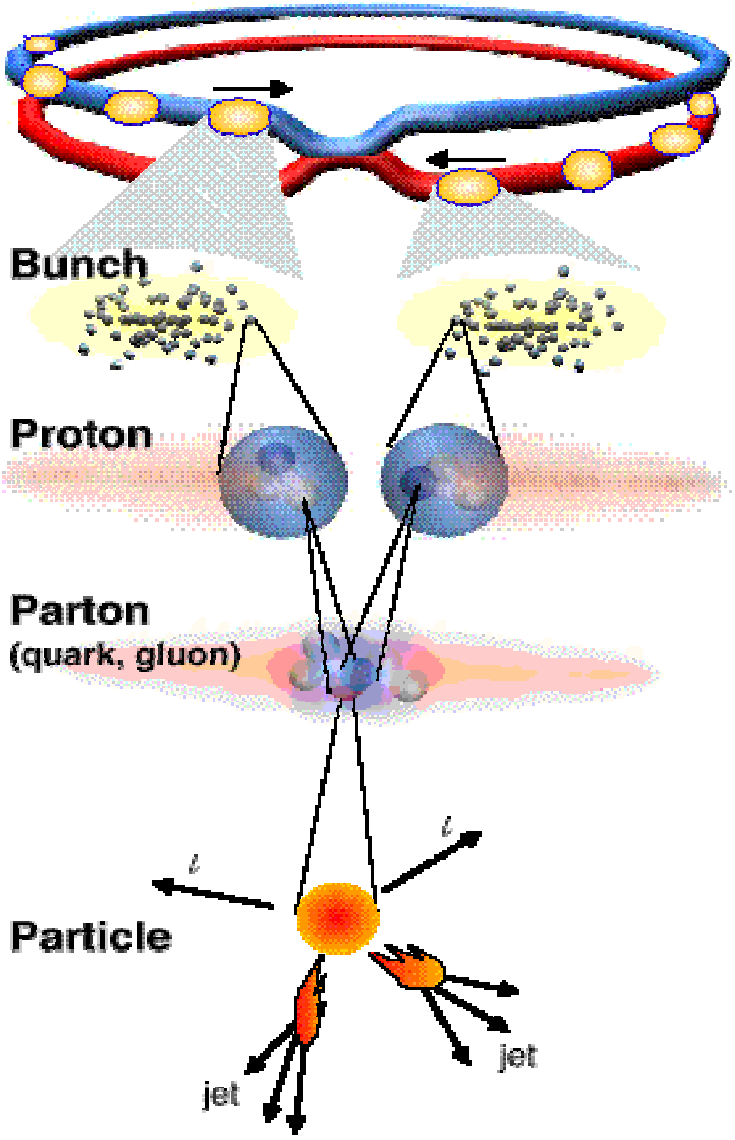


Collaboration meeting
Krakow, 4.-7. June 2003

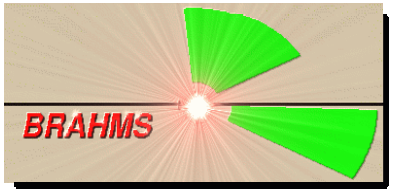
Particle ratios

(and more)

from proton + proton collisions

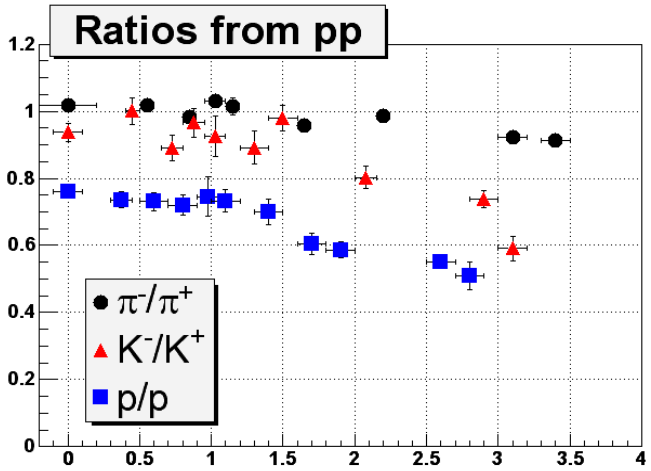
***p+p* ratios**
Bjørn H. Samset

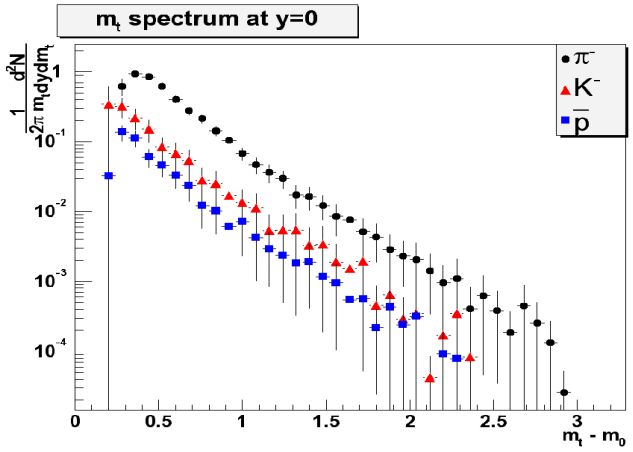
Contents



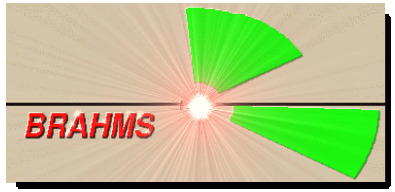
Collaboration meeting
Krakow, 4.-7. June 2003

- Data selection
- Analysis framework
- PID
- Main analysis
- Results: Ratios vs. y and pt ++
- Problems and cavebats
- Towards yields: MRS acceptances and prelim. spectra
- Discussion: FS acceptances!?!





Data, local & global tracking



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- Data from 2001 only (so far...)
- Local tracking, global tracking, calibrations etc. by Kris Hagel

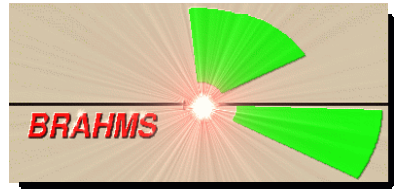
Kris

Bjørn

- All the data have recently been (re-re-)reanalyzed, taking into account new calibrations and a couple of bug fixes (KH, FV)
- Event sample: 11.5M events...

Analysis framework: FLAP

(Final Looping Analysis and Pid)



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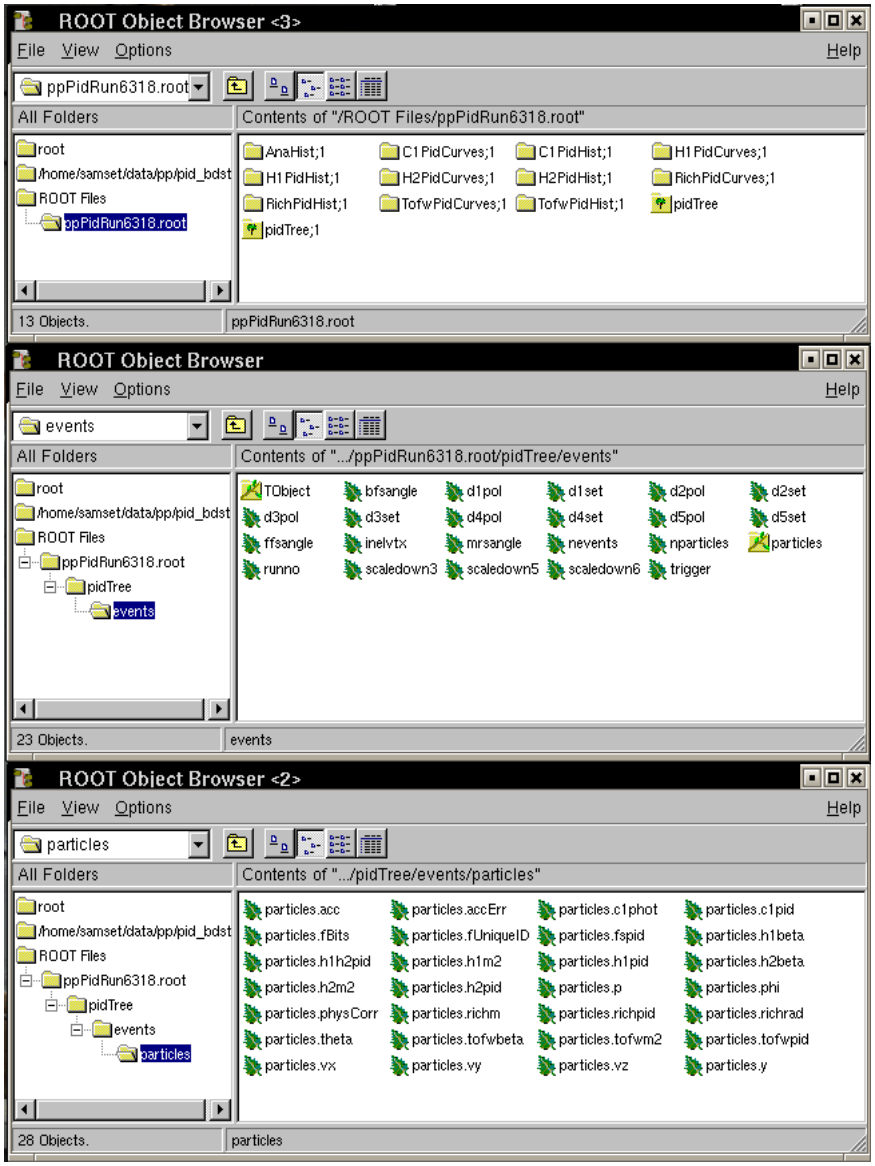

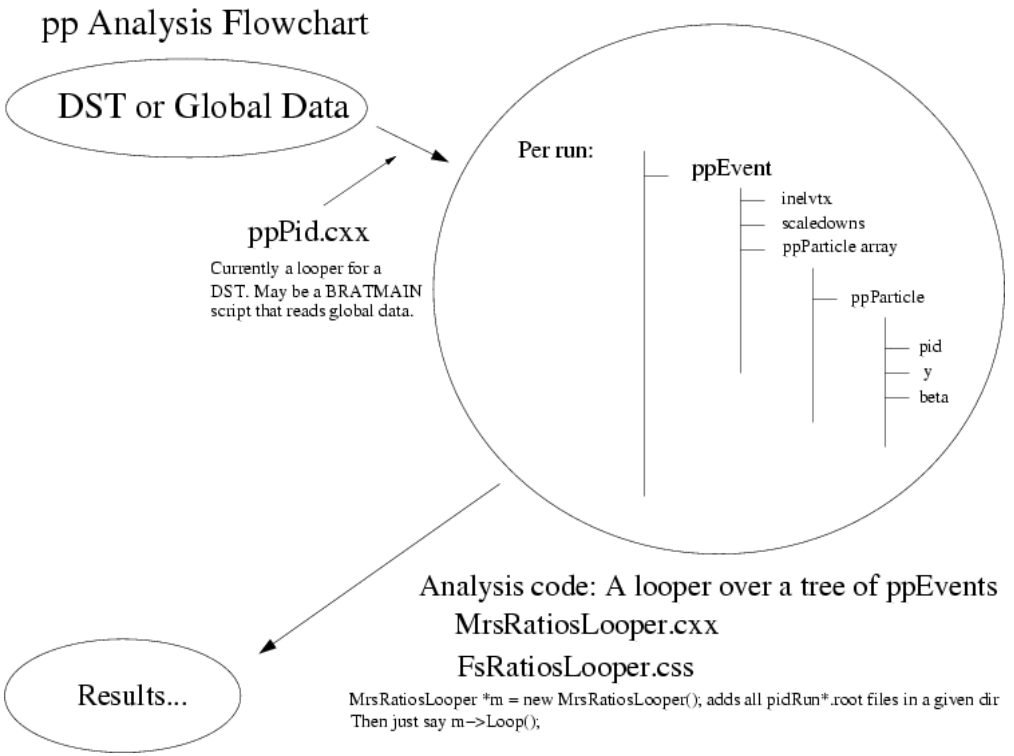

- Analysis is quick (~1hr for full 2001 dataset)
- Files are small (full dataset is 350Mb)

***p+p* ratios**
Bjørn H. Samset

PID - TOFW

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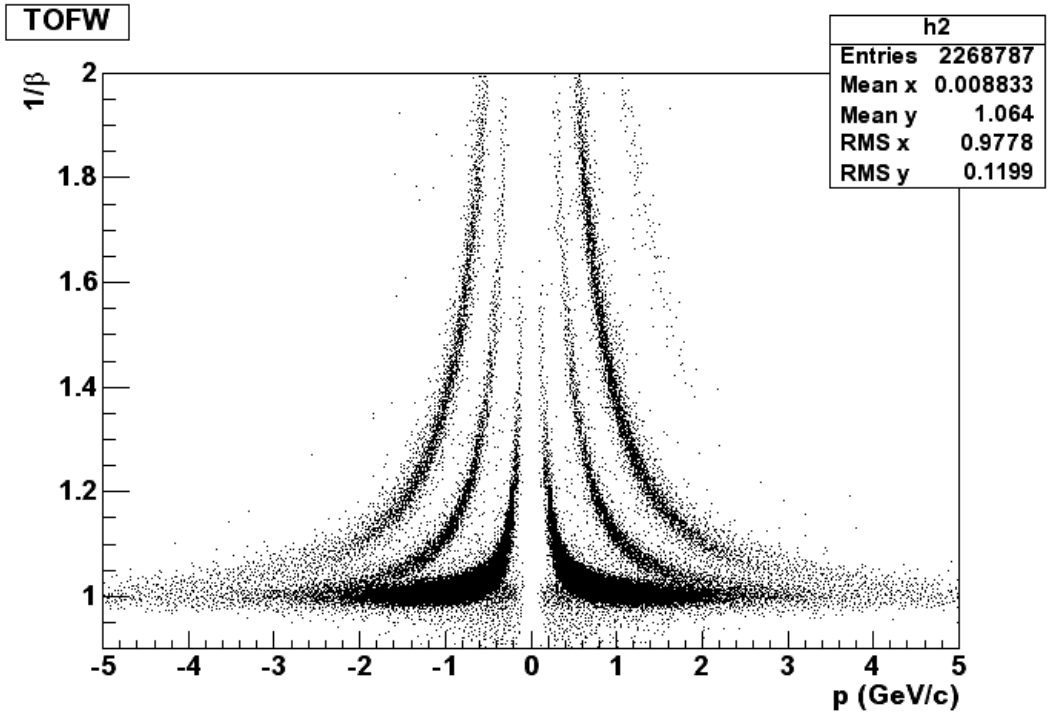
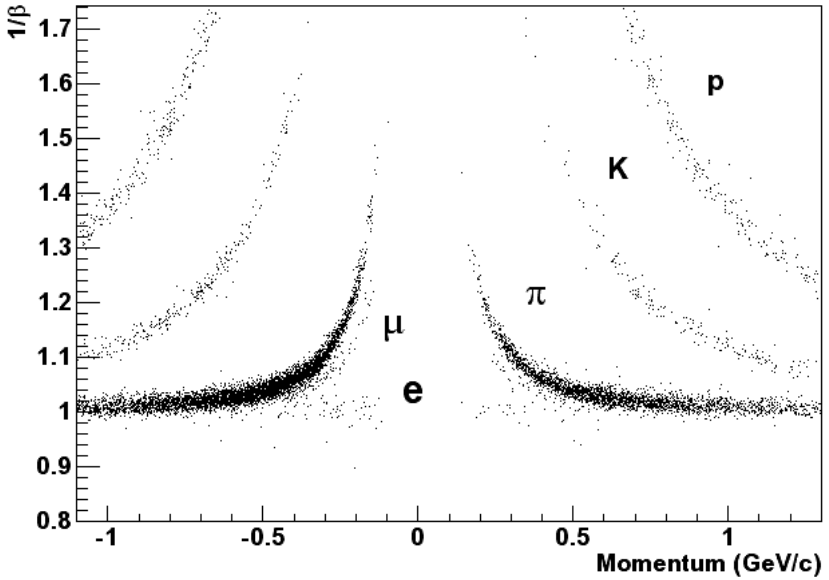


All MRS data.

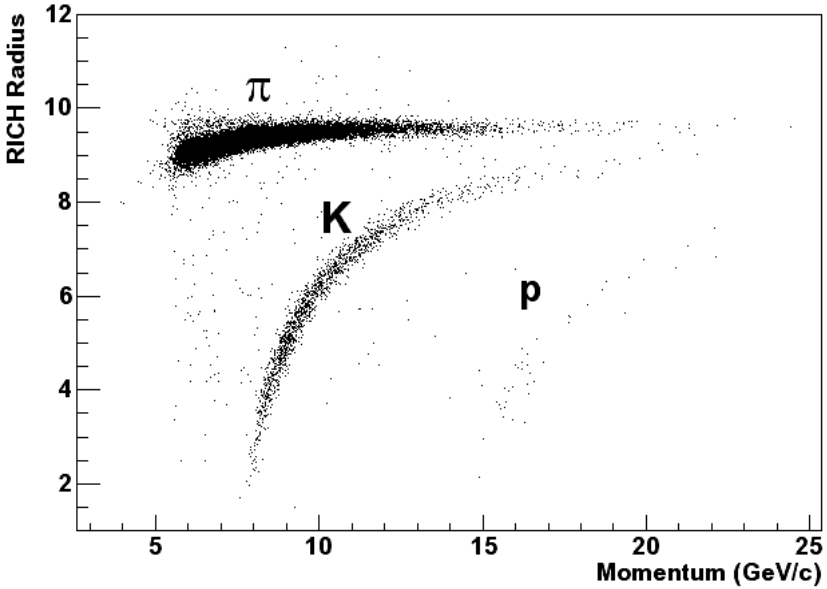
- p/K up to ~3 GeV/c
- K/π up to ~1.5 GeV/c

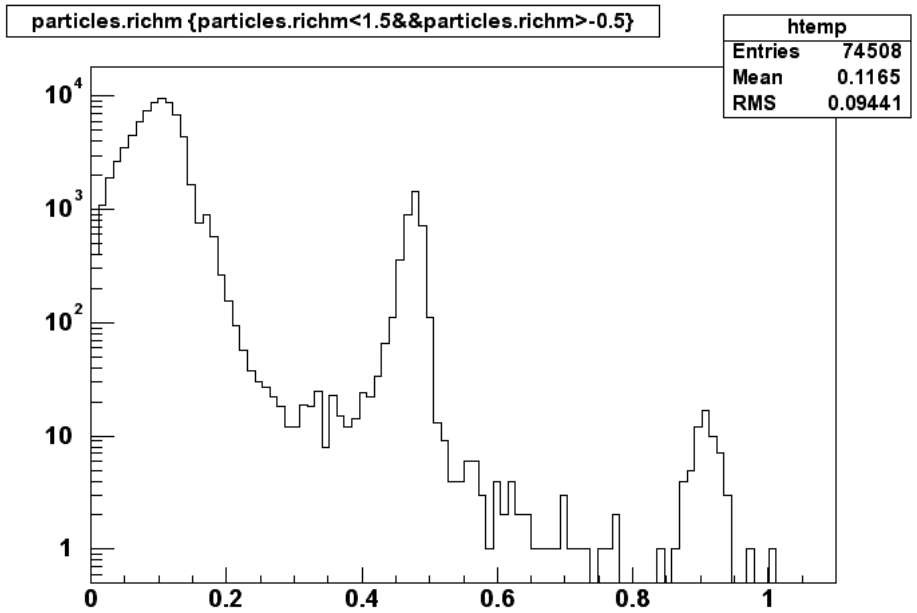
Single 90deg run. Good, clean PID for p, K, π, μ and e...

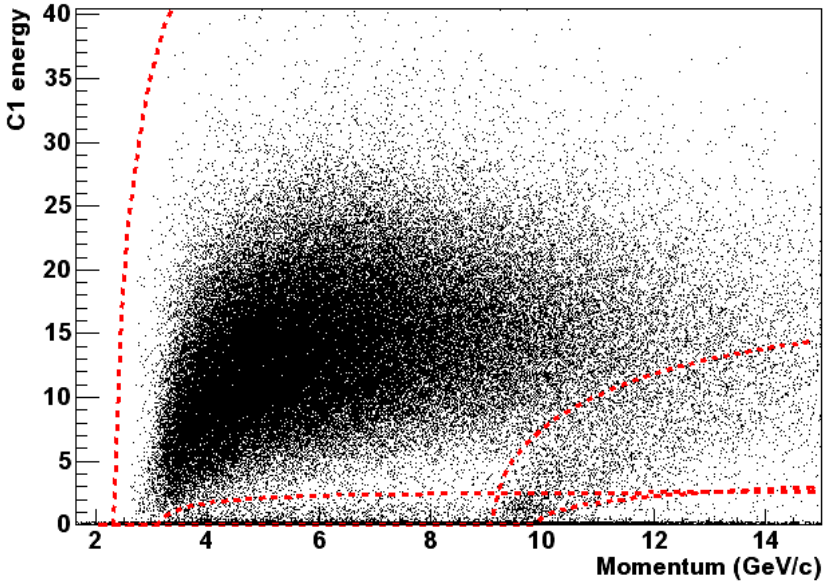


***p+p* ratios**
Bjørn H. Samset

PID - Cherenkovs



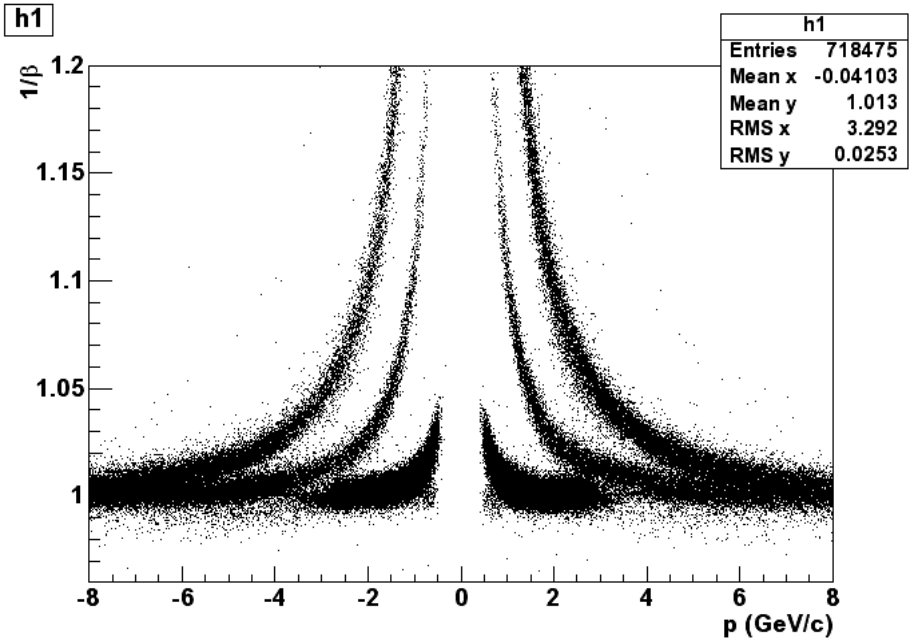


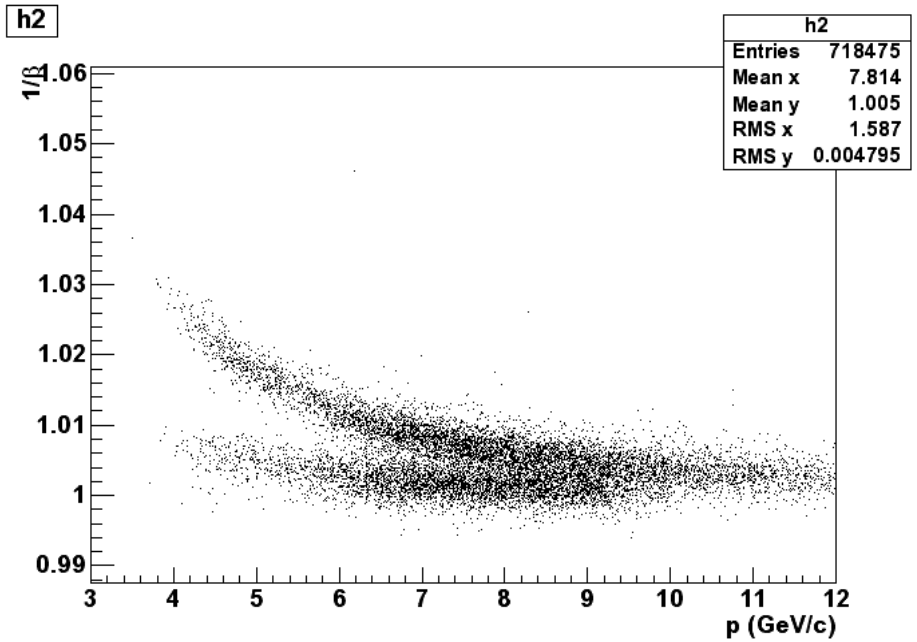


FS PID sequence:

- C1 (pions, kaons only)
- RICH
- H1 with pions vetoed
- H2 with pions vetoed

PID - H1 and H2





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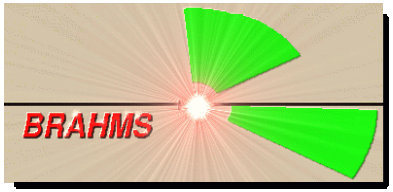
p/K up to ~4.5 GeV/c
pi up to ~3.0 GeV/c

NB: Momentum!
p is average of d2, d3 and d4 mom.

p/K up to ~6.5 GeV/c? 7 GeV/c?
No pions (all vetoed by C1/RICH)

Run selection



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Requirements to accept a run:

- PID looks OK for all detectors
- Approx. constant particles/trigger for all runs in same setting, checked for indiv. detectors
- FS: We have data for both A and B pol. at roughly the same angle and magn. field.

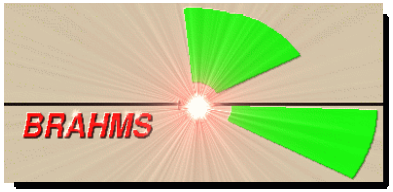
FS runs used:

6256	6303	6418	6435	6449
6257	6400	6427	6442	6473
6277	6401	6428	6445	6475
6278	6405	6429	6446	6488
6279	6410	6431	6447	6493
6302	6411	6434	6448	6669

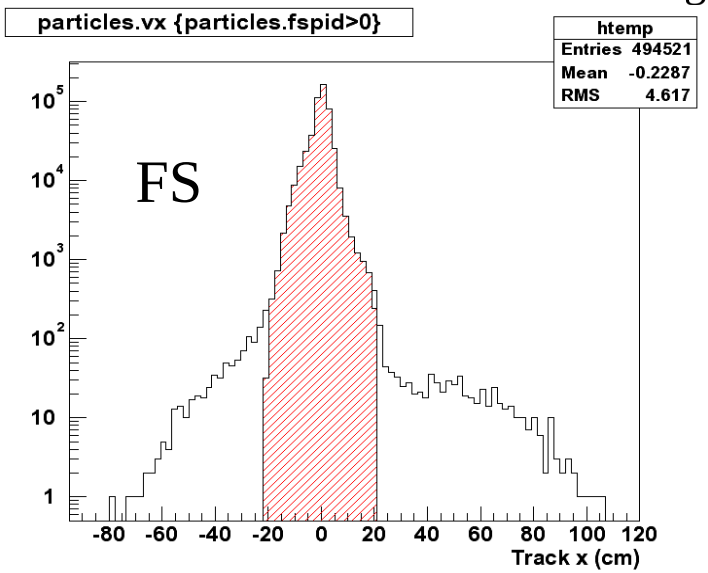
MRS runs used:

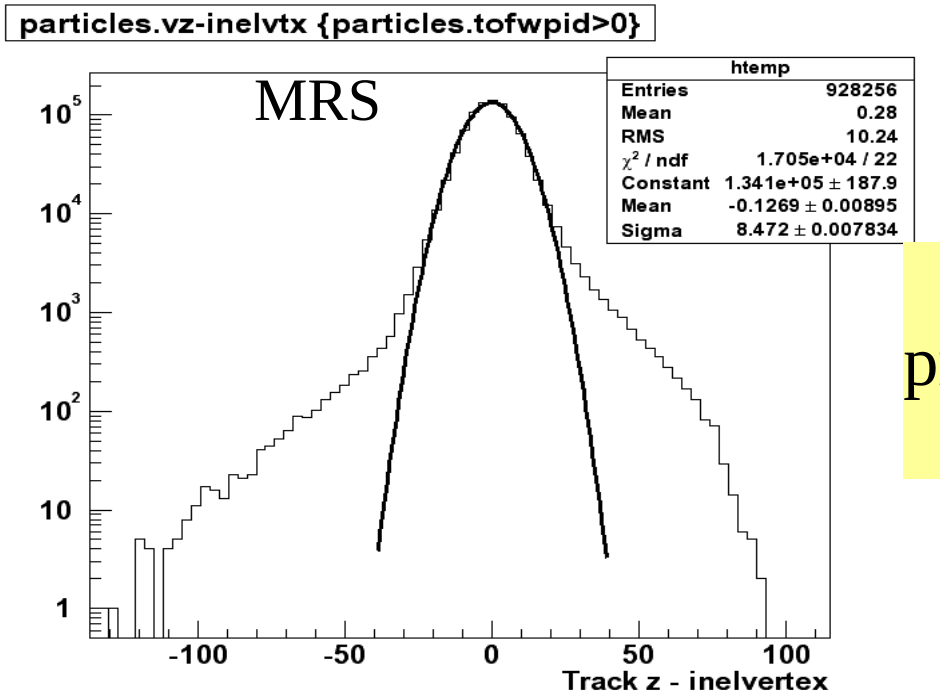
6251	6320	6427	6493	6703
6256	6321	6428	6630	6705
6257	6322	6429	6631	6706
6270	6331	6431	6633	6707
6271	6346	6432	6636	6713
6277	6394	6433	6637	6714
6278	6398	6434	6638	6715
6279	6399	6435	6639	6722
6289	6400	6442	6669	6723
6300	6401	6443	6673	6740
6302	6405	6444	6674	6741
6303	6410	6445	6675	6748
6313	6411	6446	6676	6750
6314	6415	6447	6677	6751
6315	6417	6448	6682	6752
6316	6418	6449	6689	6753
6318	6419	6475	6690	6754
6319	6420	6488	6691	

The analysis

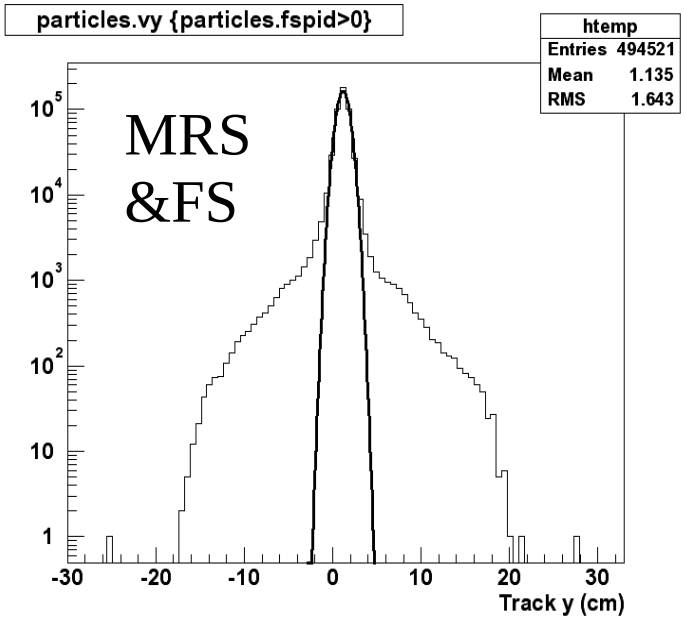


- Select bins in y
- Count the number of IDd particles in each bin, multiply by trigger scaledown (3/6)
- Normalize to the number of NSD triggers (5)
- FS: Divide A field by B field
- MRS: $r = \mathrm{sqrt}(neg_A/pos_B \cdot neg_B/pos_A)$

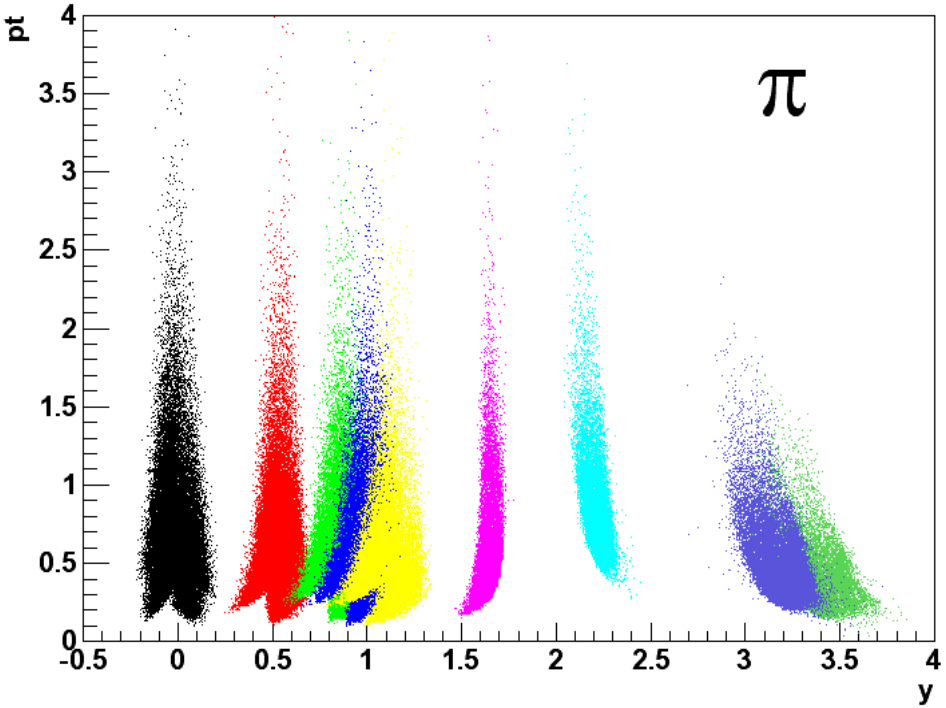




Track projection cuts



The analysis - y bins



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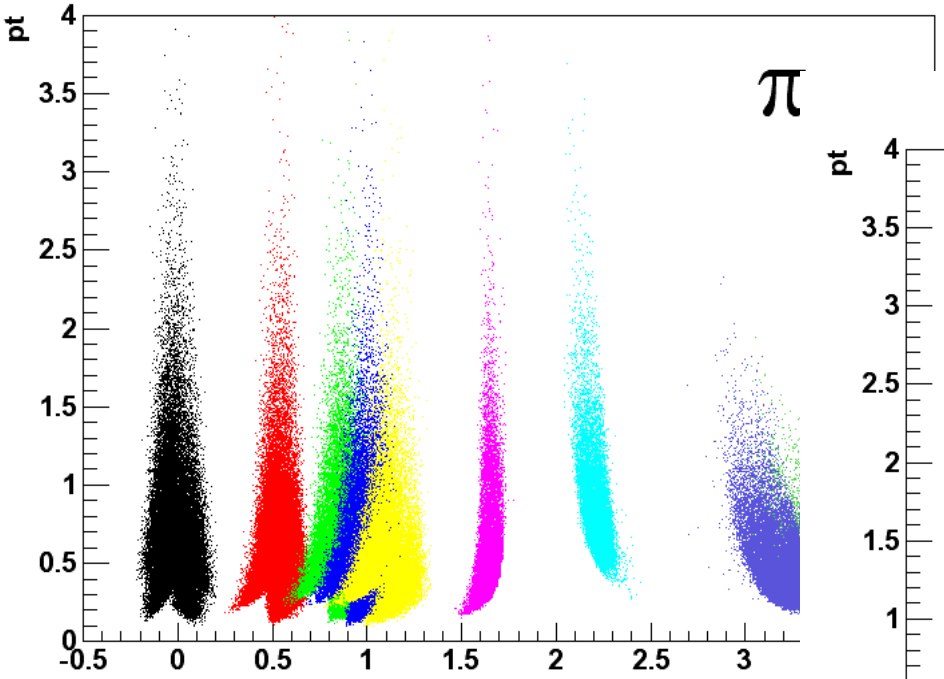
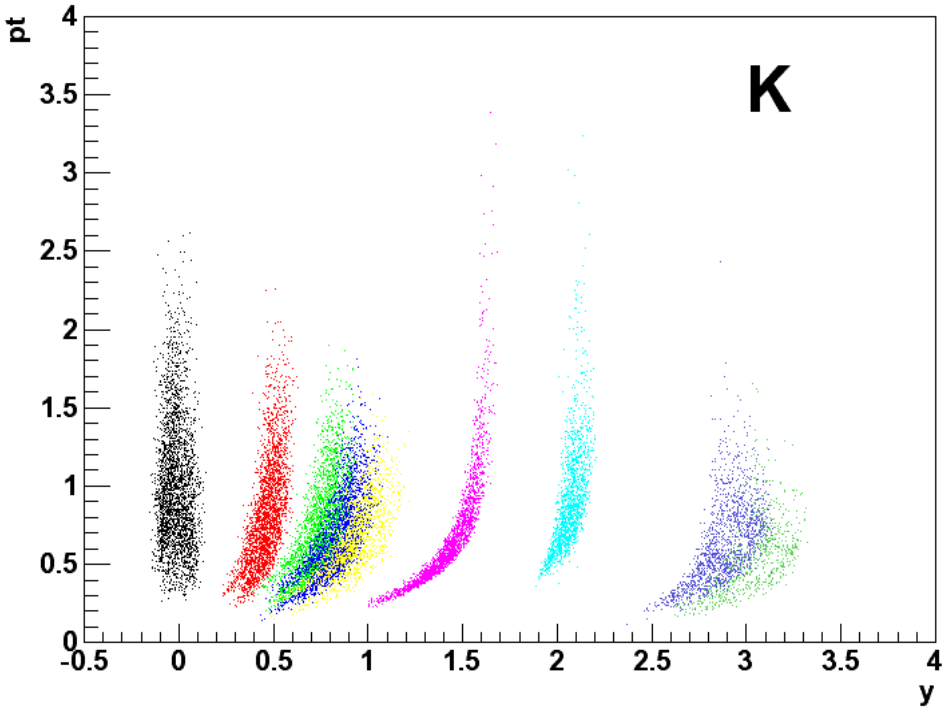
The analysis - y bins





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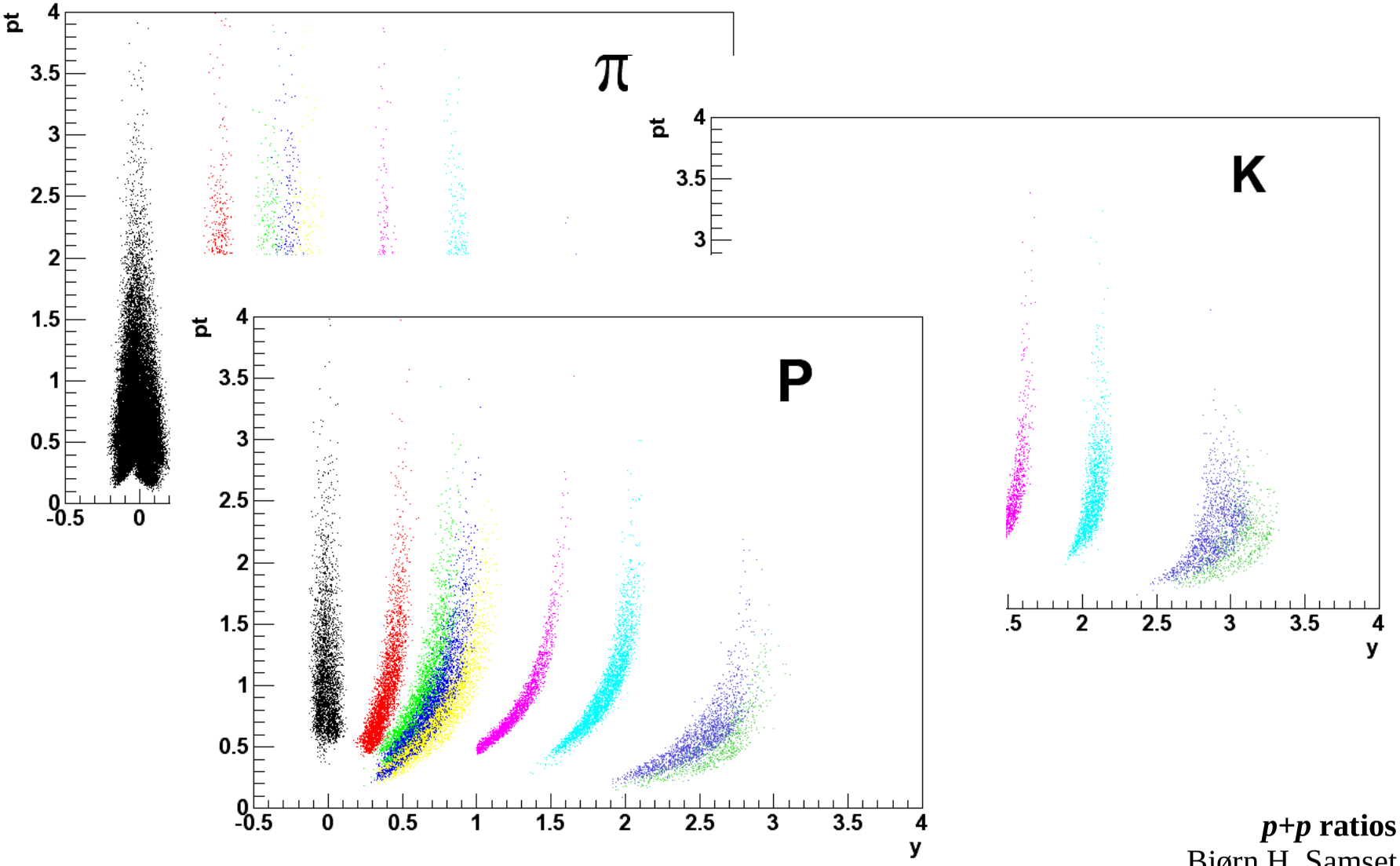
The analysis - y bins



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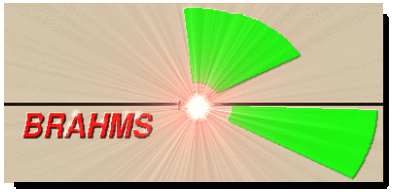
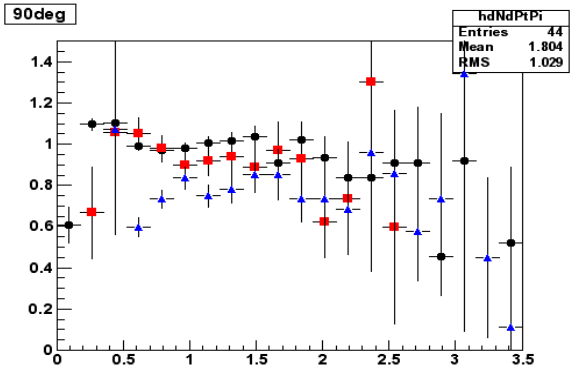
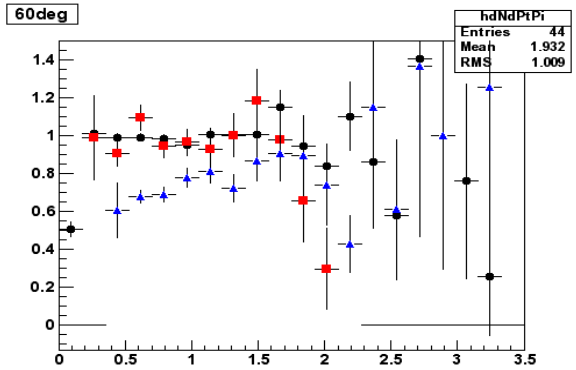
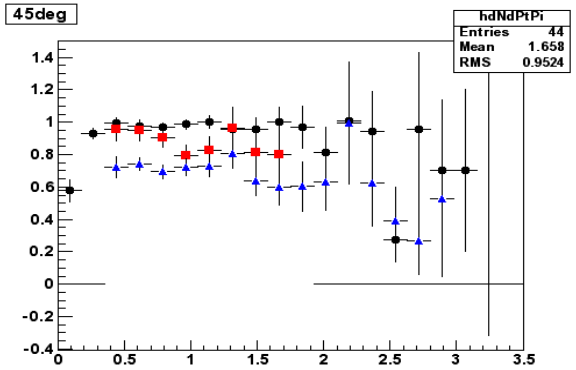
pt dependence?

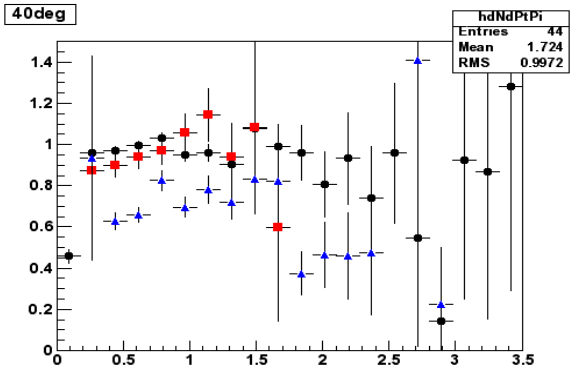
(All plots: Ratio vs. pt)

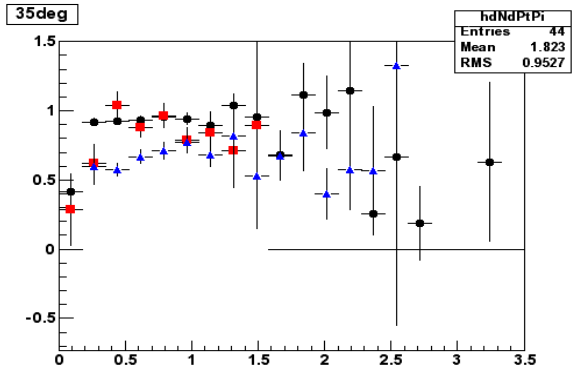


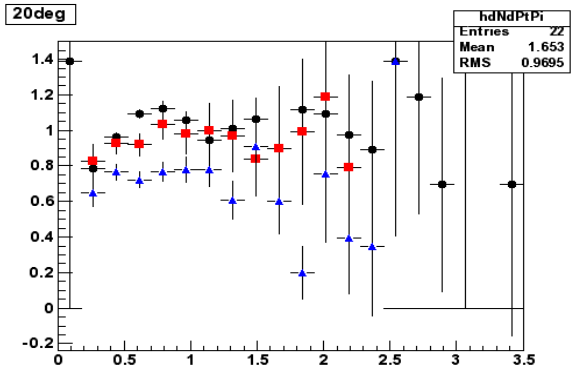


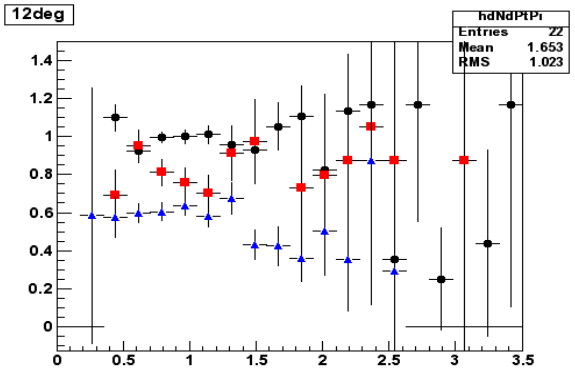


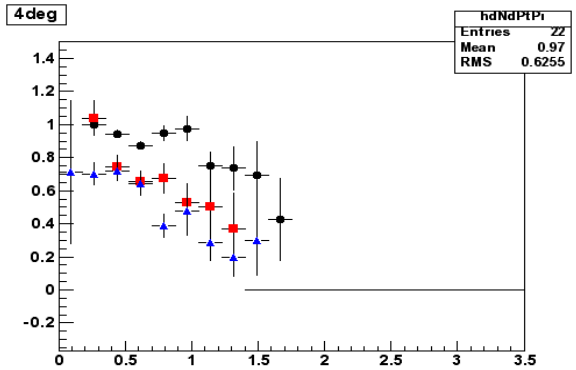


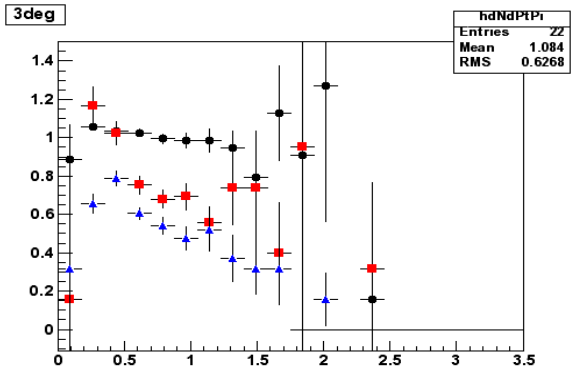




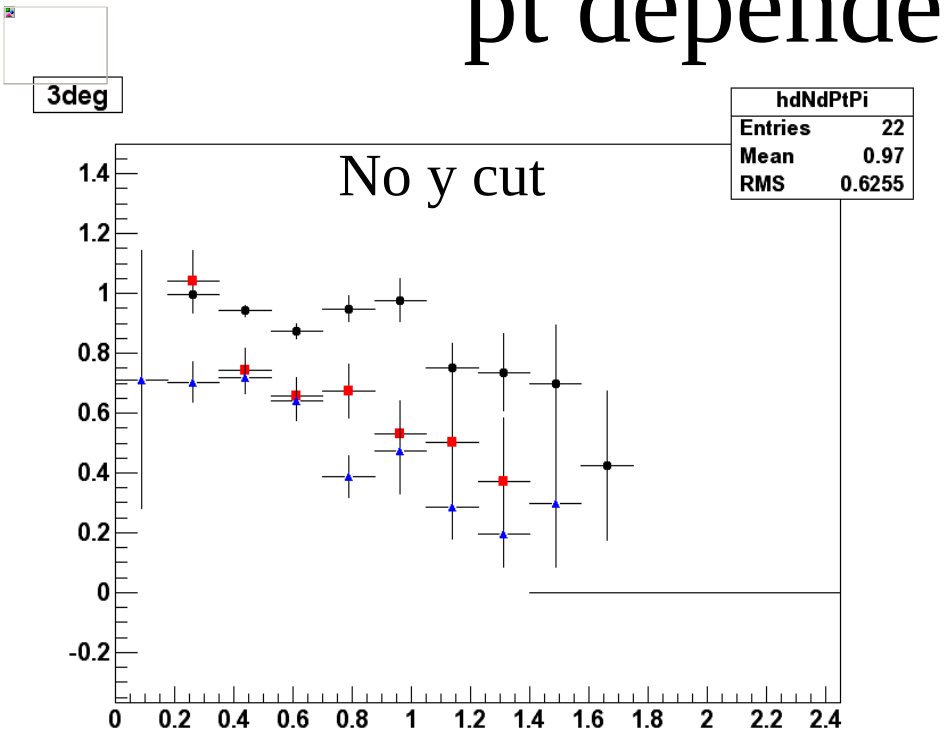




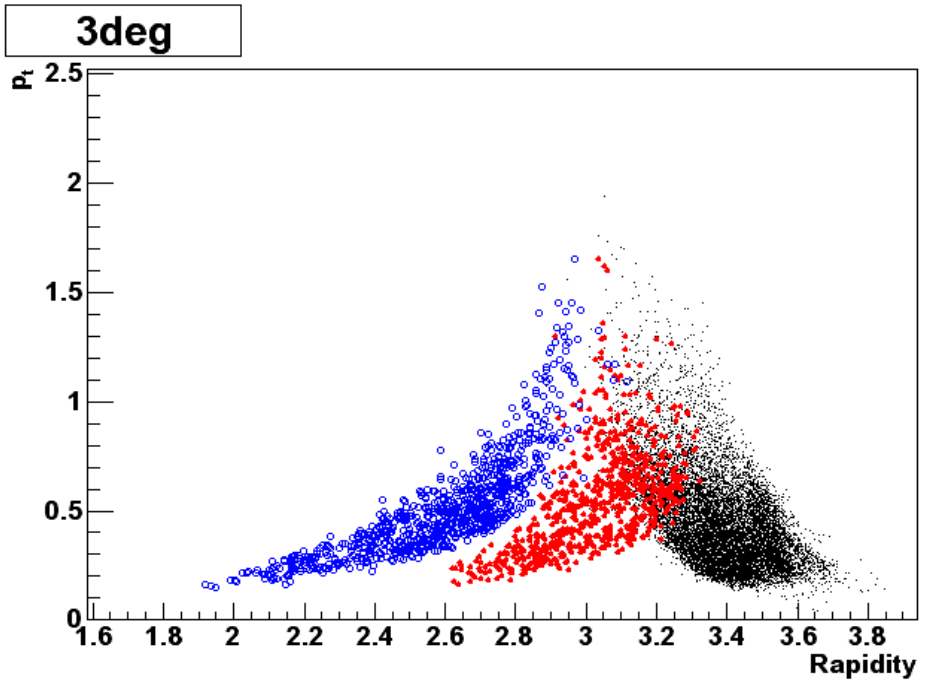




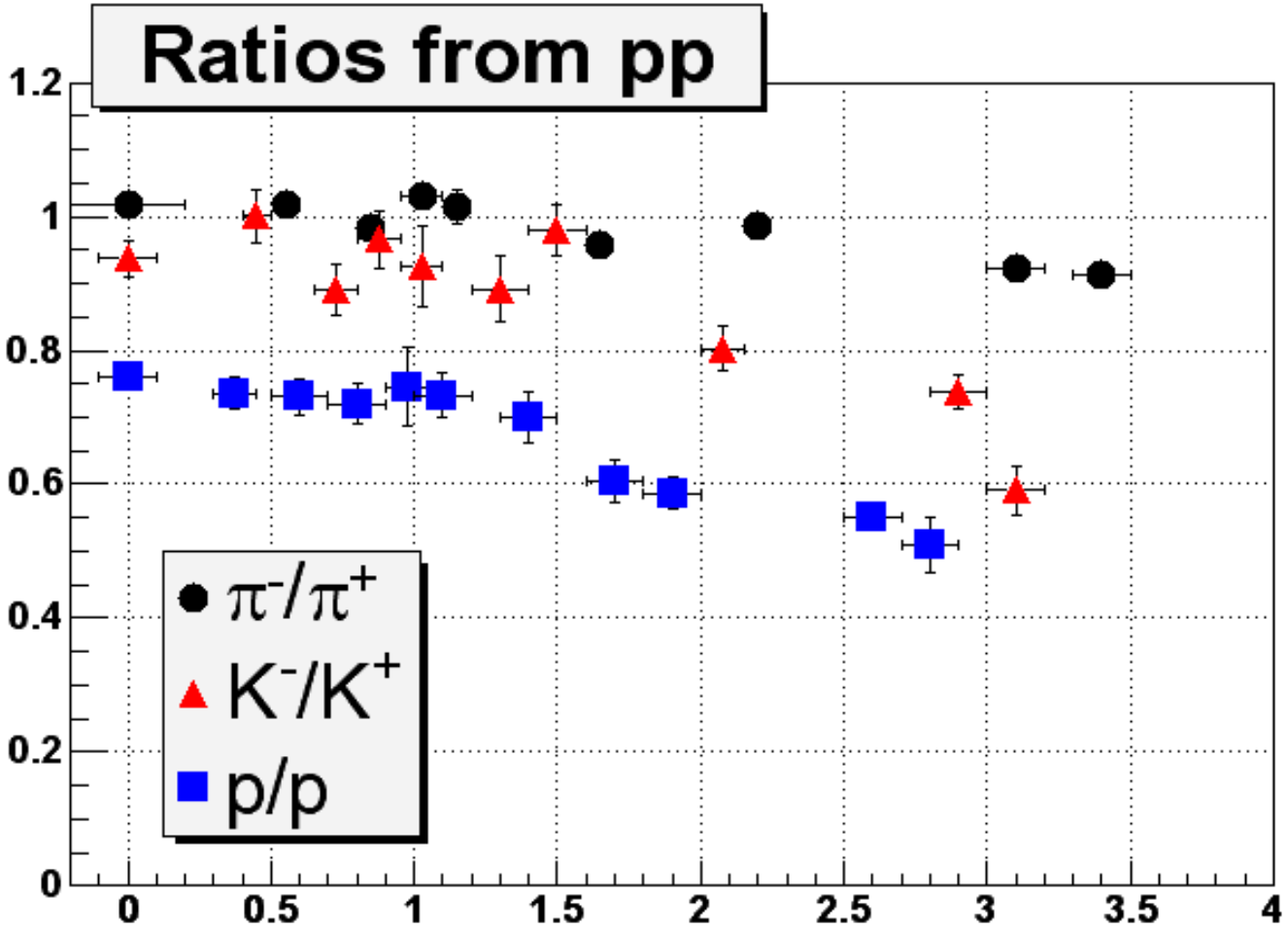
pt dependence?



dy = 0.2



pi, K: 3.0-3.2
p: 2.8-3.0



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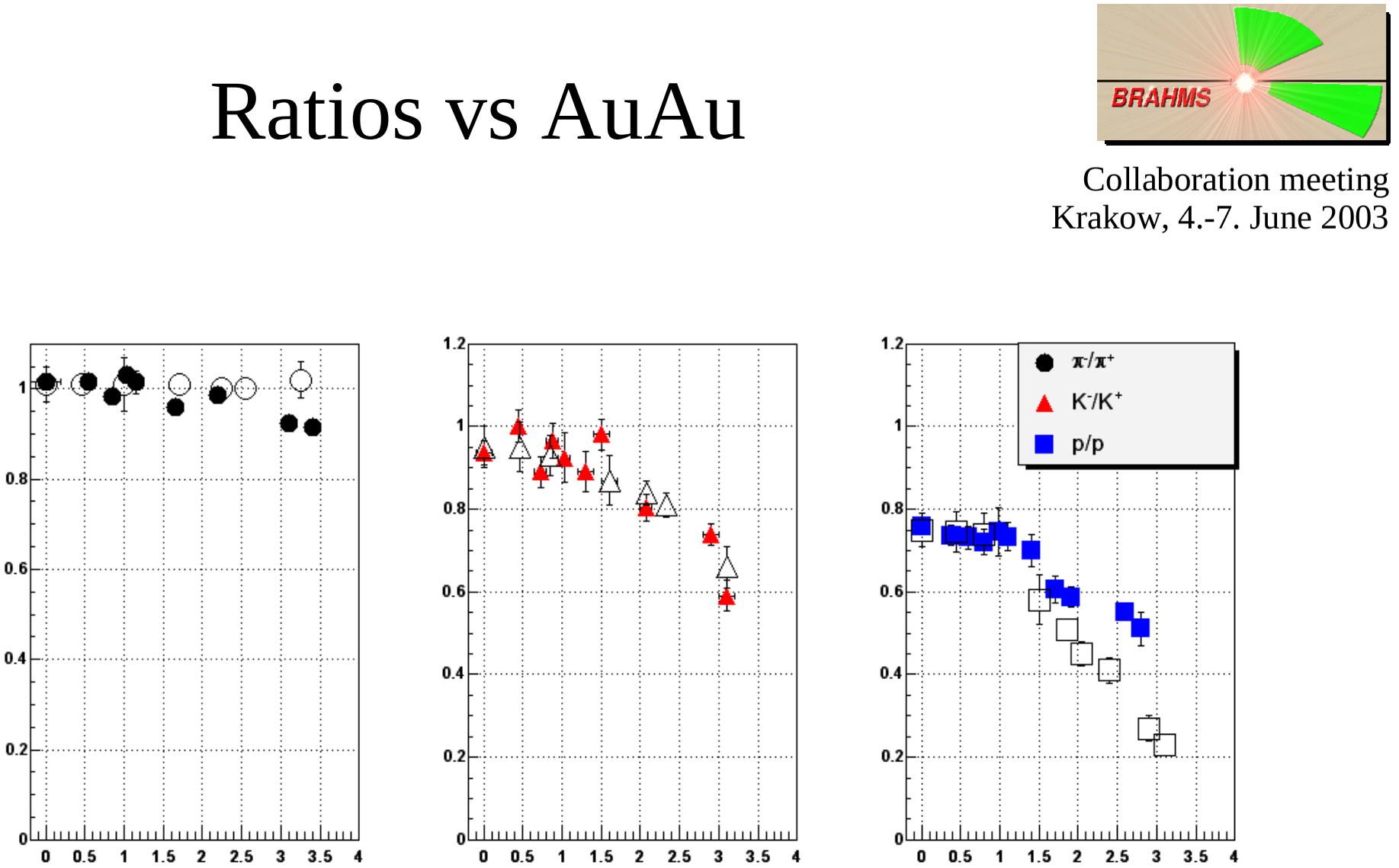
Corrections? None yet.

- Most cancel
- Absorption/production: As for AuAu, except we must add trigger slats.

Ratios vs AuAu



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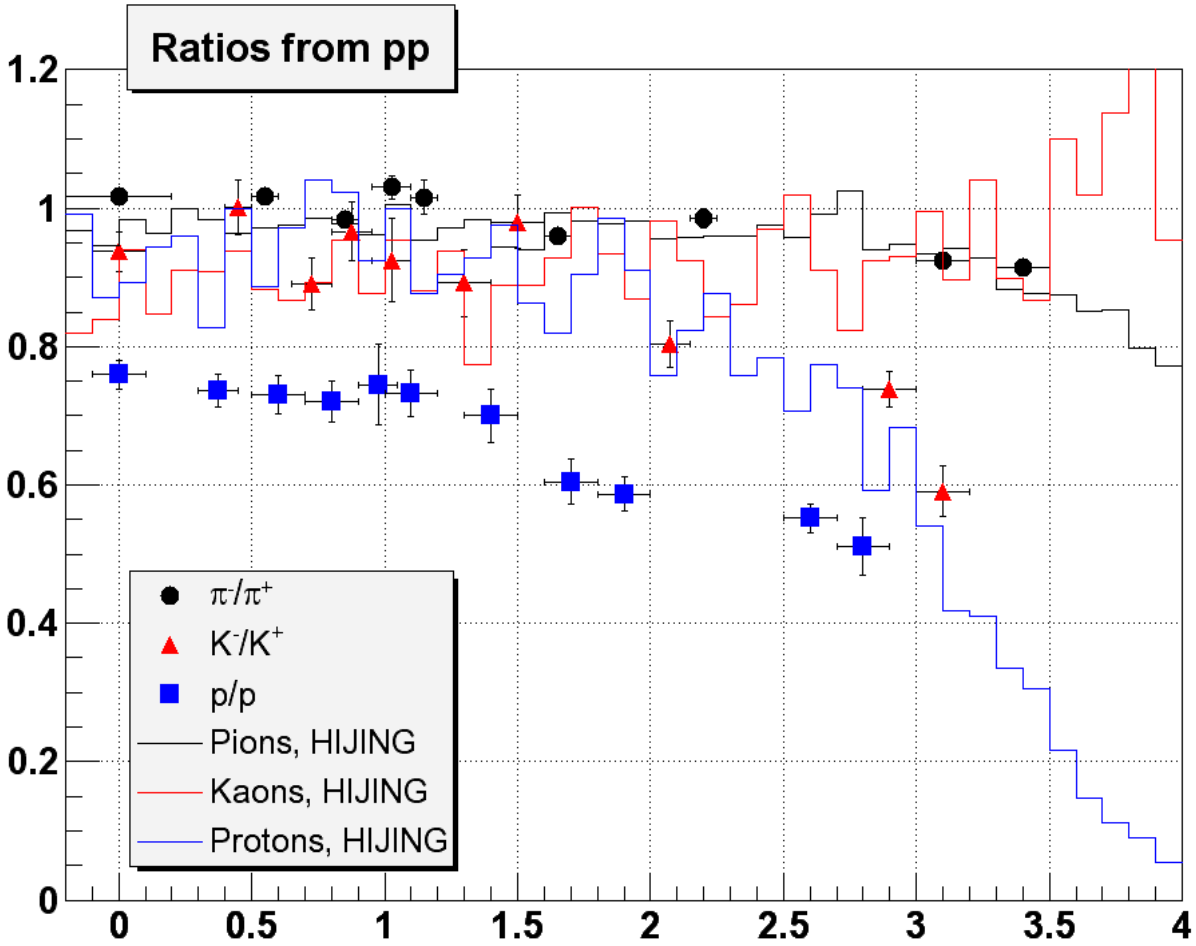
***p+p* ratios**
Bjørn H. Samset

Ratios vs HIJING



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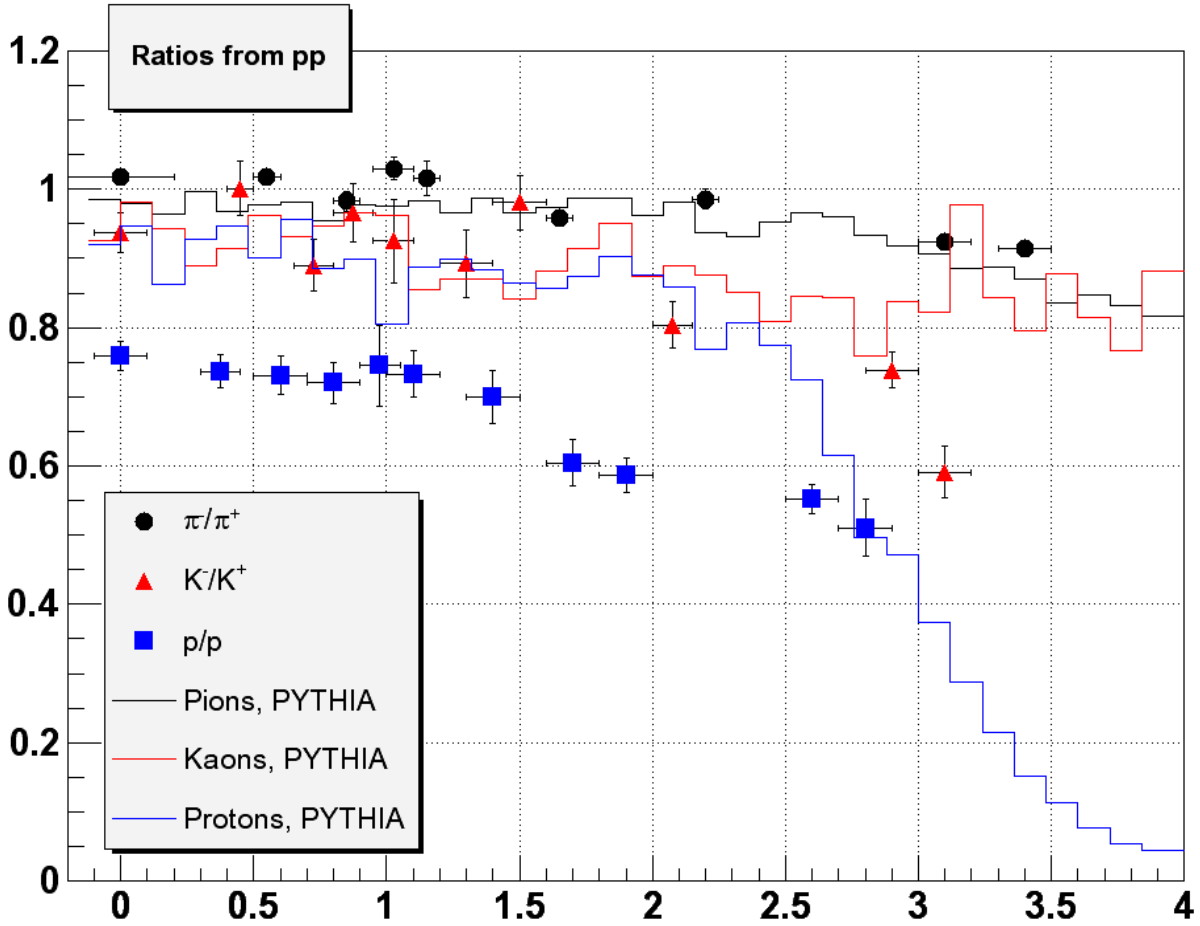
Ratios vs PYTHIA



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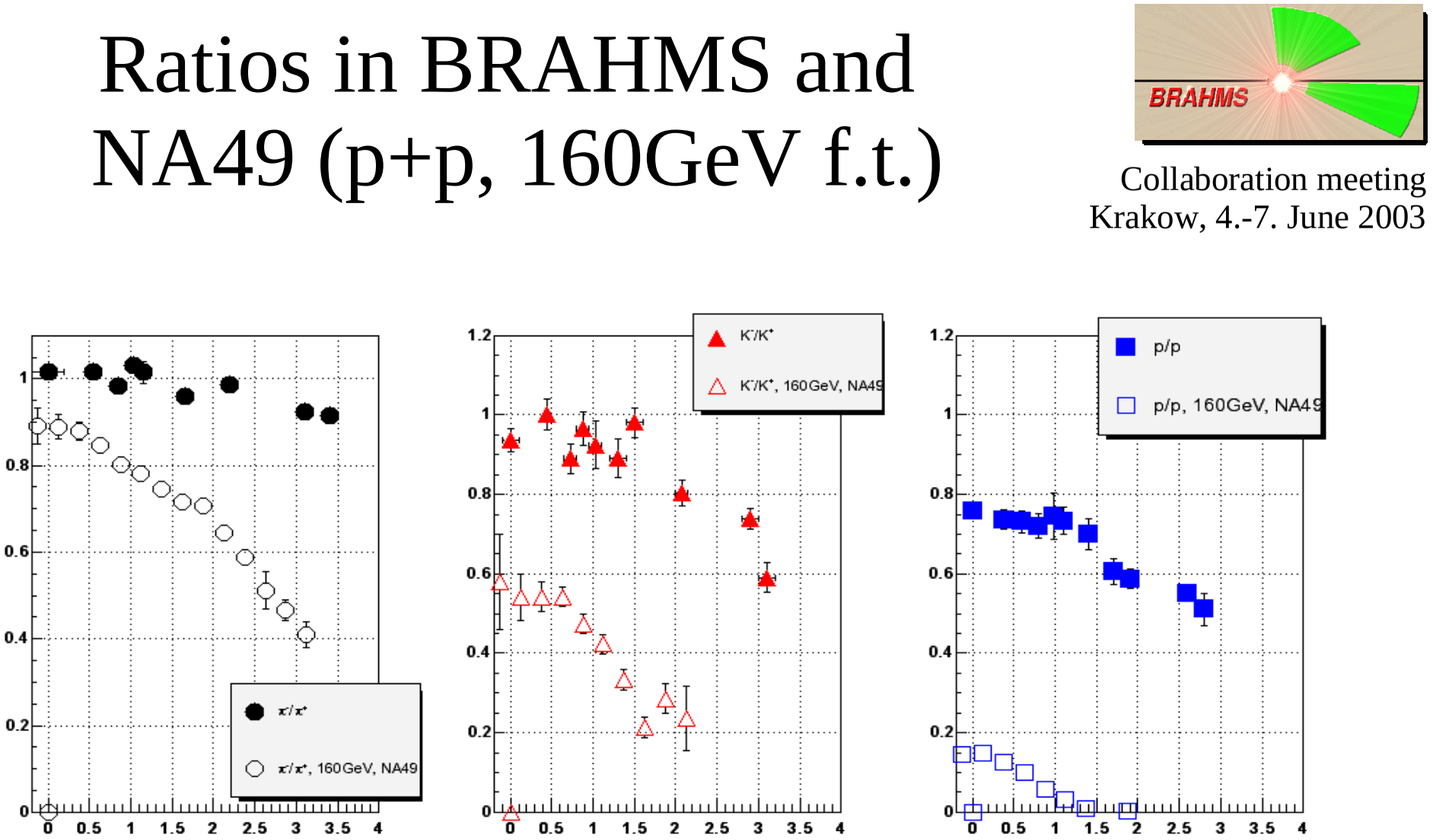
Ratios in BRAHMS and NA49 (p+p, 160GeV f.t.)



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NA49 data:
http://f.home.cern.ch/f/fsikler/public/ips/near/report/report.ps

Chemical plot

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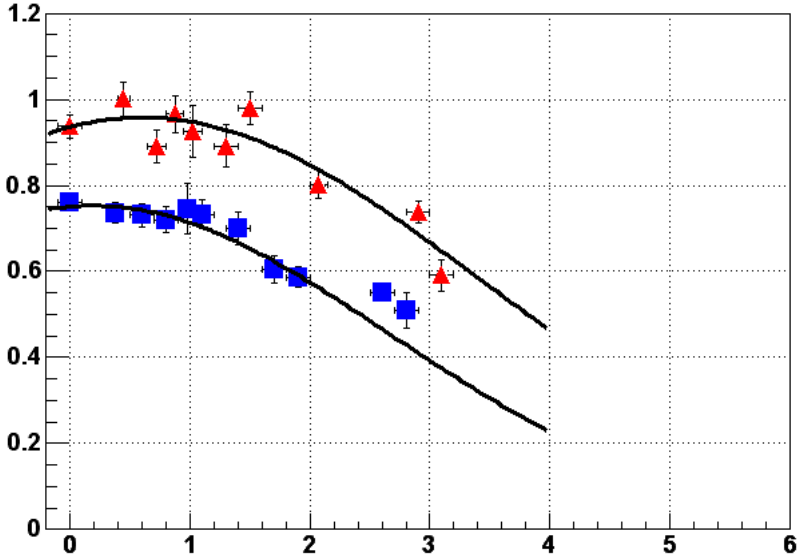

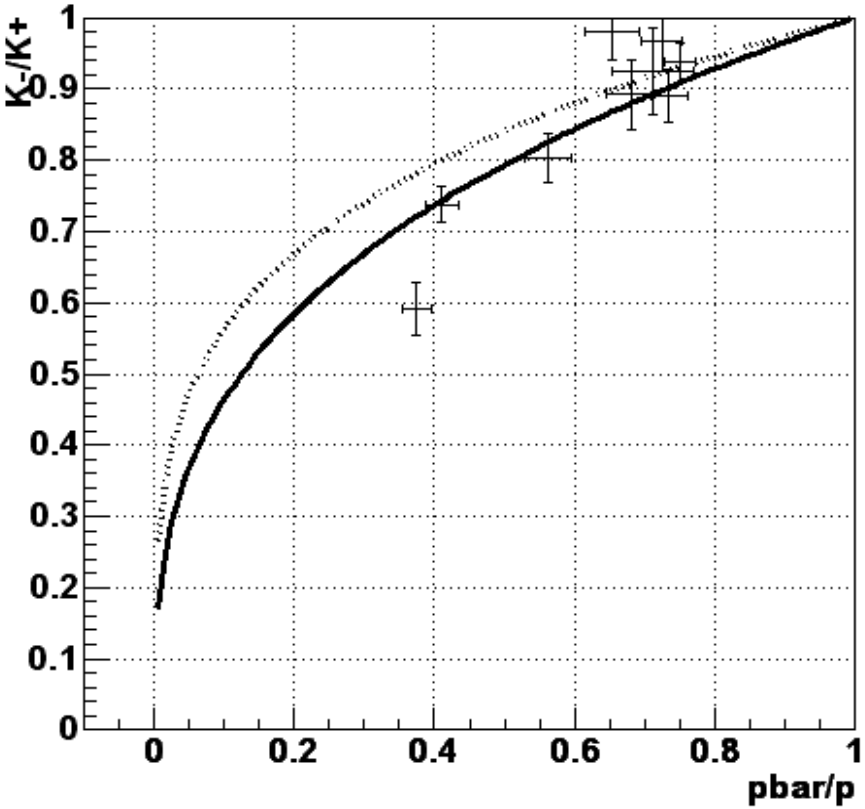

- The data indicate

$$K^-/K^+ = (\bar{p}/p)^{1/3}$$

- $\mu_s = 0$?
- (Well... Rather shaky as of yet...)

Issues and cave(b)ats

The Big Brown Bat is one of seven bat species that utilize caves in Indiana. Bats are found in Most Indiana caves (photo by Sam Frushour).

Collaboration meeting
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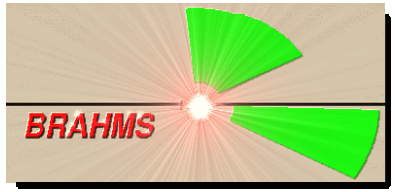
- Trigger efficiency? (What frac. of NSD cross section do we see for trig. 3,5,6?)
- Should add 2003 dataset, especially 8deg data
- <u>Systematic uncertainties</u>
  - Large (up to 50%) variations between vertex bins for both spectrometers when using inelvertex.
  - Low-y part of 3deg and 4deg settings gives very high ratios.

MRS acceptances



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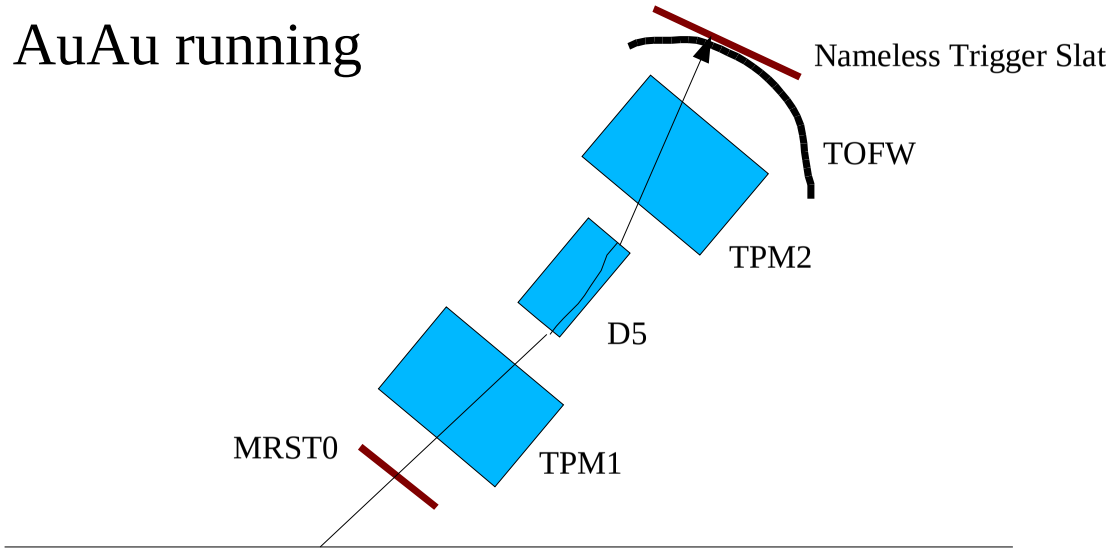
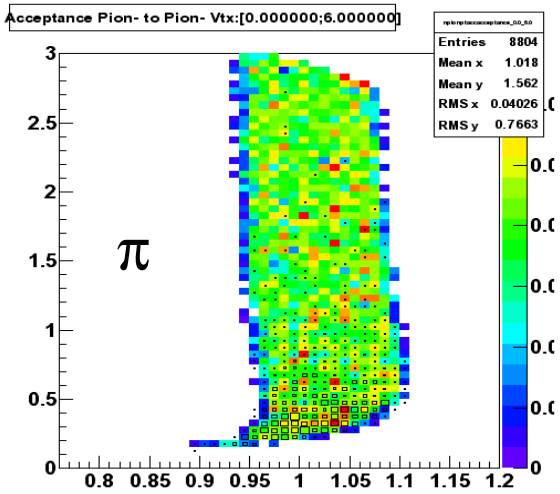
Using the software in
brahms_app/pc_app/brag/generate
brahms_app/pc_app/brag/acceptance
with a few modifications:

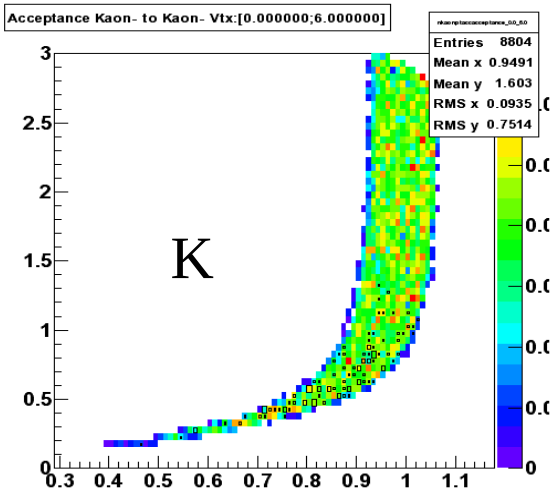
- Added MRST0 (or was it TMrf?)
- Cut in TOFW slat to simulate the trigger slat behind the TOFW
- Pushed back TPM1+D5+TPM2 50cm relative to AuAu running

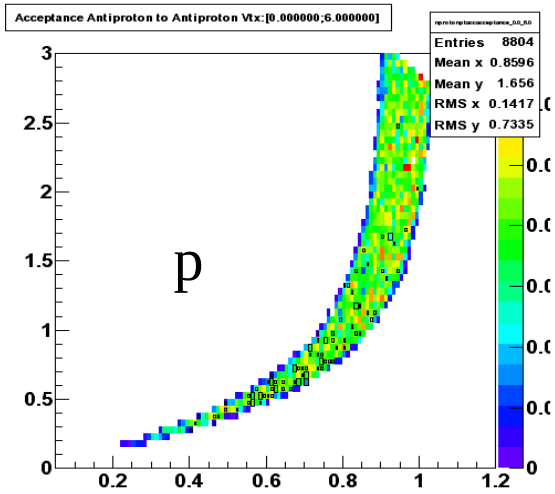
Vertex:
Using track z-projection!

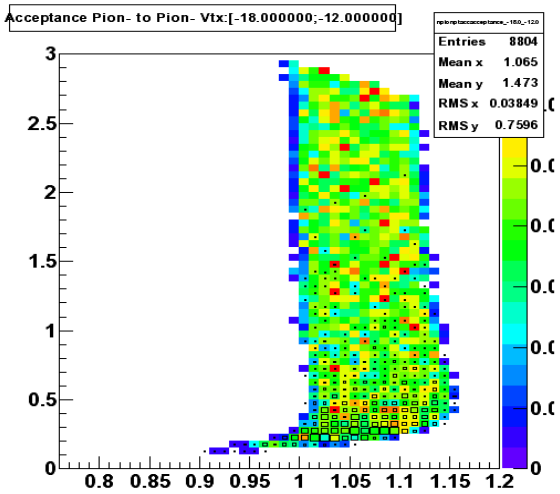


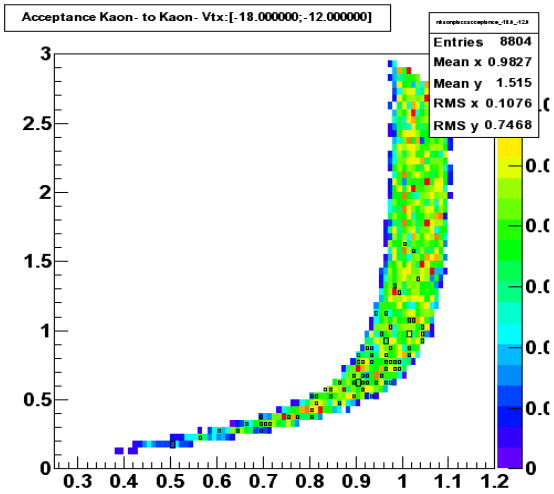
Acceptance maps - 40deg

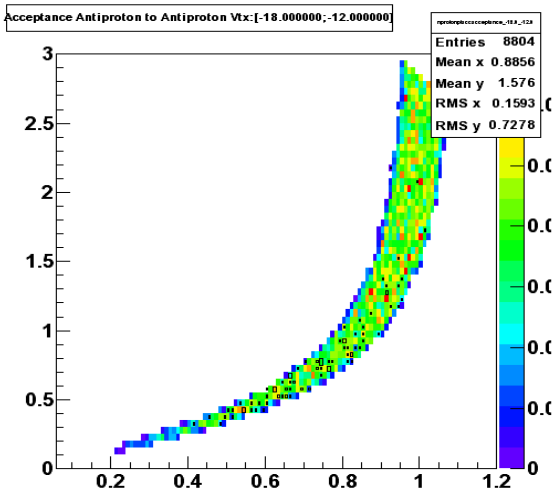




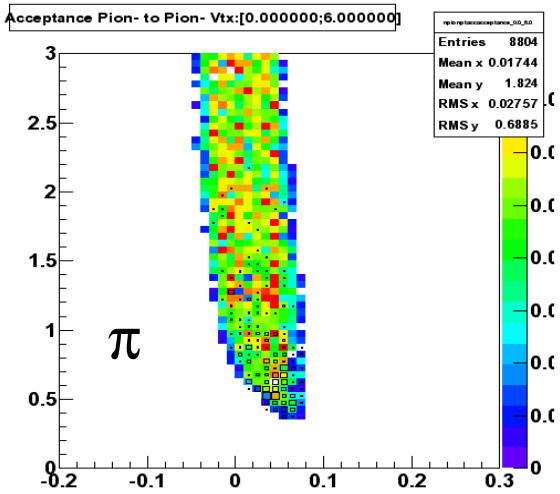


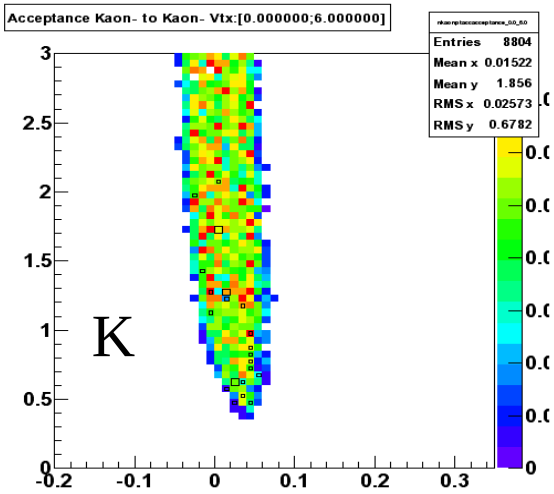


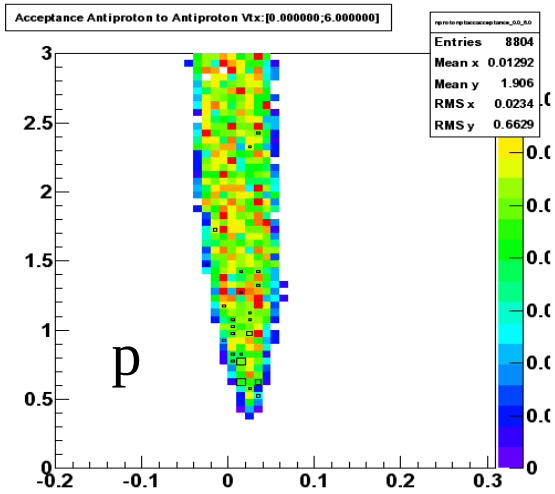


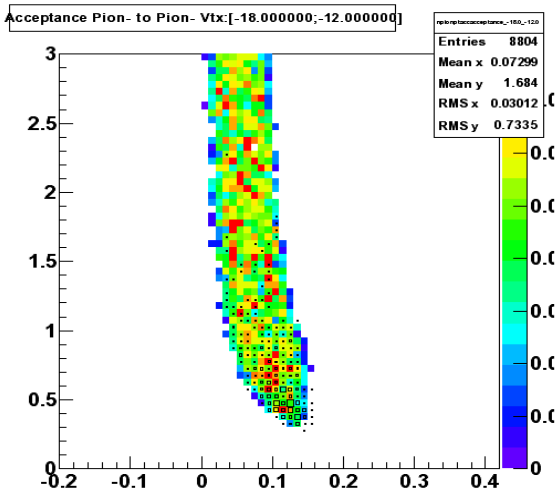


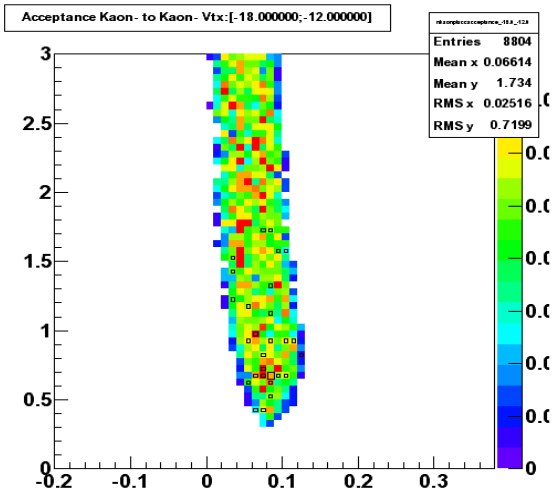
Acceptance maps - 90deg

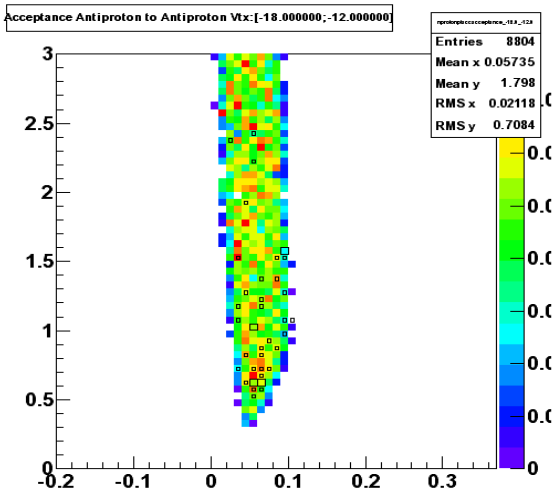






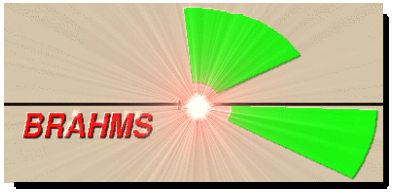






Spectra at y=0, 1000B setting

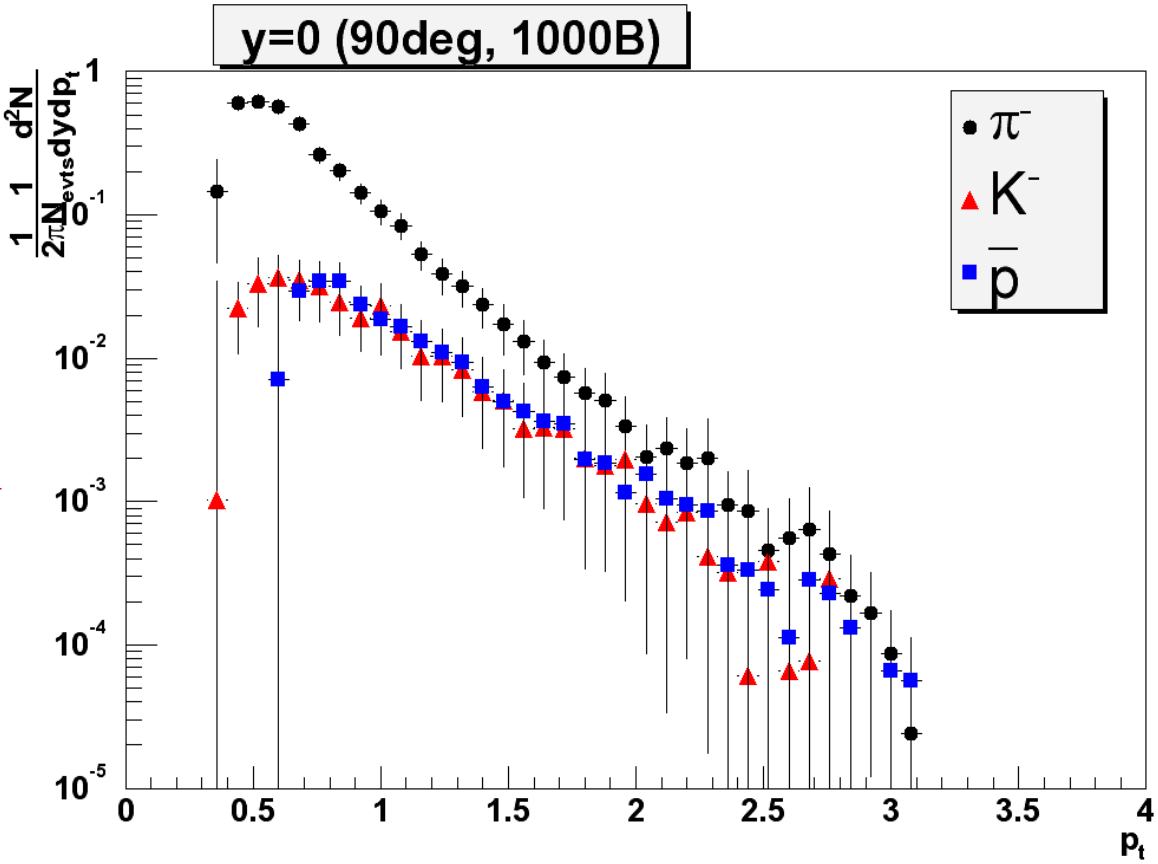
(Very recent analysis...)



Collaboration meeting
Krakow, 4.-7. June 2003

- Acceptance corrections
- Physics corrections a'la Eun-Joo
- Cut away very low acc. particles etc.

- Effects of trigger slats?
- Acc. file OK? (How high was the TOFW trigger slat?)



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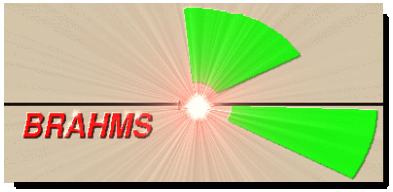

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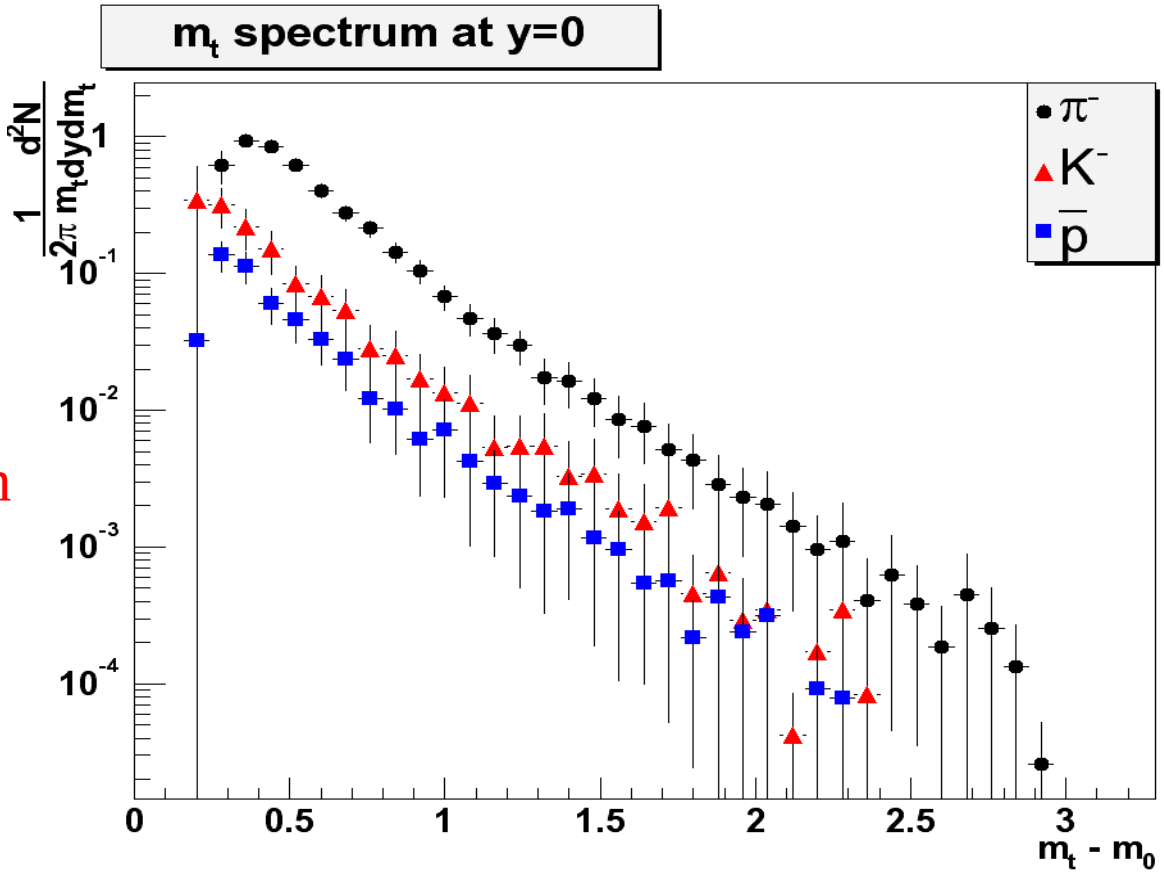

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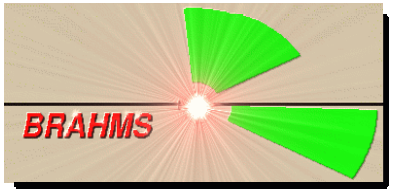

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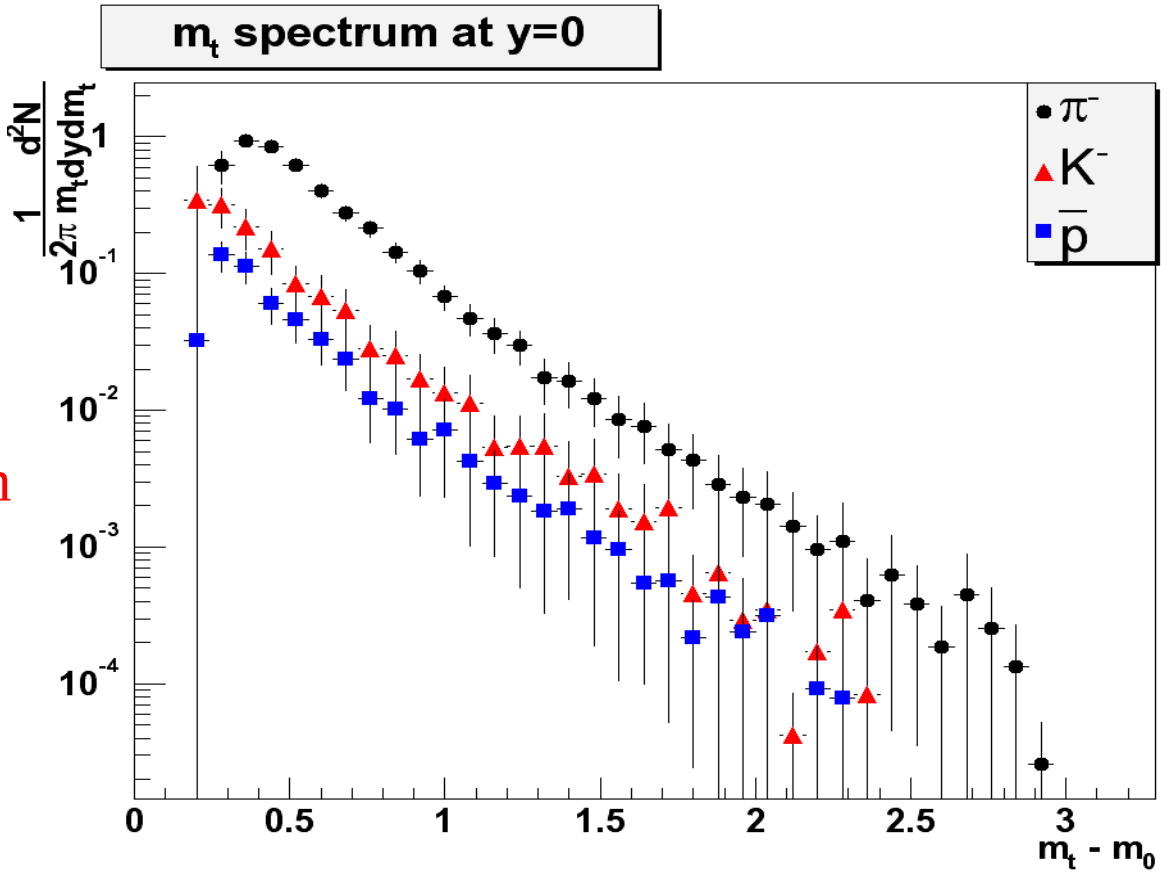

However, the details are still wrong. Ratios and yields are strange - more work to do!

Spectra at y=0, 1000B setting

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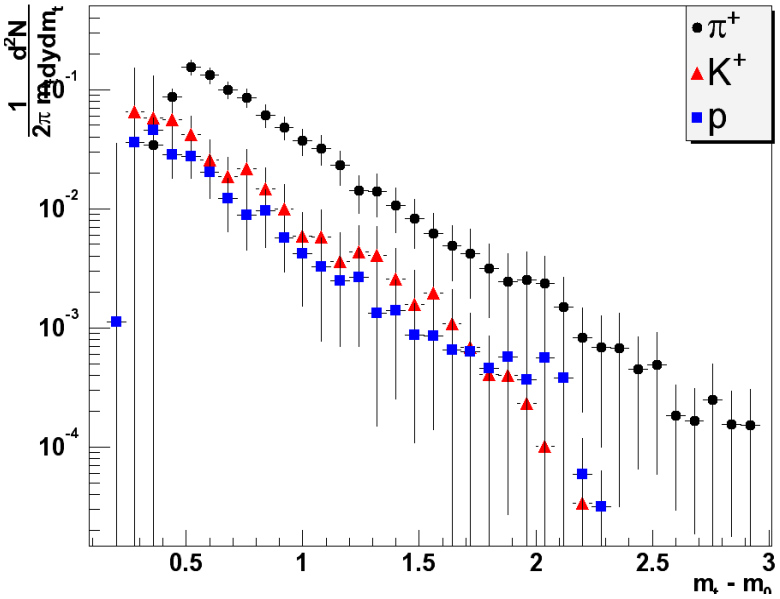
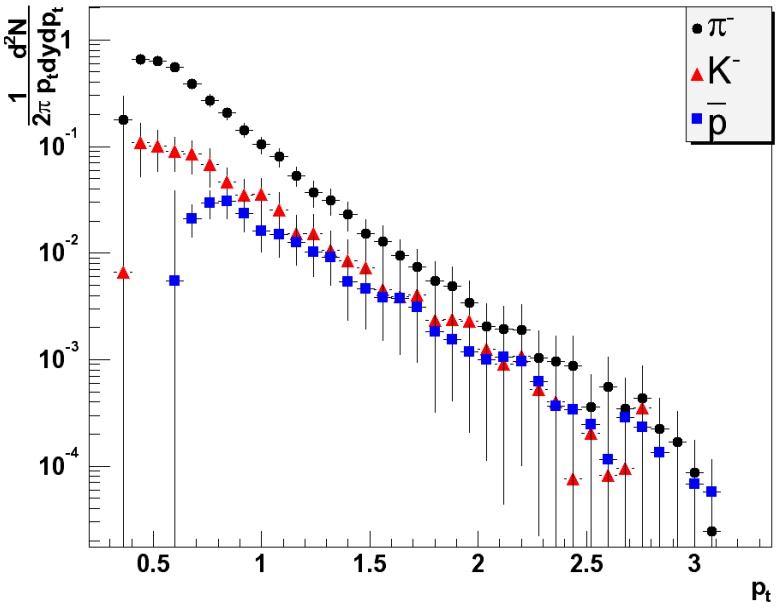
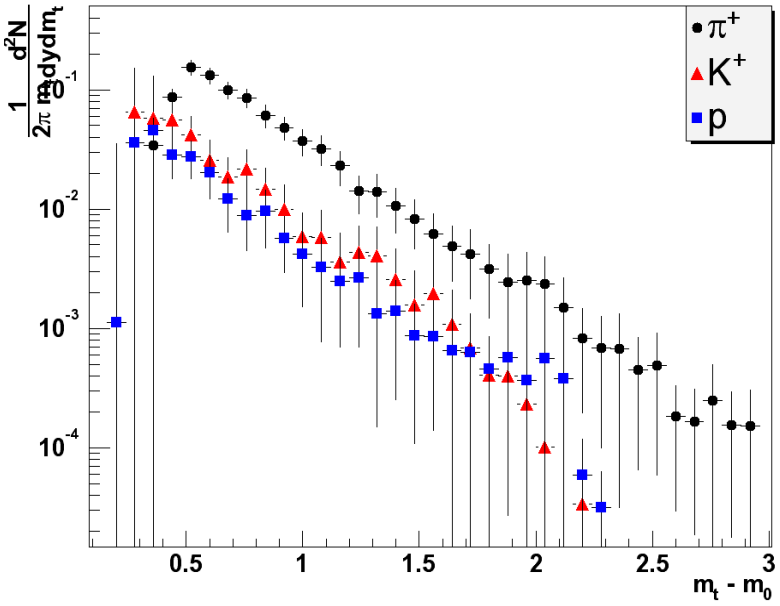
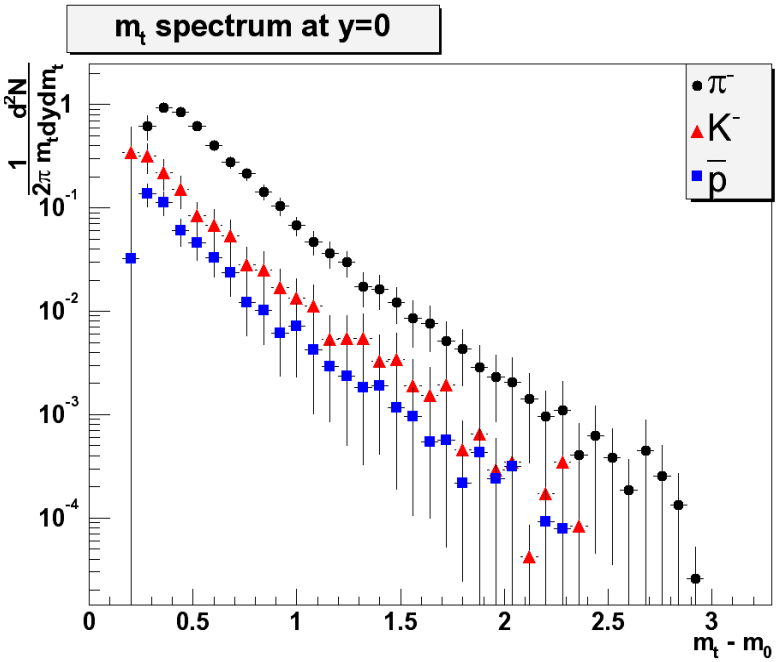
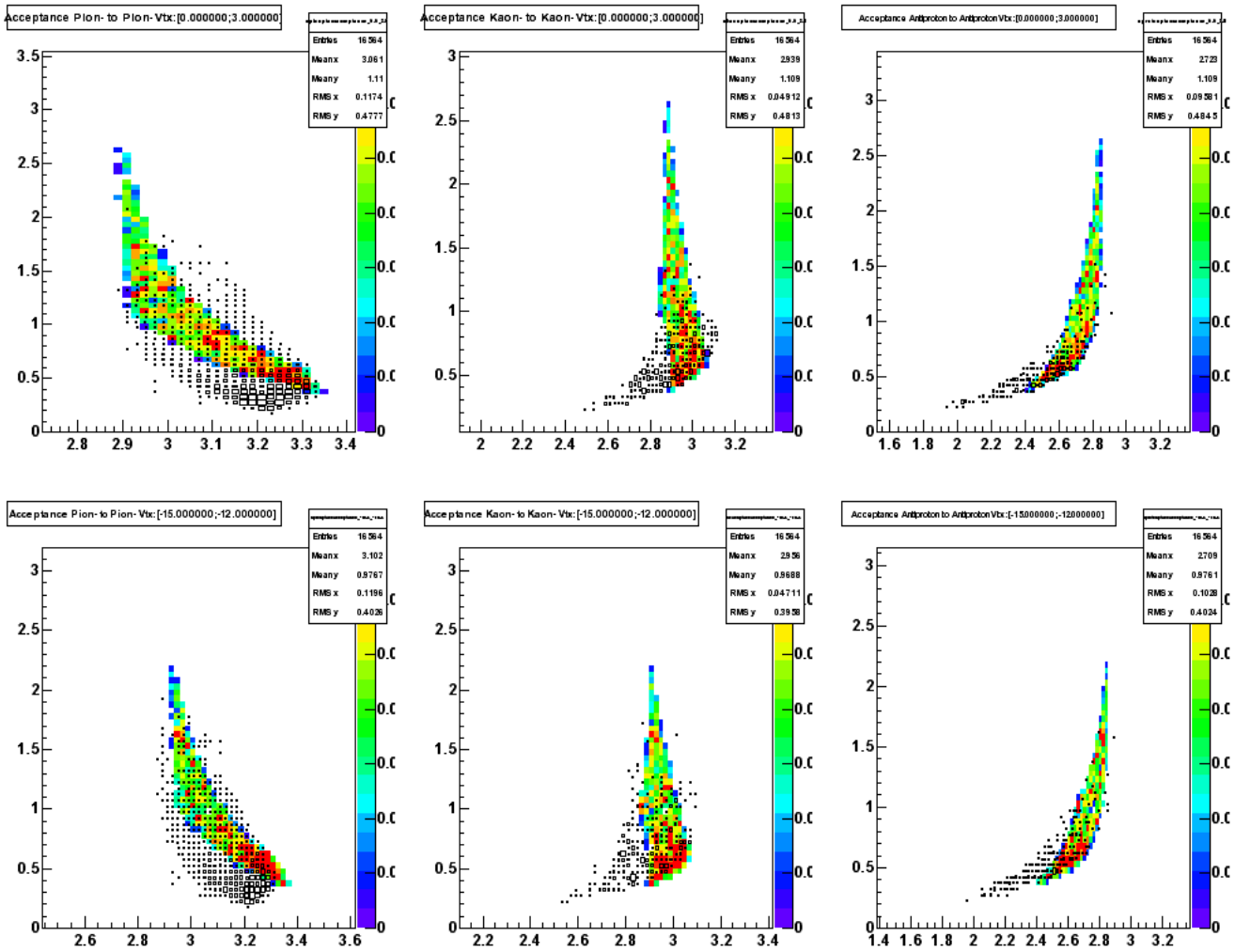








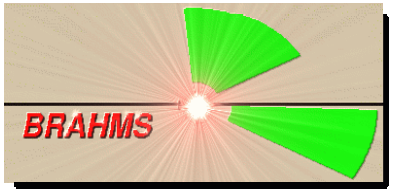
FS acceptance !?!



Collaboration meeting
Krakow, 4.-7. June 2003

- No track projections here...
- Inelvertex is just too wide
- Acc. based on pos, angle at T1 midplane?
- Works, but how do I get the absolute normalization?

Conclusions



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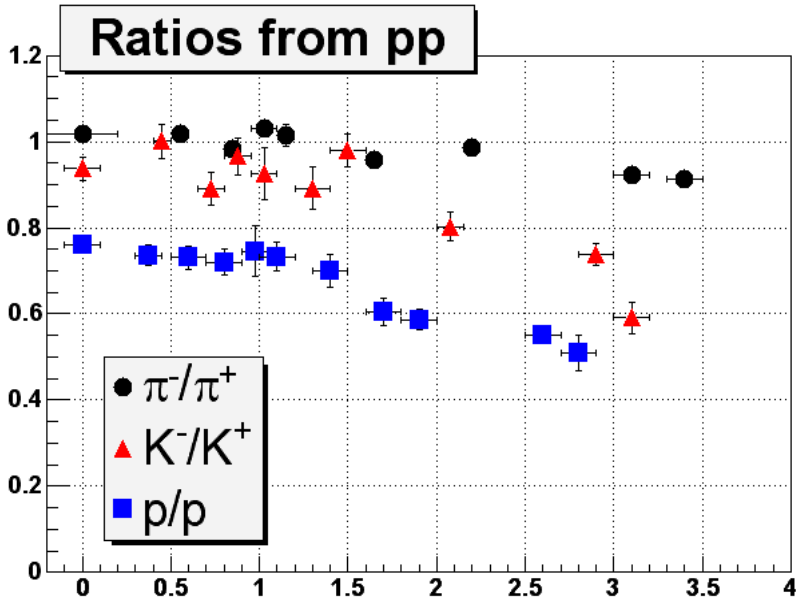
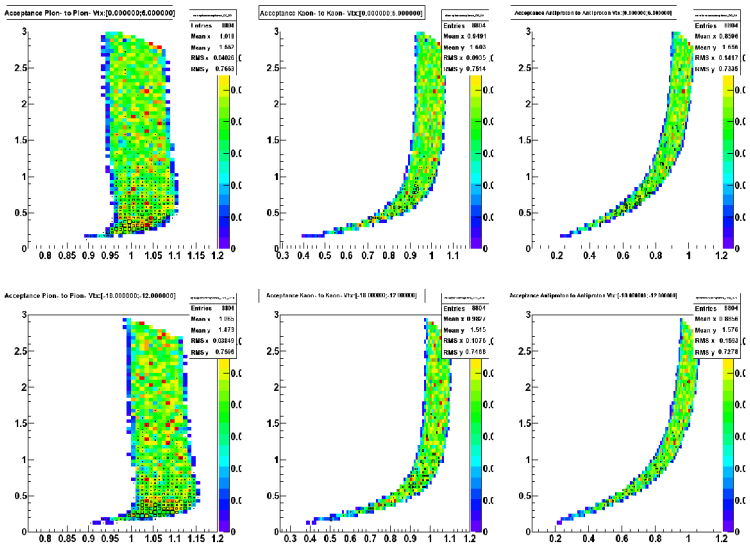
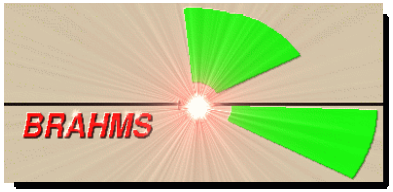


- Ratios are looking good.
- pt dep. at high y?
- Some work still left, but not very much...

- Acceptance is OK for MRS
- Spectra at midrapidity should come soon
- FS is another story...





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***p*+*p* ratios**

Bjørn H. Samset