Phi measurement with TOF: update for systematic effects

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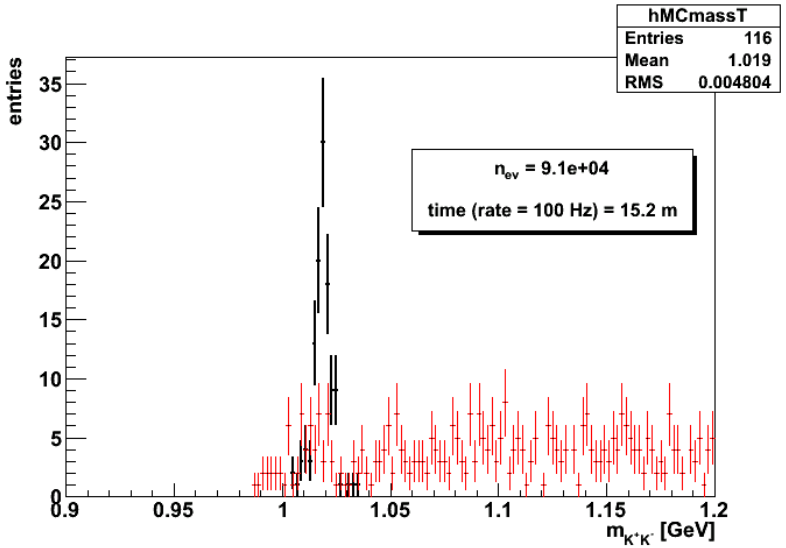
Outline

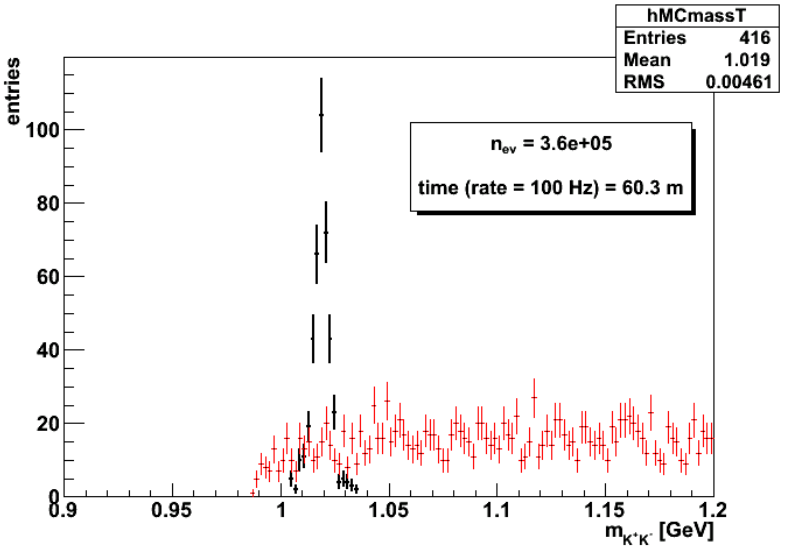
- Motivation for □ measurments
- Statistics and significance after few days of data taking
- Study on systematics
- The □ measure

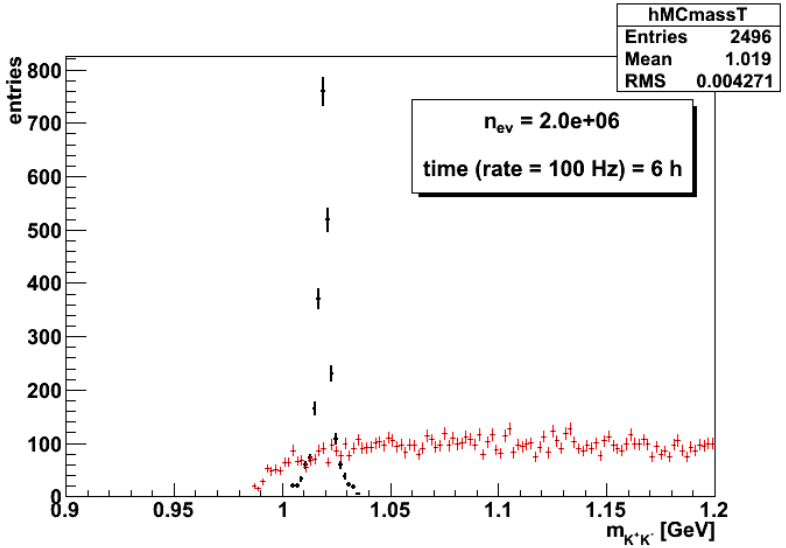
Motivation for □ studies in ALICE (with TOF)

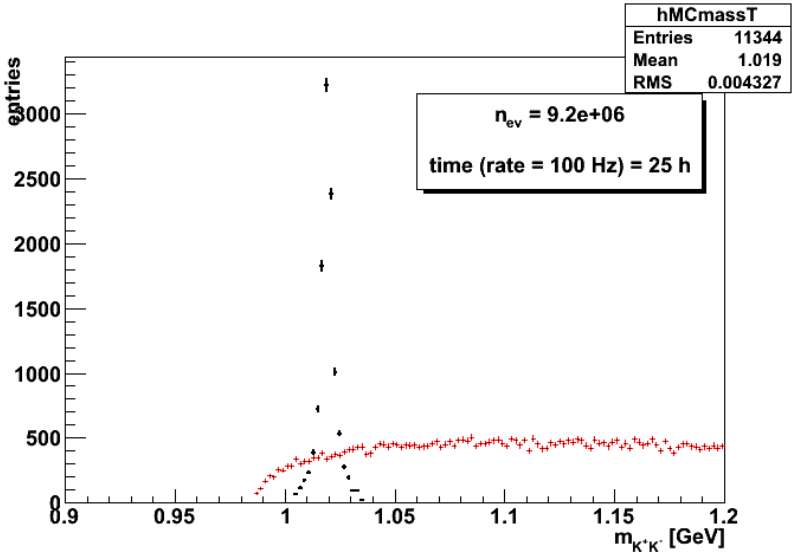
- QGP time evolution close to the □ lifetime
- Mass/width shift as a signal for chiral symmetry restoration
- Strangeness
- Elliptic flow: mass/quark order?
- PID with TOF very good for K+K- channel study

How many □ we can expect at the startup of LHC?





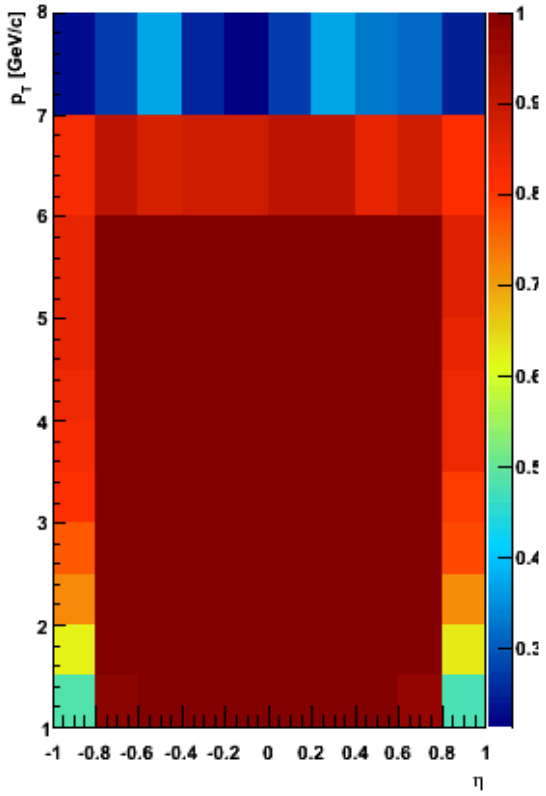




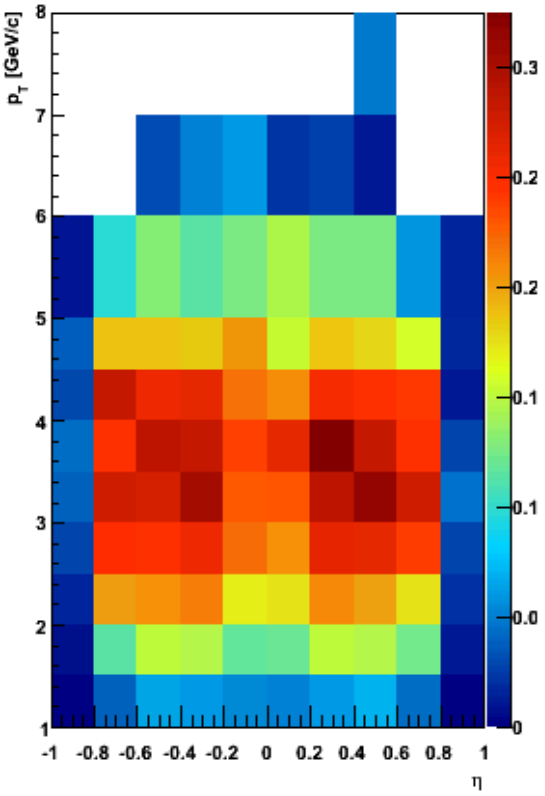
Acceptance and Efficiency

- Estimation for 20M pp MB @ 10 TeV

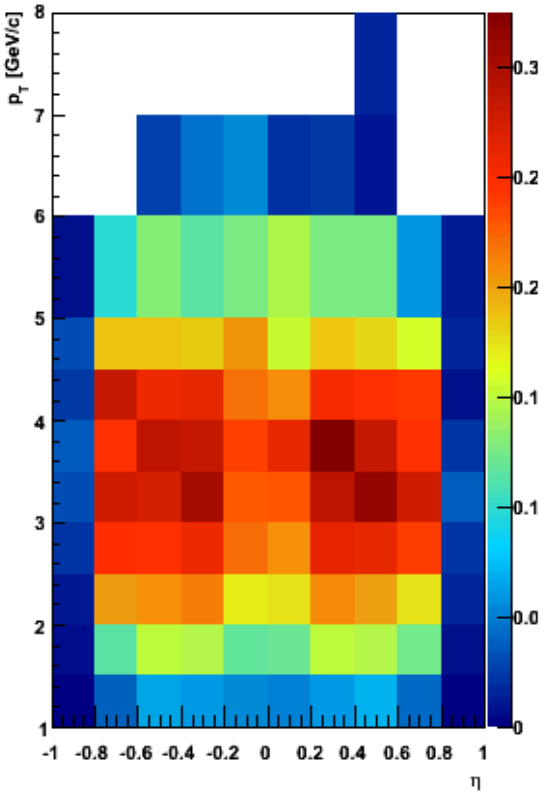
Geometrical acceptance



Efficiency in the acceptance

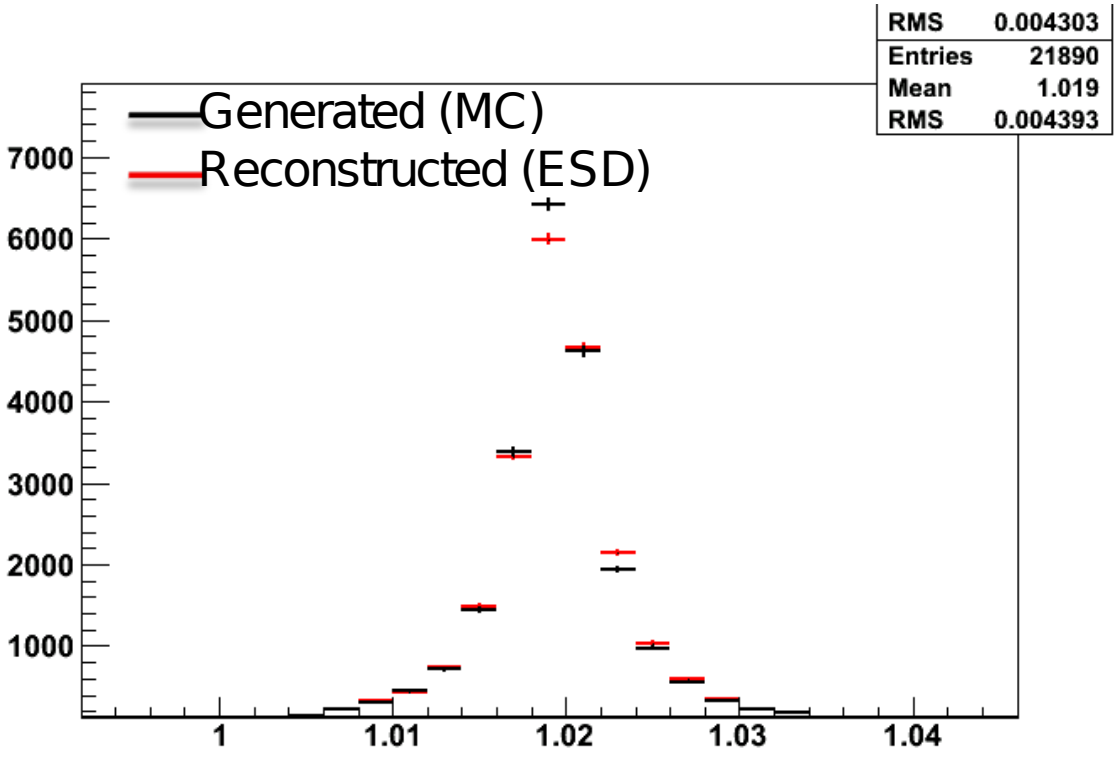


Efficiency x Acceptance



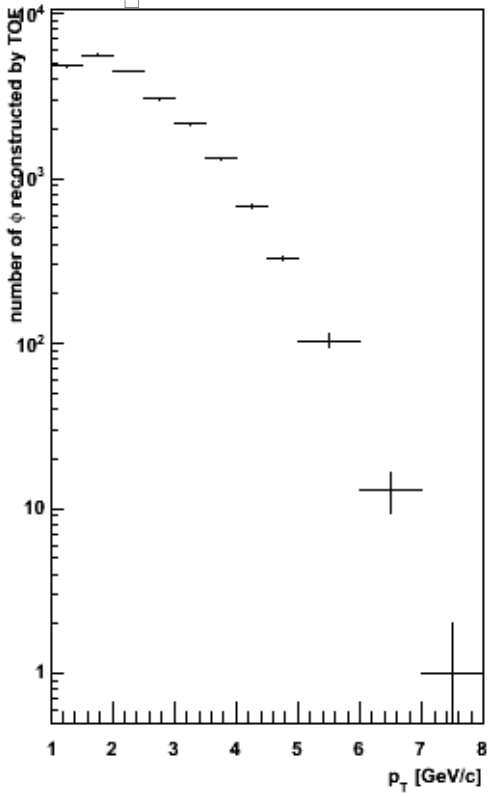
Resolution in the invariant mass spectrum

We can reconstruct the invariant mass spectrum with a very good accurancy thanks to the TPC resolution!!!

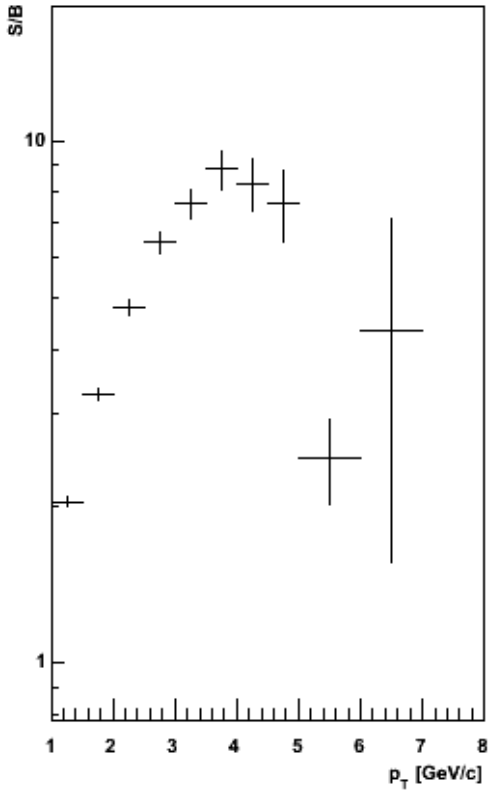


S/B ratio & Significance (20M ppMB)

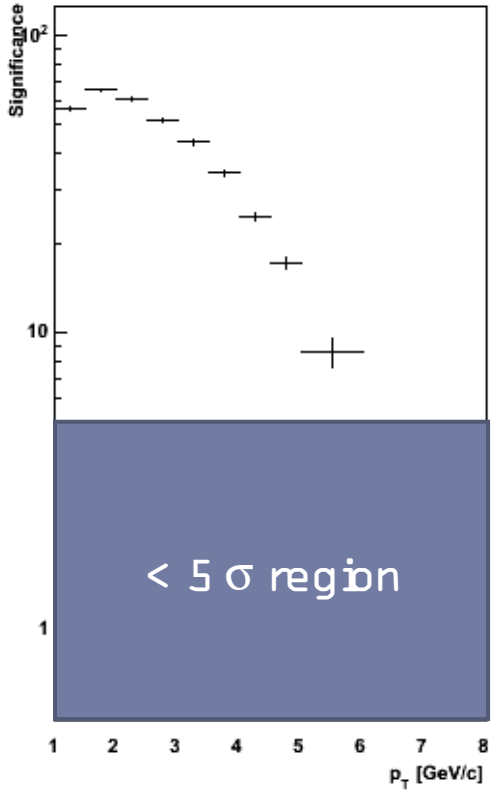
N reconstructed



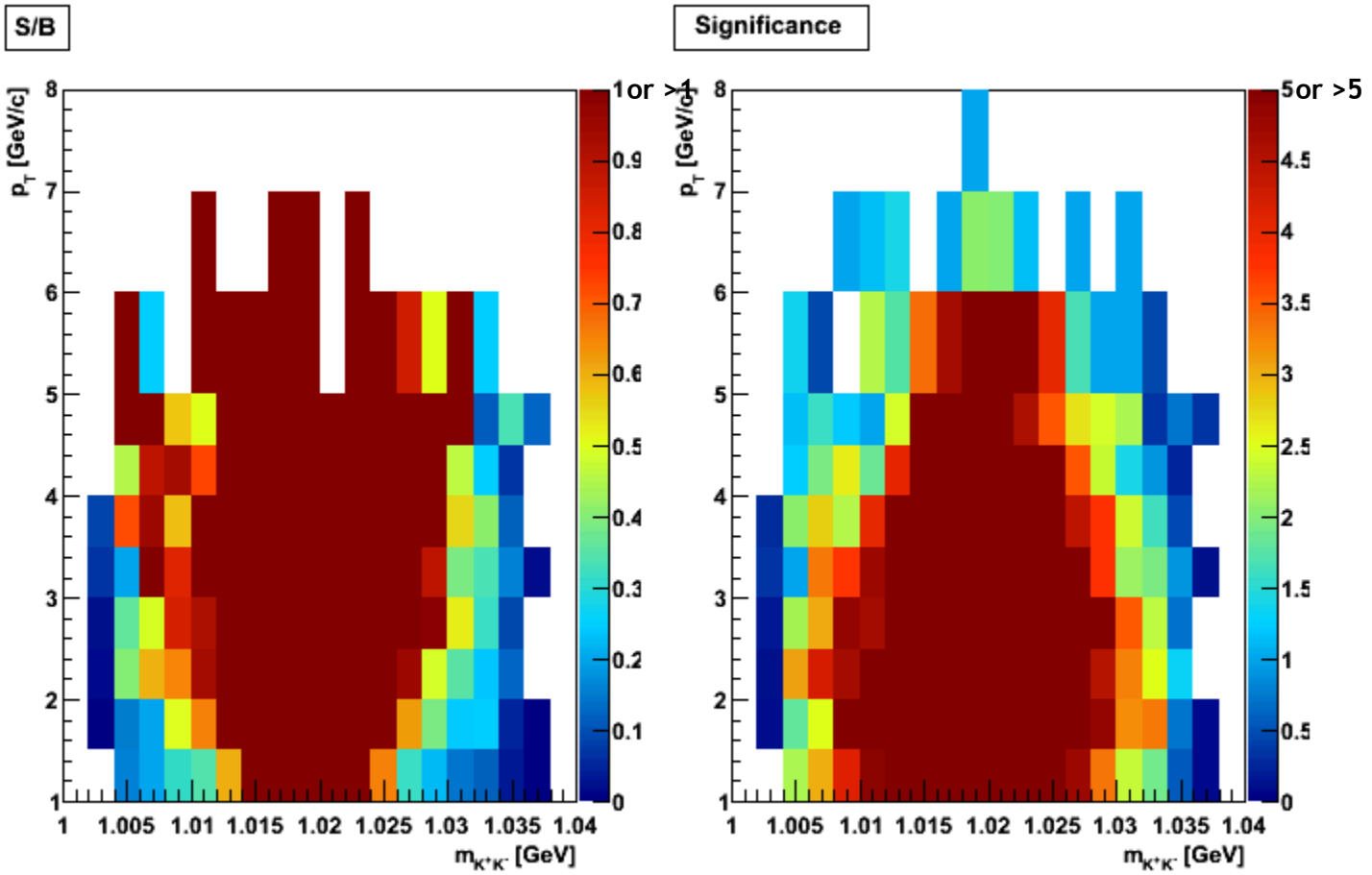
S/B



significance

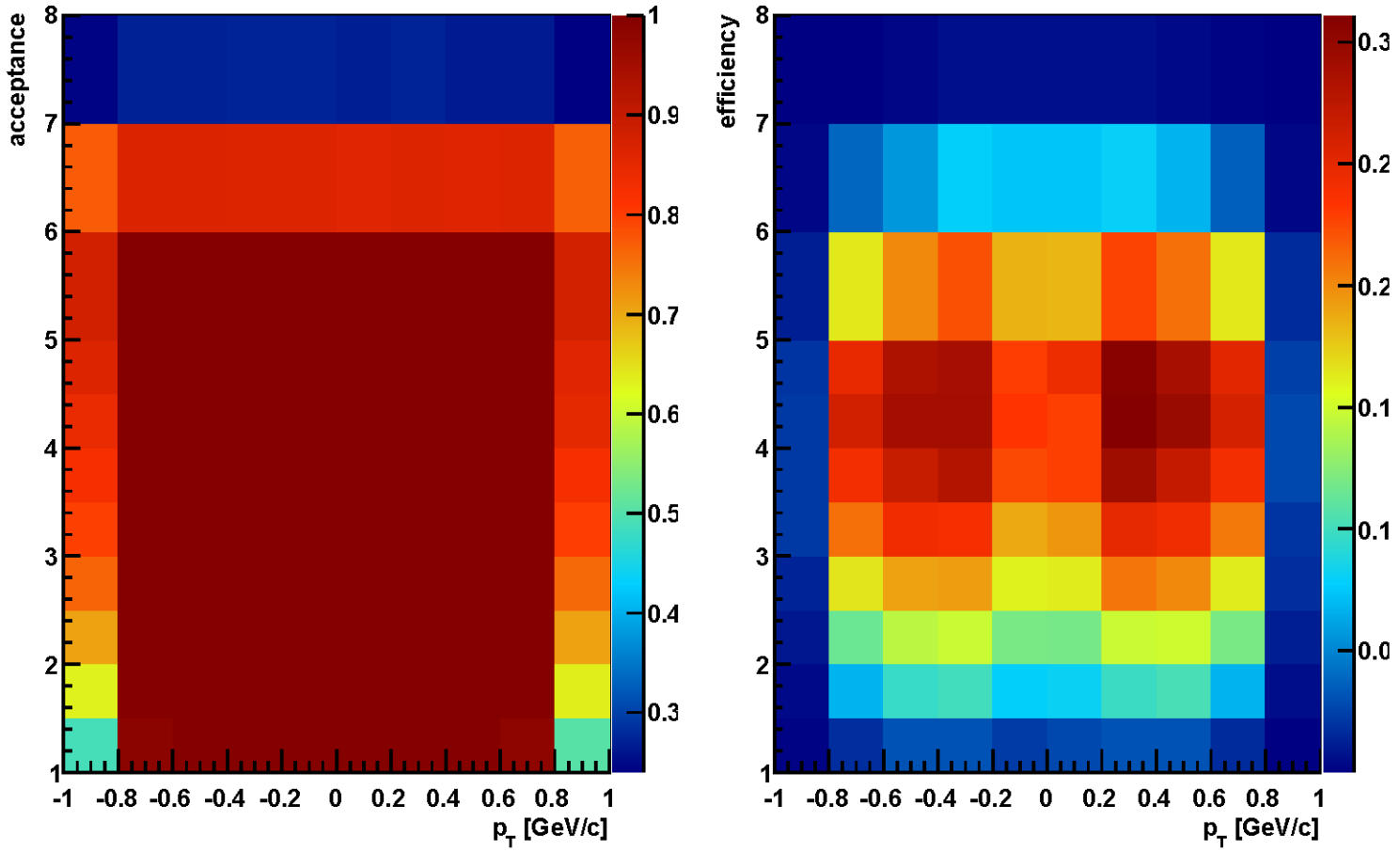


Significance vs. resolution in m_{inv} bins



What about systematics?

Efficiency derived from PID performance



1M ϕ with a p_T flat distribution

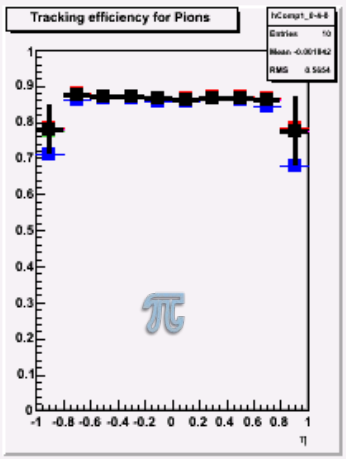
List of the parameters used for systematics

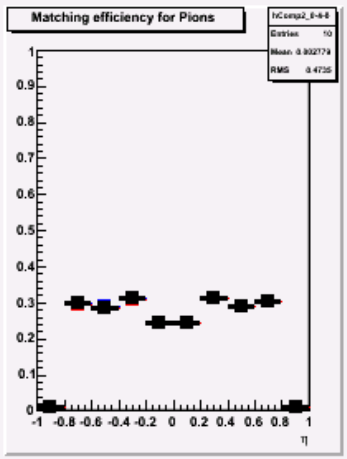
	Standard values	Cut 1	Cut 2	Cut 3	Cut 4
N cluster TPC	50	55	45	50	50
Max χ^2 track	3.5	3.0	4.0	3.5	3.5
Pion abbundance	0.85	0.85	0.85	0.8	0.85
Kaon abbundance	0.1	0.1	0.1	0.15	0.07

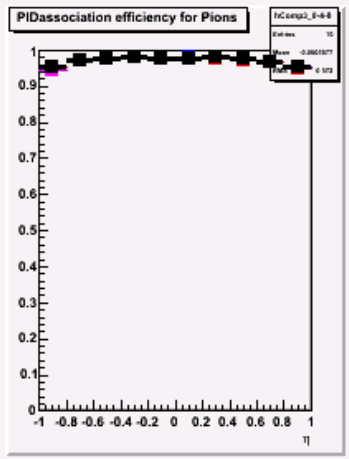
tracking PID

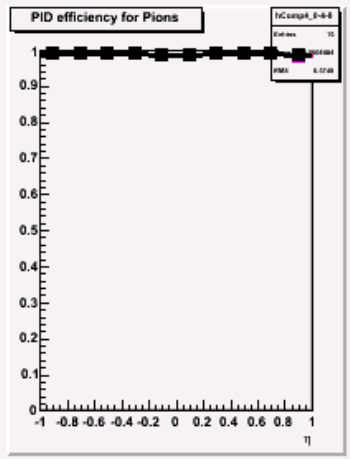
Efficiency: tracking, matching, PID

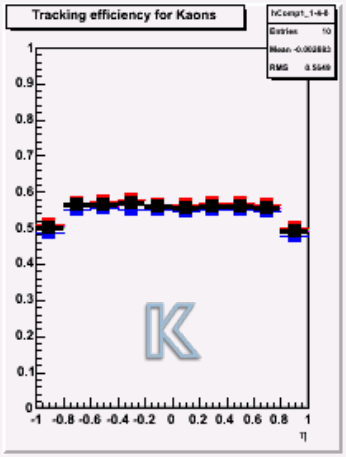
$0.25 < p_T < 0.5$

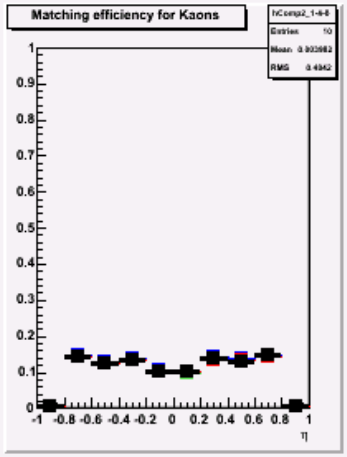


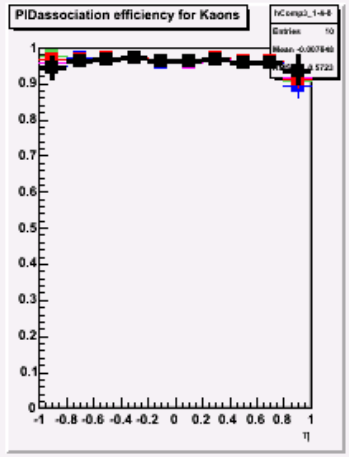


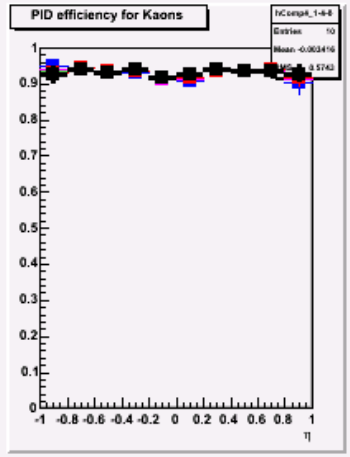


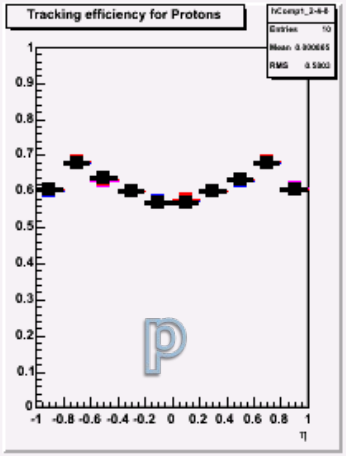


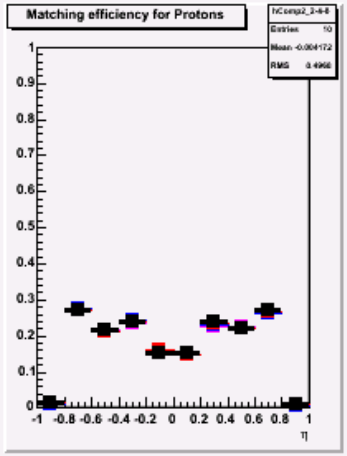


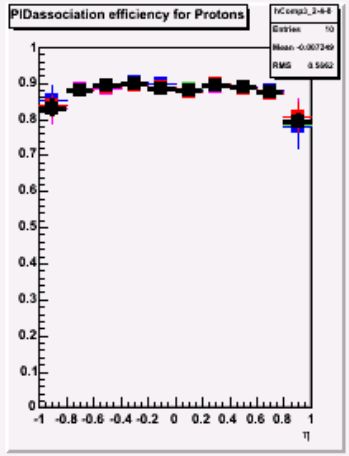


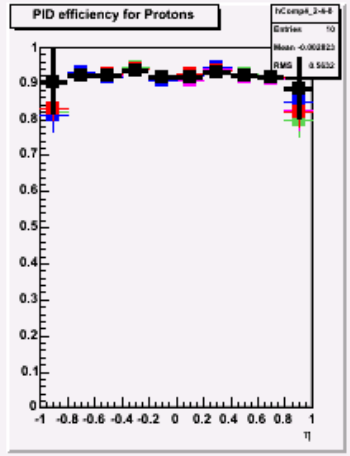






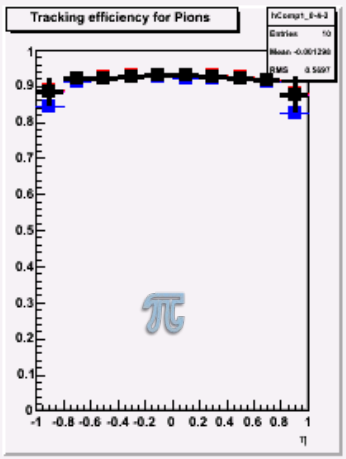


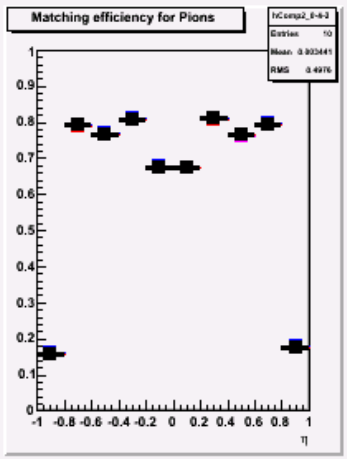


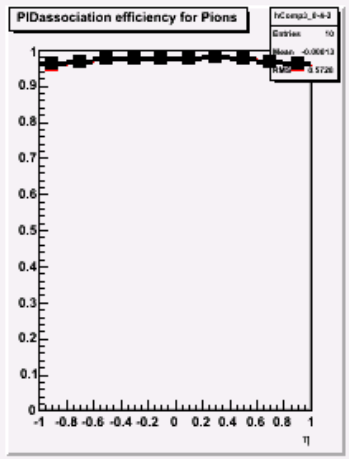


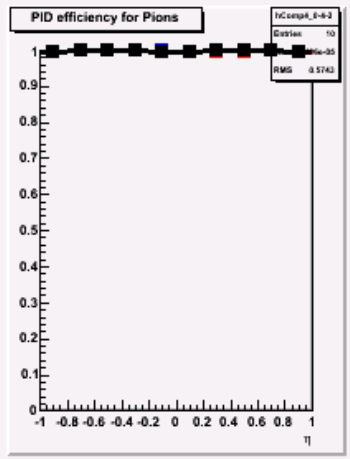
Efficiency: tracking, matching, PID

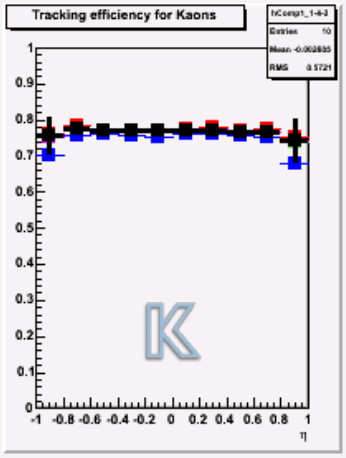
$0.75 < p_T < 1.0$

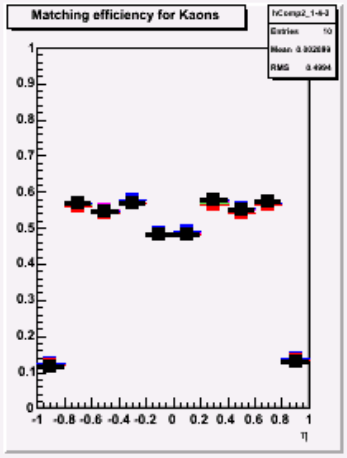


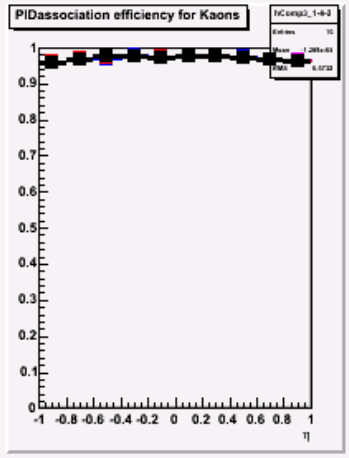


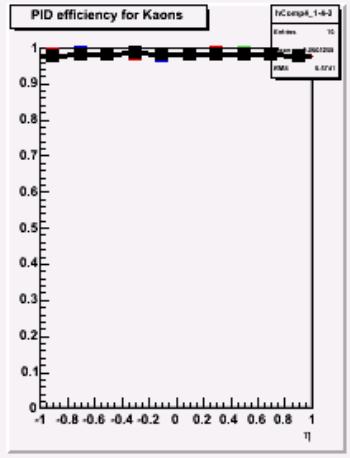


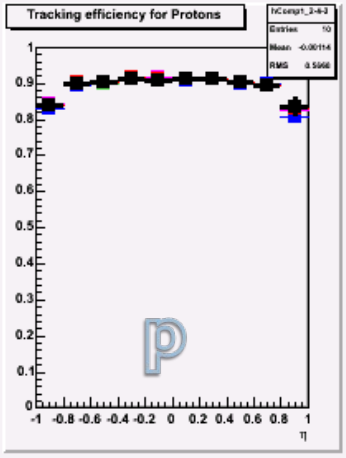


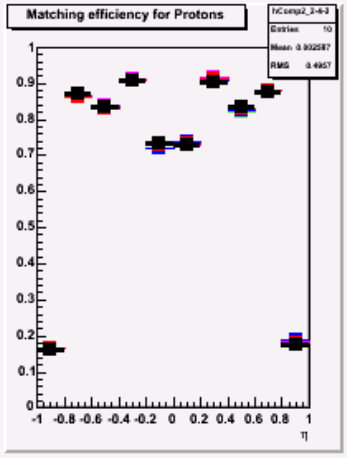


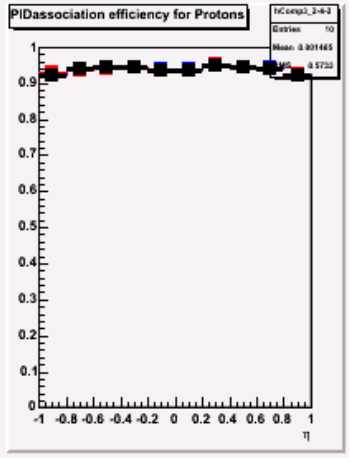


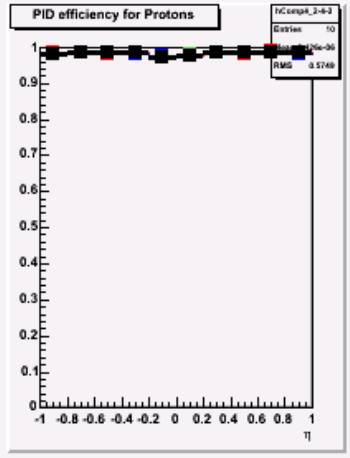






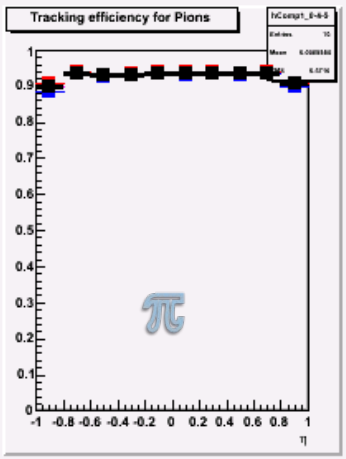


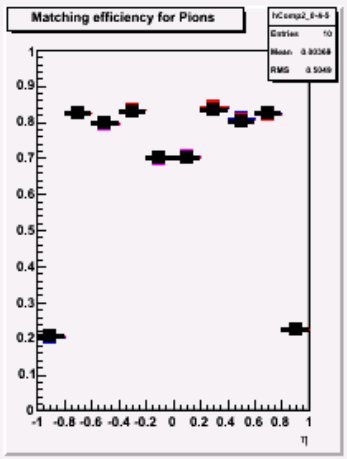


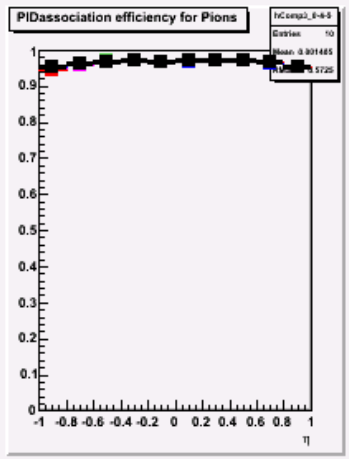


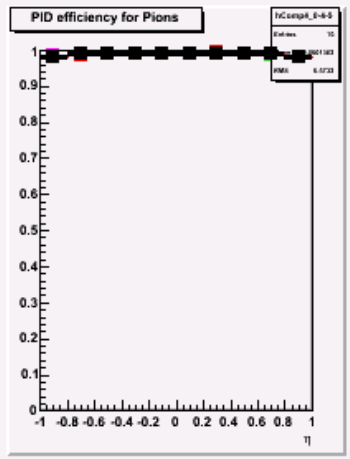
Efficiency: tracking, matching, PID

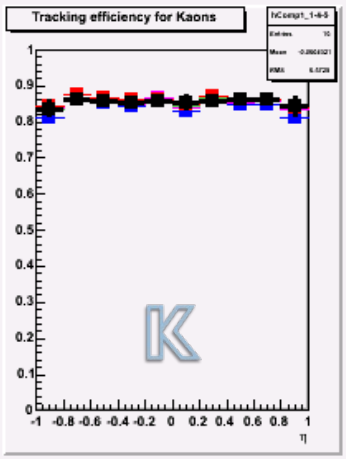
$1.75 < p_T < 2.0$

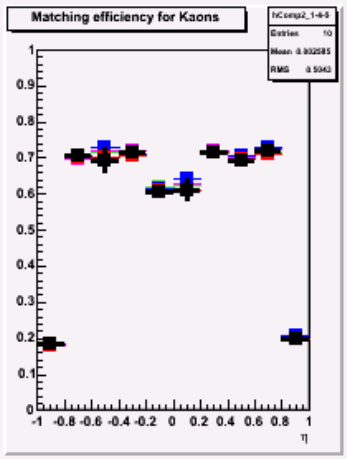


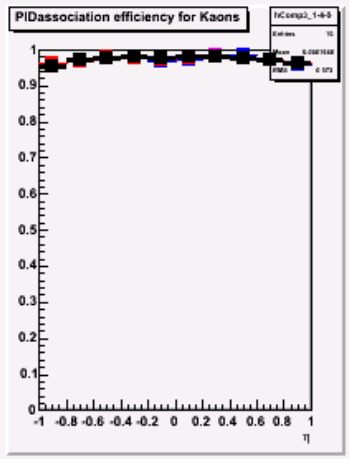


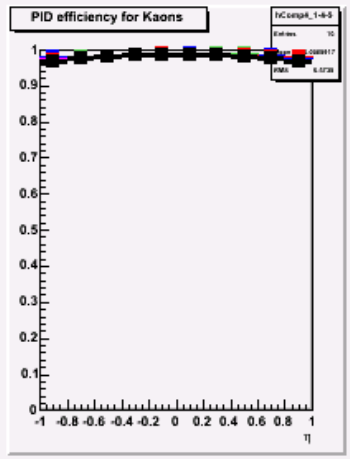


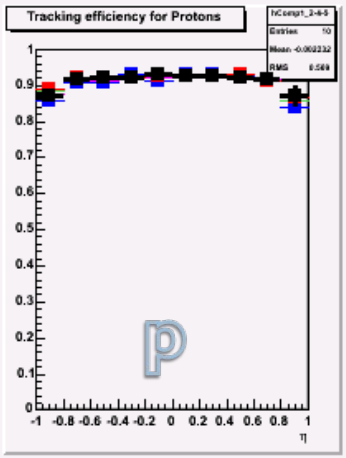


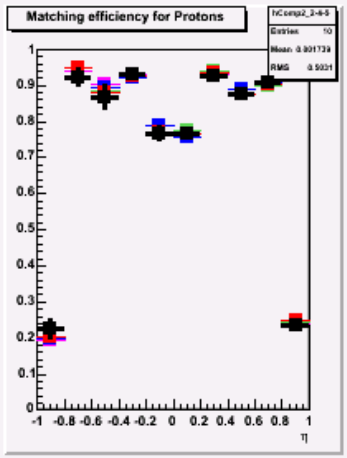


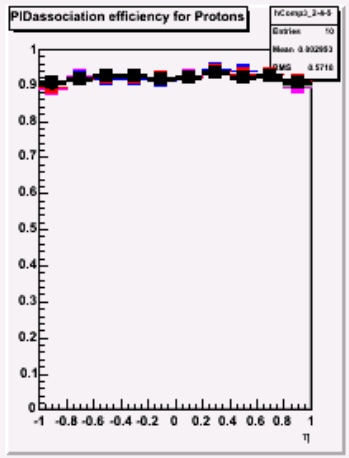


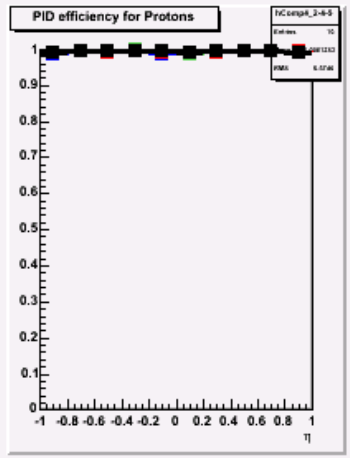






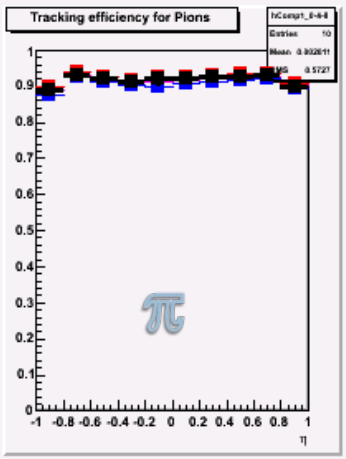


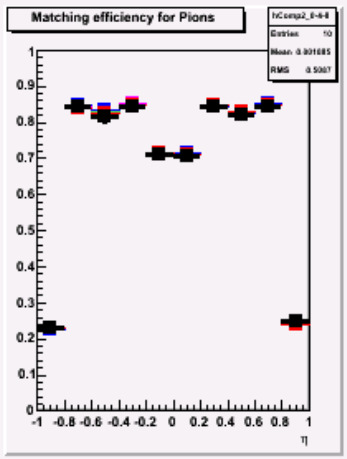


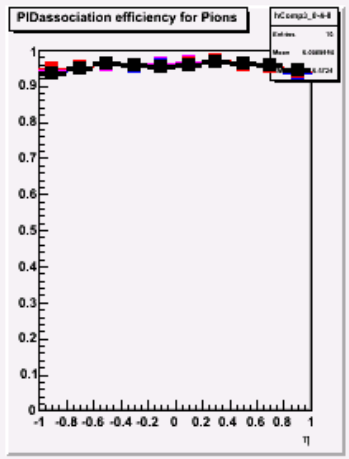


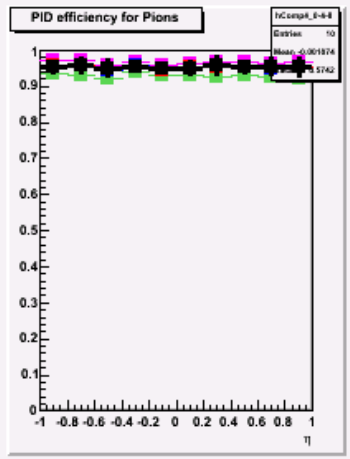
Efficiency: tracking, matching, PID

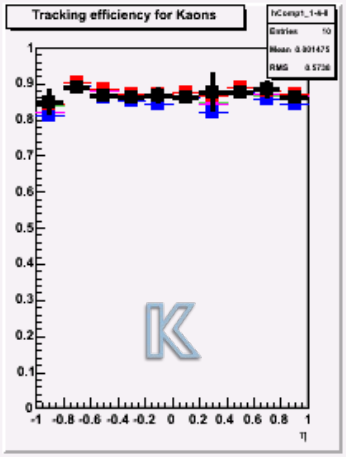
$2.5 < p_T < 3.0$

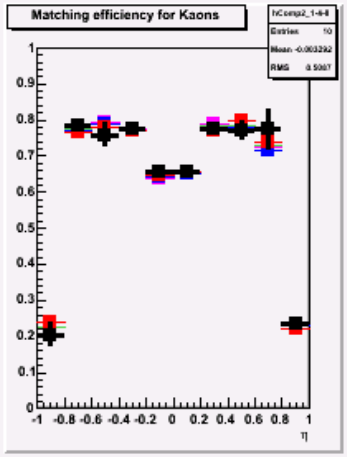


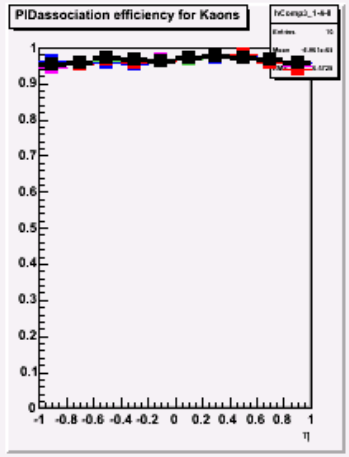


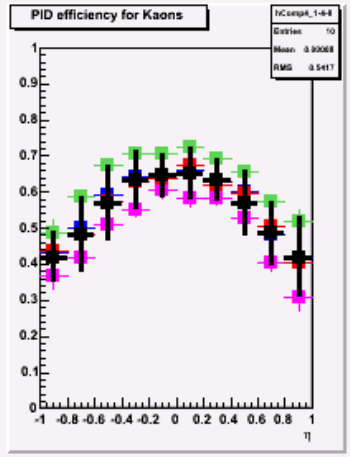


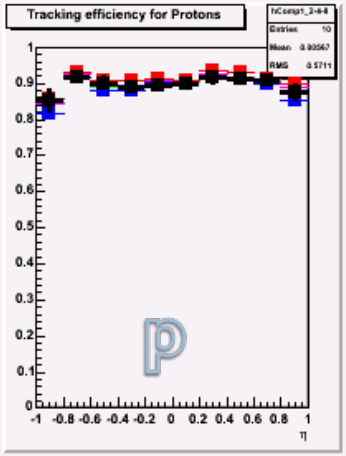


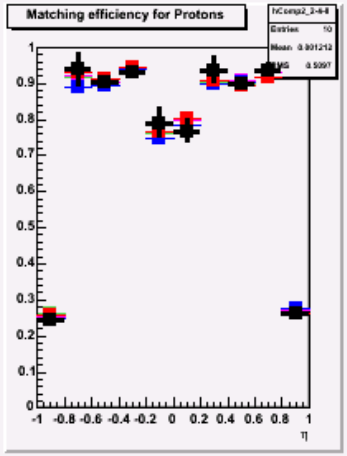


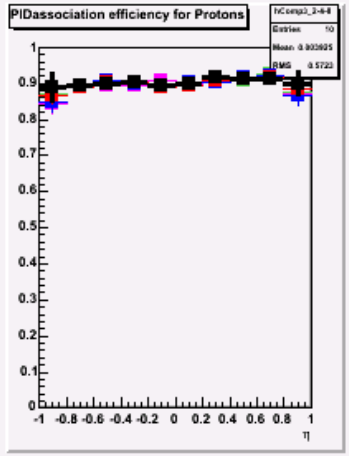


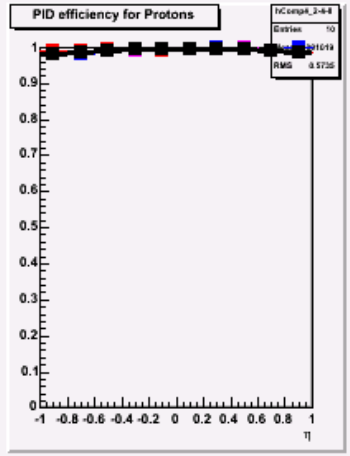






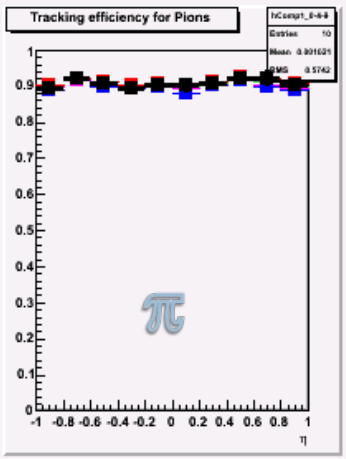


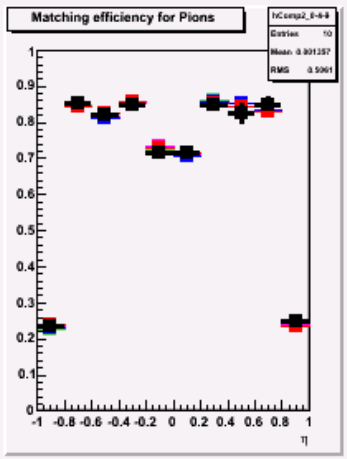


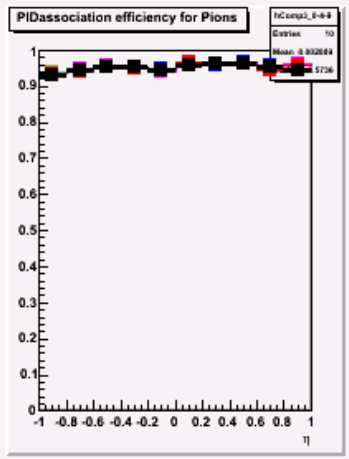


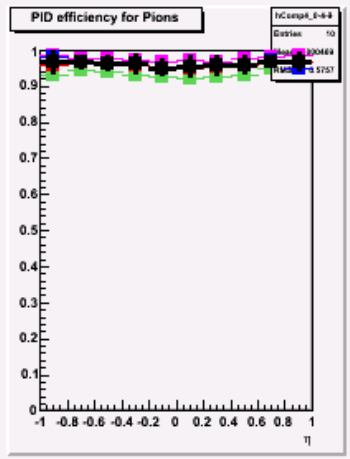
Efficiency: tracking, matching, PID

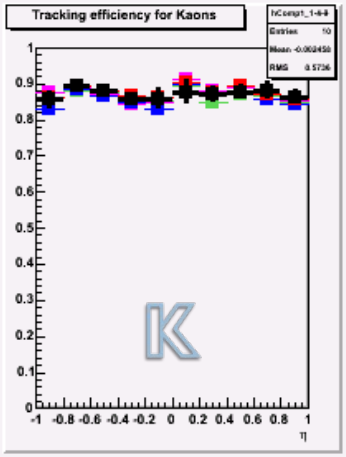
$3.0 < p_T < 3.5$

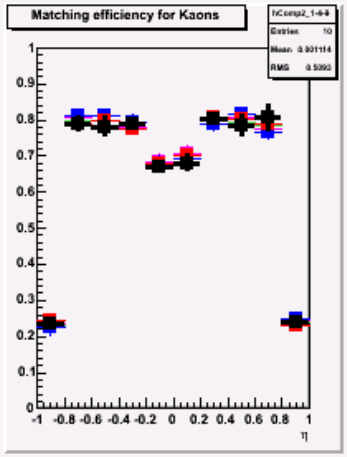


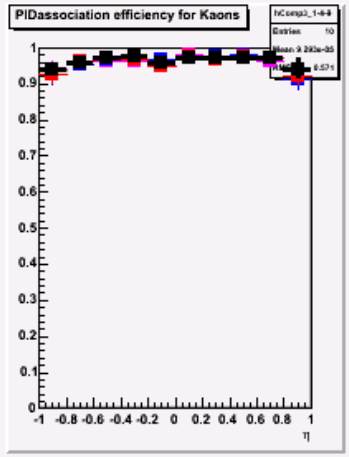


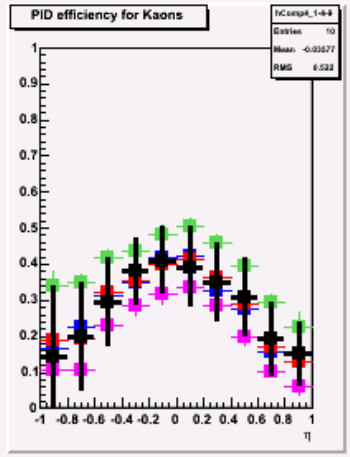


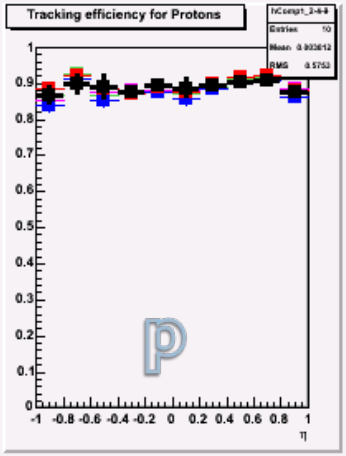


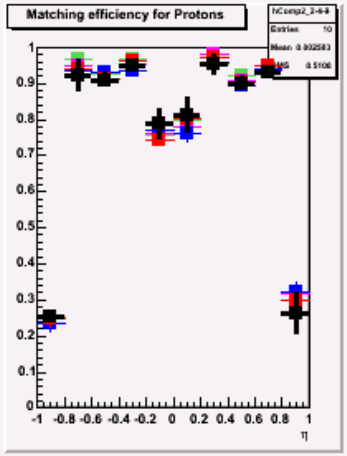


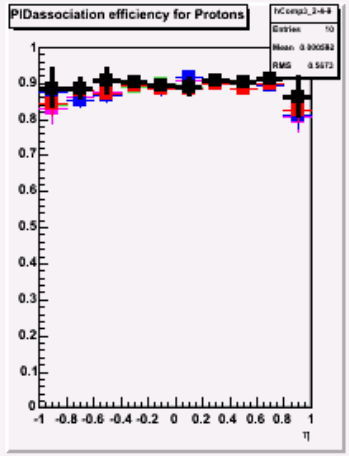


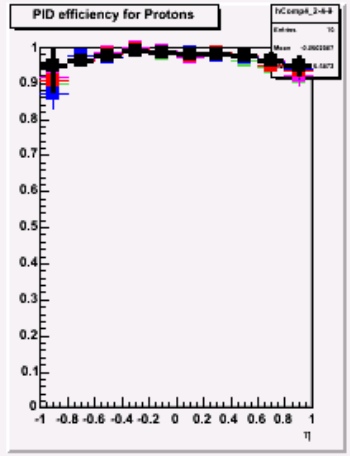




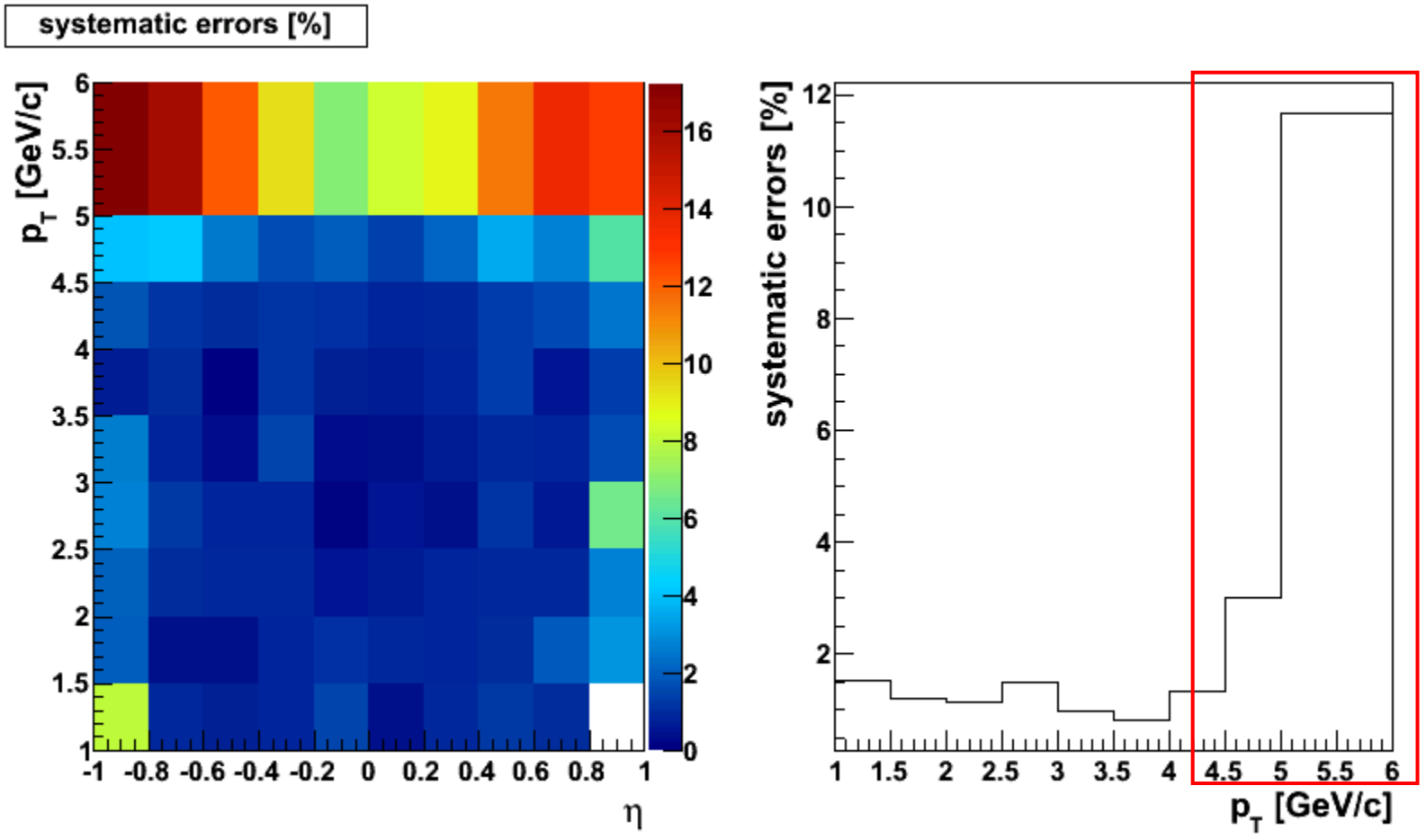






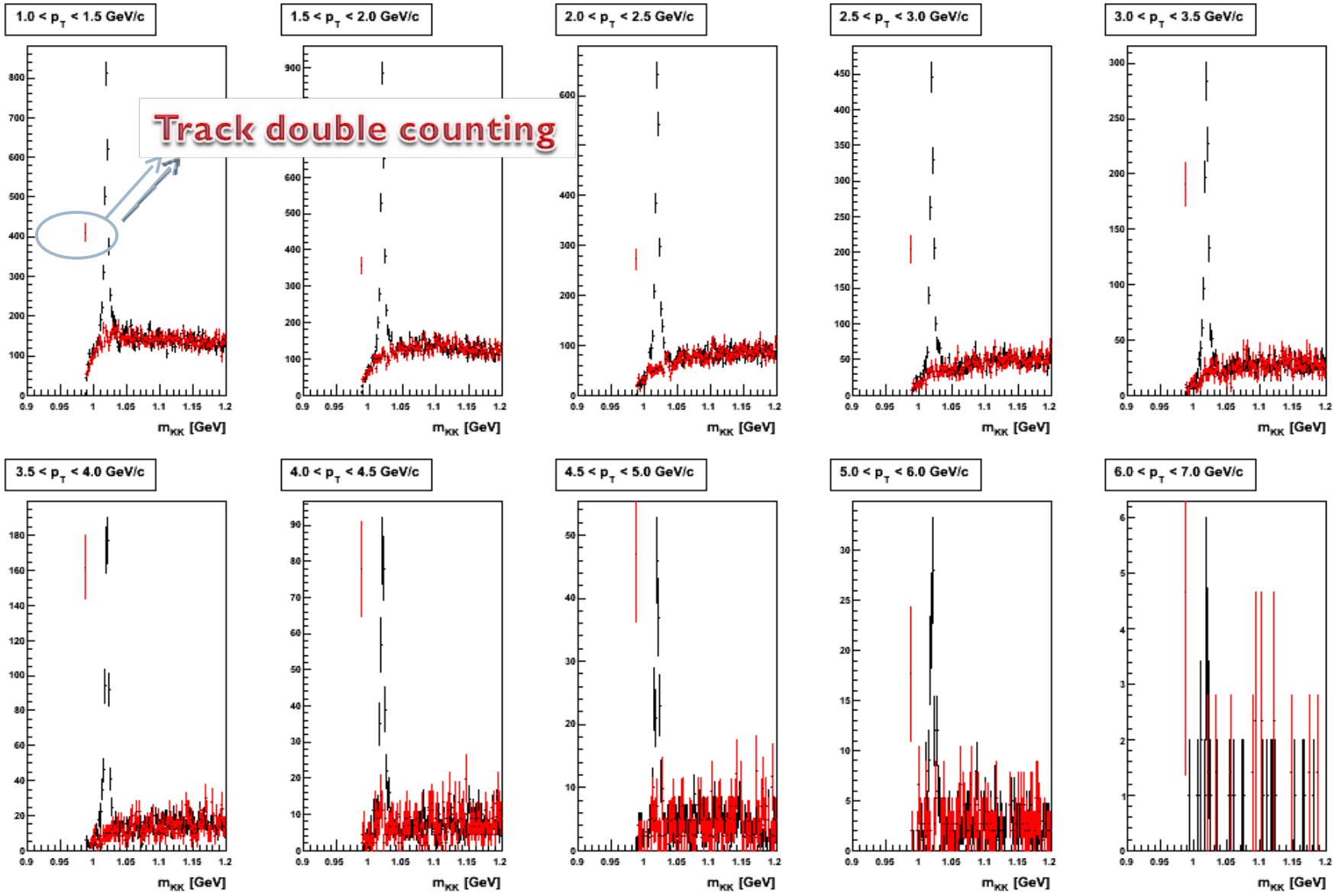


Systematics for the □

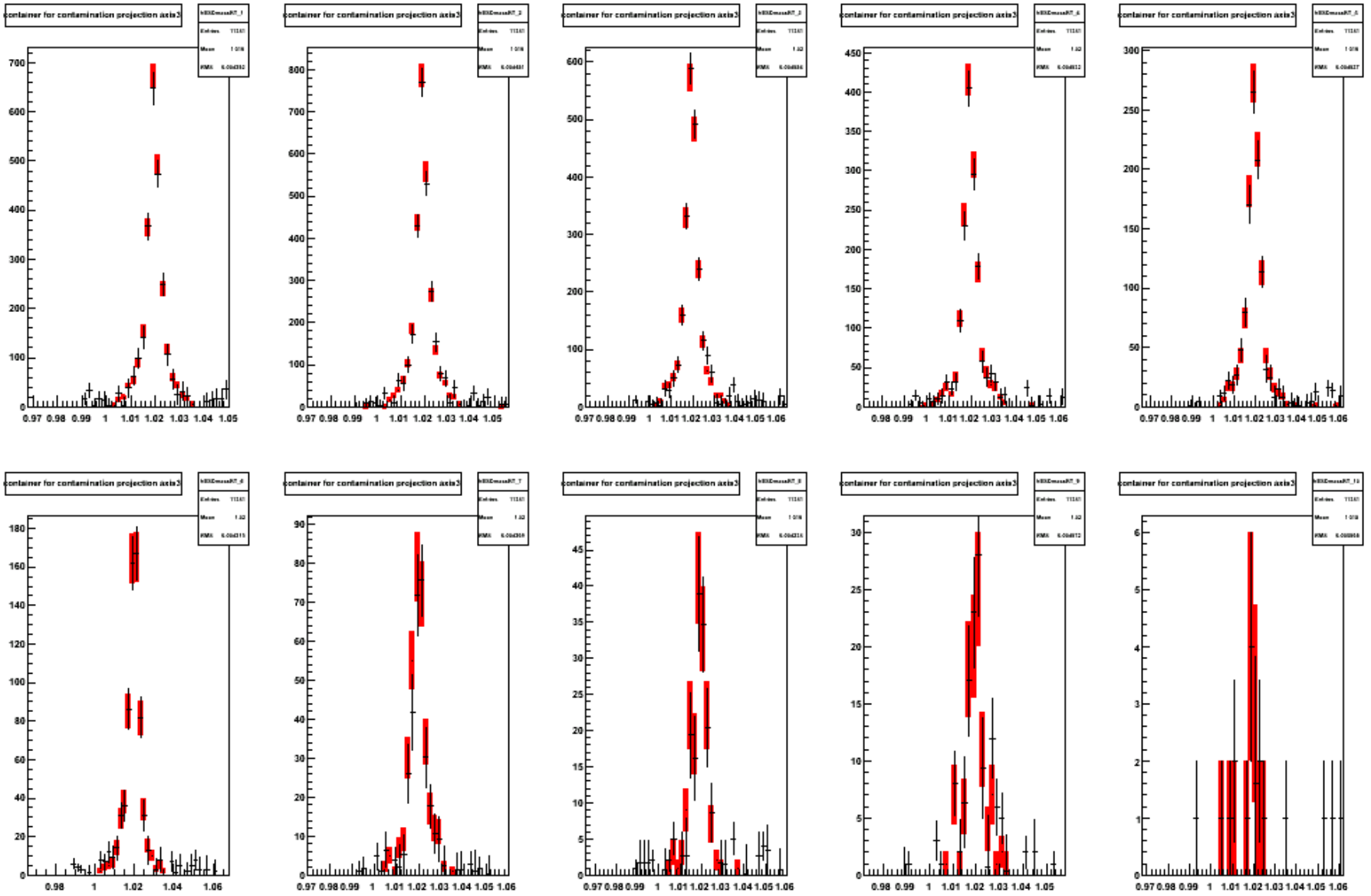


- reconstructed spectra

Reconstructed spectra(background from *SAME SIGN*)

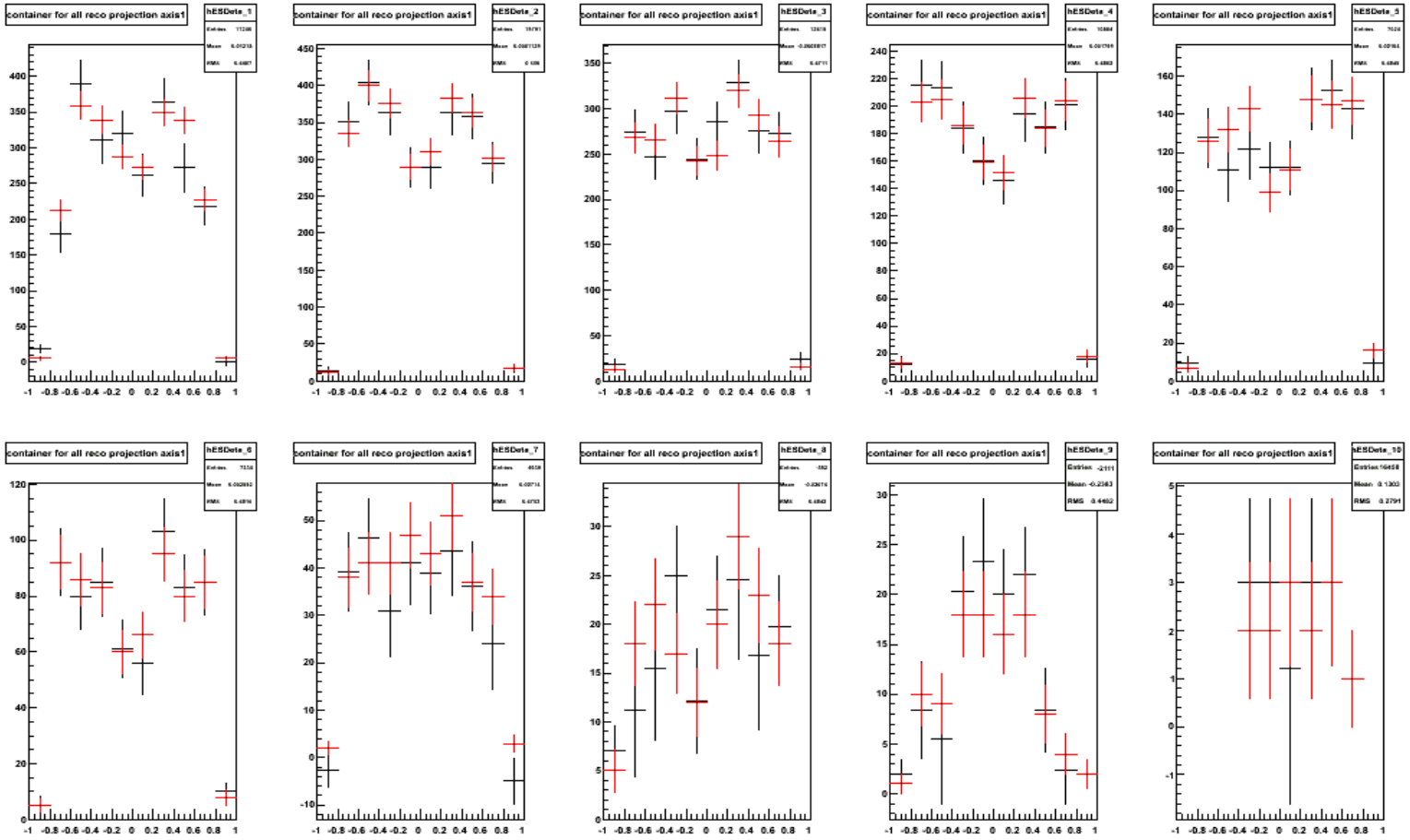


After background subtraction

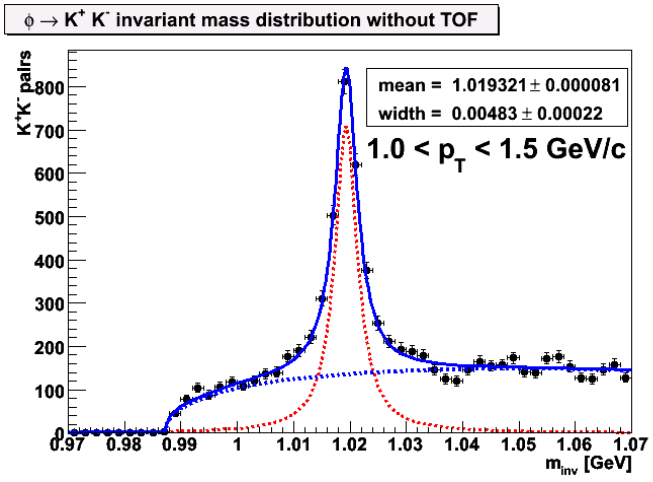


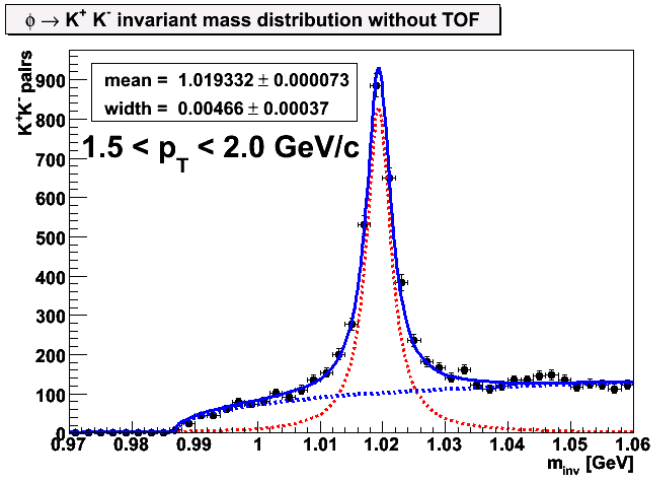
η distribution

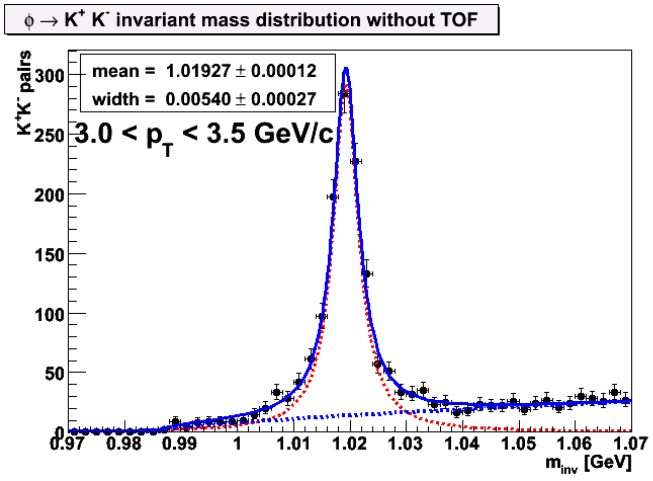
Reconstructed (ESD)
Generated (MC)

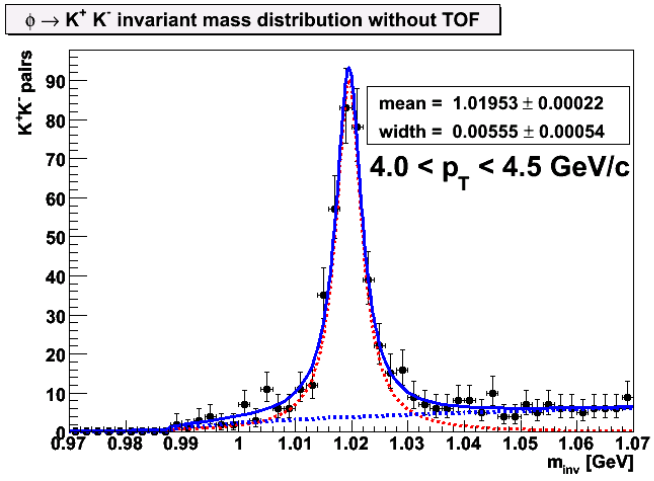


Fit: Breit-Wigner + polynomial

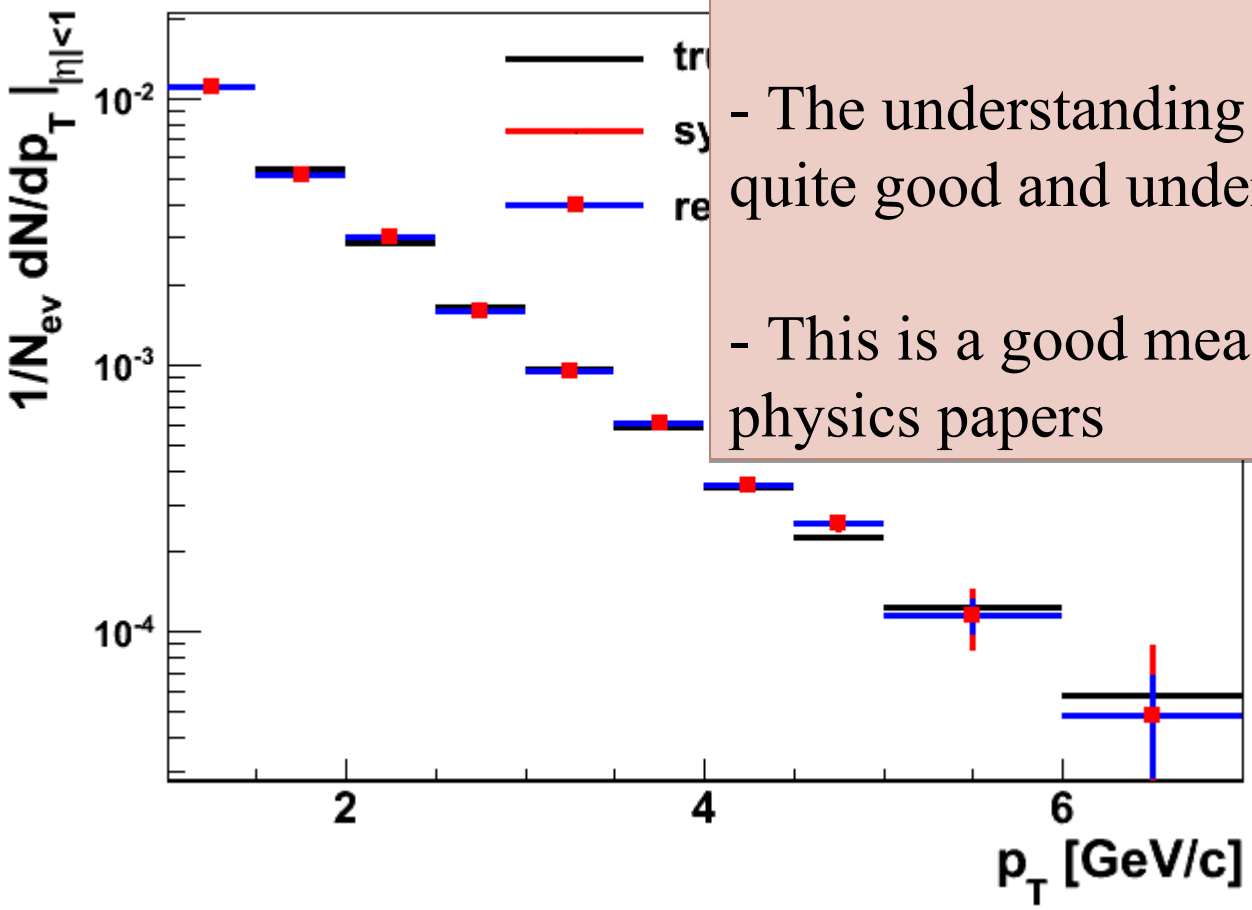








p_T spectrum: final results



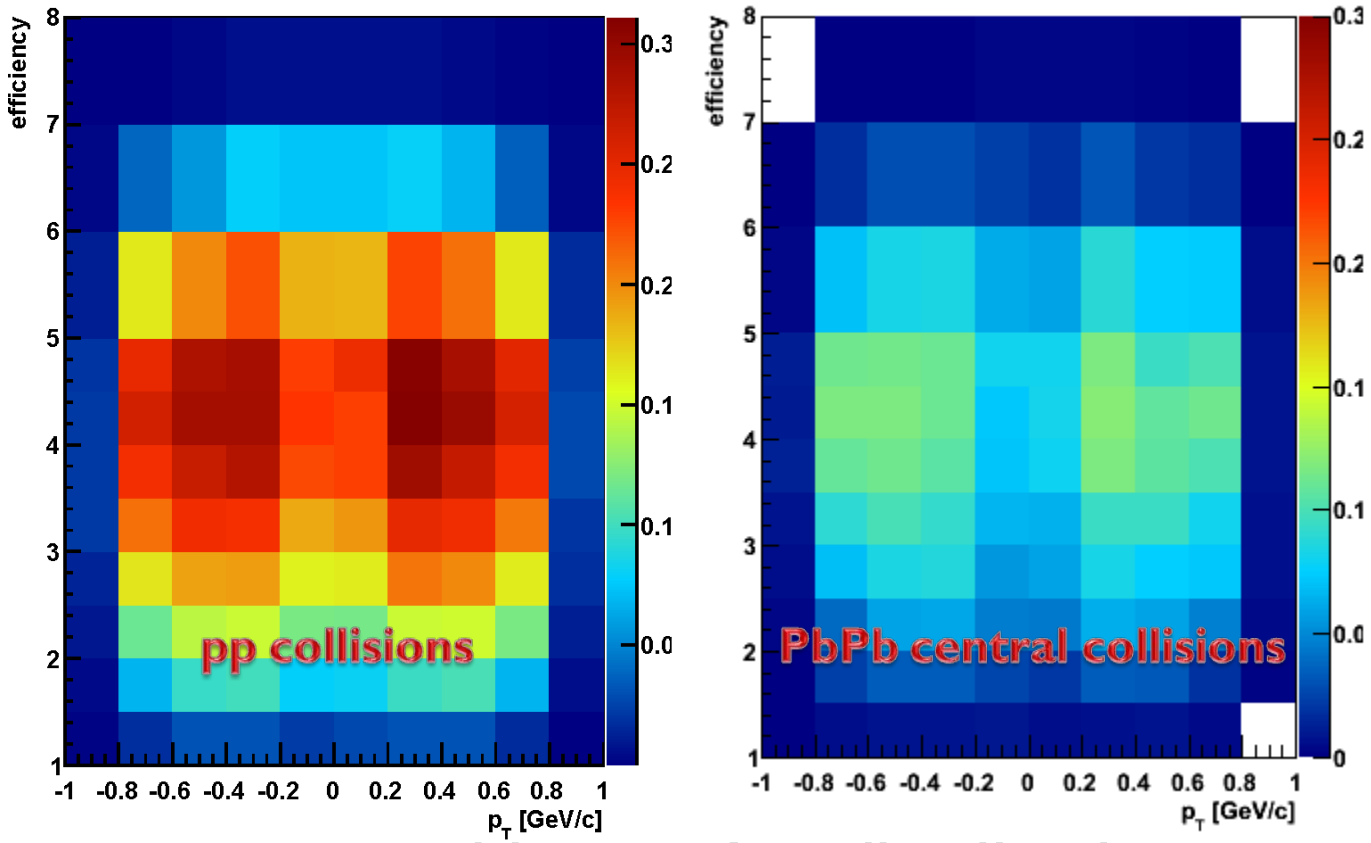
- We are ready to measure signals in the first collisions

- The understanding of the systematics is quite good and under control

- This is a good measurement for the first physics papers

What about PbPb?

- 10K events for central PbPb collision from the GRID are not enough to measure a peak.



1M ϕ with a p_T flat distribution