

Lateral Profile Tuning in the Plug



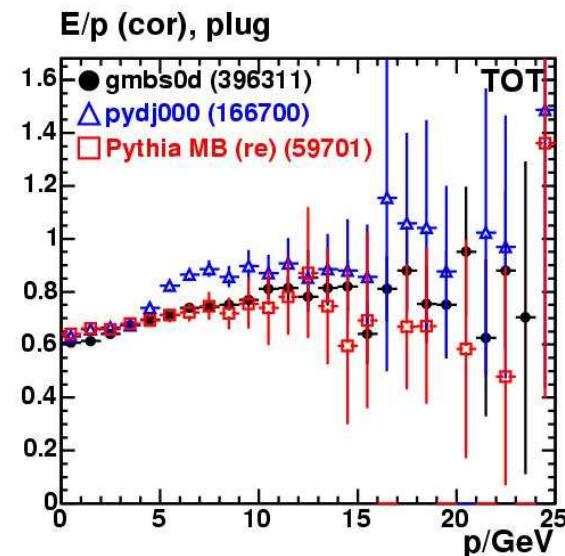
Pedro A. Movilla Fernández (LBNL)

Simulation Group Meeting Dec 1st, 2005

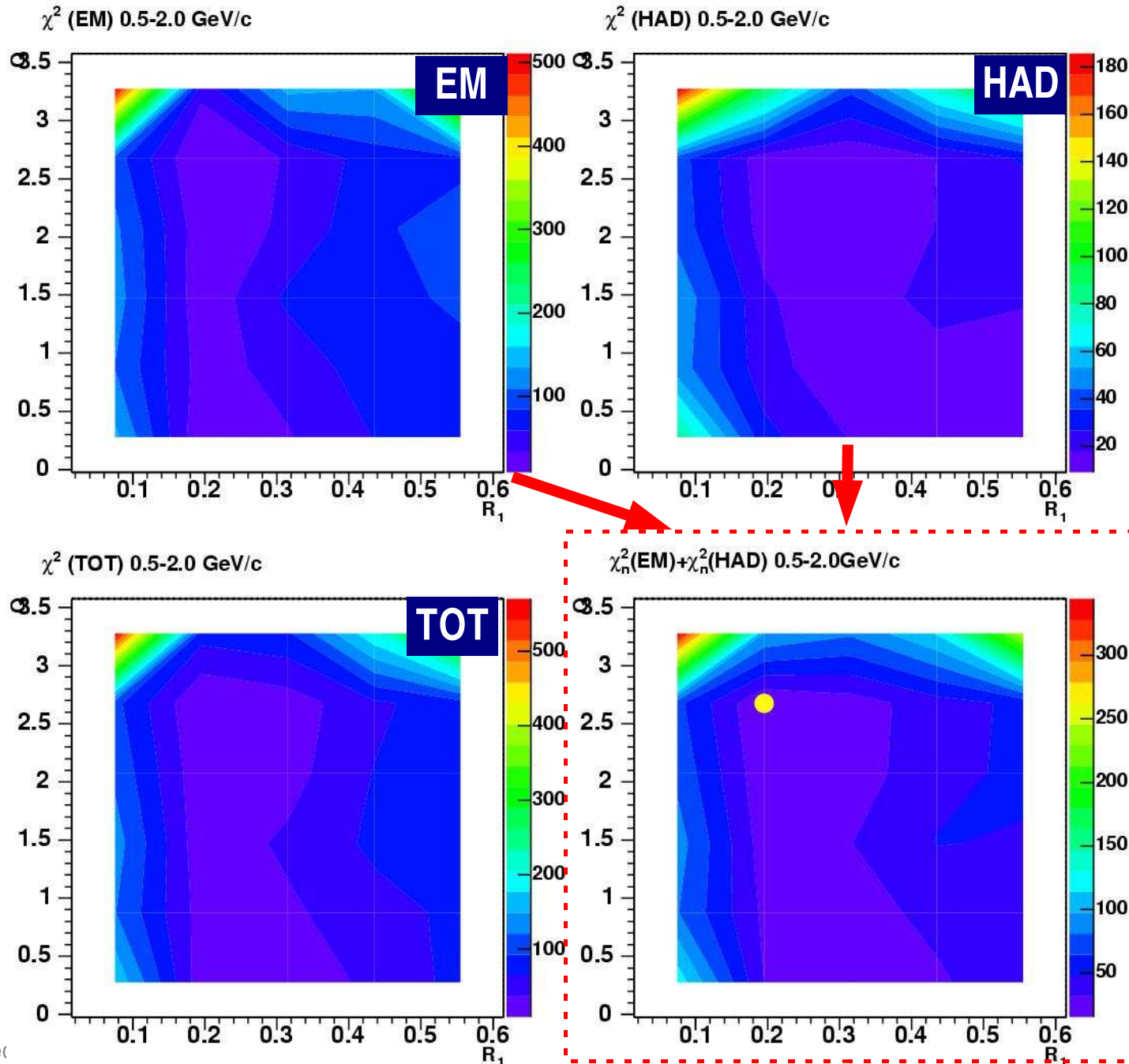
Overview



- Attempt to tune plug hadronic lateral response consistently up to 24 GeV/c
 - Lateral profile need to be fixed prior to tuning of absolute response / calorimeter sampling fractions
 - For lateral tuning results in the central, see [my simulation group talk 10/20/05](#)
- Analysis sample:
 - data: gmbs0d minbias sample (20M)
 - IO tracks, towers 13-15
 - most track quality cuts like in the central, [see e.g: Shawn's simulation group talk 11/09/05](#)
 - lepton veto ($p > 16 \text{ GeV/c}$): $\text{HAD/EM} > 0.05$, $\text{TOT} > \min(0.1p, 5 \text{ GeV/c})$
- MC: FakeEv plus minbias events
 - fake tracks and pythia minbias tracks give consistent responses (see my above talk)
- Conclusions
- Appendix: E/p distributions + flavor dependence studies



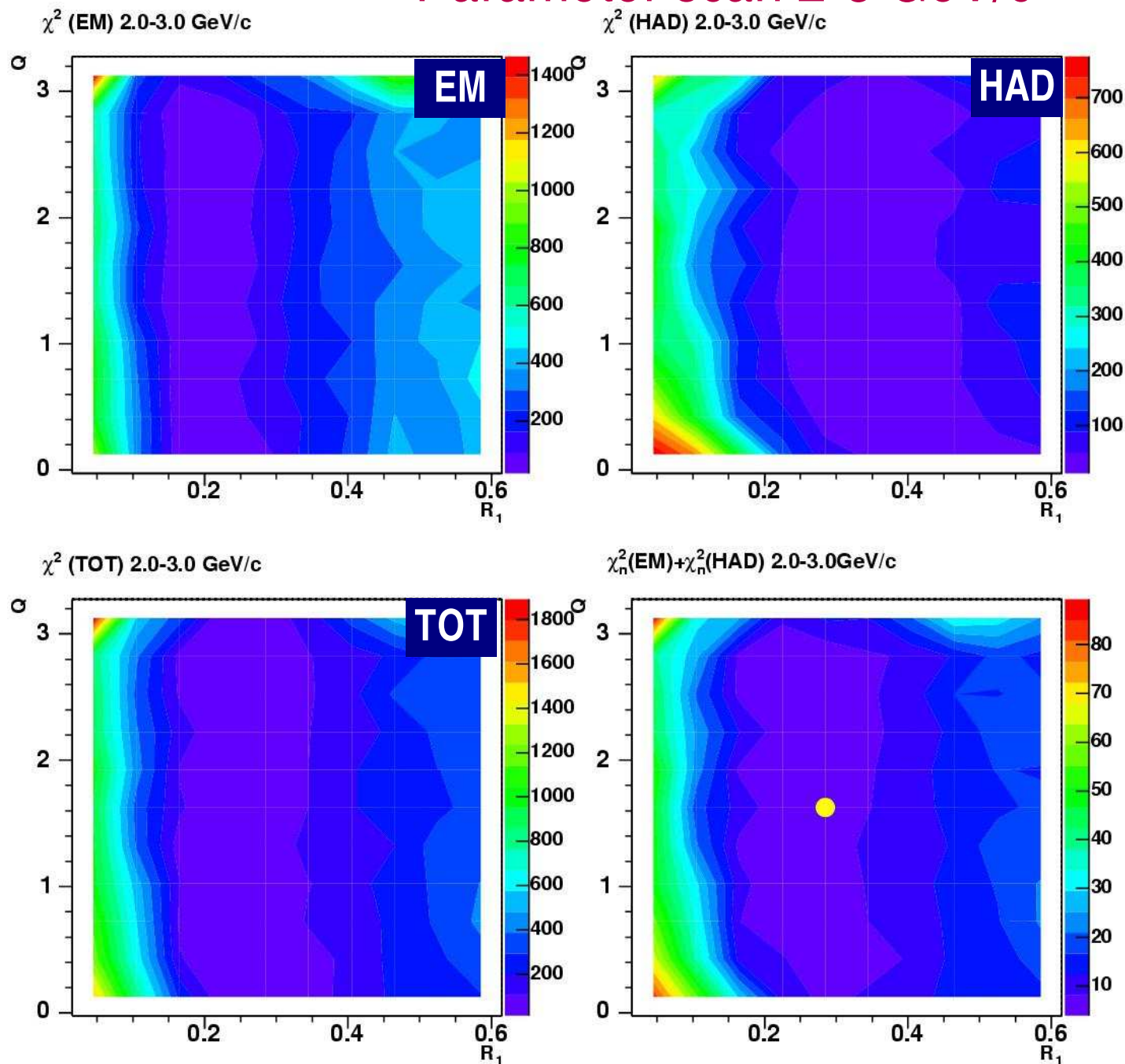
Parameter scan 1-2 GeV/c



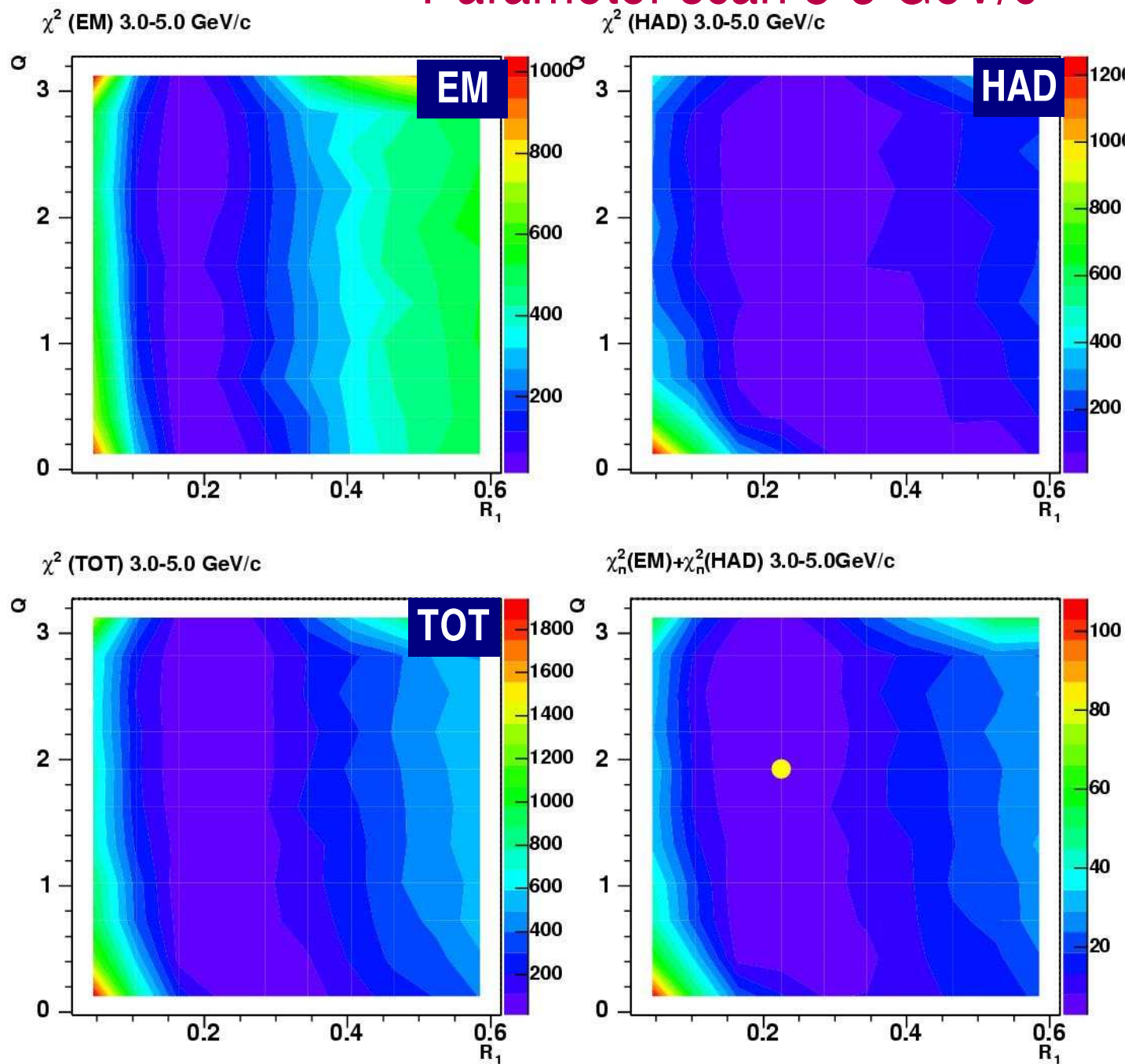
- This example has very low track statistics, need to combine cells

combined EM + HAD information

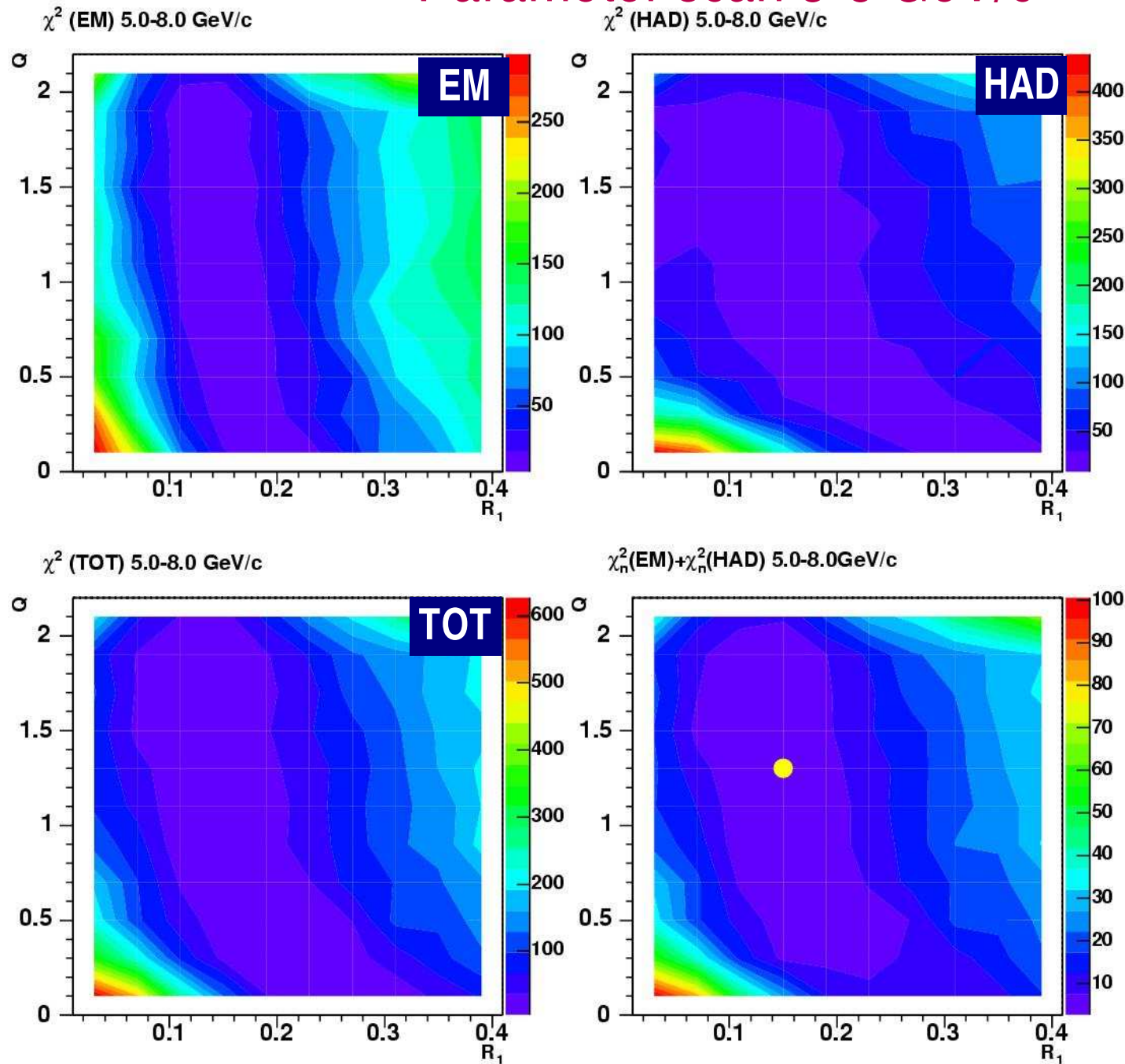
Parameter scan 2-3 GeV/c



Parameter scan 3-5 GeV/c

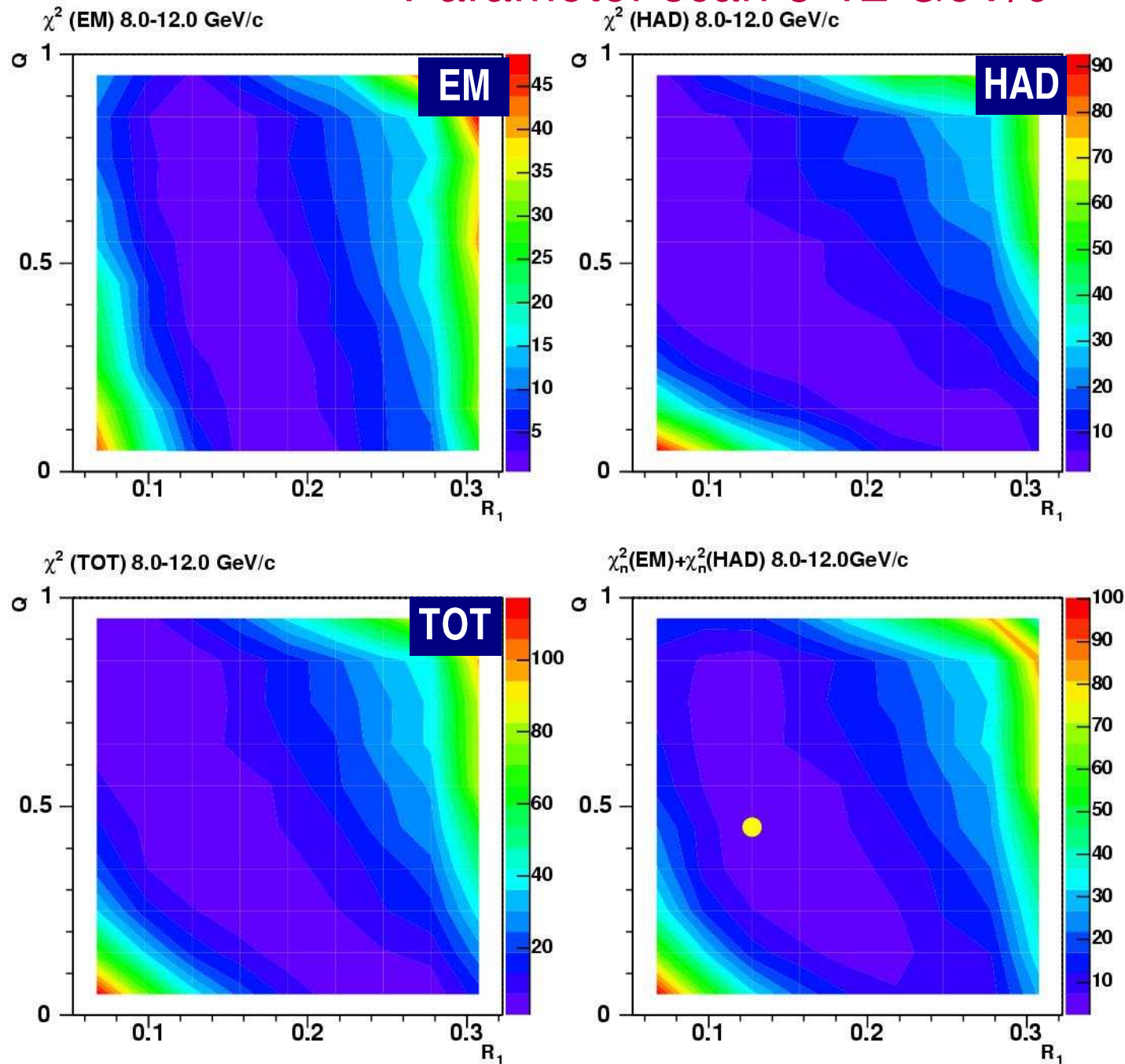


Parameter scan 5-8 GeV/c



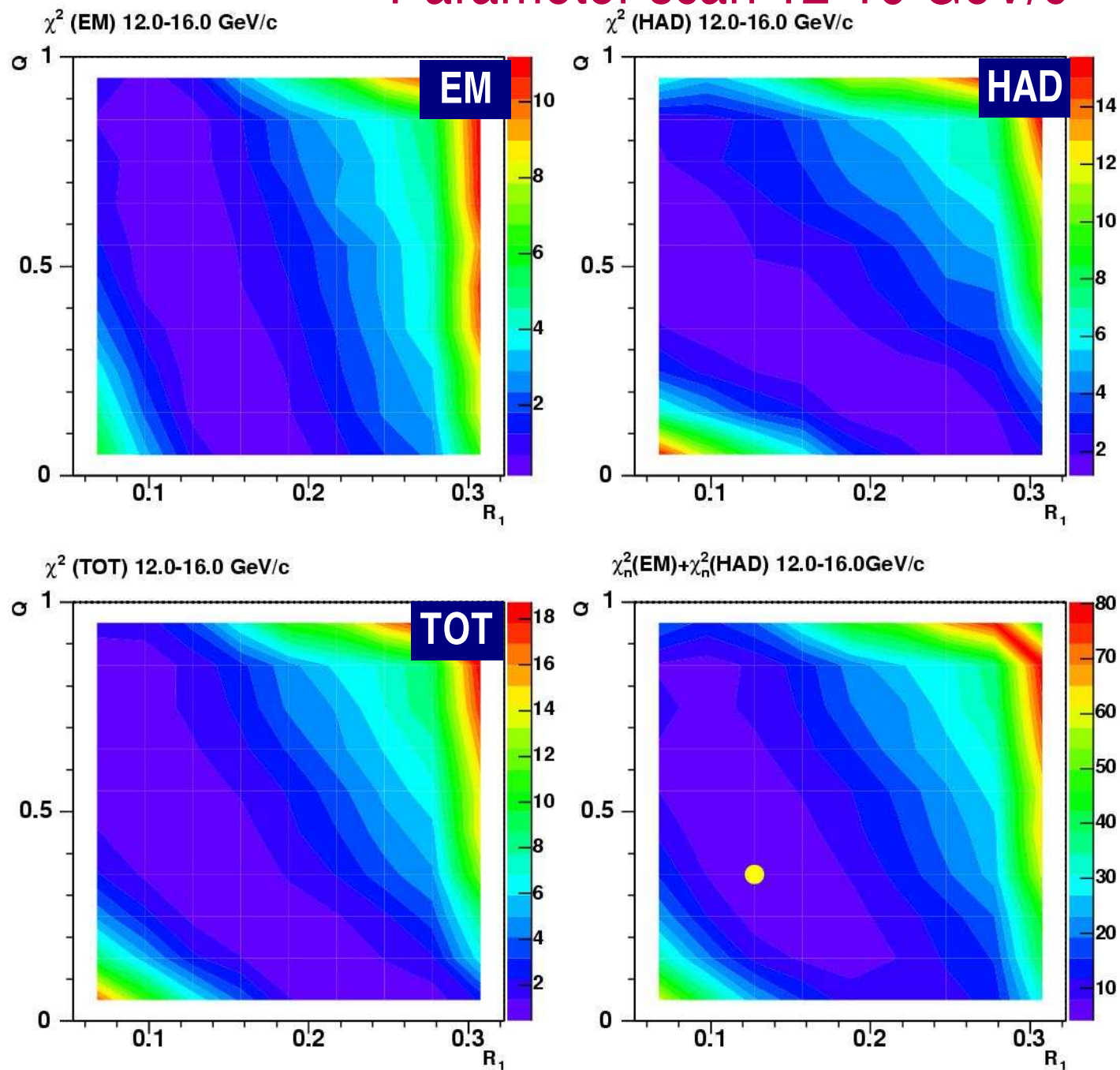
NB: zoomed region

Parameter scan 8-12 GeV/c

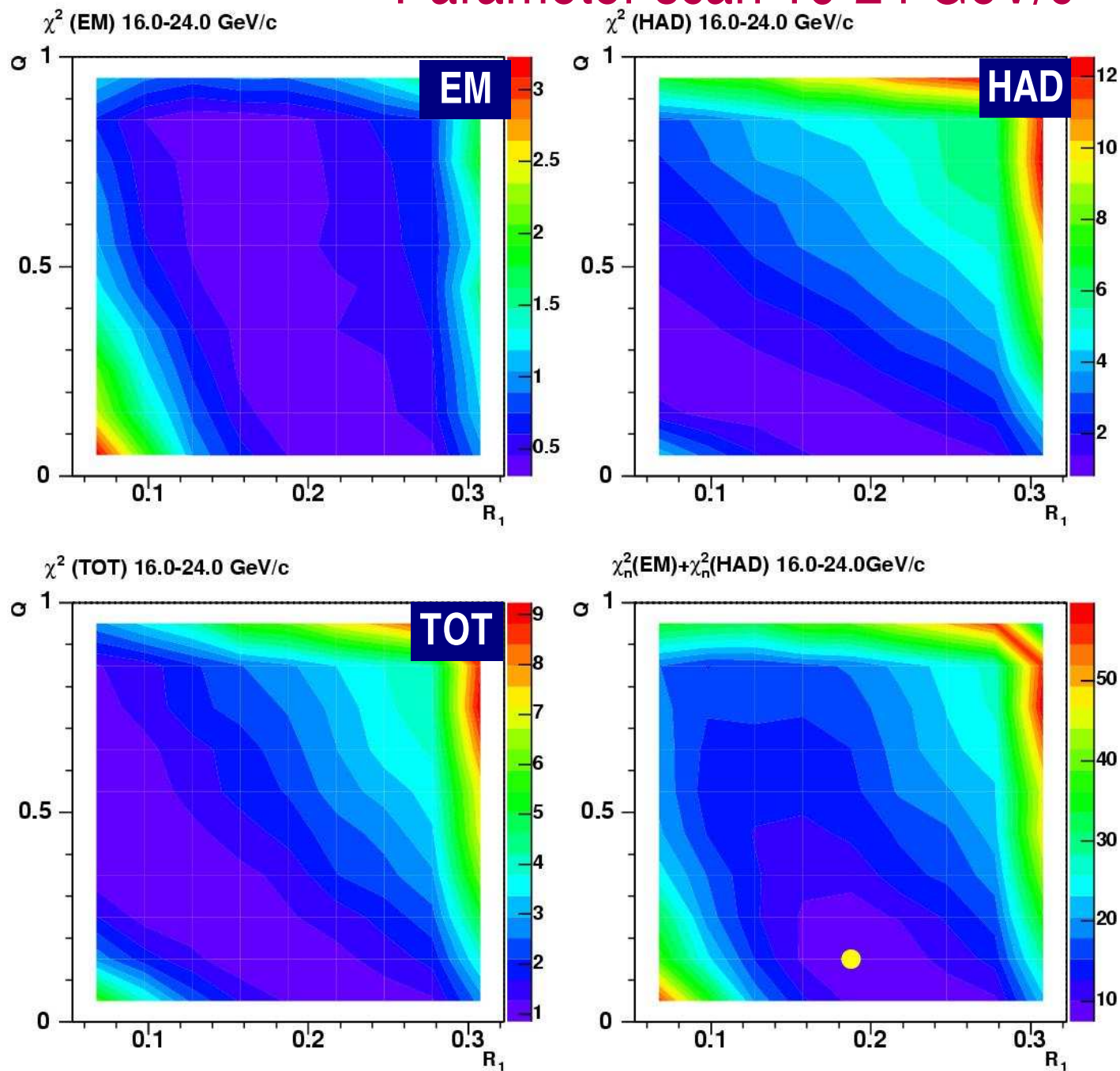


NB: more zoom

Parameter scan 12-16 GeV/c

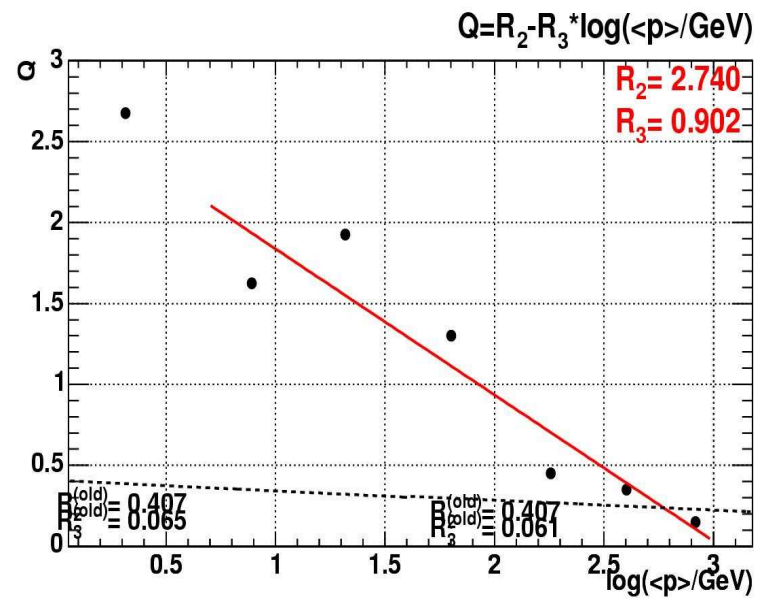
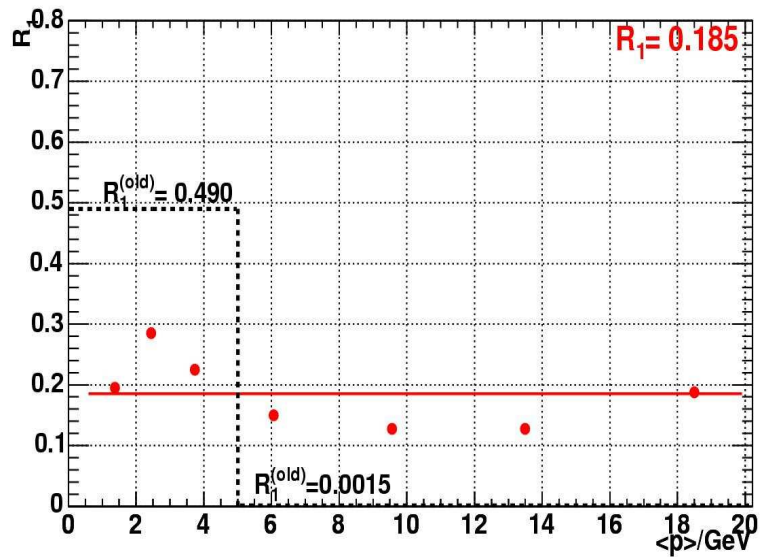


Parameter scan 16-24 GeV/c

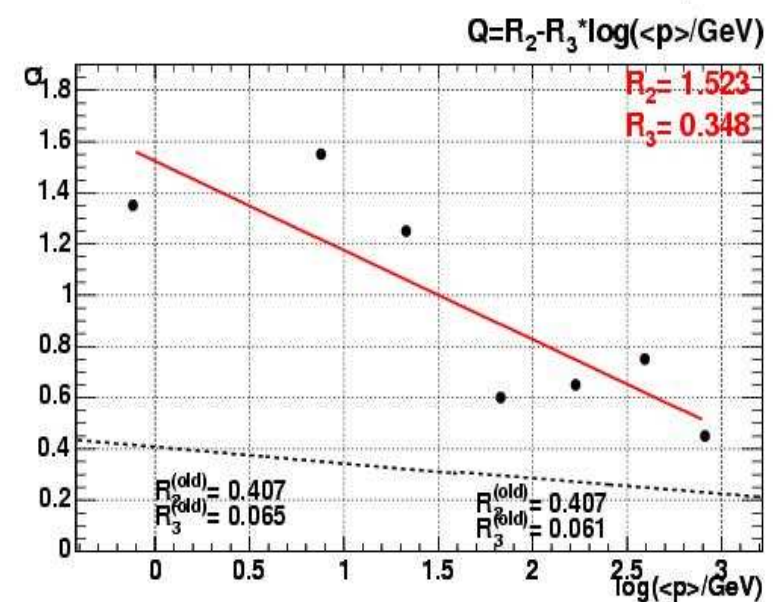
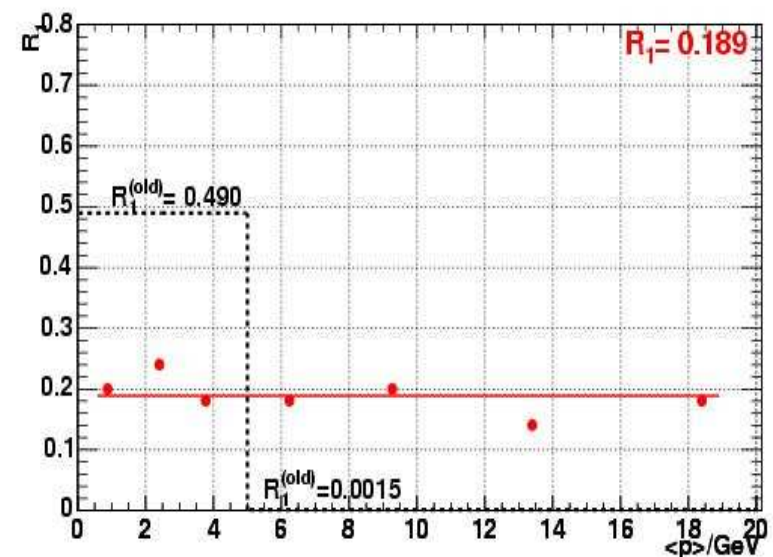


Results

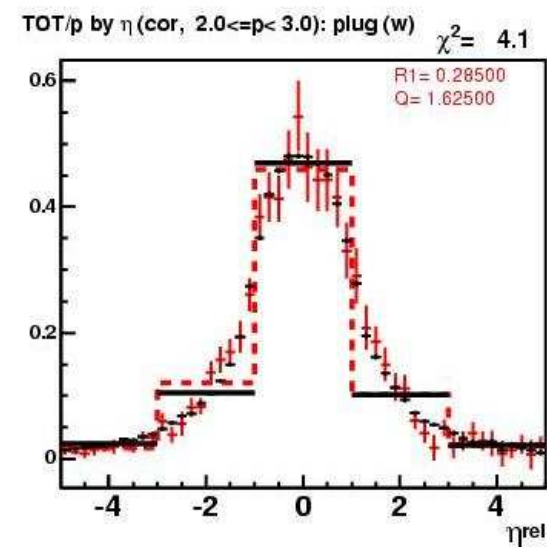
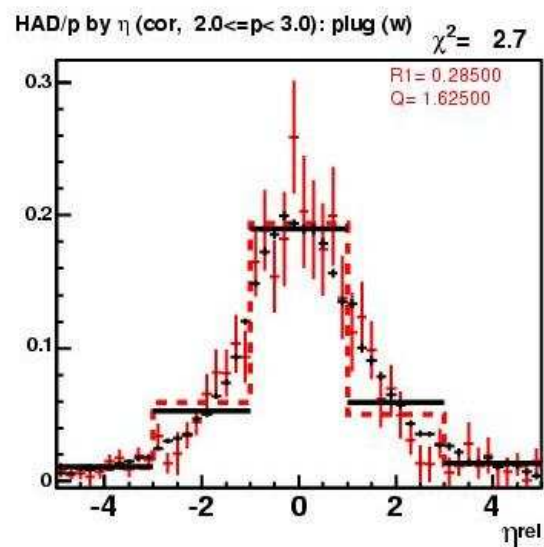
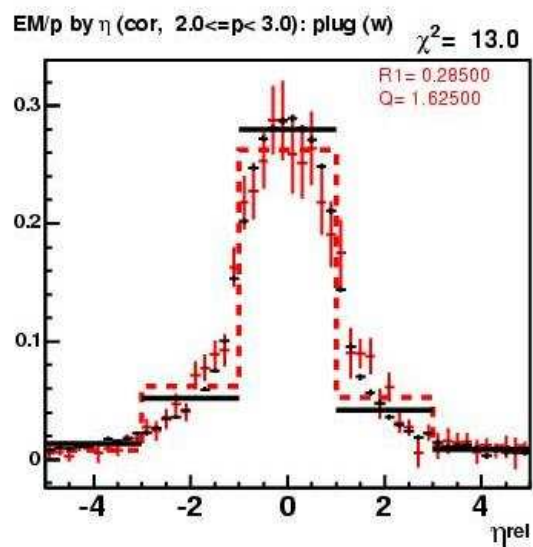
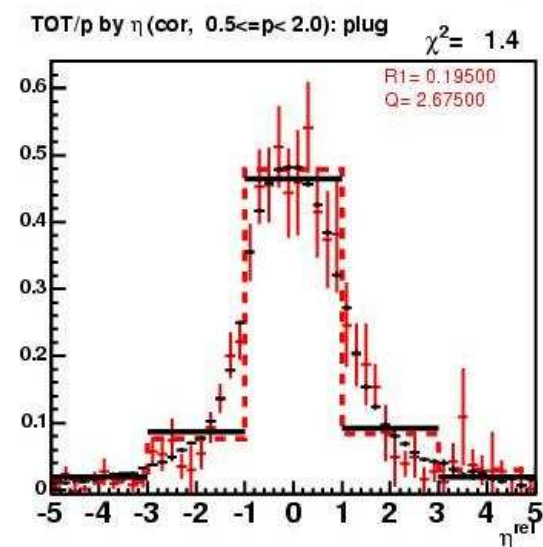
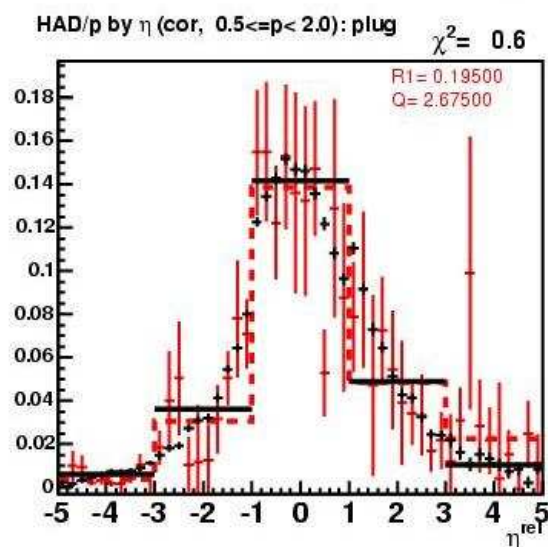
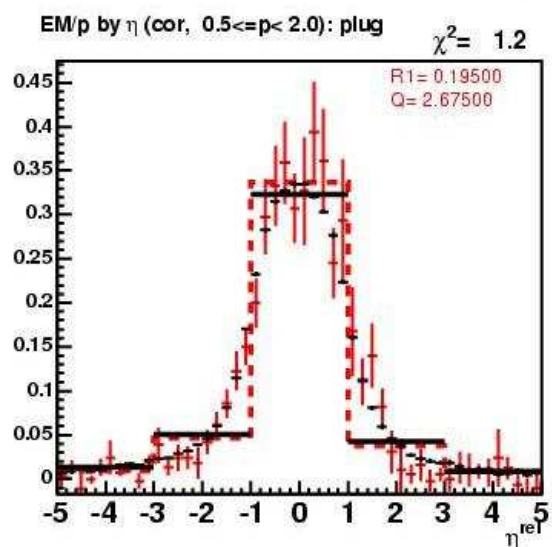
Plug



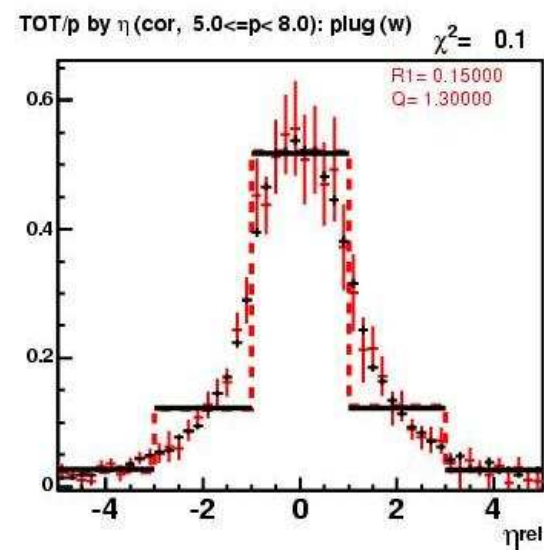
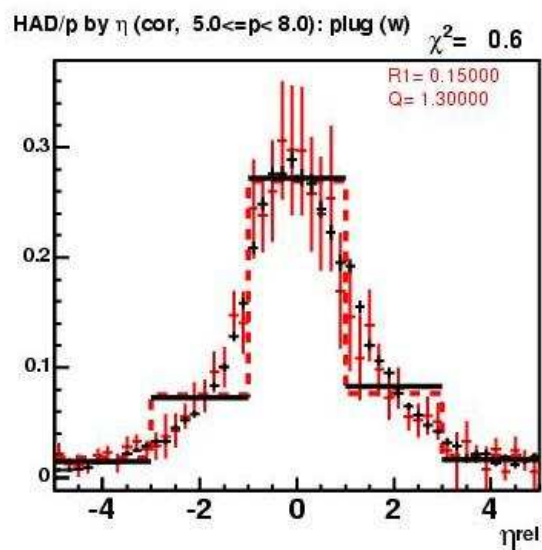
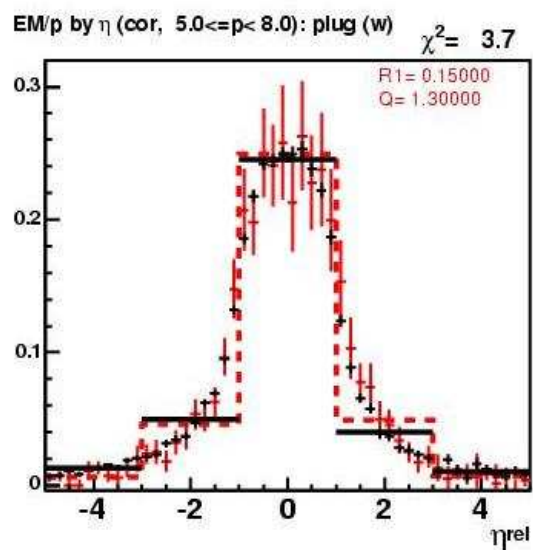
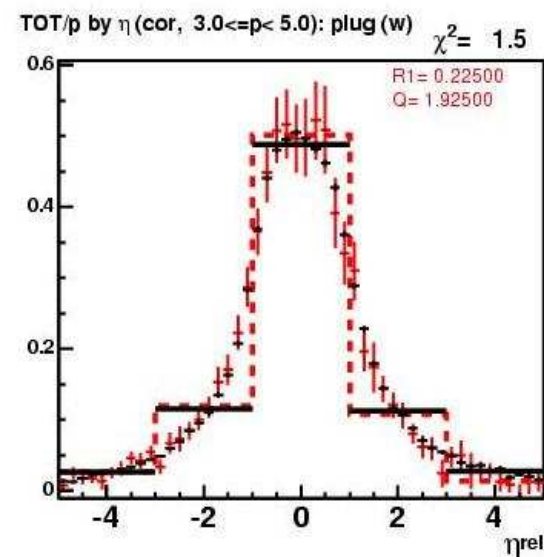
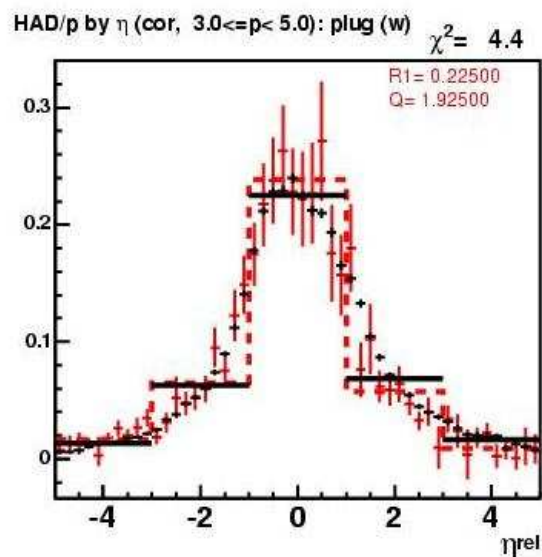
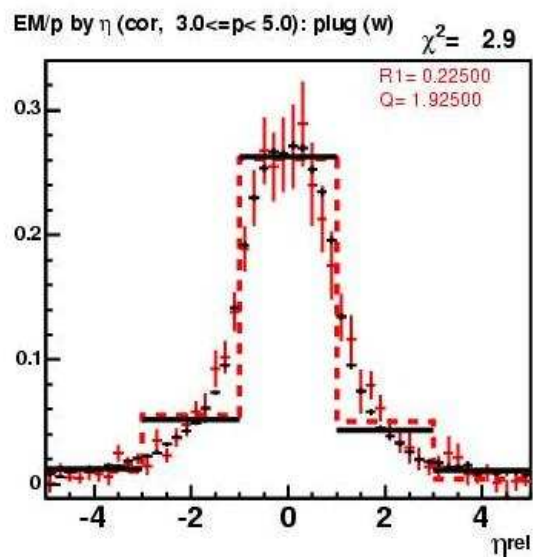
Central



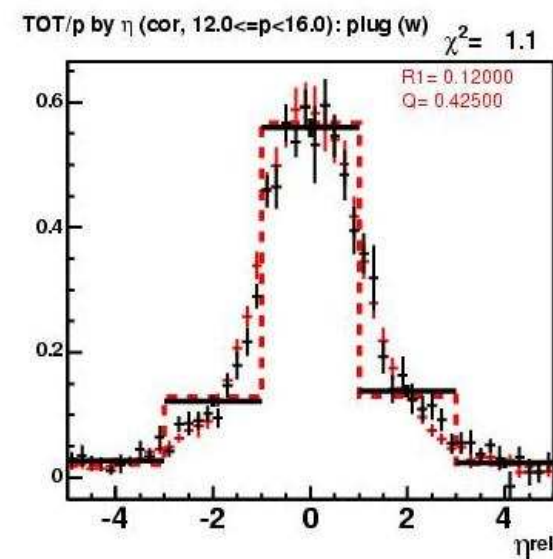
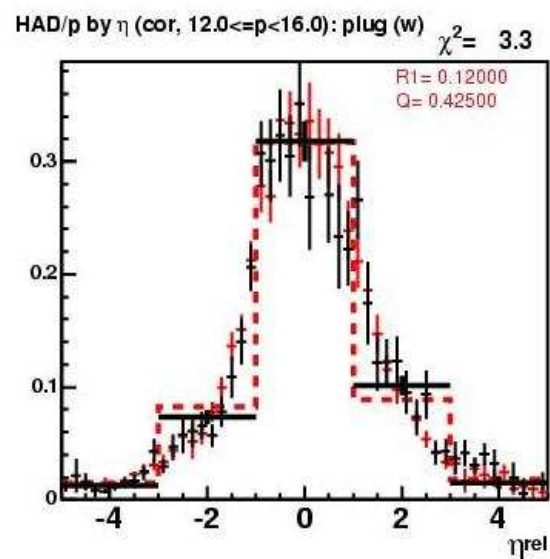
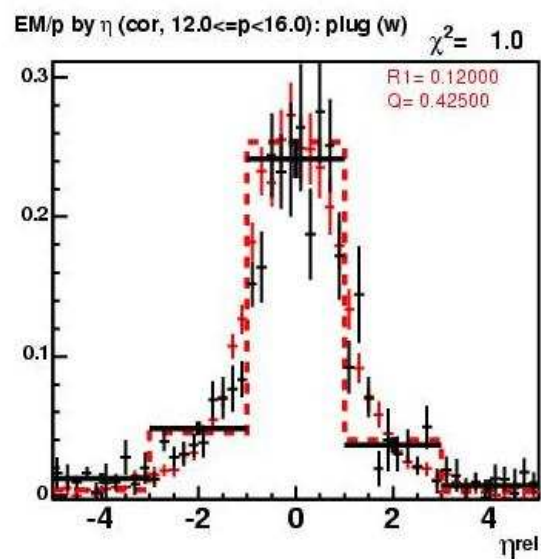
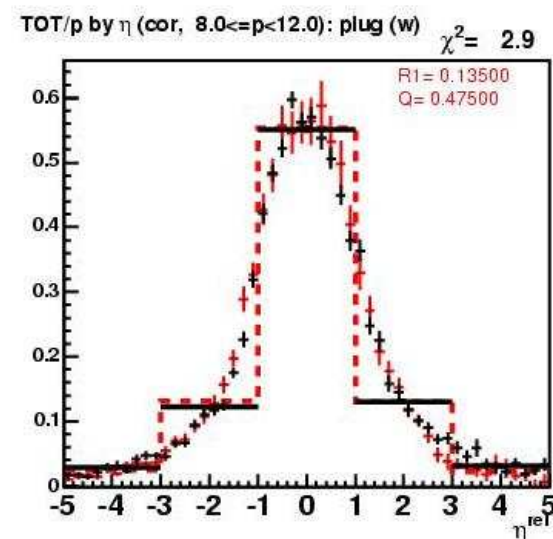
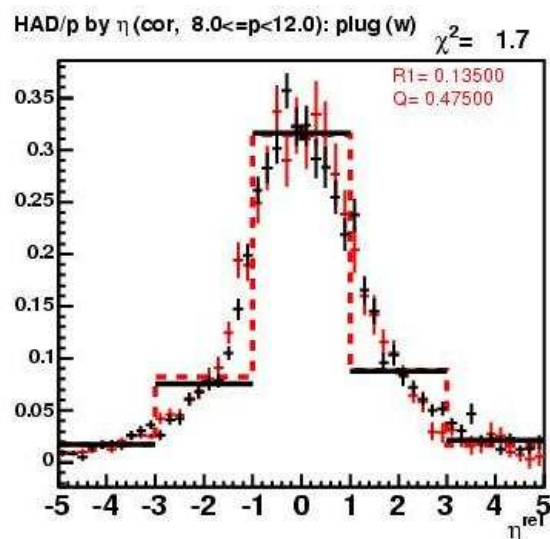
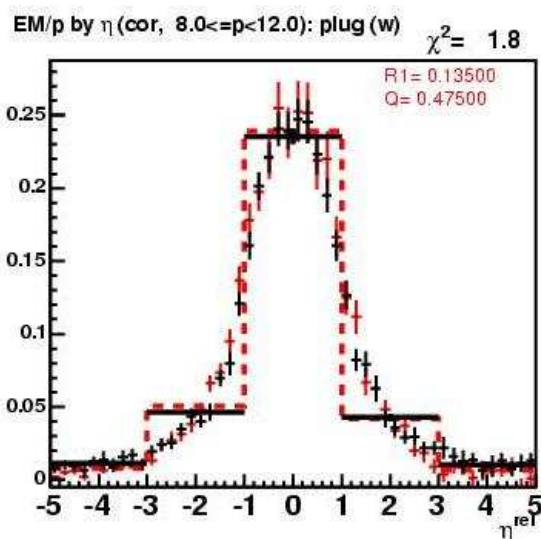
Normalized lateral profiles 1-3 GeV/c



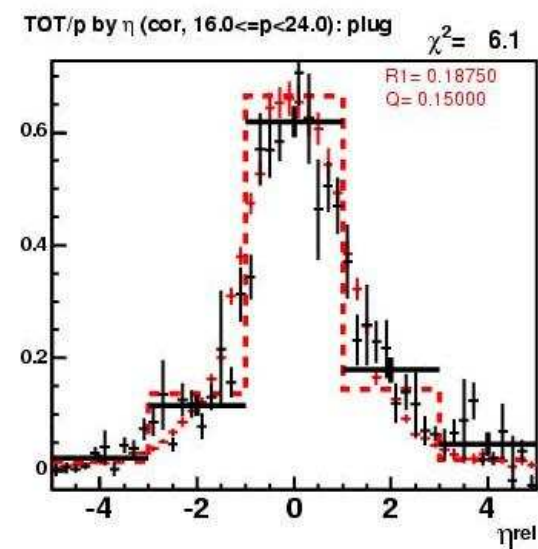
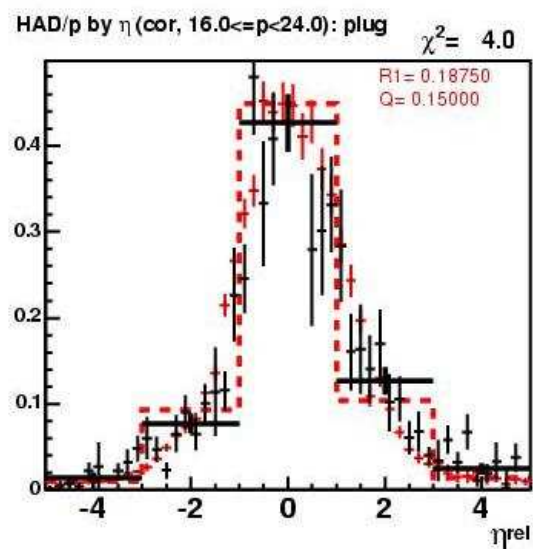
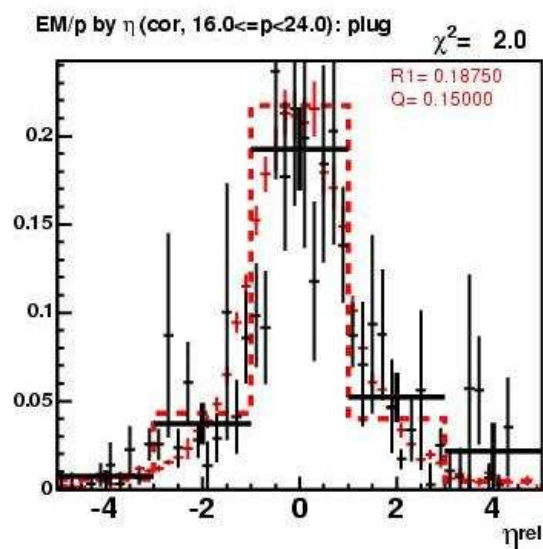
Normalized lateral profiles 3-8 GeV/c



Normalized lateral profiles 8-16 GeV/c



Normalized lateral profiles 16-24 GeV/c



Conclusion



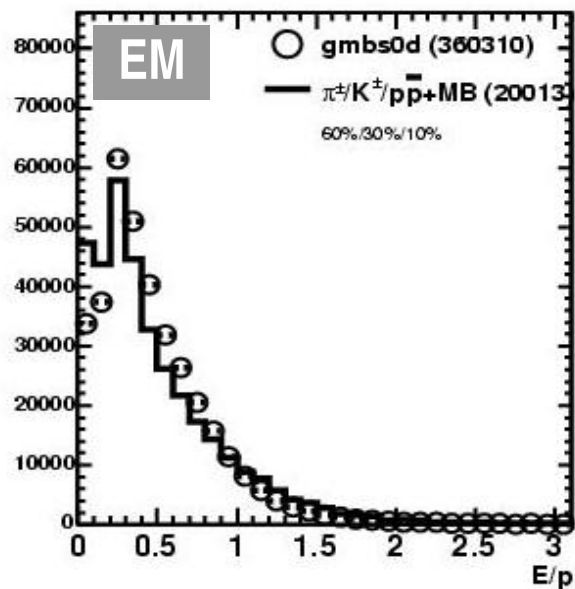
- Gflash lateral core parameter consistently determined in plug and central part: $R_1 \sim 0.19$
- “Spread” term (R_2, R_3) different in plug and central.
 - Plug profiles appear 2-3 times stronger dependent on initial particle momentum and shower depth.
 - Impact of passive material?
 - Intersection with zero at ~ 20 GeV (central was > 80 GeV/c).
Need to take H1 default for higher momenta.
- Try to refine tuning, more MC track statistics.

- Plug E/p distributions

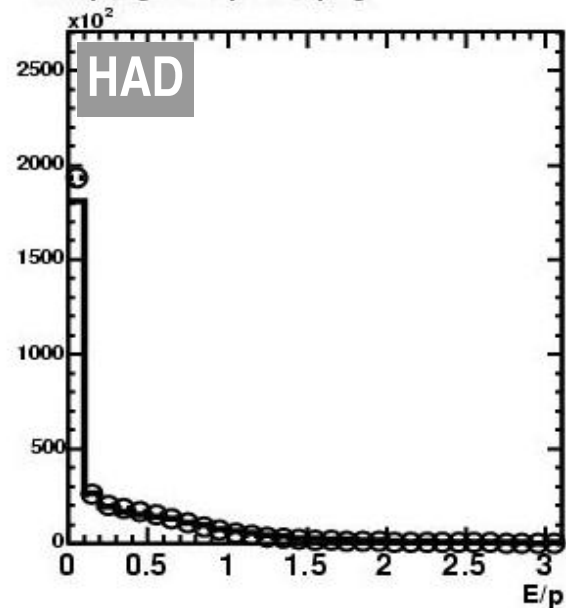
E/p distribution (0.5-2.0 GeV/c, plug)



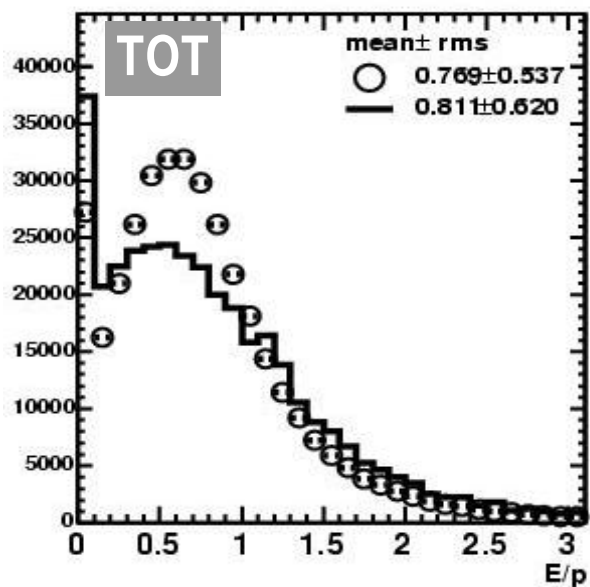
EM/p (sig, $0.5 \leq p < 2.0$): plug



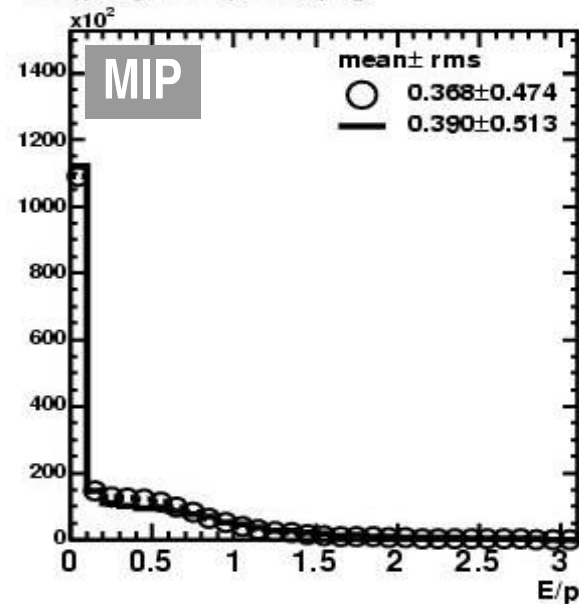
HAD/p (sig, $0.5 \leq p < 2.0$): plug



TOT/p (sig, $0.5 \leq p < 2.0$): plug



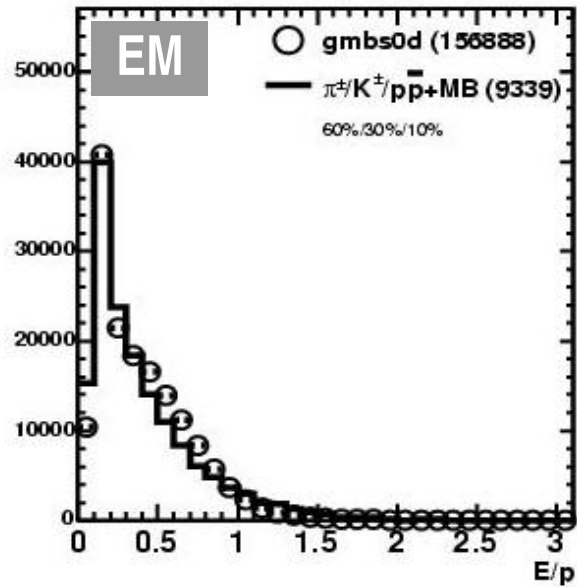
MIP/p (sig, $0.5 \leq p < 2.0$): plug



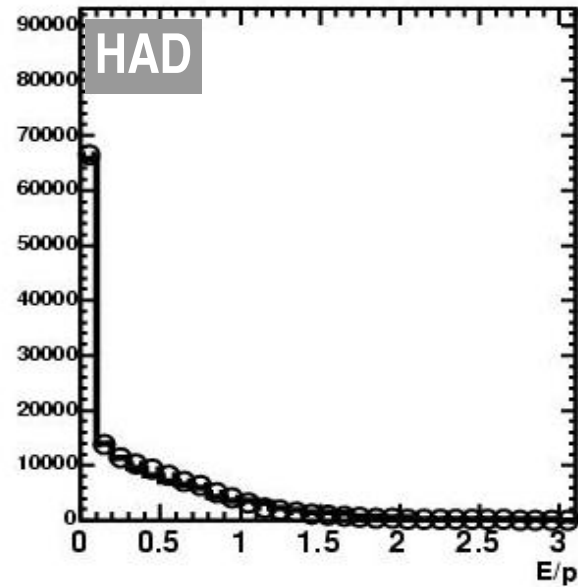
E/p distribution (2-3 GeV/c, plug)



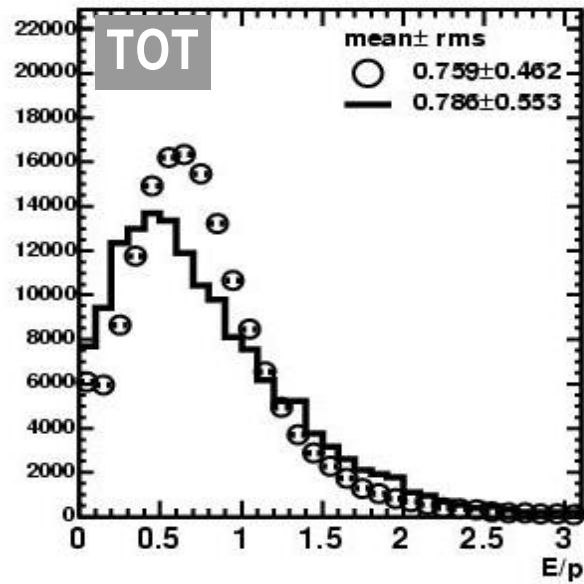
EM/p (sig, $2.0 \leq p < 3.0$): plug



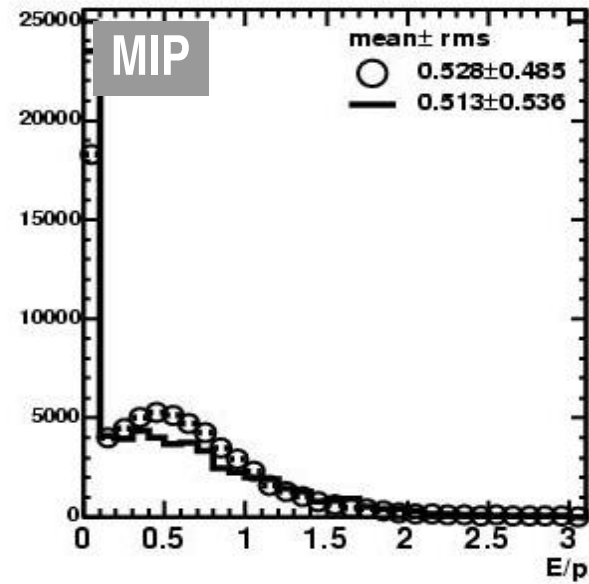
HAD/p (sig, $2.0 \leq p < 3.0$): plug



TOT/p (sig, $2.0 \leq p < 3.0$): plug



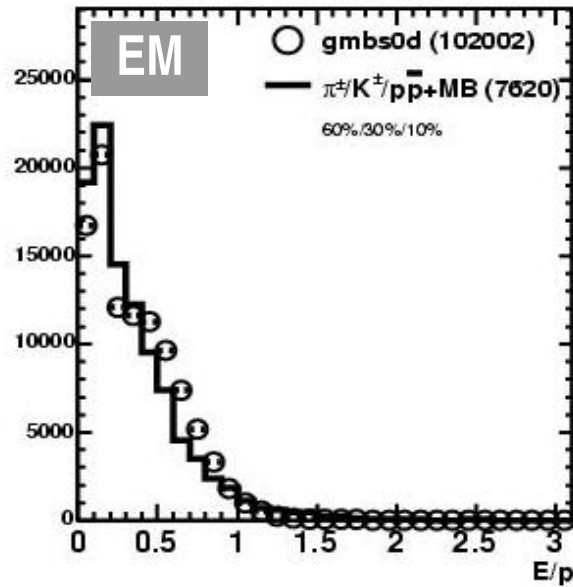
MIP/p (sig, $2.0 \leq p < 3.0$): plug



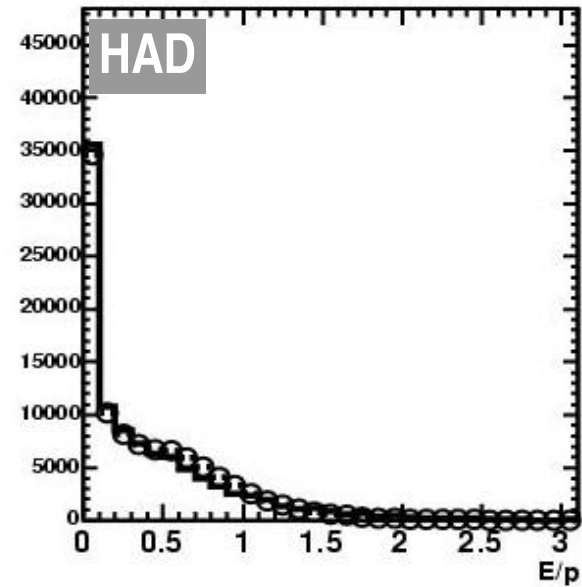
E/p distribution (3-5 GeV/c, plug)



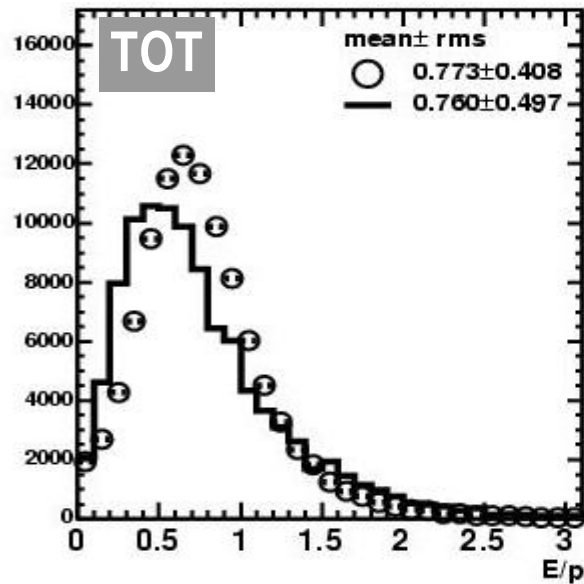
EM/p (sig, $3.0 \leq p < 5.0$): plug



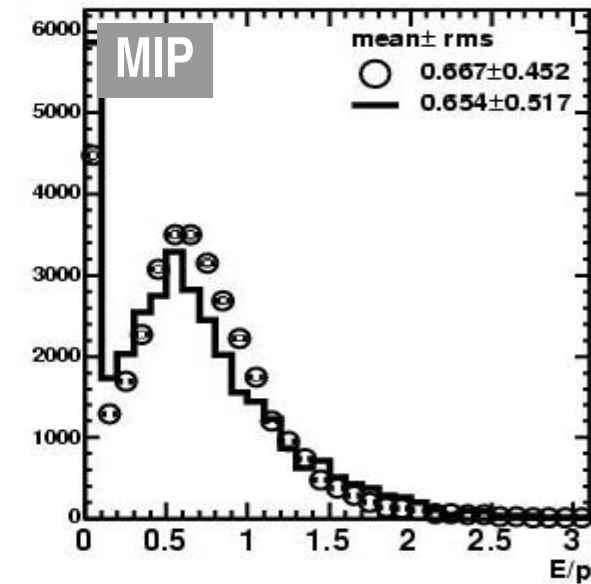
HAD/p (sig, $3.0 \leq p < 5.0$): plug



TOT/p (sig, $3.0 \leq p < 5.0$): plug



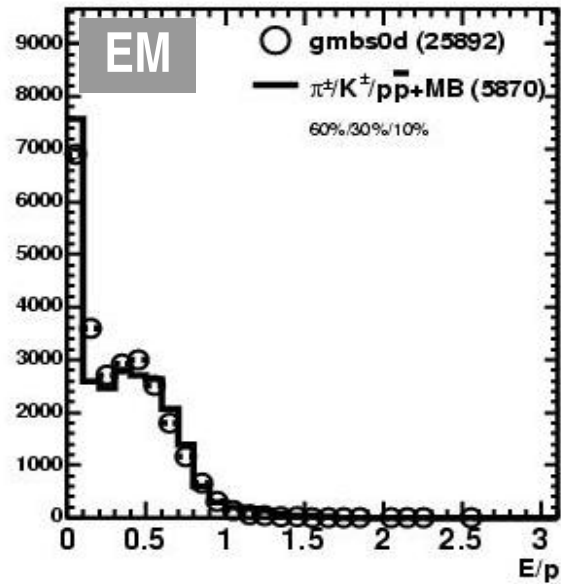
MIP/p (sig, $3.0 \leq p < 5.0$): plug



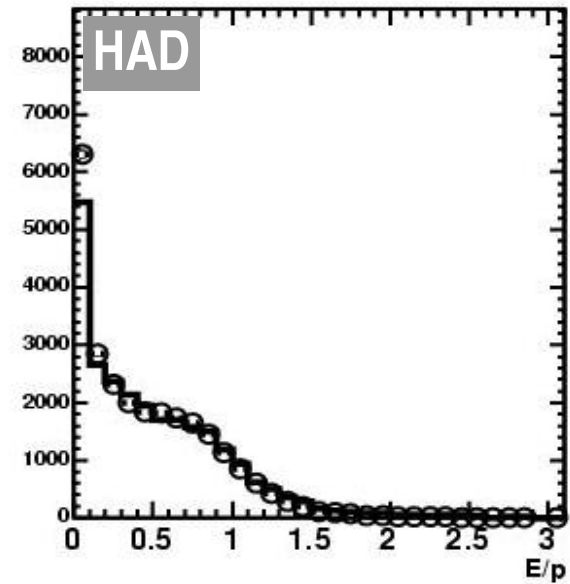
E/p distribution (5-8 GeV/c, plug)



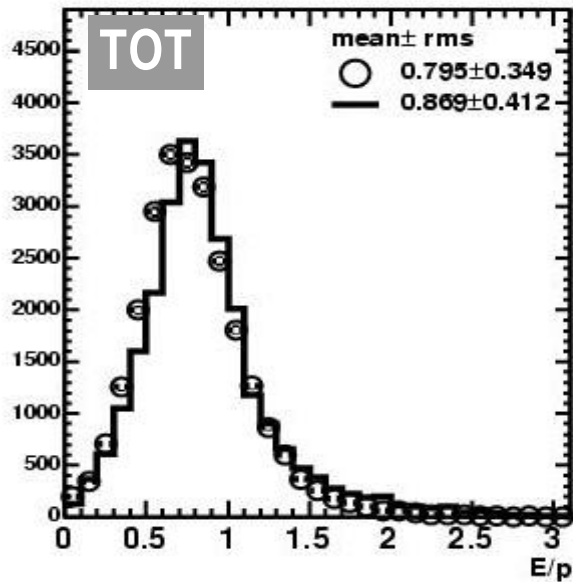
EM/p (sig, $5.0 \leq p < 8.0$): plug



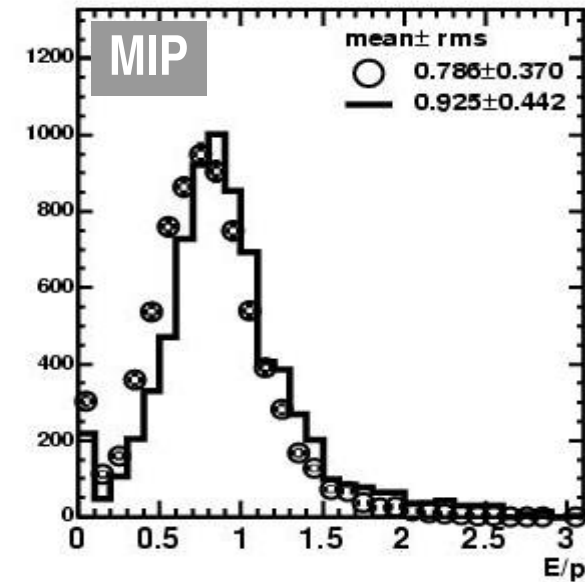
HAD/p (sig, $5.0 \leq p < 8.0$): plug



TOT/p (sig, $5.0 \leq p < 8.0$): plug



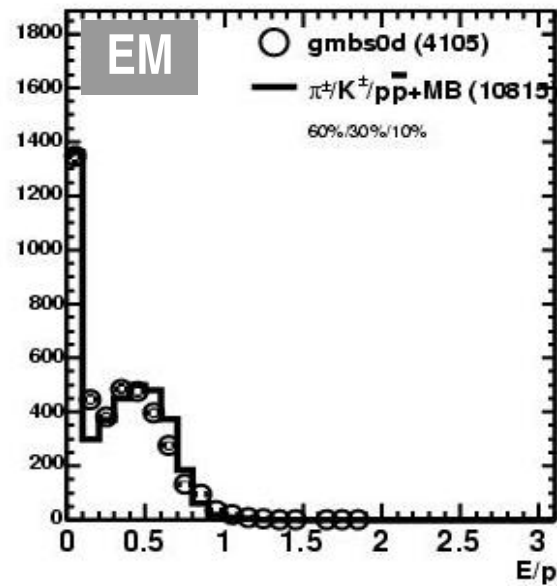
MIP/p (sig, $5.0 \leq p < 8.0$): plug



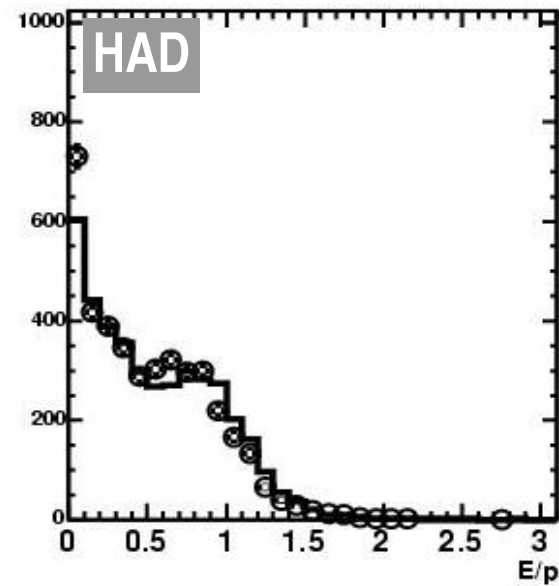
E/p distribution (8-12 GeV/c, plug)



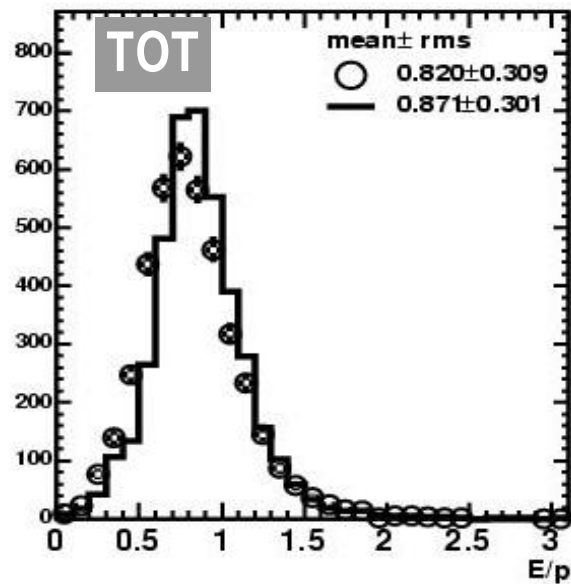
EM/p (sig, $8.0 \leq p < 12.0$): plug



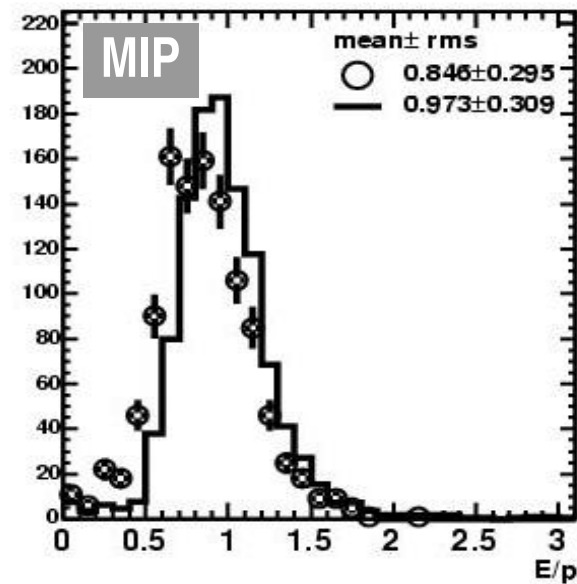
HAD/p (sig, $8.0 \leq p < 12.0$): plug



TOT/p (sig, $8.0 \leq p < 12.0$): plug



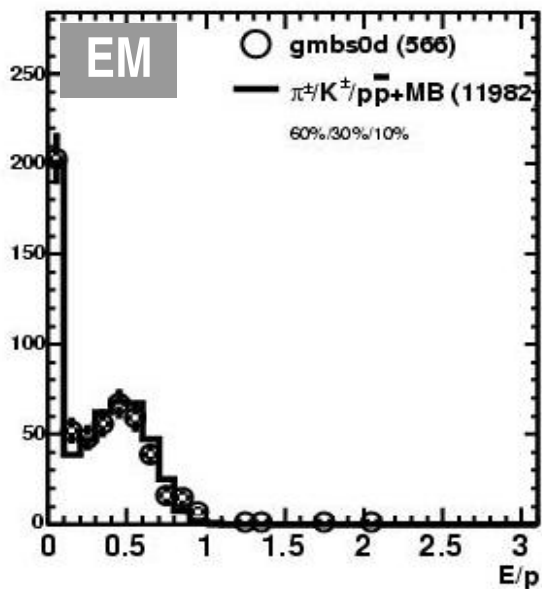
MIP/p (sig, $8.0 \leq p < 12.0$): plug



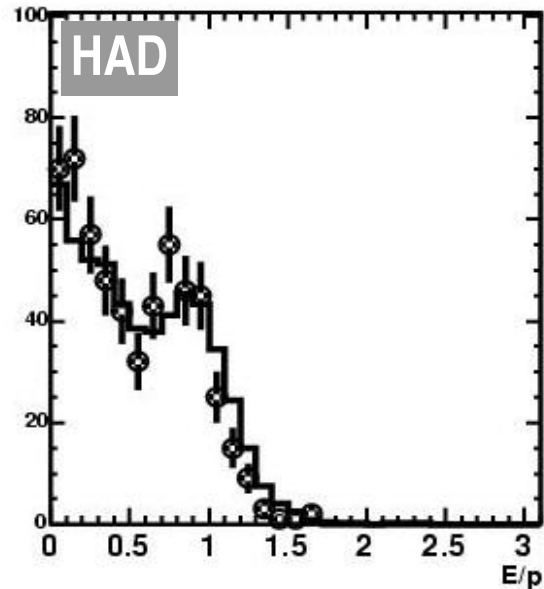
E/p distribution (12-16 GeV/c, plug)



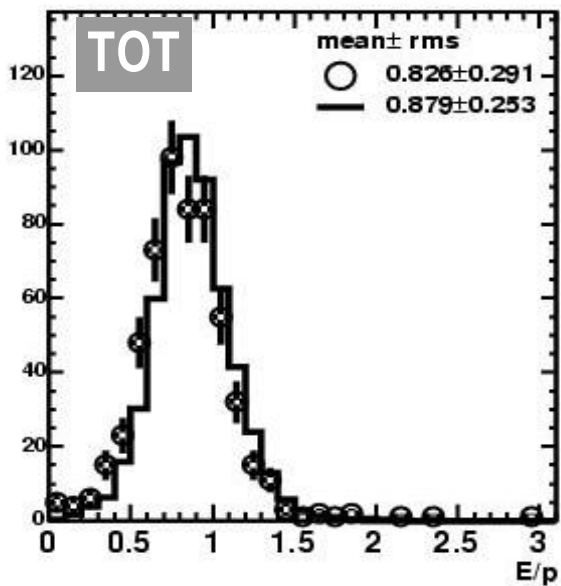
EM/p (sig, 12.0<= p <16.0): plug



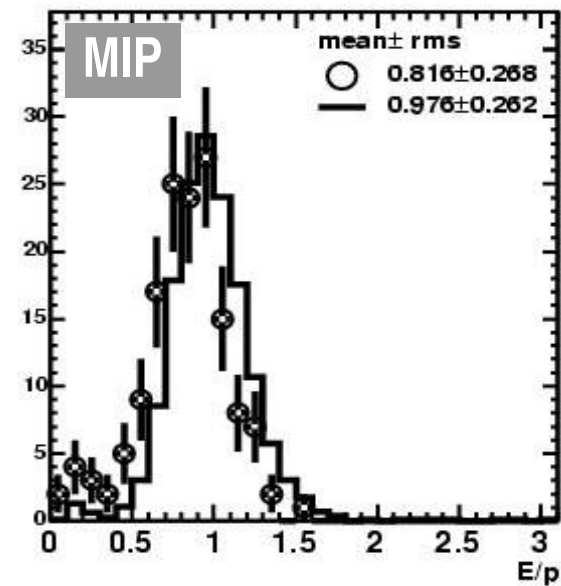
HAD/p (sig, 12.0<= p <16.0): plug



TOT/p (sig, 12.0<= p <16.0): plug



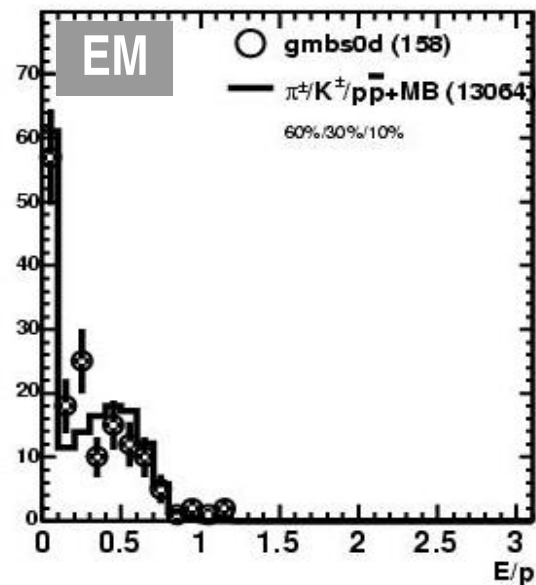
MIP/p (sig, 12.0<= p <16.0): plug



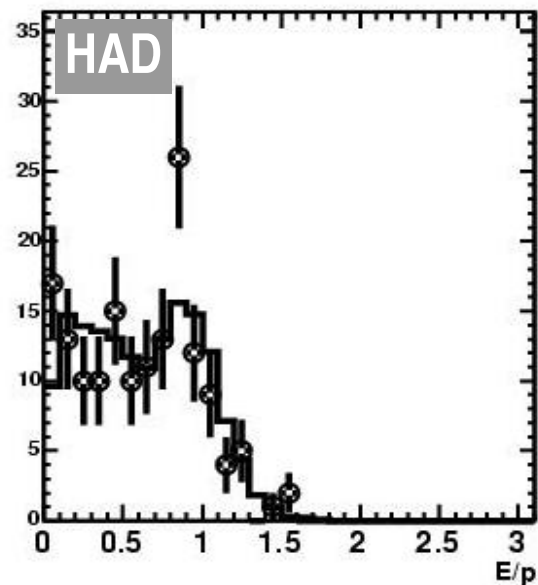
E/p distribution (16-24 GeV/c, plug)



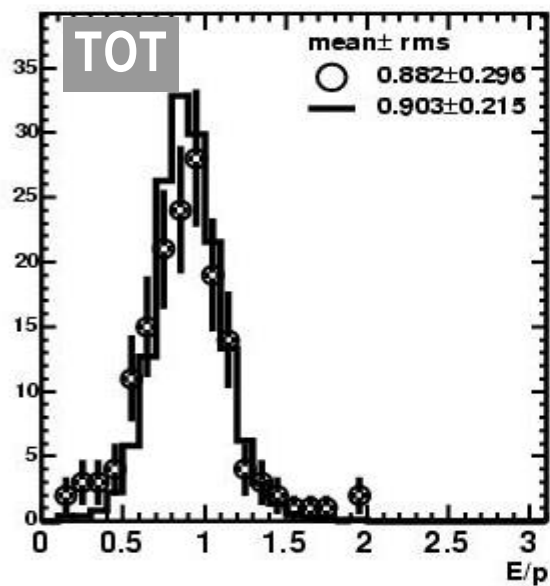
EM/p (sig, 16.0<= p <24.0): plug



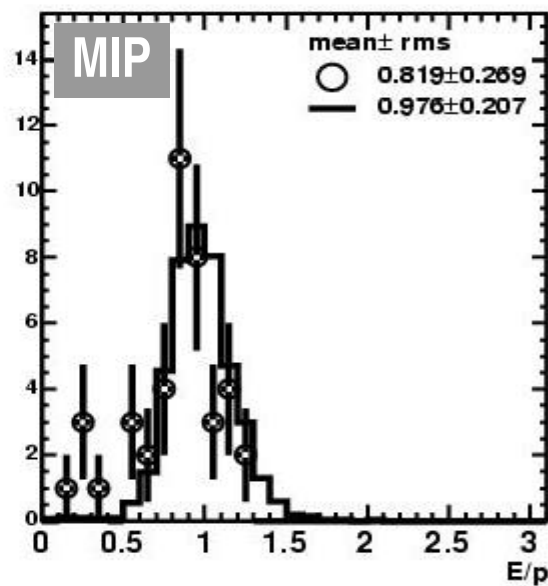
HAD/p (sig, 16.0<= p <24.0): plug



TOT/p (sig, 16.0<= p <24.0): plug



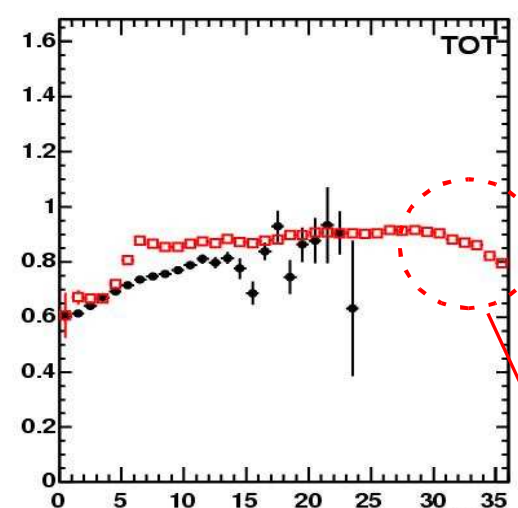
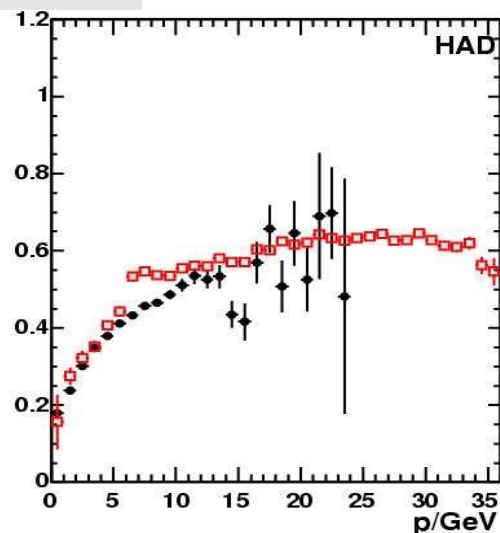
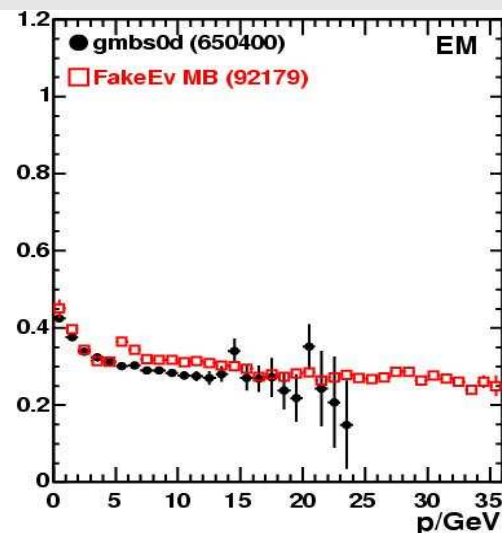
MIP/p (sig, 16.0<= p <24.0): plug



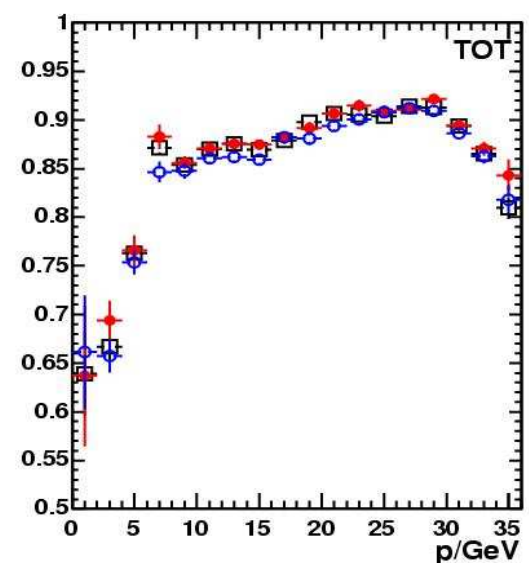
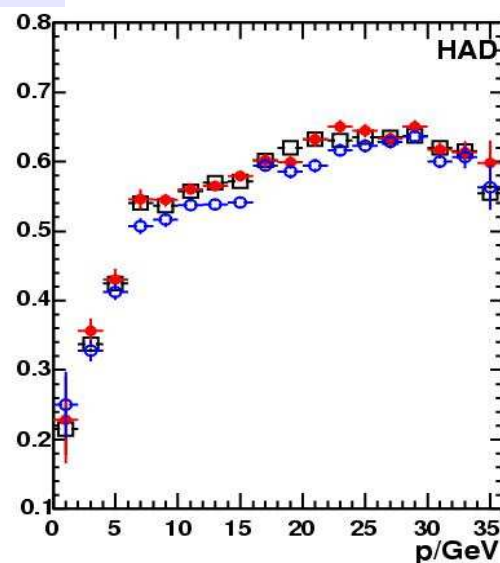
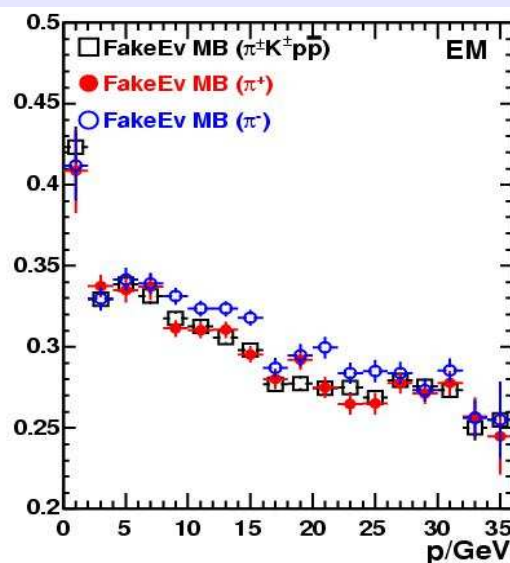
- Flavor dependence

E/p vs. p (plug)

fakeev standard mix + MB vs. data

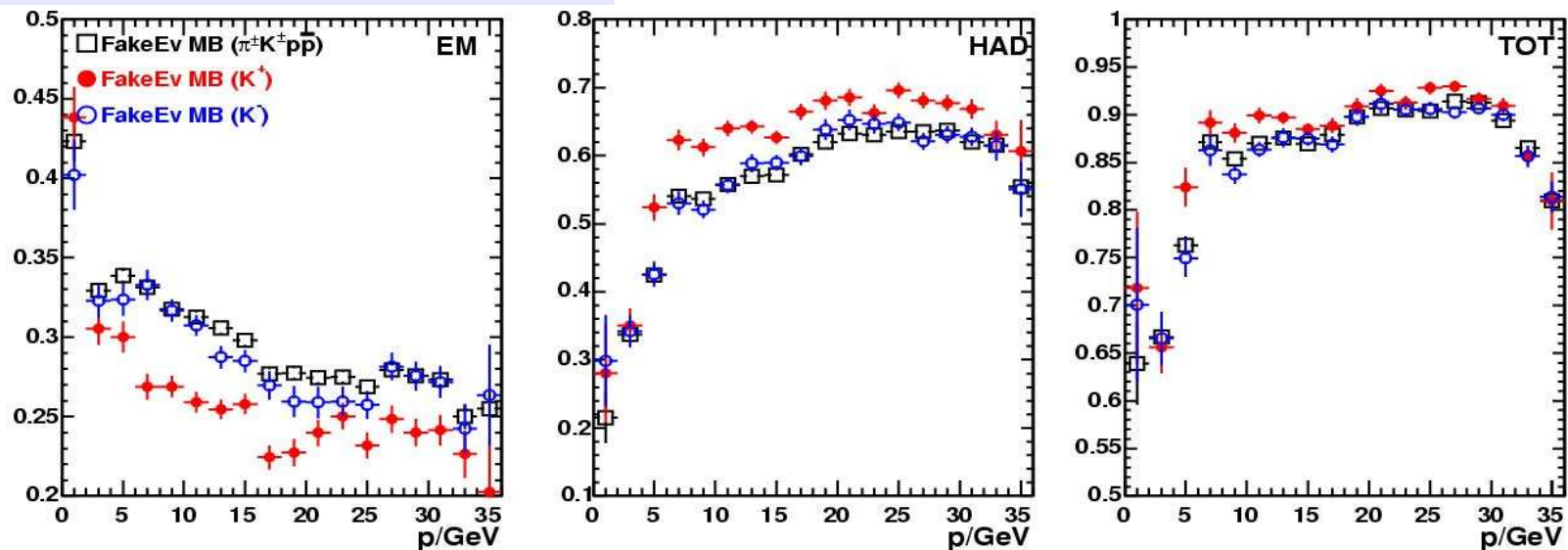


standard mix +MB vs. π^+/π^- +MB

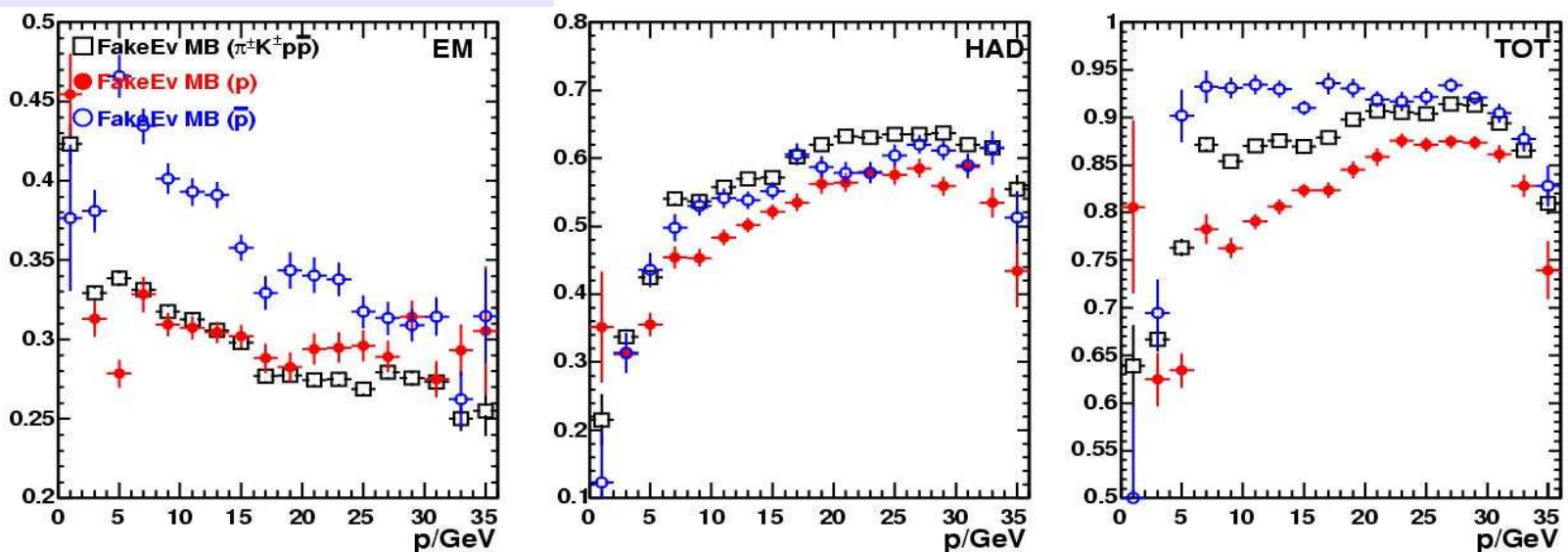


Mean E/p vs. p (plug)

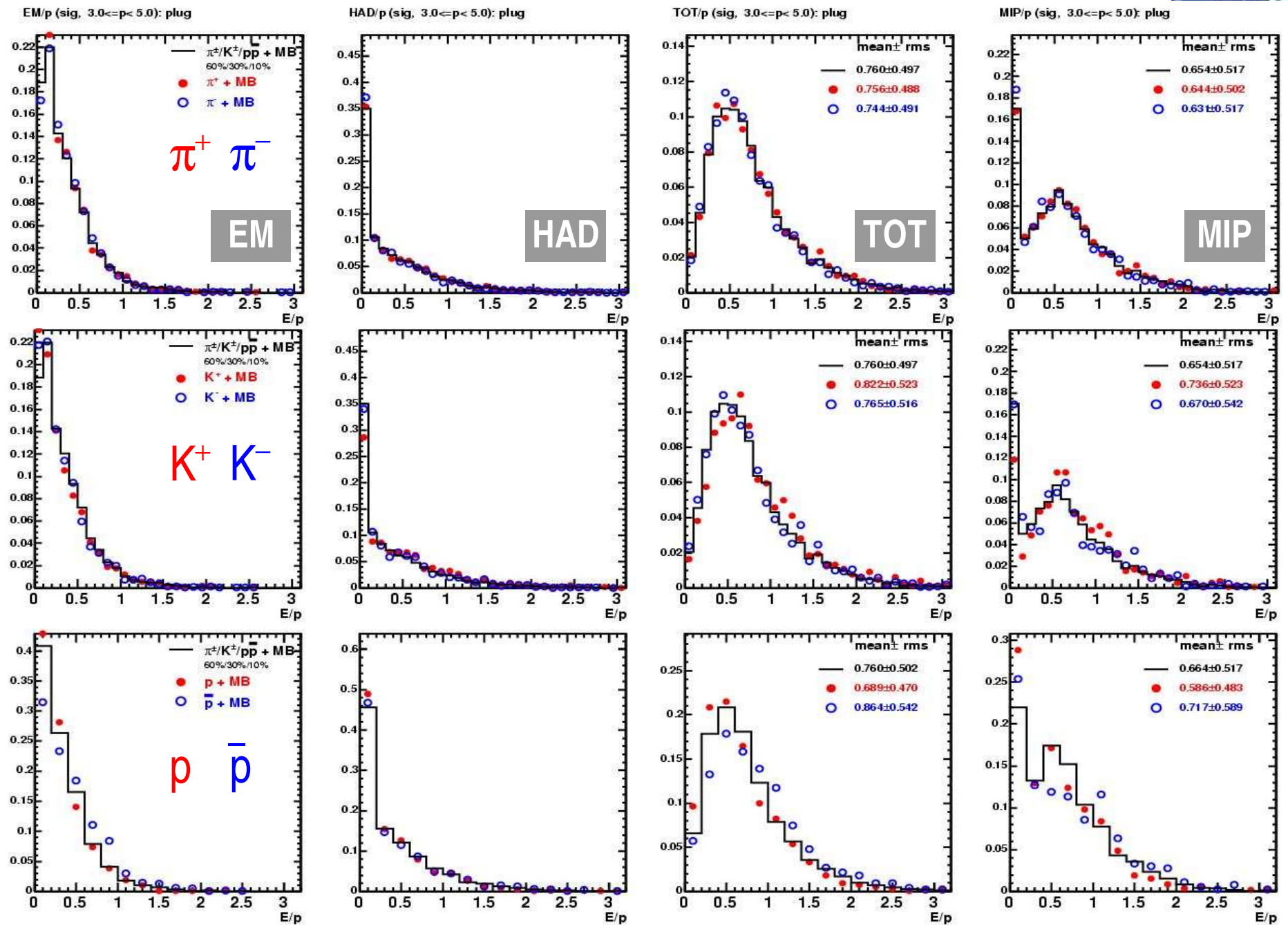
standard mix +MB vs. K^+/K^- + MB



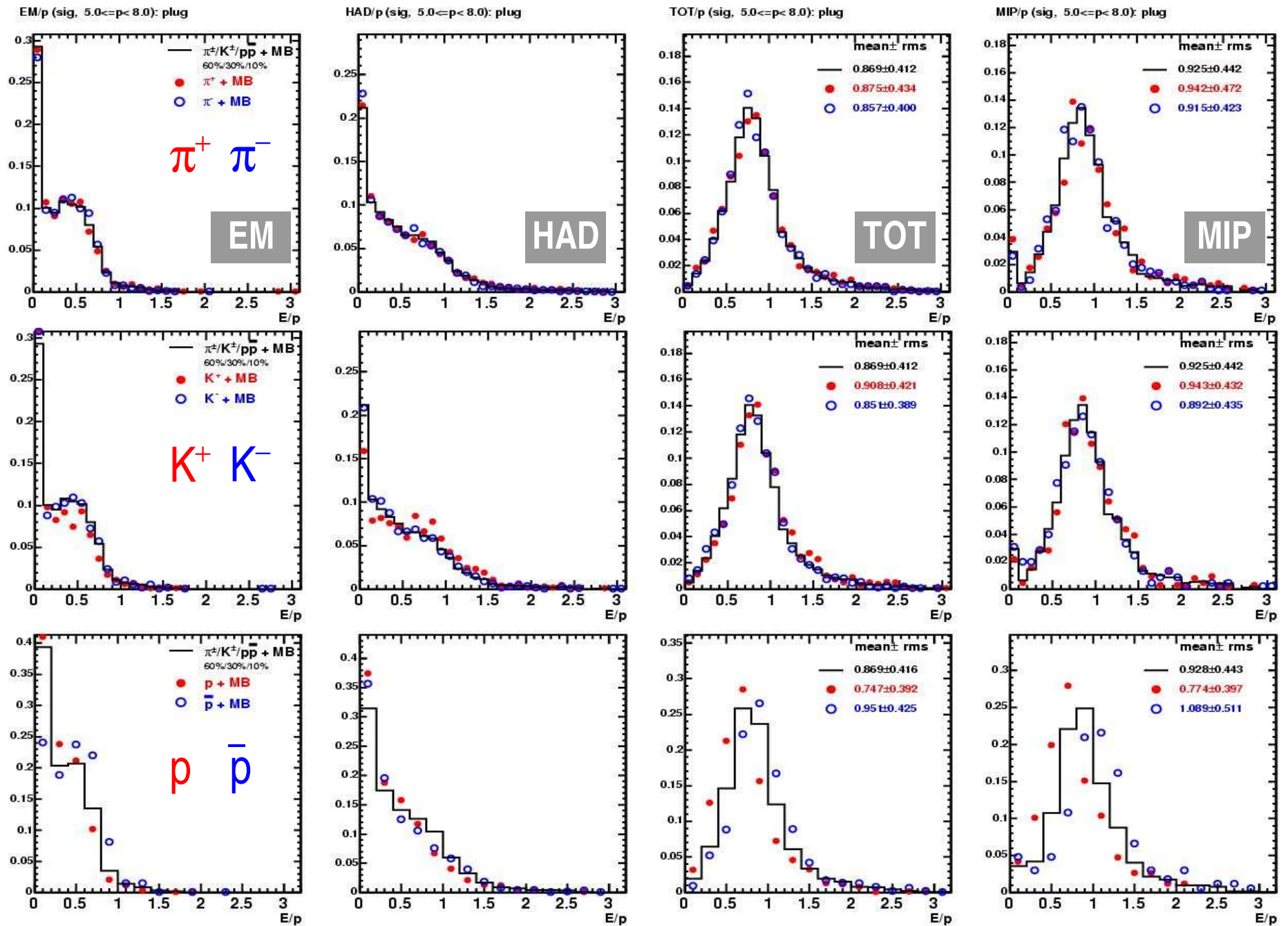
standard mix + MB vs. $p/\bar{p}$ + MB



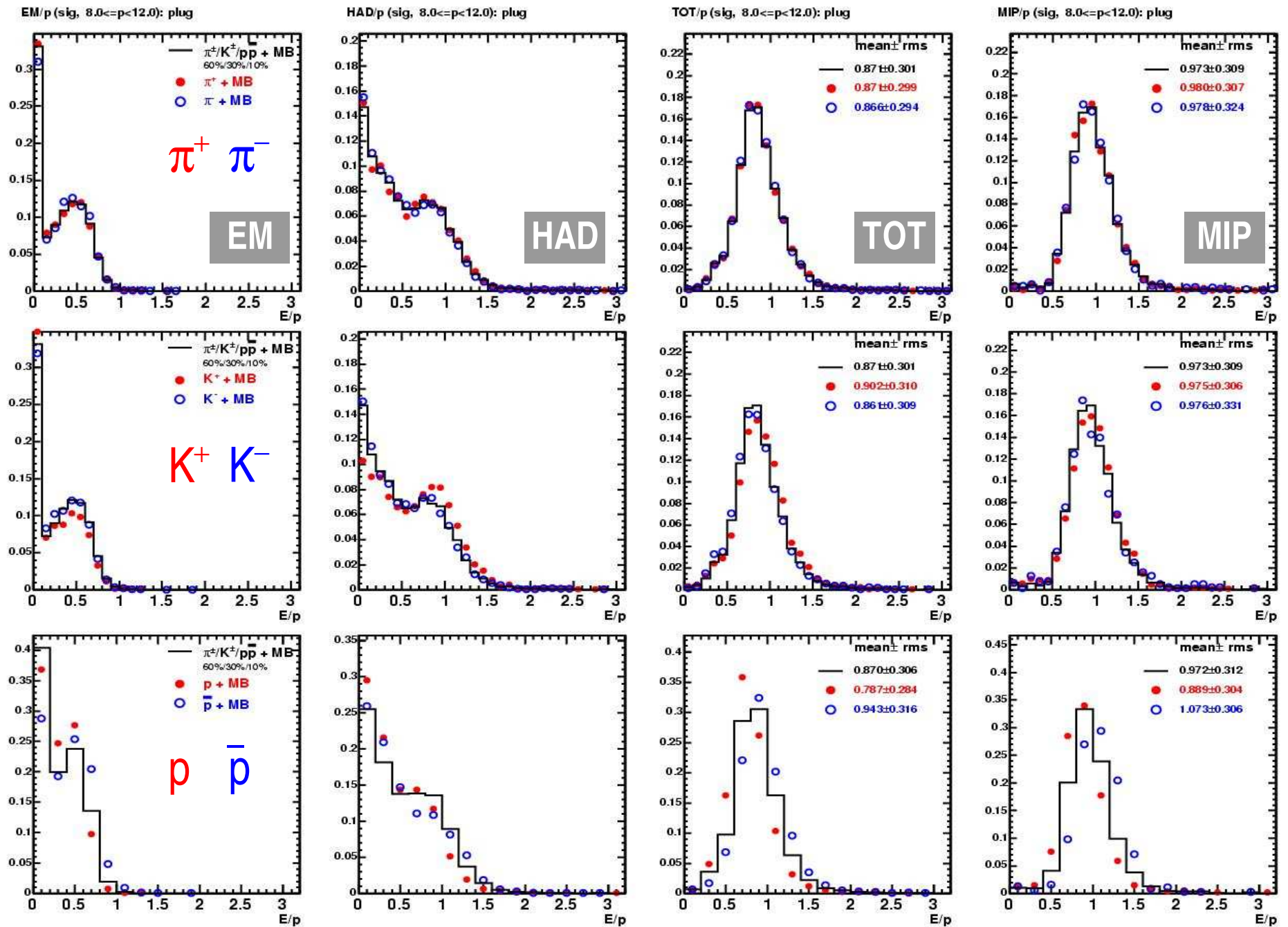
E/p distribution (3-5 GeV/c, plug)



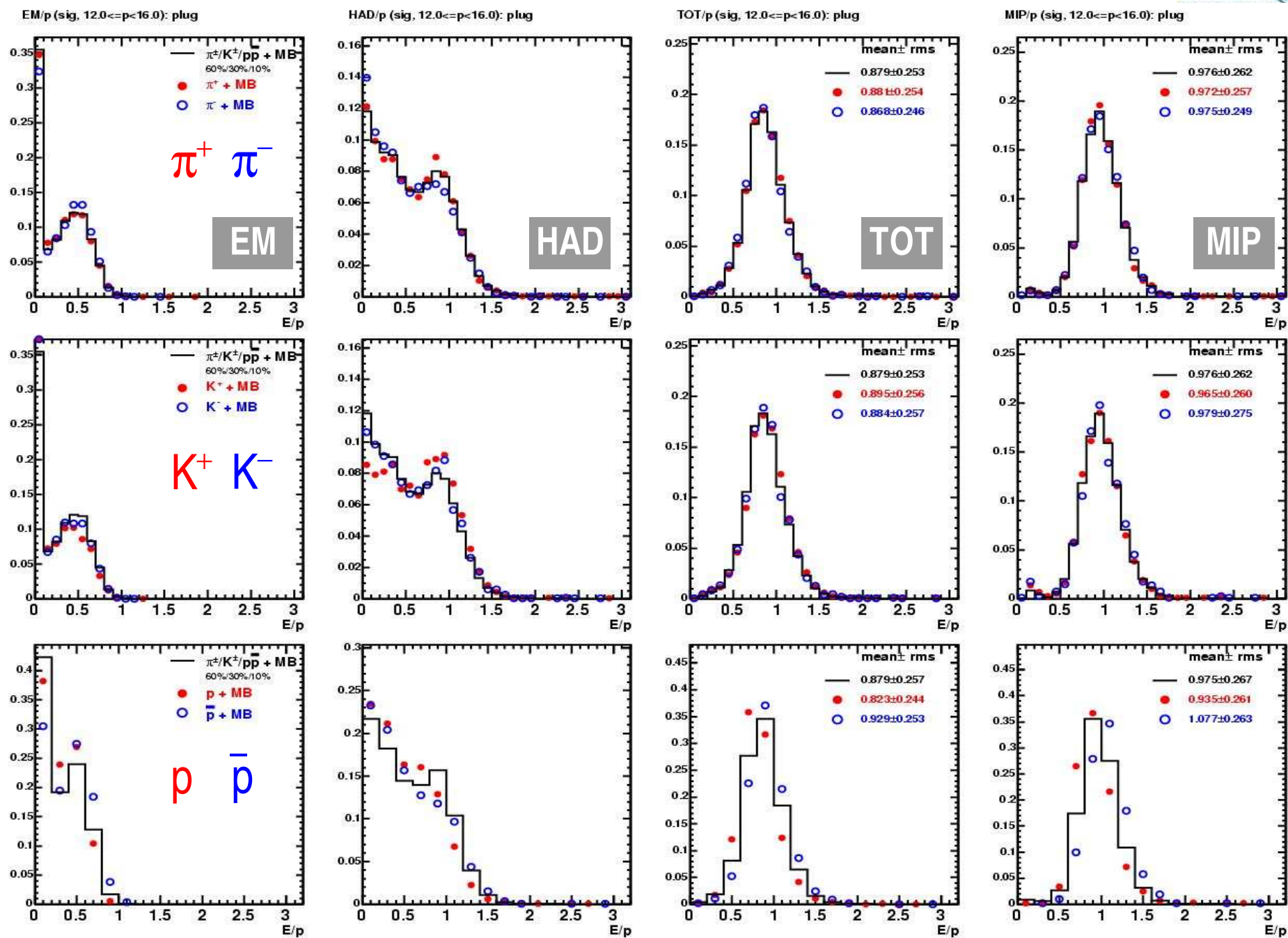
E/p distribution (5-8 GeV/c, plug)



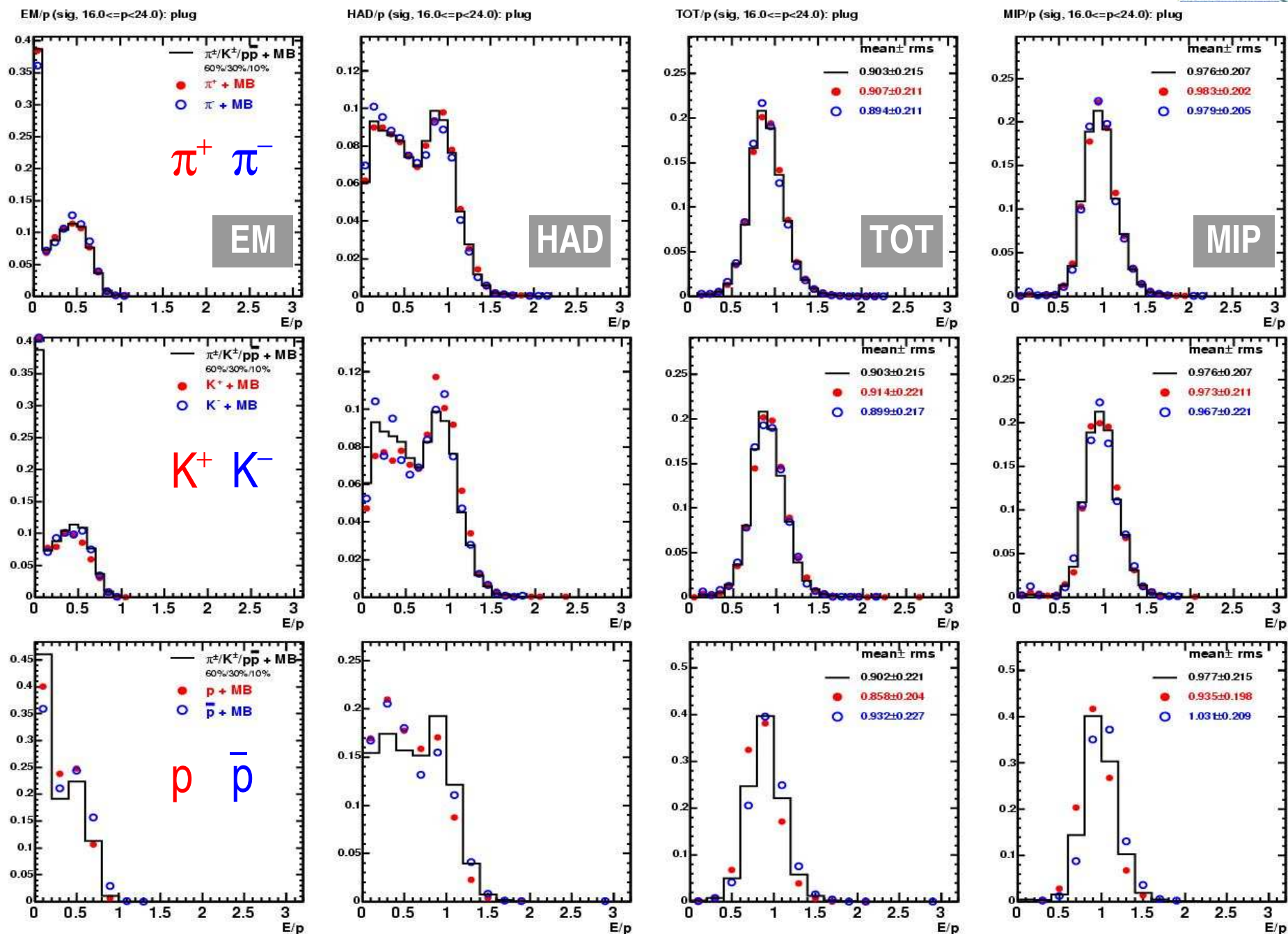
E/p distribution (8-12 GeV/c, plug)



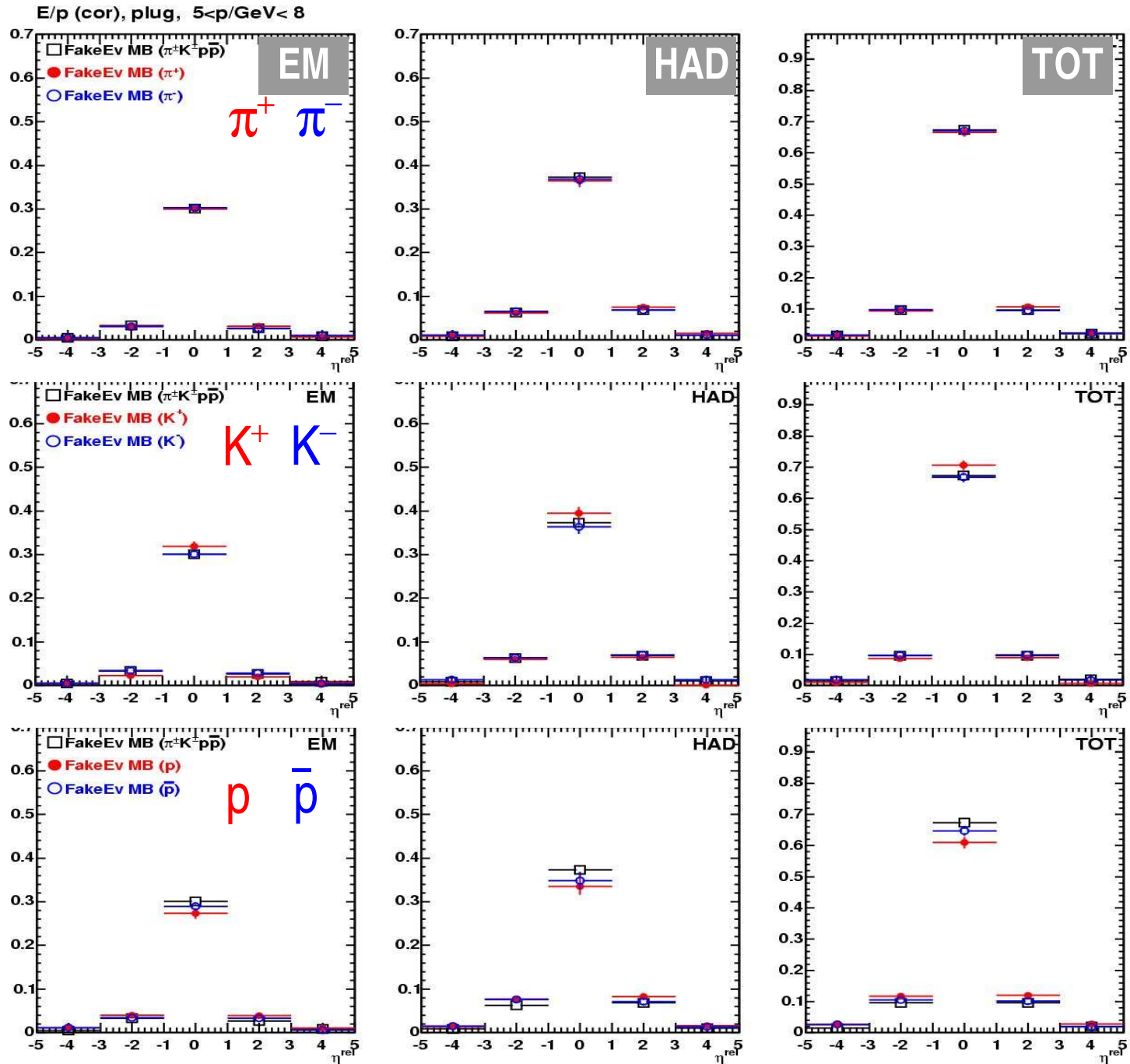
E/p distribution (12-16 GeV/c, plug)



E/p distribution (16-24 GeV/c, plug)



Normalized lateral profiles (5-8 GeV/c, plug)



Normalized lateral profiles (12-16 GeV/c, plug)

