RICH, QCD fit

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General Cuts

- Best primary vertex
- Incoming + scattered muon
- Vertex inside the target
- Beam cross all cells
- $0.1 < y < 0.9$

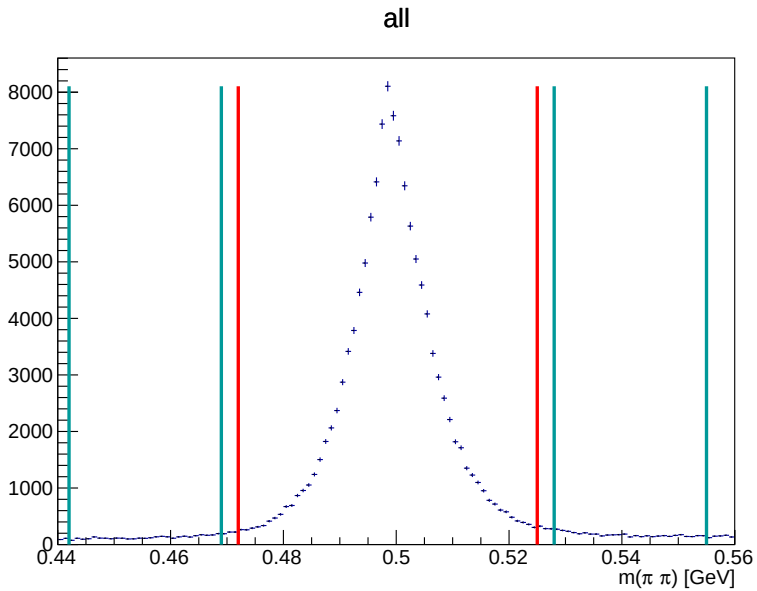
K_0 selection

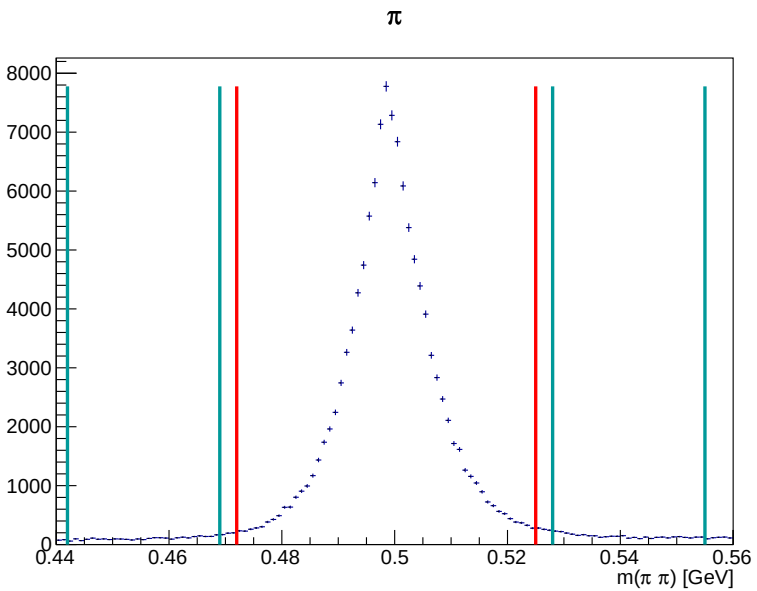
- Secondary vertex, 2 outgoing particles
- Opposite charge
- Particle $XX0 < 10$
- $p > 1$ GeV
- Particle has fit parameter
- $z_{Last} < 350$ cm
- Track not connected to any primary vertex
- $p_t^+ > 23$ MeV
- Distance vertices $> 2\sigma$
- Collinearity cut > 0.99995 (0.9999)
- $m(\pi, \pi) - m(K_0) < 150$ MeV
- $m(\pi, p) - m(\Lambda) > 10$ MeV

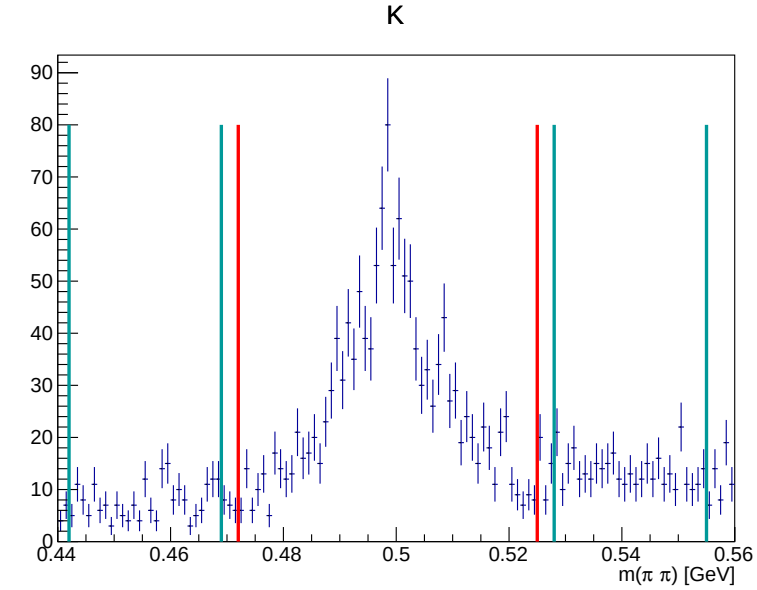
RICH cuts

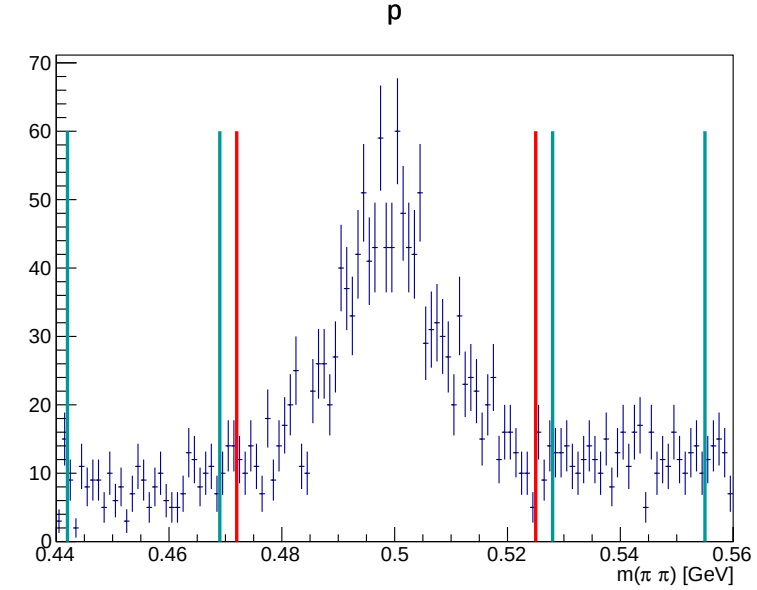
- Remove RICH pipe
- Pions
  - $LH(\pi)/LH(K) > 1$
  - $LH(\pi)/LH(p) > 1$
  - $LH(\pi)/LH(bg) > 1$
- Kaons
  - $LH(K)/LH(\pi) > 1.02$
  - $LH(K)/LH(p) > 1$
  - $LH(K)/LH(bg) > 1.24$
- Protons above threshold
  - $LH(p)/LH(\pi) > 1$
  - $LH(p)/LH(K) > 1$
  - $LH(p)/LH(bg) > 1$
- Protons below threshold
  - $LH(bg)/LH(\pi) > 1$
  - $LH(bg)/LH(K) > 1$
  - All $LH == 0$

Sidebins

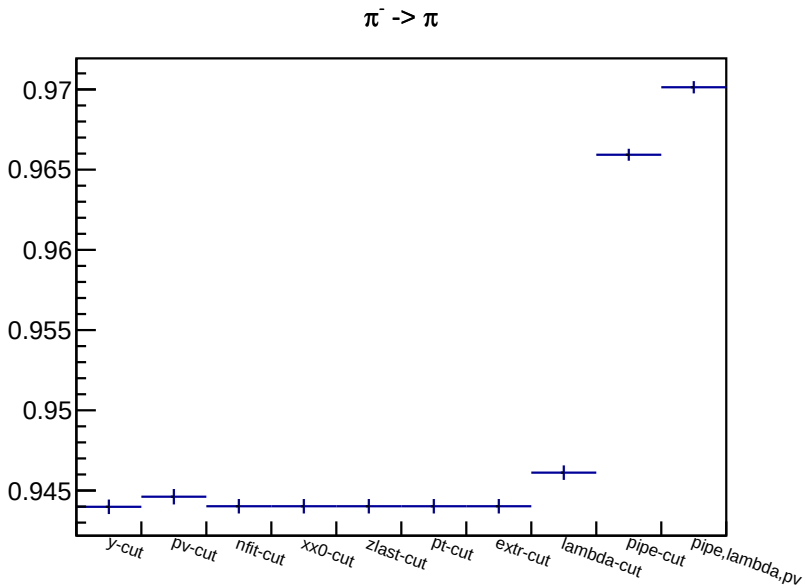

all
8000
7000
6000
5000
4000
3000
2000
1000
0
0.44
0.46
0.48
0.5
0.52
0.54
0.56
m(π π) [GeV]

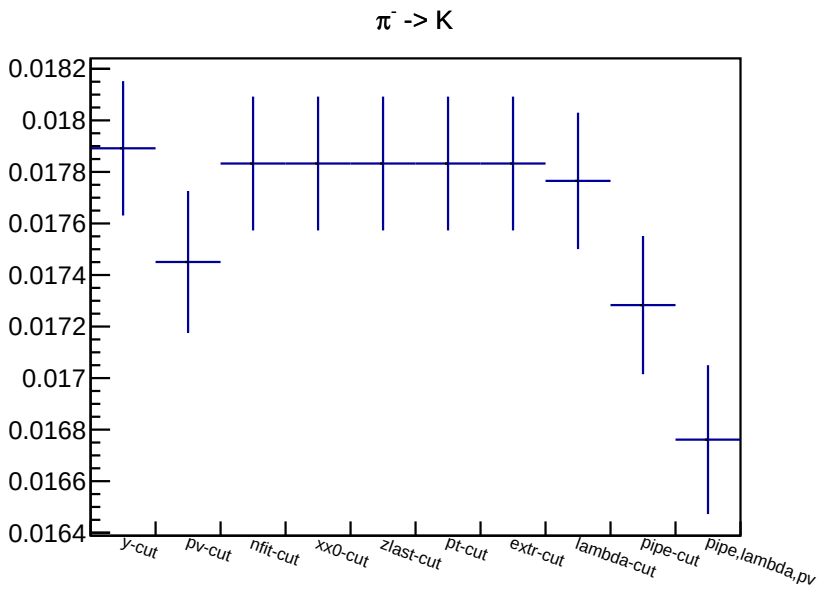

π
8000
7000
6000
5000
4000
3000
2000
1000
0
0.44
0.46
0.48
0.5
0.52
0.54
0.56
m(π π) [GeV]

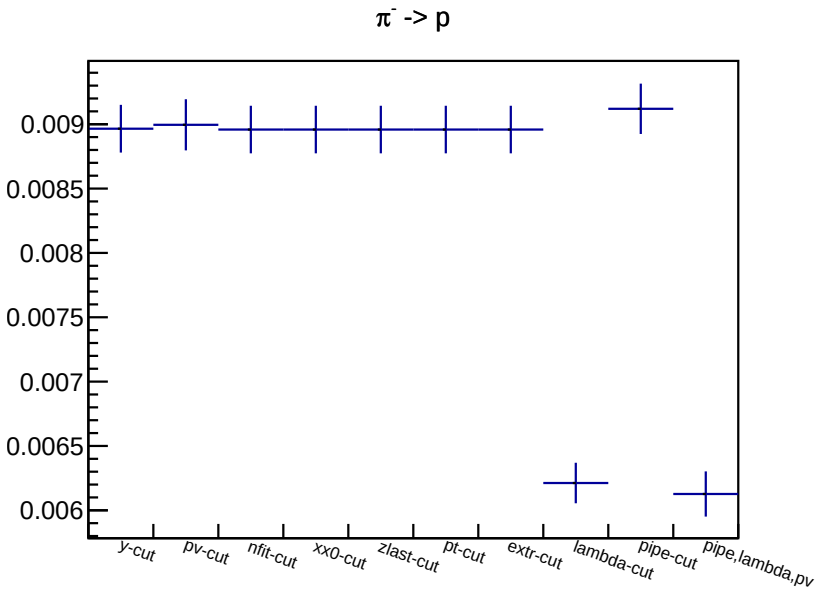

K
90
80
70
60
50
40
30
20
10
0
0.44
0.46
0.48
0.5
0.52
0.54
0.56
m(π π) [GeV]

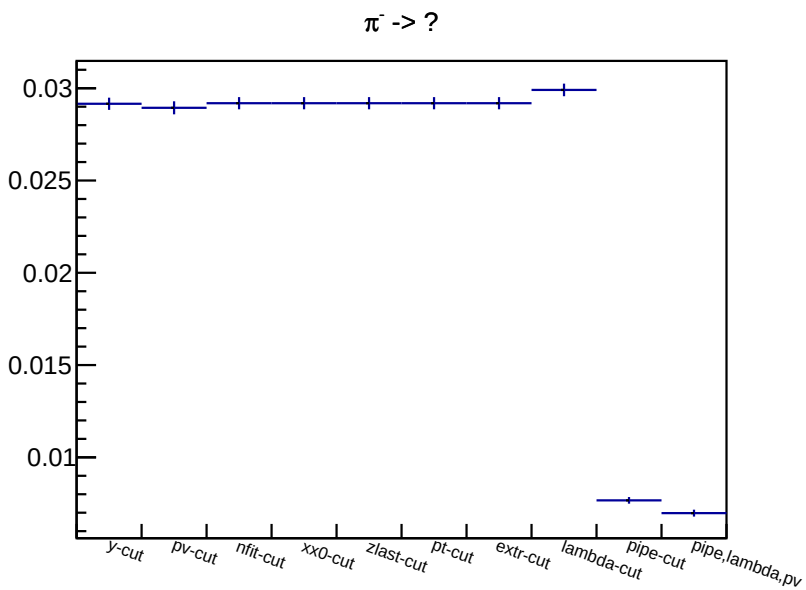

p
70
60
50
40
30
20
10
0
0.44
0.46
0.48
0.5
0.52
0.54
0.56
m(π π) [GeV]

Cuts

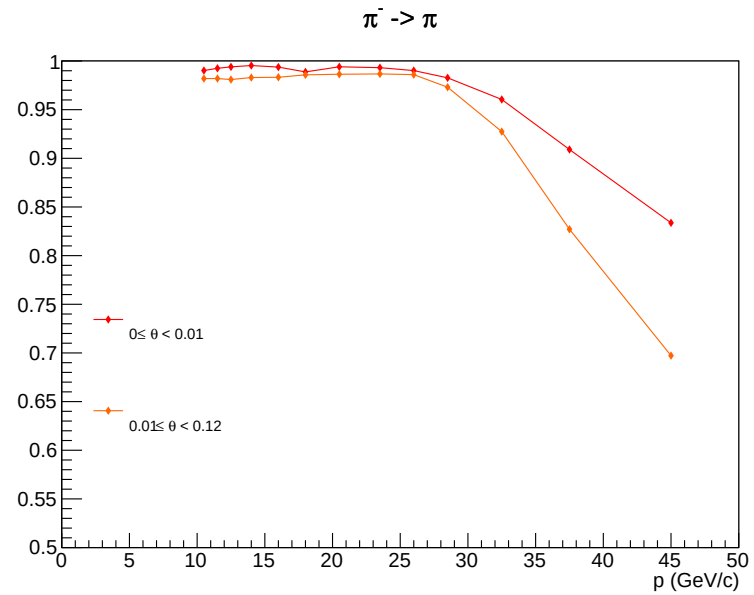

π⁻ -> π
0.97
0.965
0.96
0.955
0.95
0.945
y-cut
pv-cut
nfit-cut
xx0-cut
zlast-cut
pt-cut
extr-cut
lambda-cut
pipe-cut
pipe,lambda,pv

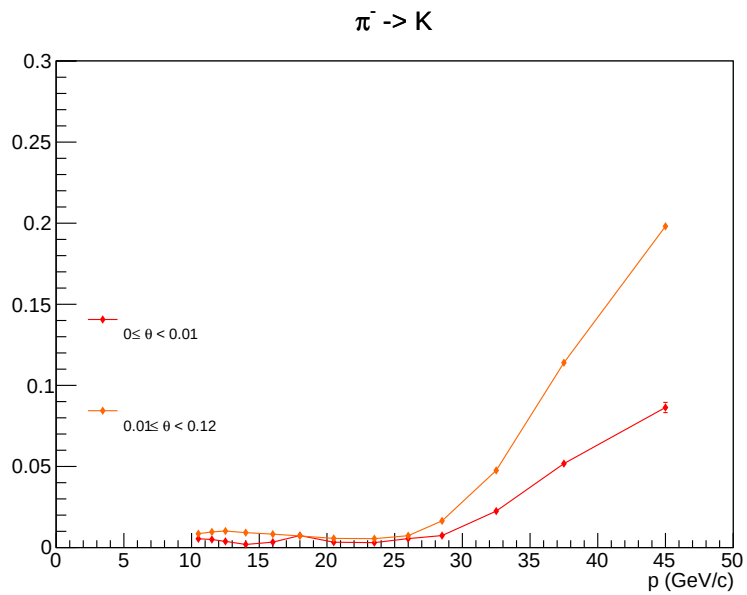

π⁻ -> K
0.0182
0.018
0.0178
0.0176
0.0174
0.0172
0.017
0.0168
0.0166
0.0164
y-cut
pv-cut
nfit-cut
xx0-cut
zlast-cut
pt-cut
extr-cut
lambda-cut
pipe-cut
pipe,lambda,pv

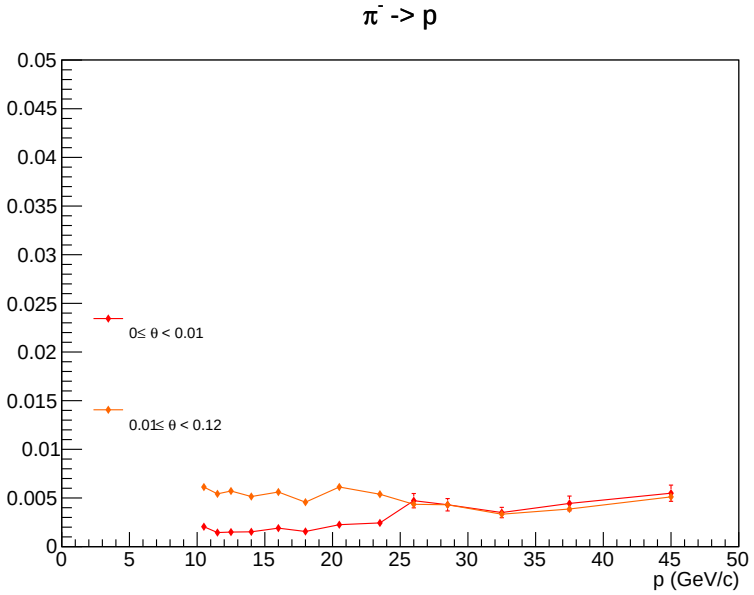

π⁻ -> p
0.009
0.0085
0.008
0.0075
0.007
0.0065
0.006
y-cut
pv-cut
nfit-cut
xx0-cut
zlast-cut
pt-cut
extr-cut
lambda-cut
pipe-cut
pipe,lambda,pv

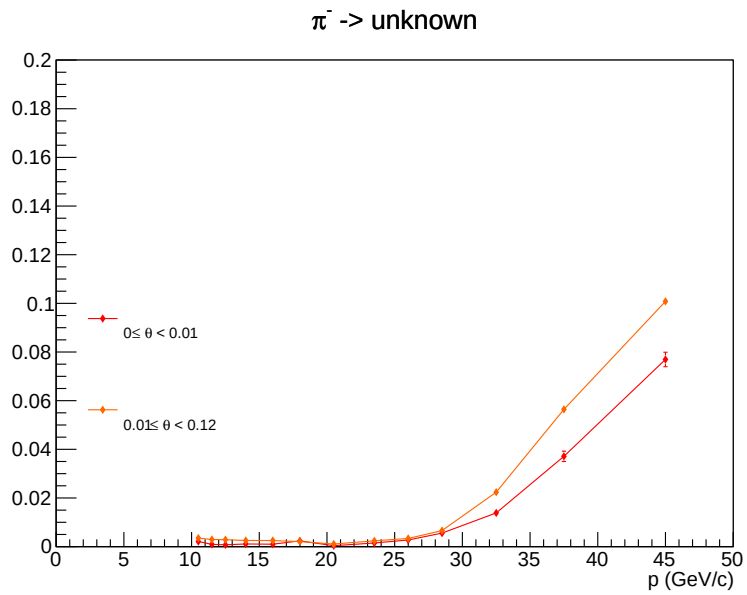

π⁻ -> ?
0.03
0.025
0.02
0.015
0.01
y-cut
pv-cut
nfit-cut
xx0-cut
zlast-cut
pt-cut
extr-cut
lambda-cut
pipe-cut
pipe,lambda,pv

RICH π^- (fit)

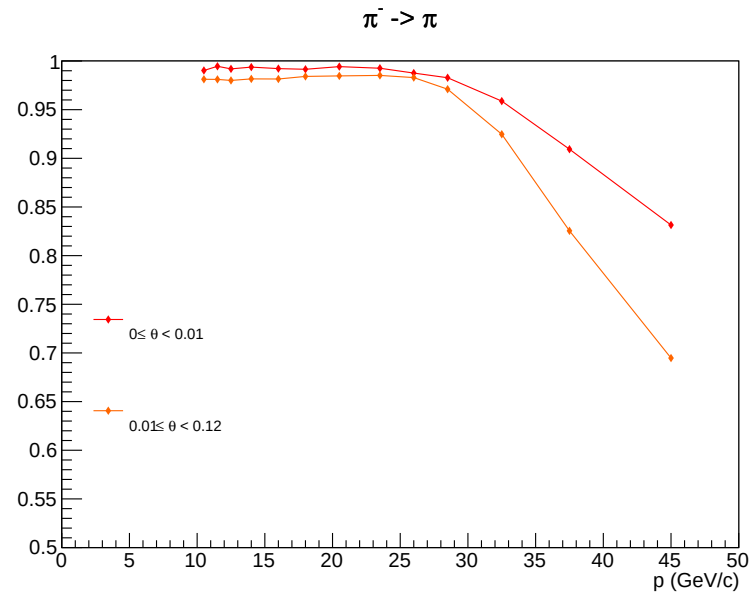

π- -> π
0≤ θ < 0.01
0.01≤ θ < 0.12
p (GeV/c)

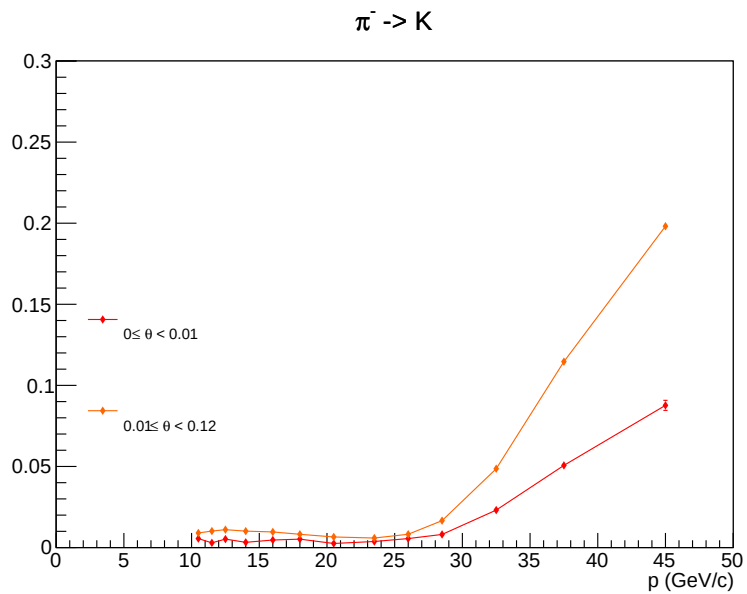

π- -> K
0≤ θ < 0.01
0.01≤ θ < 0.12
p (GeV/c)

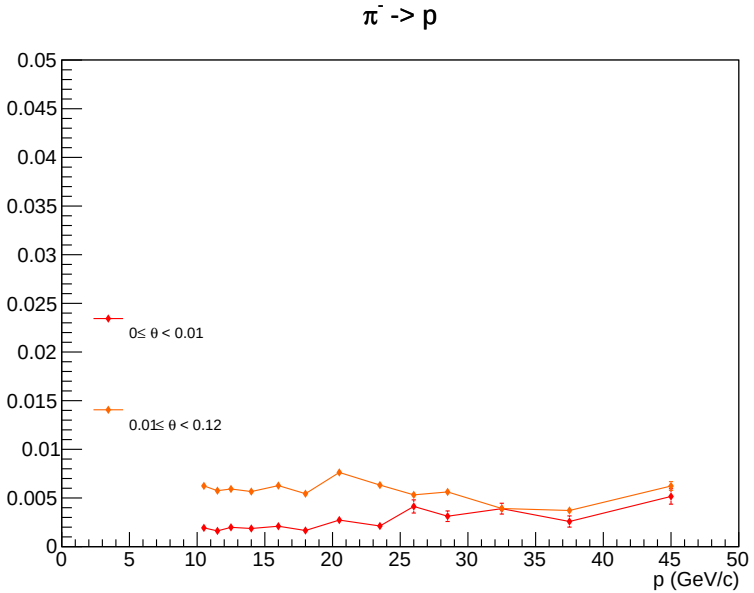

π- -> p
0≤ θ < 0.01
0.01≤ θ < 0.12
p (GeV/c)

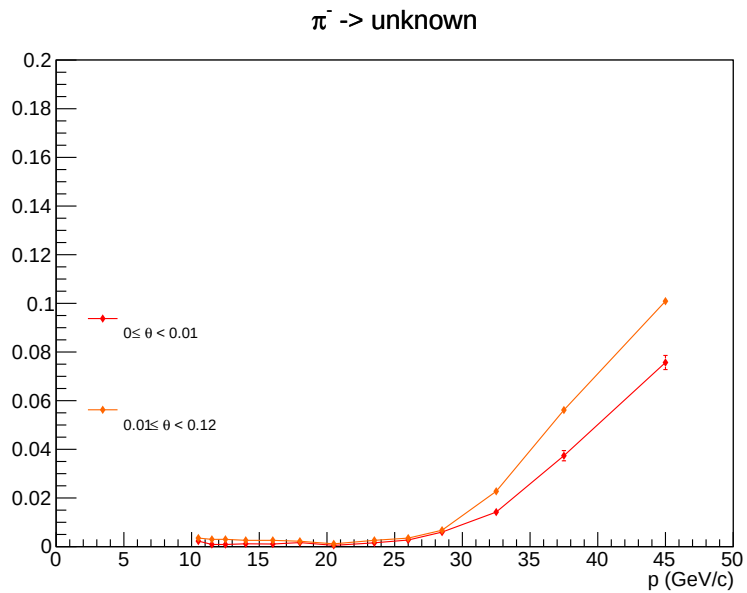

π- -> unknown
0≤ θ < 0.01
0.01≤ θ < 0.12
p (GeV/c)

RICH π^- (sidebin)

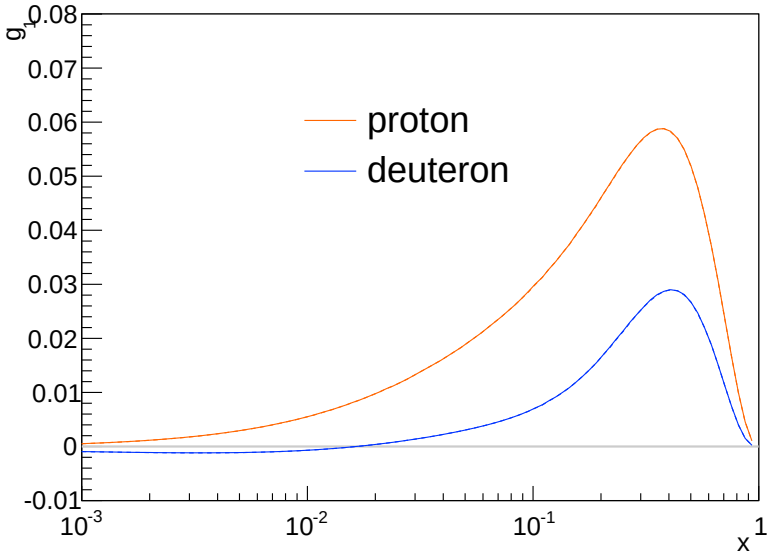


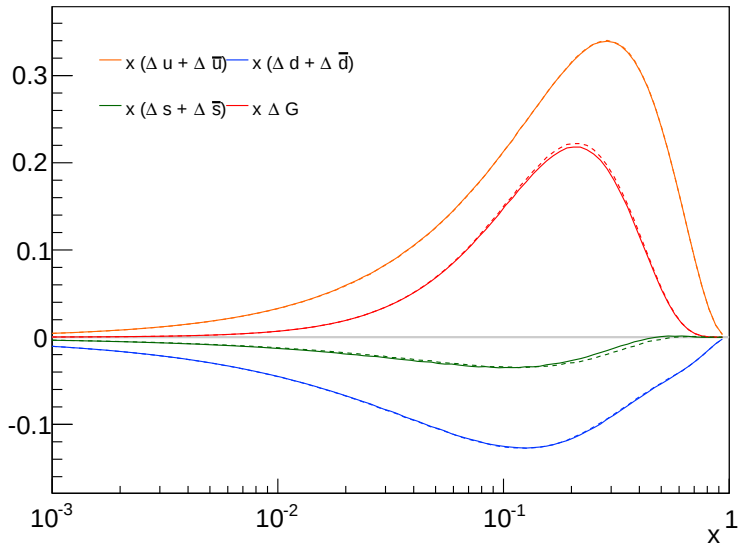


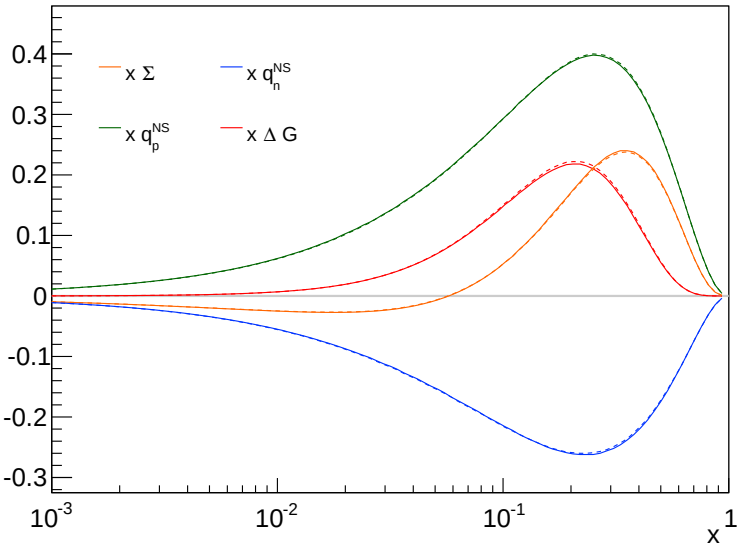




MRST 2008 / 2004







- dotted line MRST 2008
- new: $\bar{s}, \bar{b}, \bar{c}$

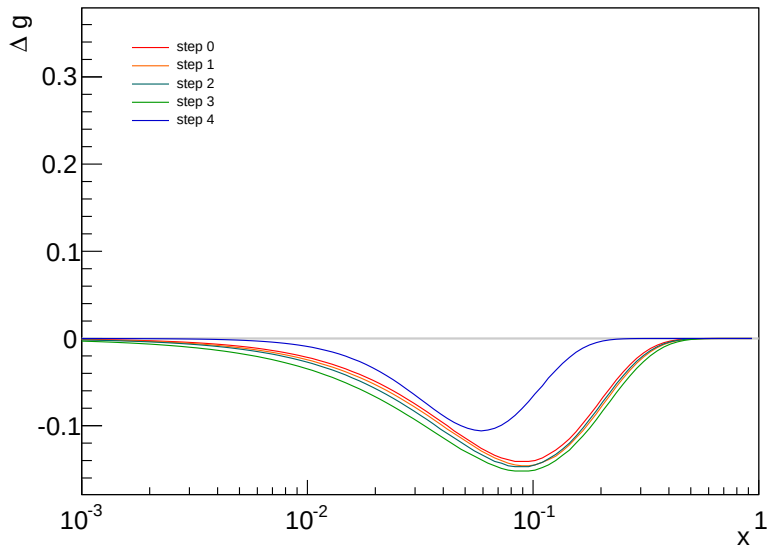
Errorband

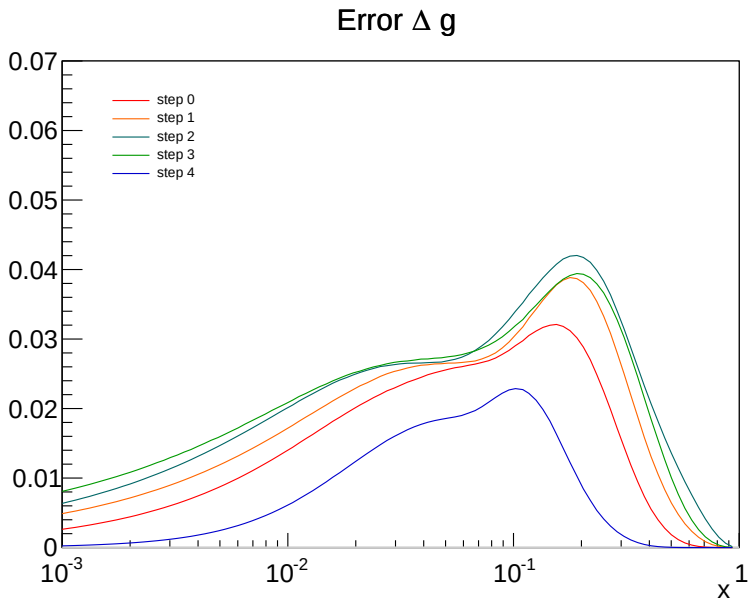
- Basic data set:

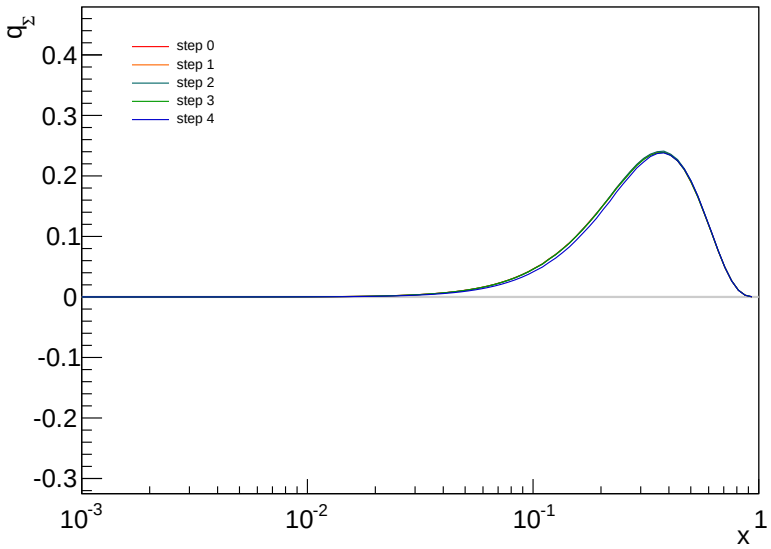
- p data:
  - EMC
  - SMC
  - E143
  - E155
  - HERMES
  - COMPASS 07
  - COMPASS 11
  - CLAS
- d data:
  - SMC
  - E143
  - E155
  - HERMES
  - COMPASS 04
  - CLAS
- n data:
  - HERMES
  - JLAB
  - E142
  - E154

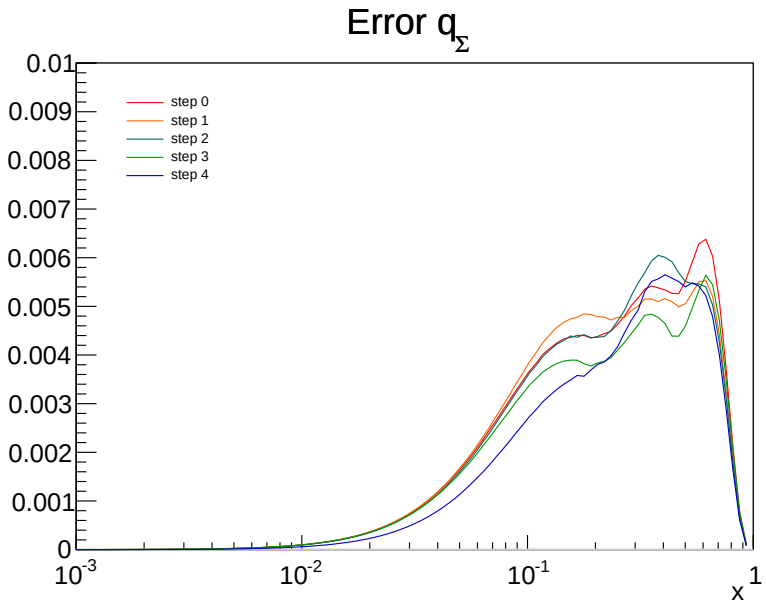
- Step1: add COMPASS (ΔG)
- Step2: add COMPASS 07
- Step3: add COMPASS 11
- Step4: add CLAS

Errorbands I









Errorbands II