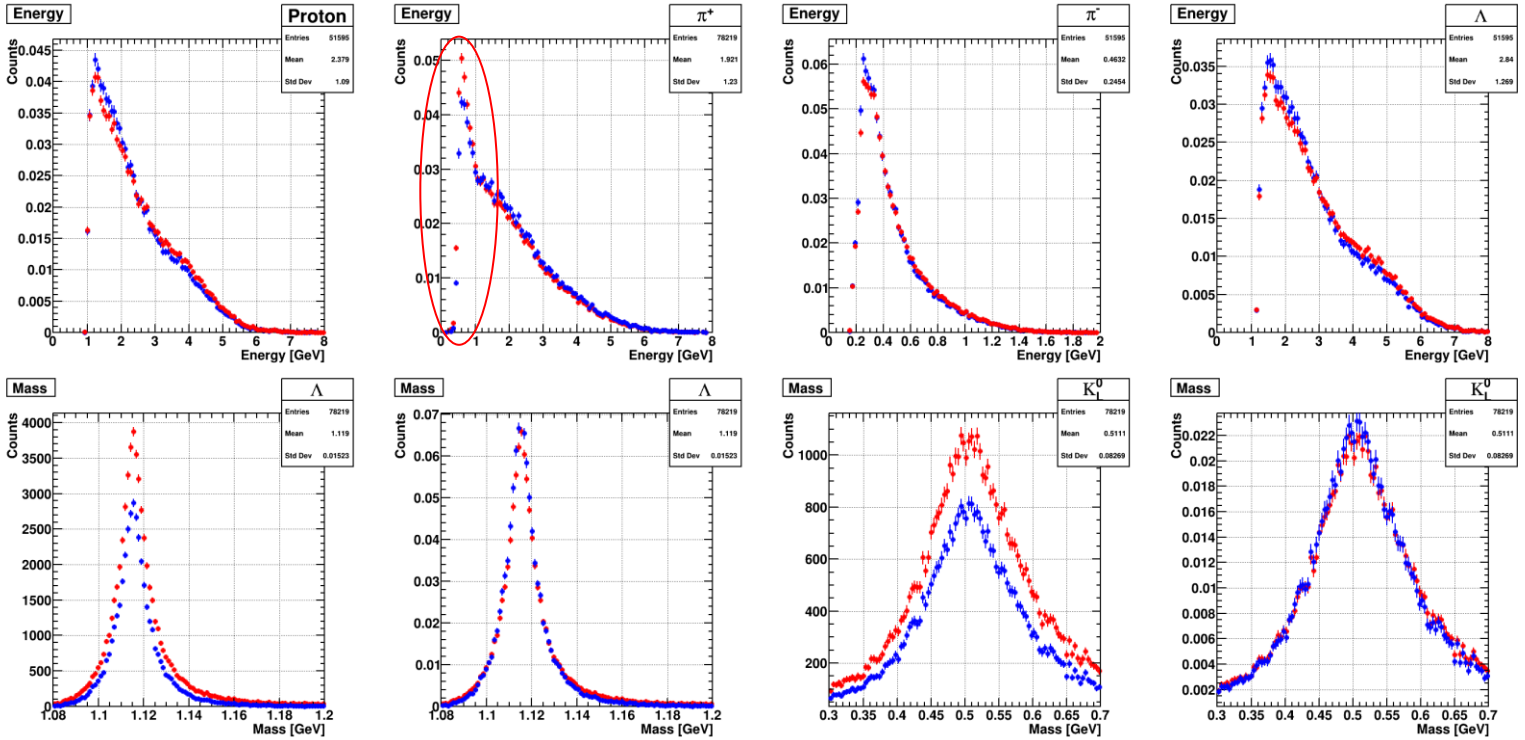




Energy and Mass Distributions Comparison : Measured distributions

Default(F0) files are depicted in Blue(Red)

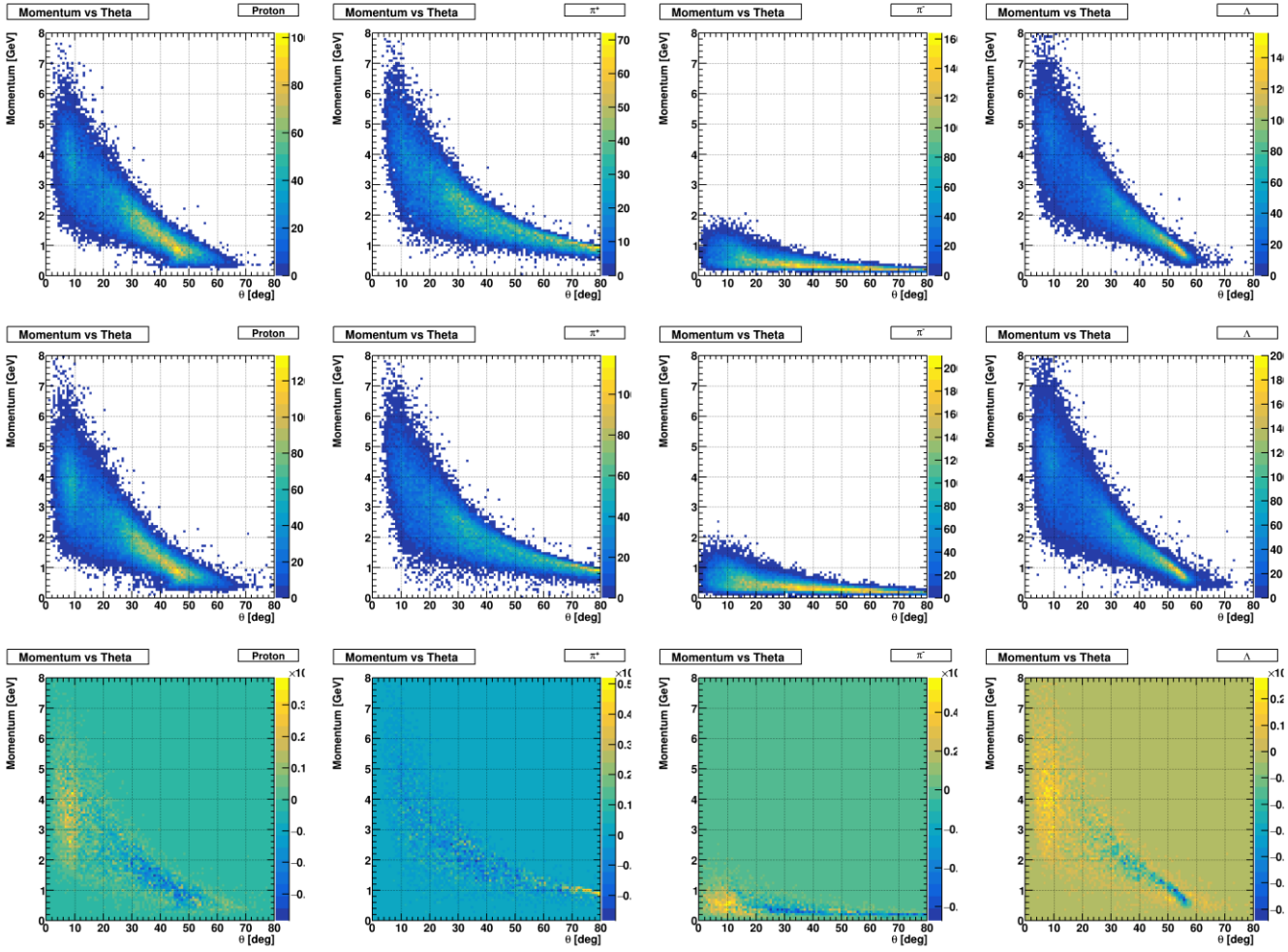
- There seems to be a sizable difference between the two distributions at low energy for the π^-.



M. B. C. Scott

Mass Distributions Comparison : Measured vs. Measured

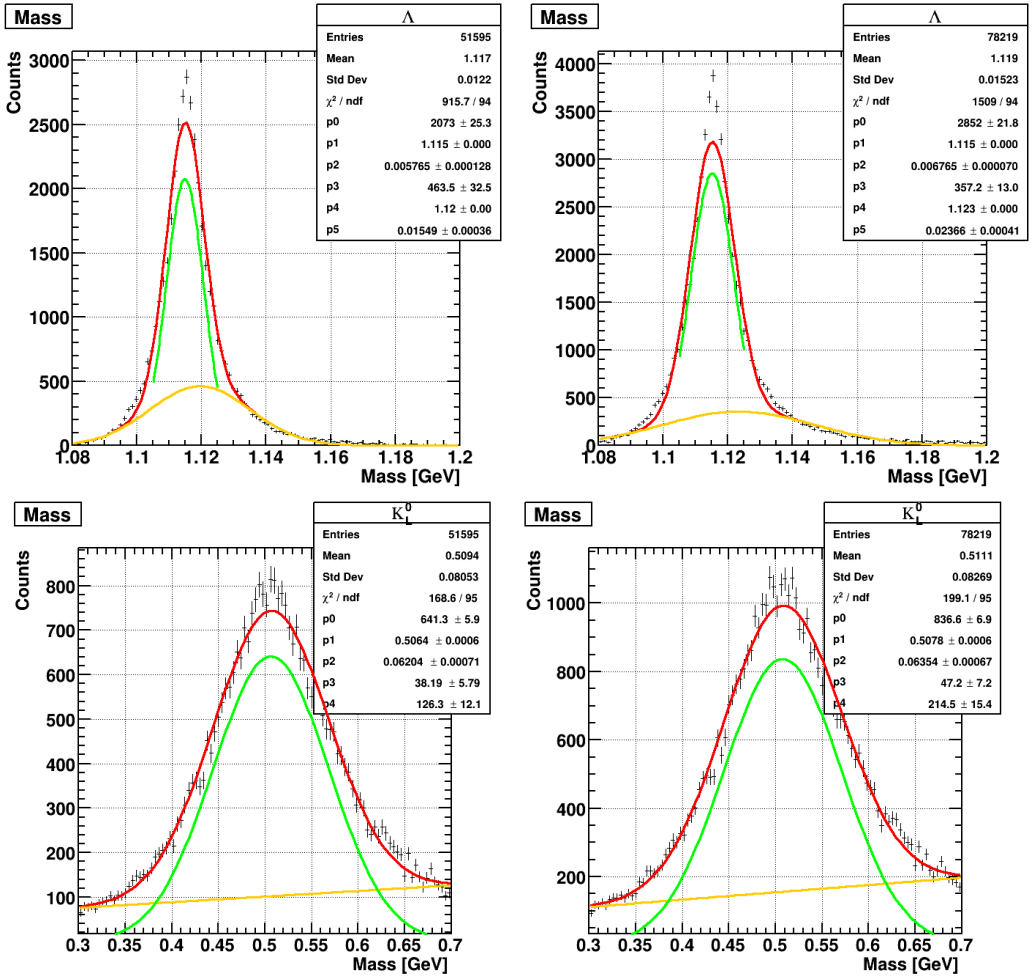
- The top, middle, and bottom rows are the F0, Default, and normalized F0 – Default Momentum vs. theta distributions, respectively.
- The proton, π^-, and Λ all have a larger proportion of lower theta, and consequently more higher momentum, events in F0 than in the default.



Invariant Masses

Left(Right) columns Default(F0)

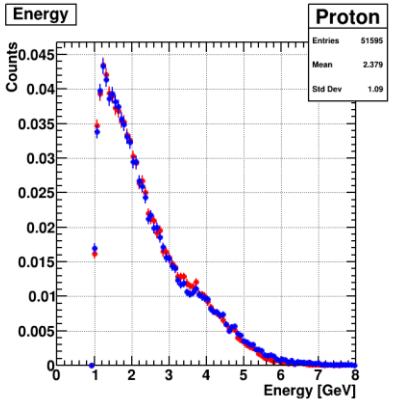
- To the right are the invariant mass distributions for the Λ and K_L^0 which is depicted on the top and bottom rows respectively.
- The left(right) columns are the default(F0) files.
- The Λ has been fit with a double gaussian as opposed to the gaussian + pol1 before and the new gaussian has a mean of about 1.2 GeV, which is close to the Σ^0 mass of 1.192 GeV.

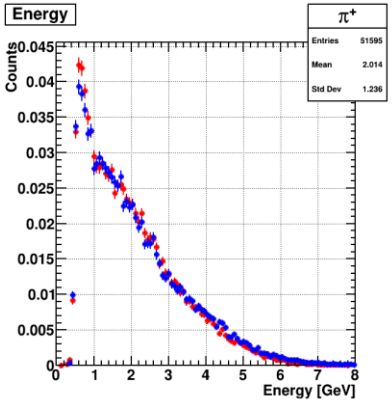


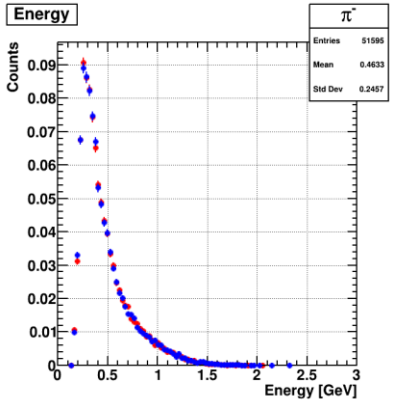
Back up slides

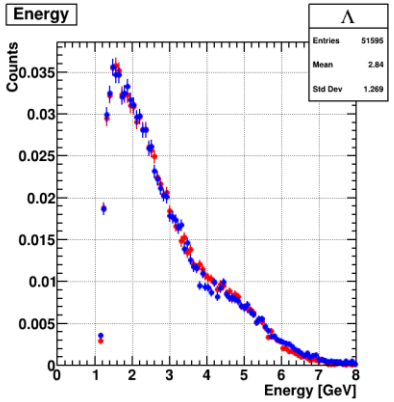
ENERGY & THETA DISTRIBUTIONS COMPARISON : MEASURED VS. KINFIT

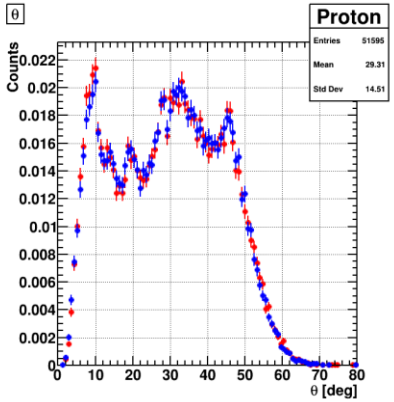
The same file KinFit(Mea.) distributions are depicted in Blue(Red)

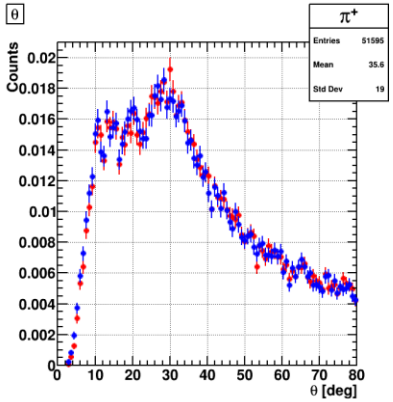


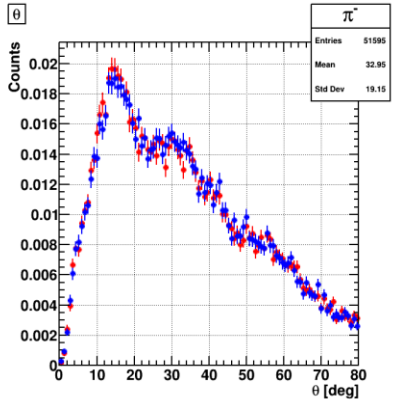


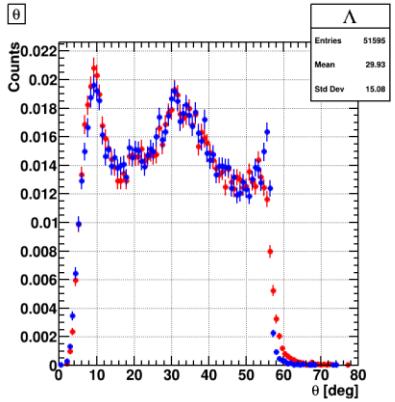








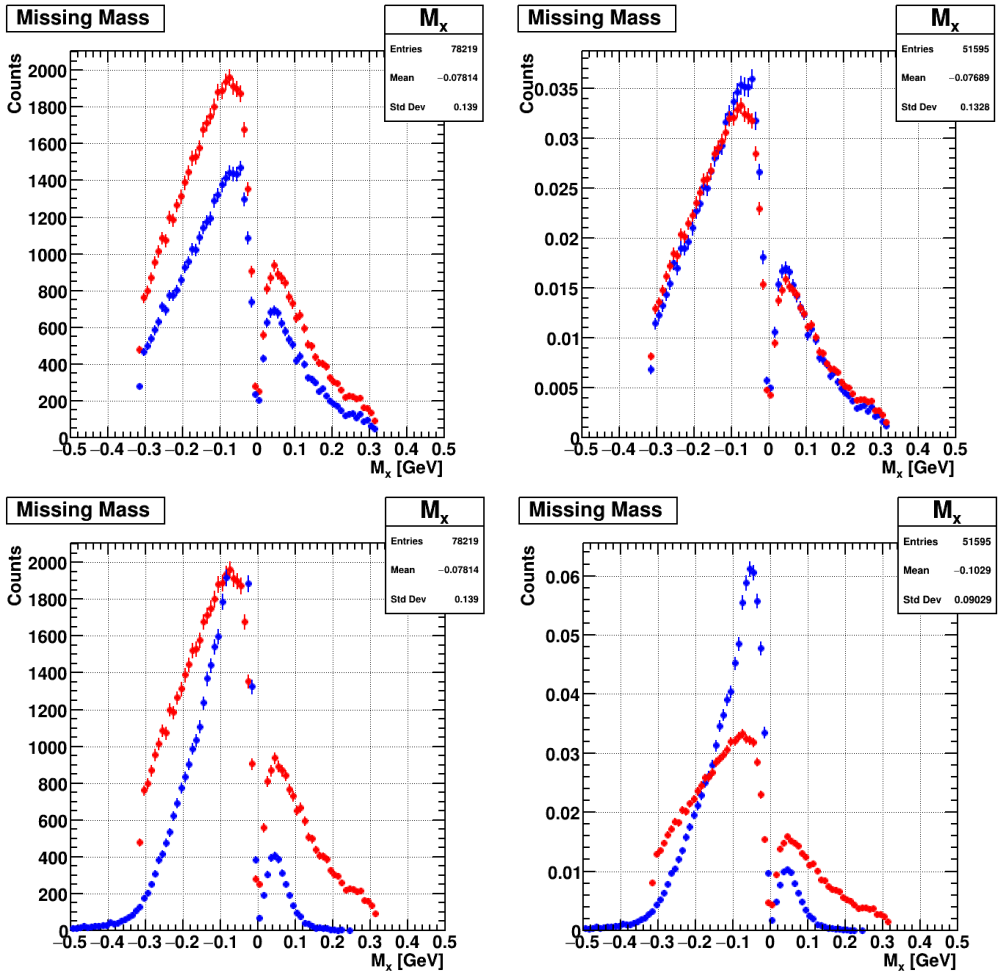




ORGE
IGTON
RSITY
WASHINGTON, DC

Missing Mass Comparison

- Top row depicts Default(F0) in Blue(Red)
- Bottom row depicts KinFit(Measured) in Blue(Red)



M. B. C. Scott