FLying Angry Pig

MRS Analysis

- Preliminary Data Analysis Done
- Physics

Centrality Dependent

-Spectra with <pt>, slope, yields

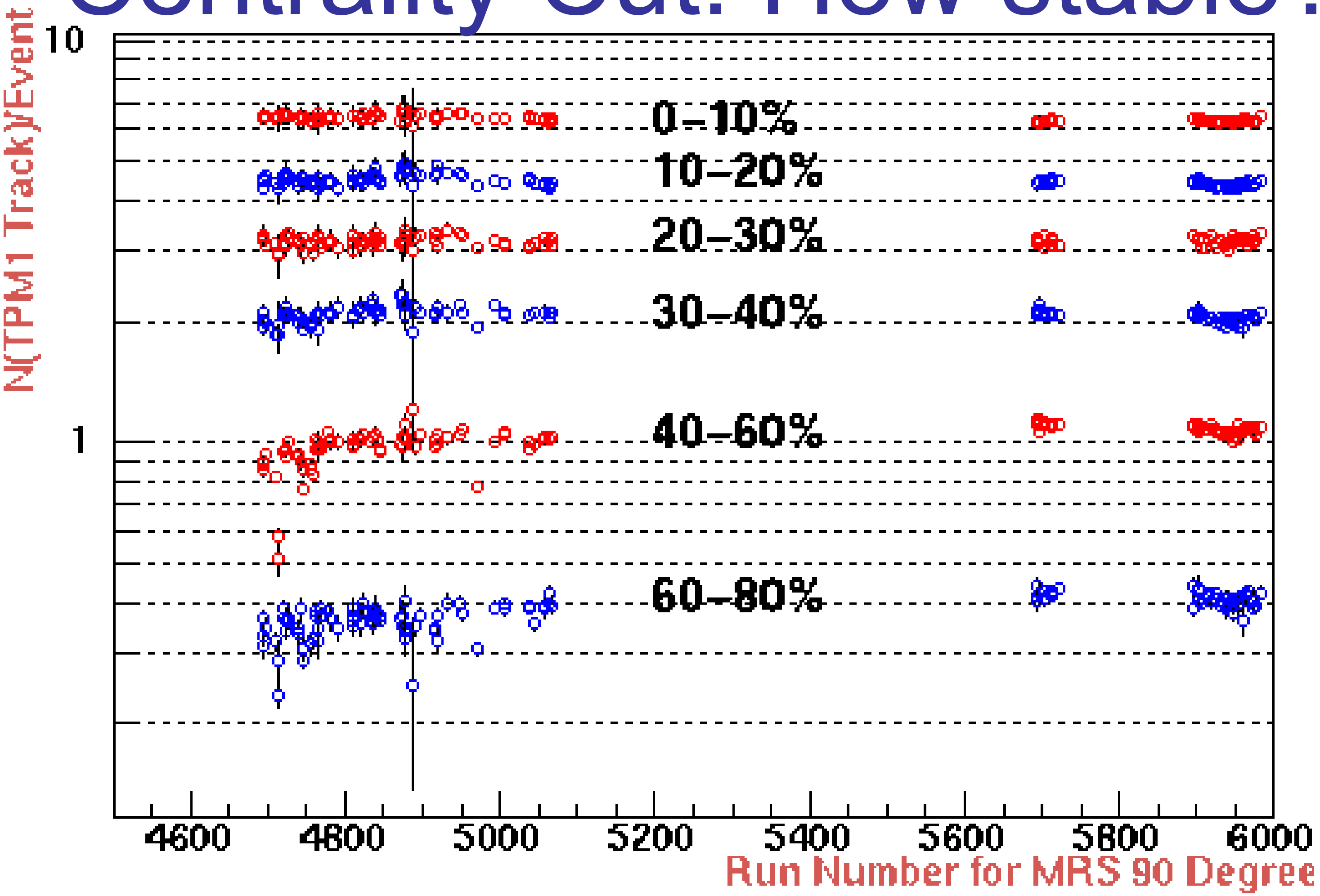
-Ratios (especially p/π, K/π) as function of pt

-BW fit

at y=0

- Reasonable statisitcs but lacking very peripheral Data (> 60%)
- Should $y \approx 1$ data be included? (probably not)
- Letter or review paper?
- See Eun-Joo's Note on the web (not complete yet) for details

Centrality Cut: How stable?

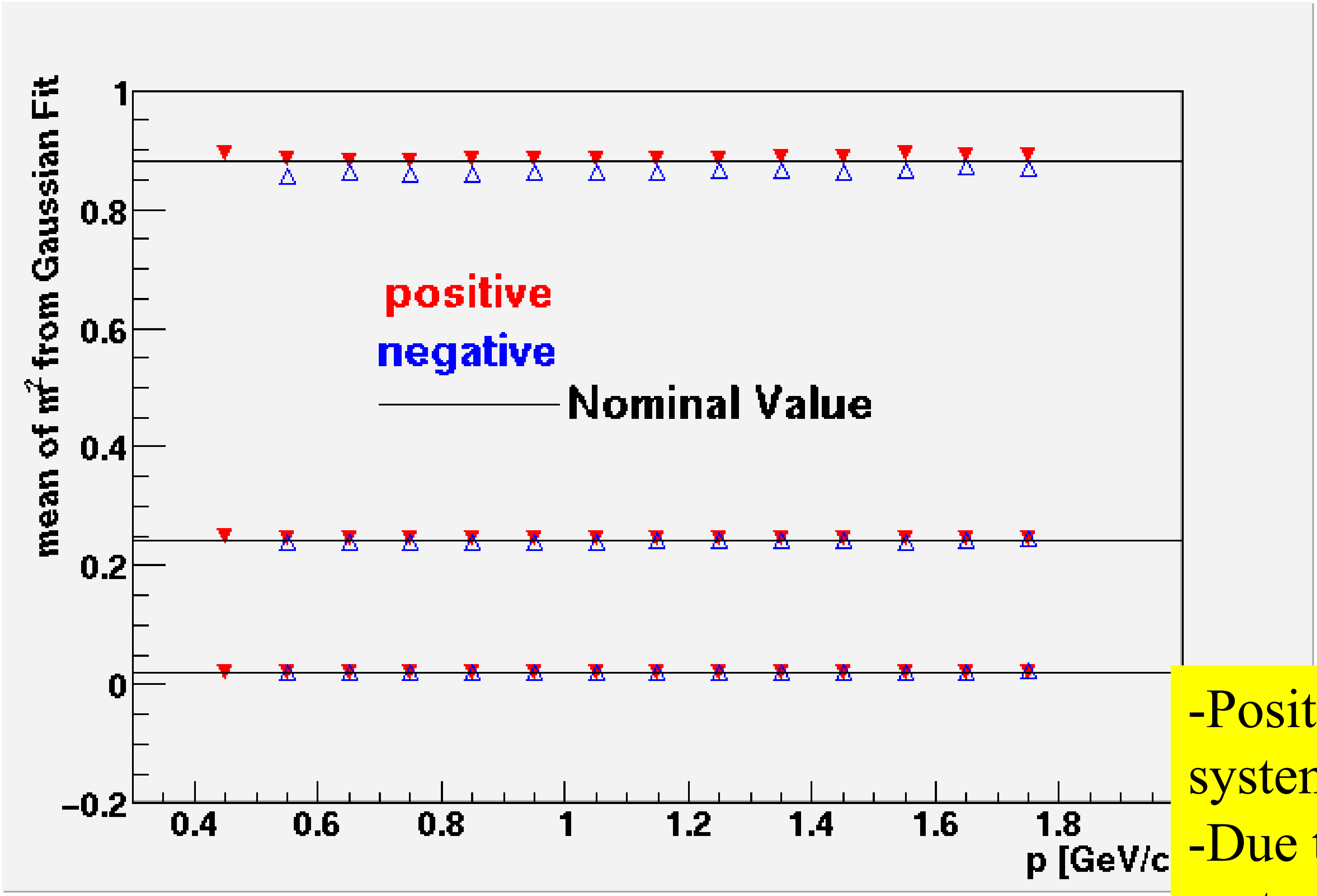


- Centrality Cuts (multiplicity) with the latest calibration
- No scale-down factors considered (centrality cut fine enough?: see 20-30%)
- Some small run dependencies: (Earlier ones, ~run5900)

Resolution of Centrality Cut

Centrality (%)	RMS/<$N_{Track(TPM1)}$>
0-10%	1.7%
10-20%	2.4%
20-30%	2.5%
30-40%	3.4%
40-60%	8.9%
60-80%	9.4%

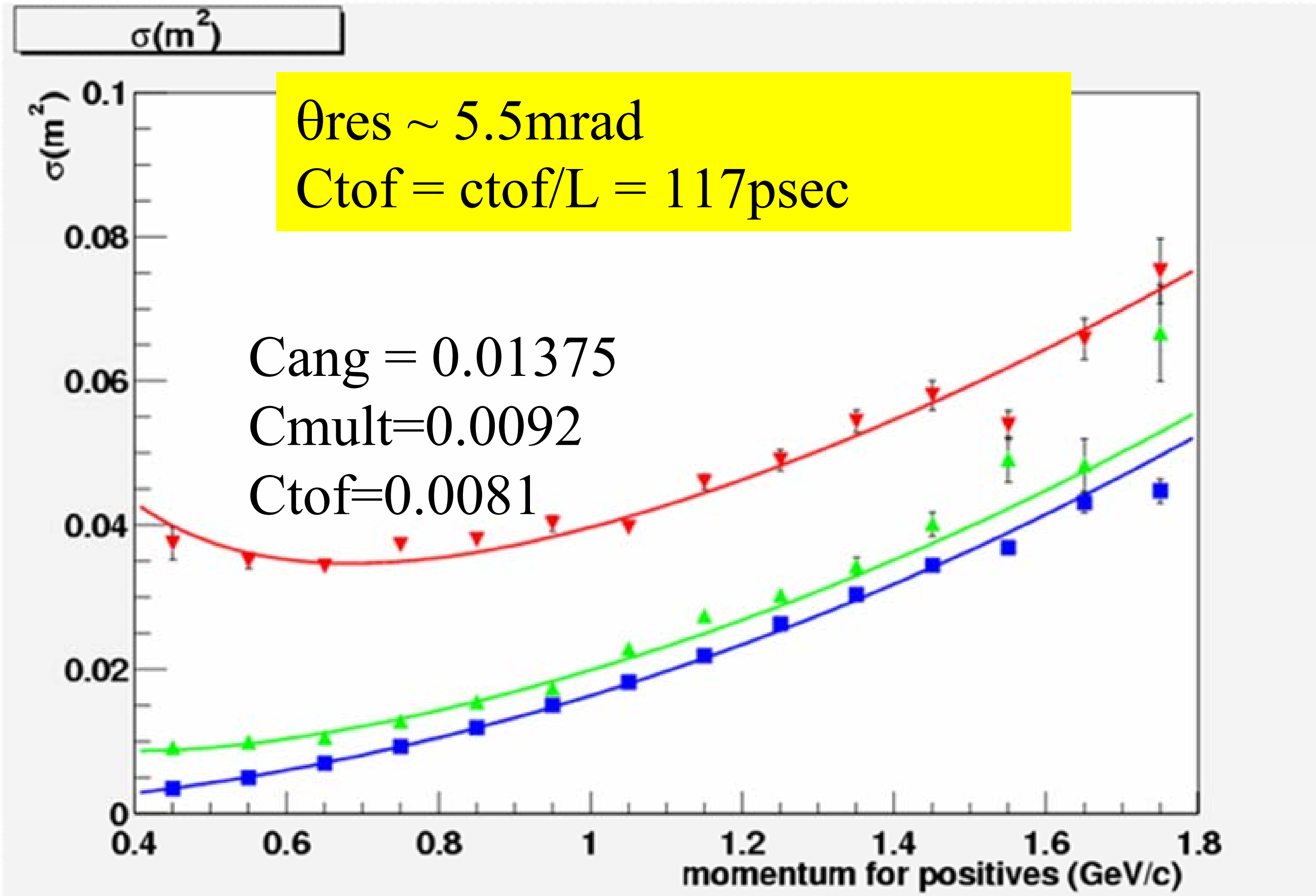
Mean of m^2



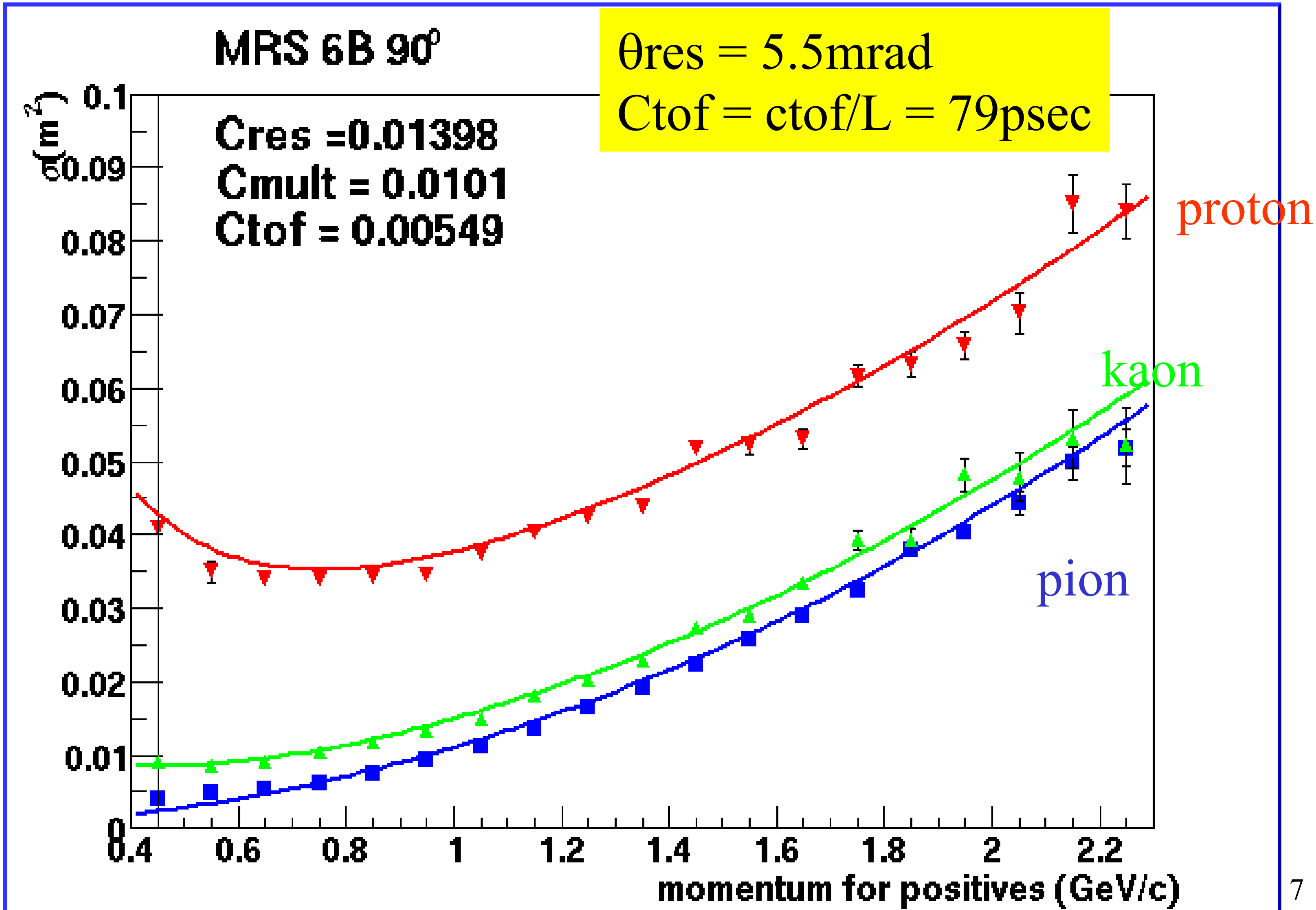
-Positive/negative systematics.

-Due to x/θ vs p systematics?

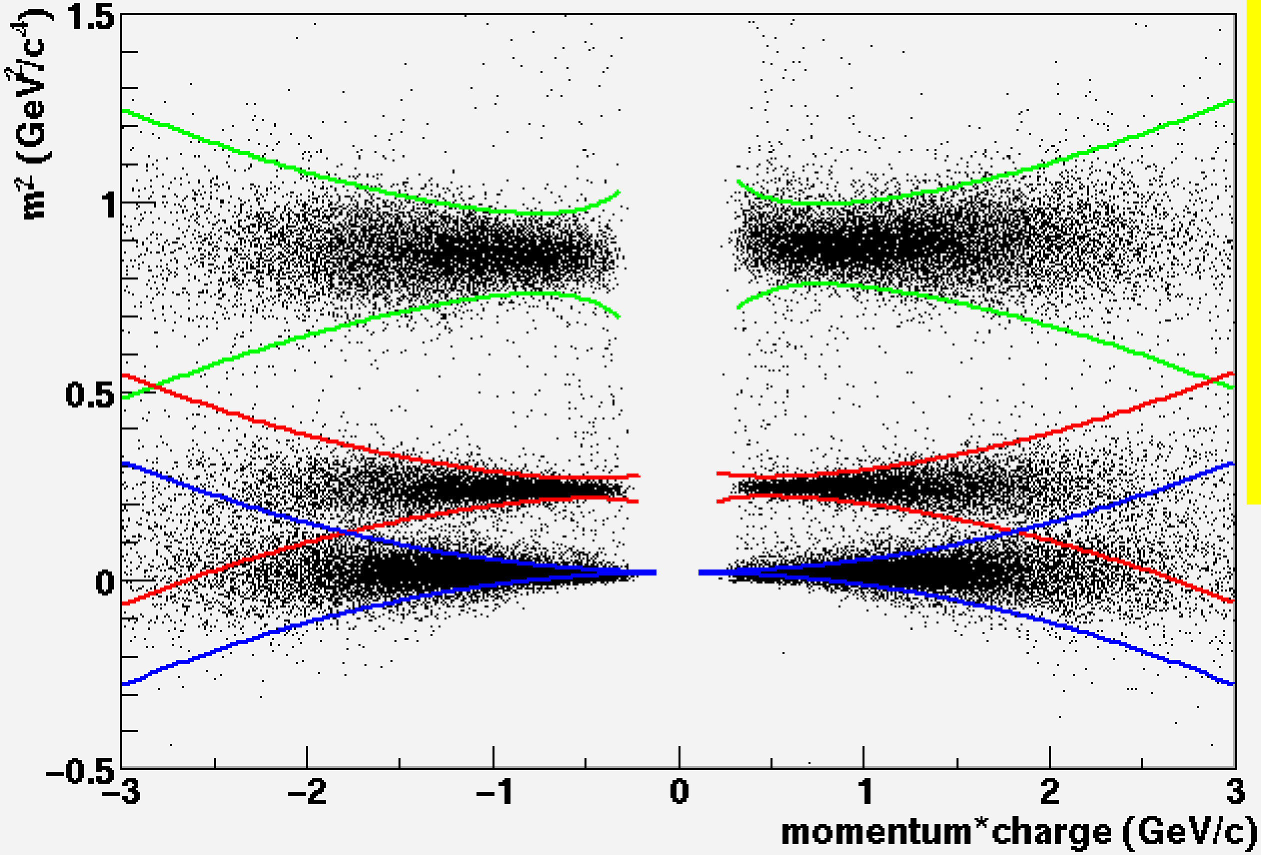
m_2 resolution without slewing



m_2 resolution with slewing



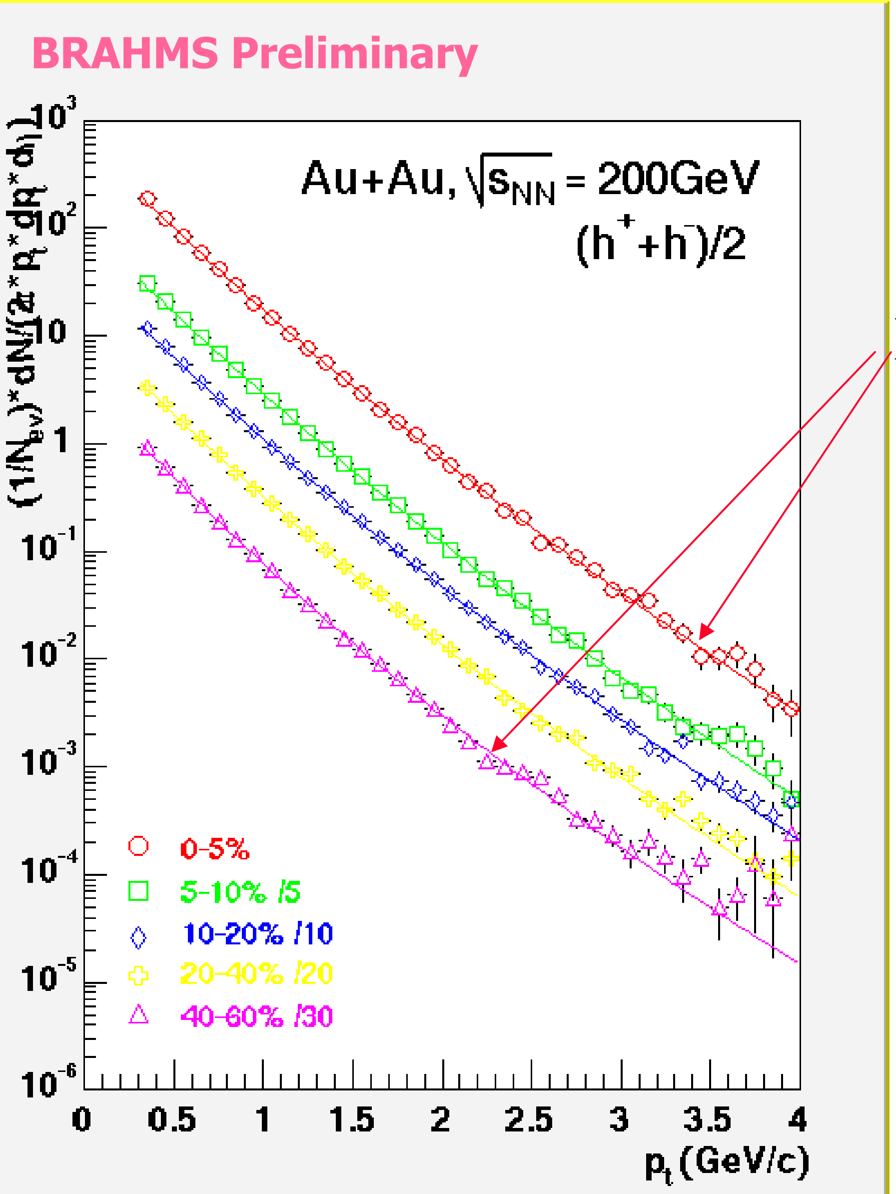
pid cut



- Best cut to use? (over box or beta vs p cut)
- Overestimate momentum resolution
- p,k include δm_0
- Can be used for higher pt coverage

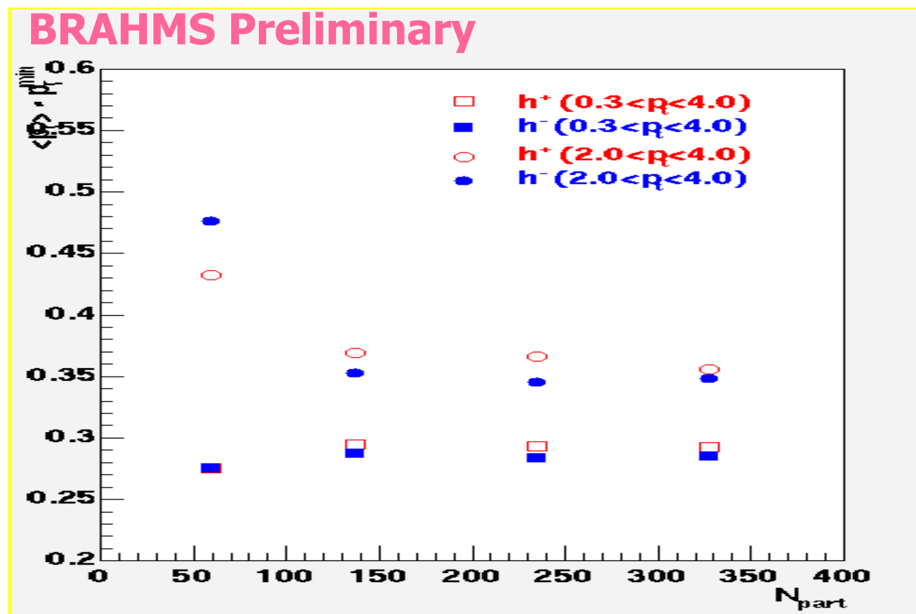
BRAHMS

Charged Hadron Spectra as a function of rapidity at y=0

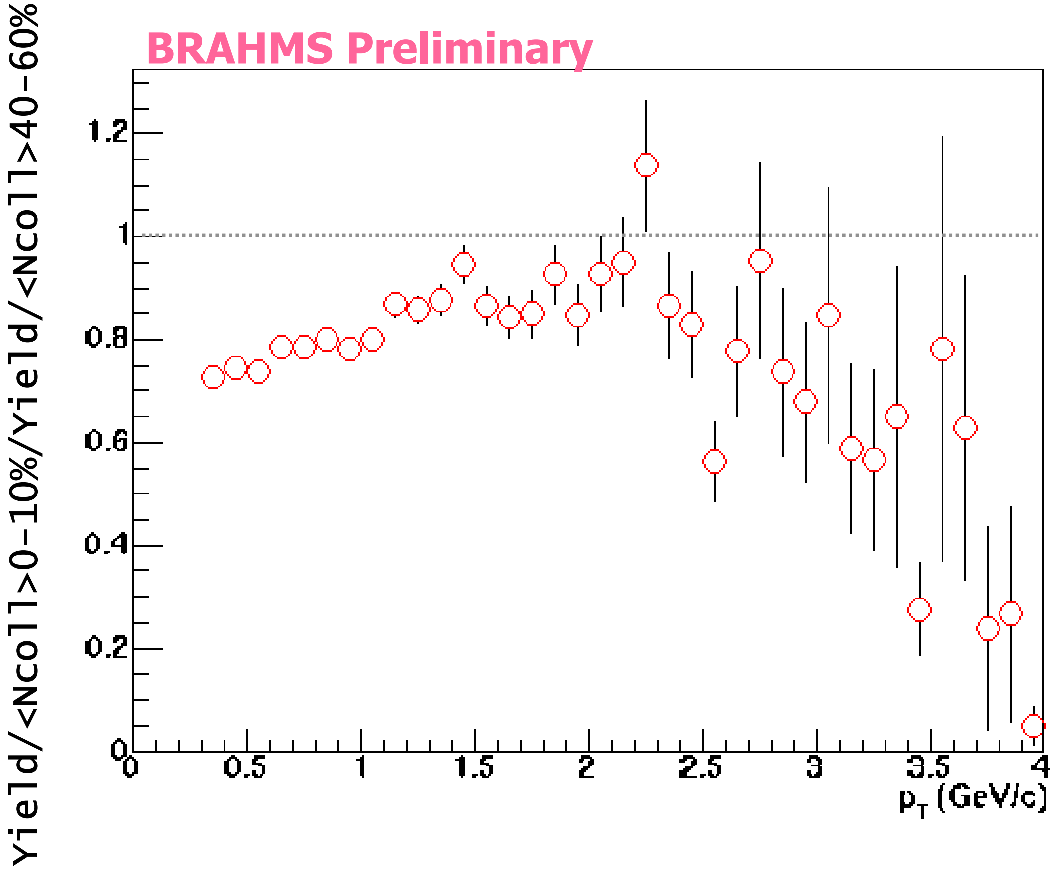


kinky

- Mean pt:
  - -increase at low pt
  - -decrease at high pt
  - as <Npart> increase
- Collective flow at low pt
  + Suppression at high pt

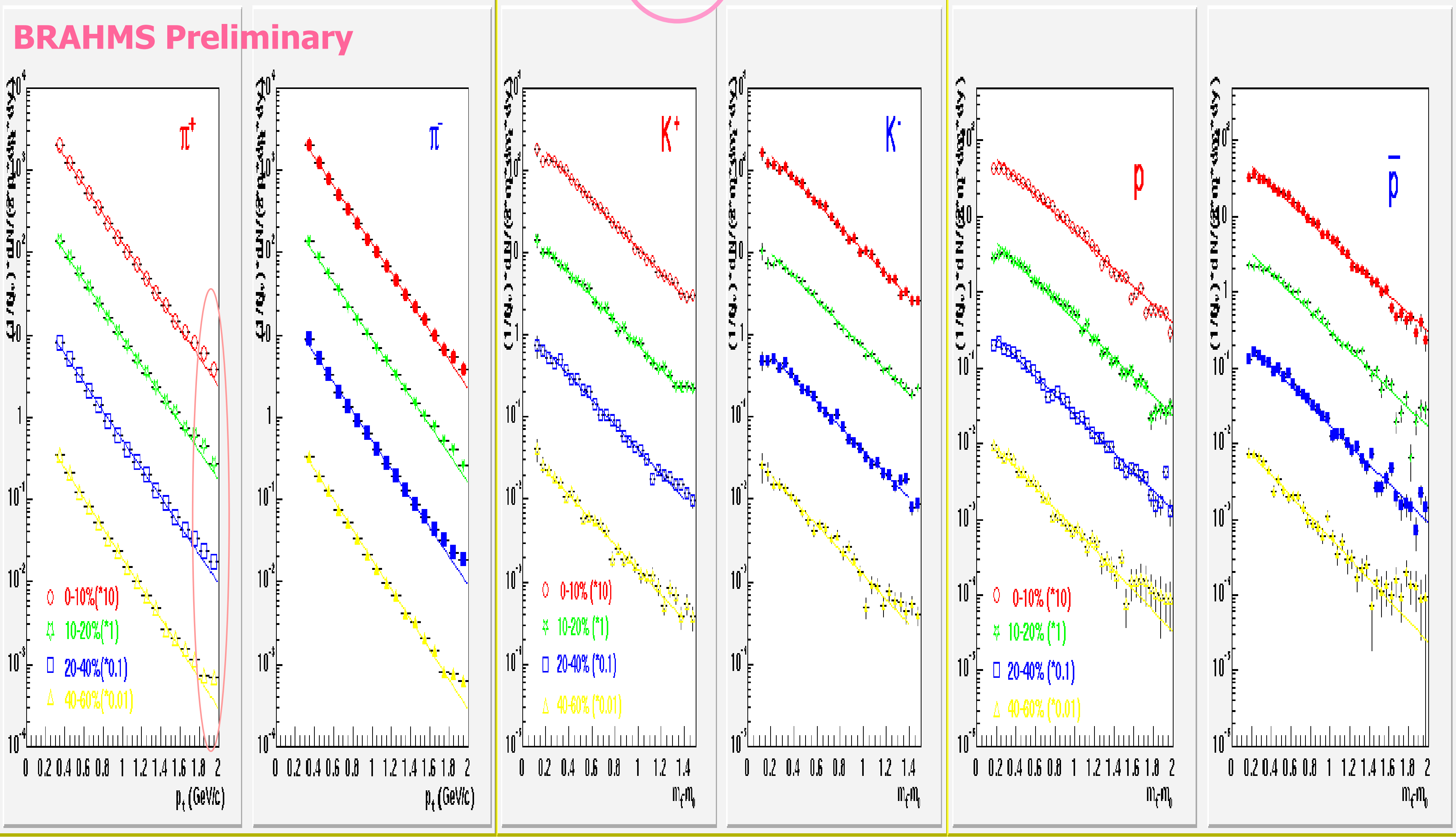


High-p_T Physics:
Central/Semi-peripheral collisions at y = 0

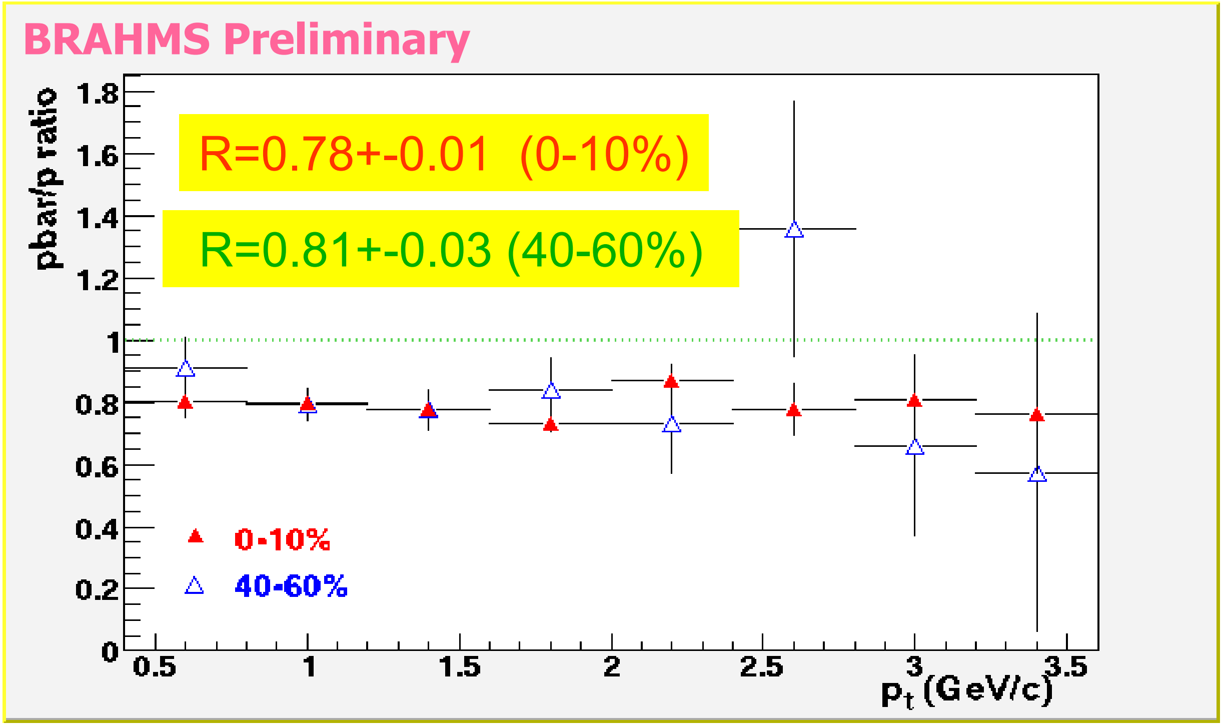


- Charged hadron spectra scaled by the number of binary collisions.
- high p_T suppression in central collisions (0-10%) compared to semi-peripheral (40-60%)
- Identified particles at y=0,2:analysis in progress
-

Spectra vs Centrality at y=0 $\sqrt{s_{NN}}$ =200 GeV



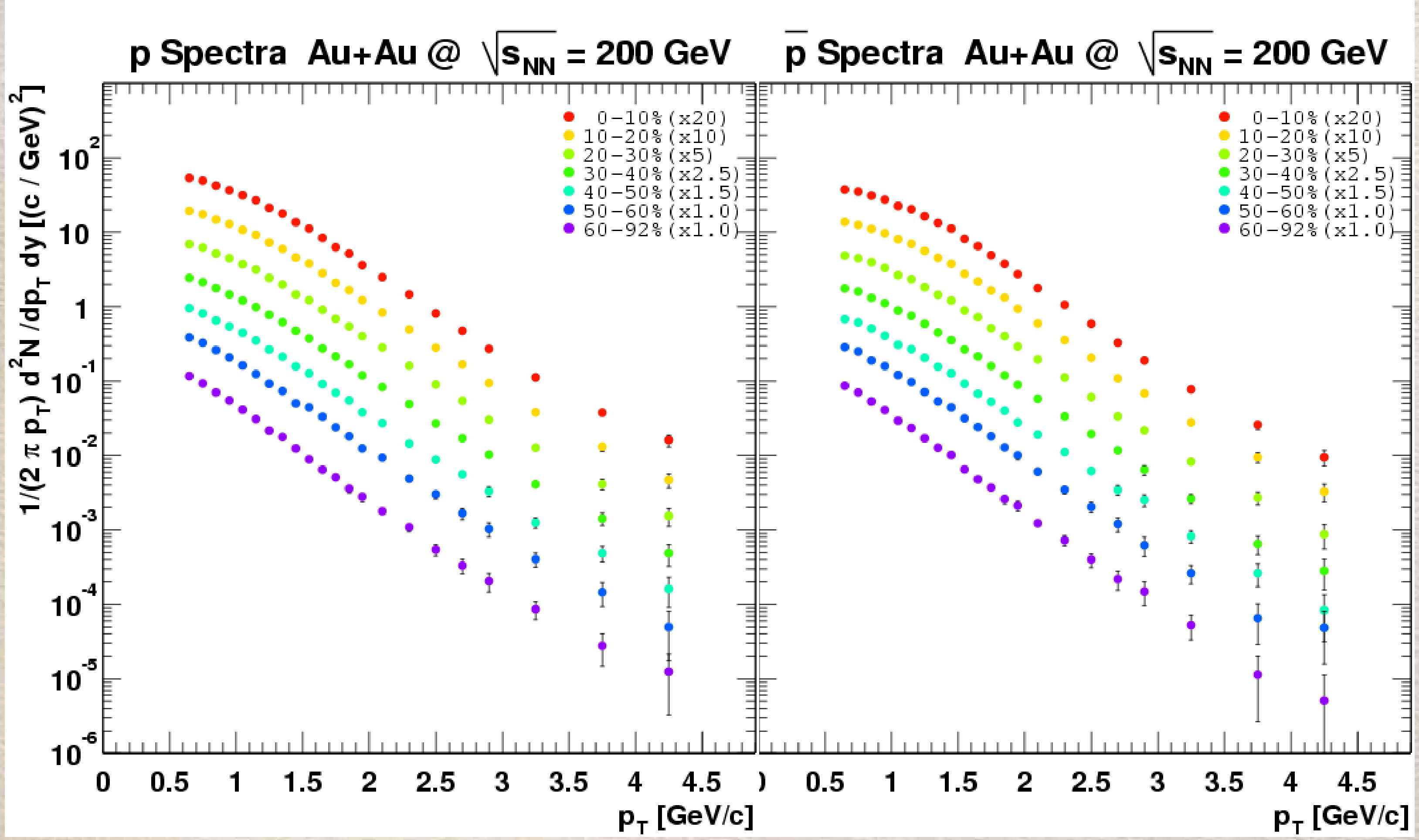
p_T and centrality dependent pbar/p ratios at y=0



- The ratio for central events (0-10%) are almost flat over 0.5<pt<3.5GeV/c.
- R(central)~R(peripheral)

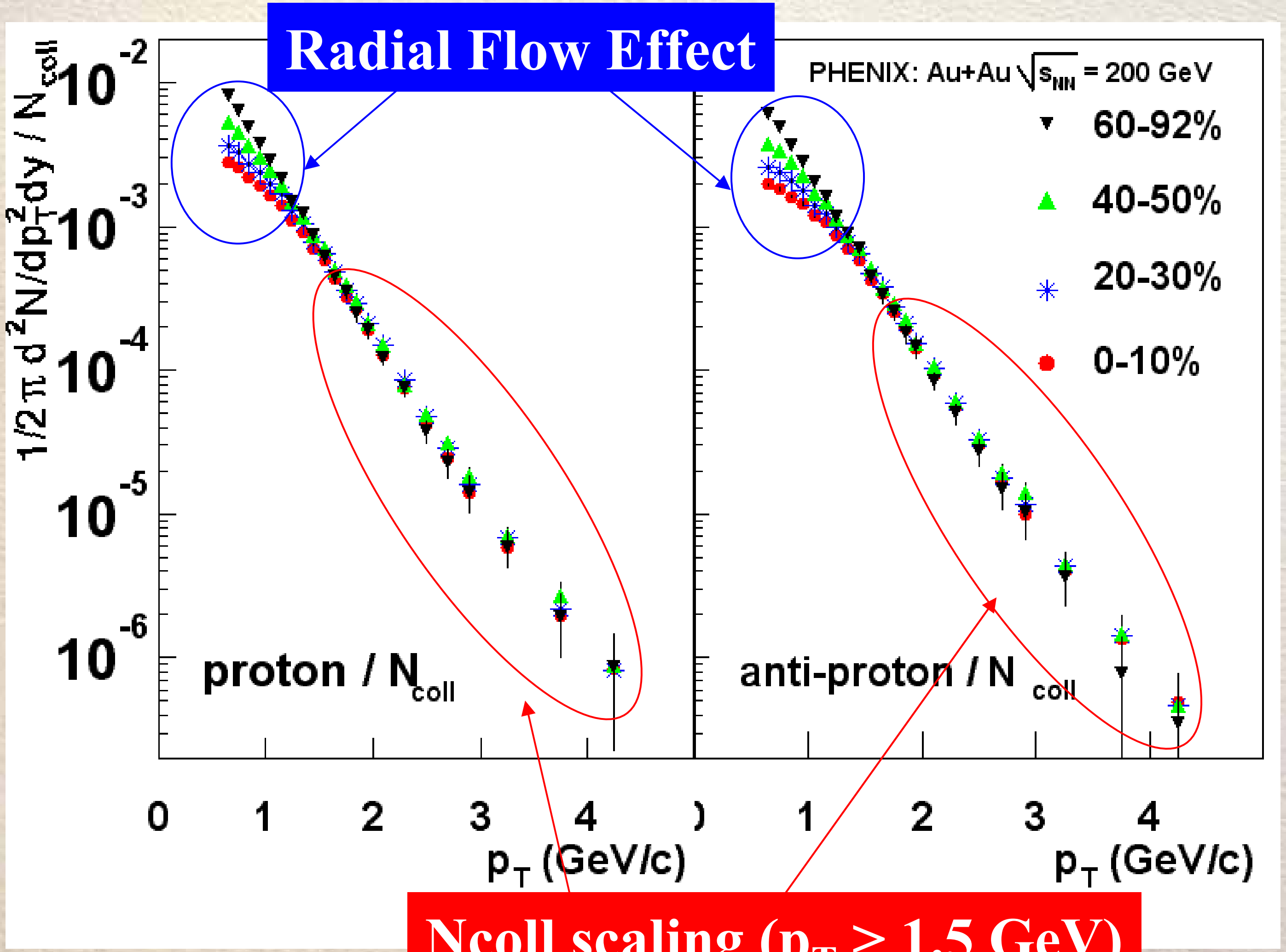
Proton and anti-proton spectra in AuAu at 200 GeV

PHENIX



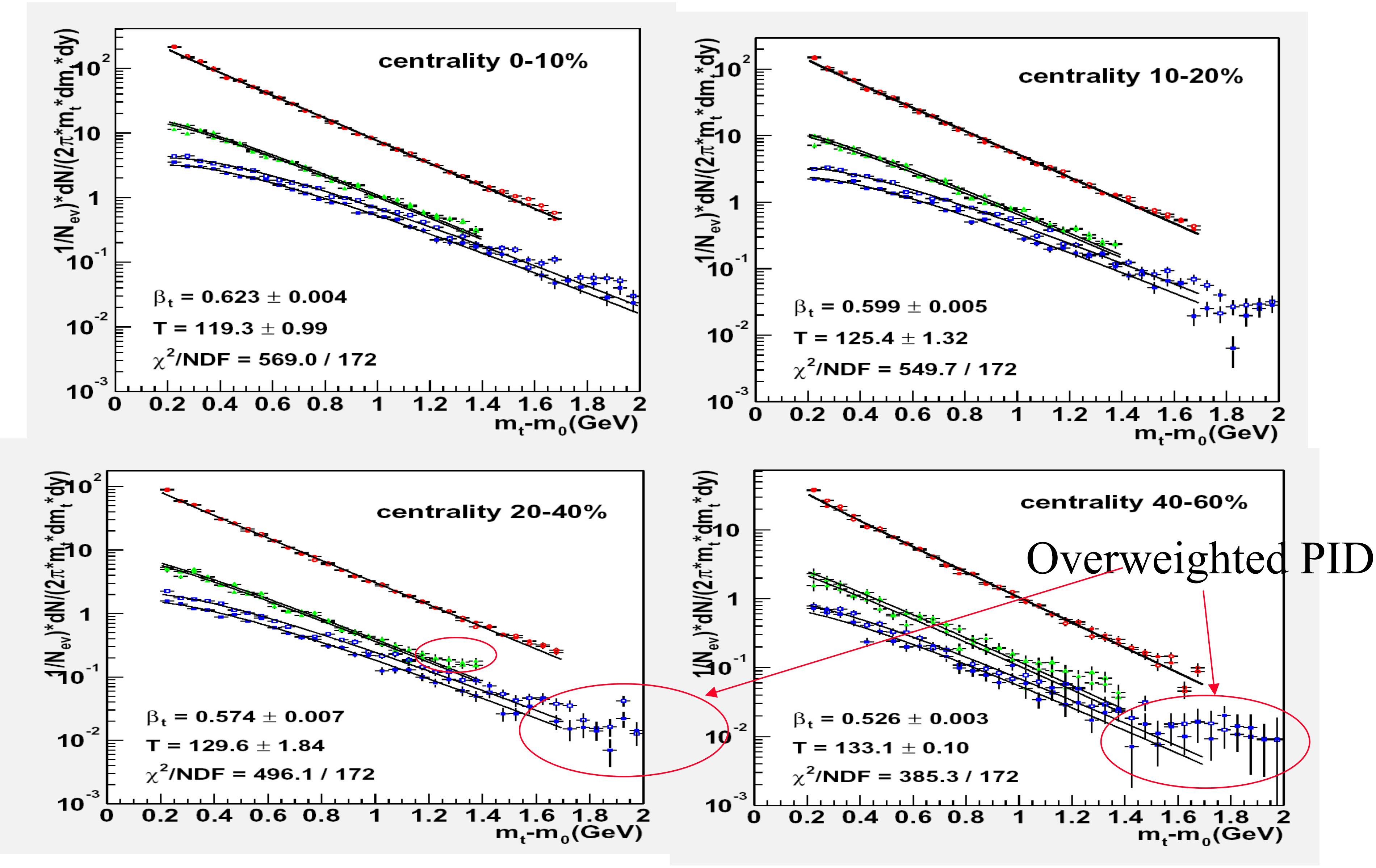
- Corrected for weak decay feed-down effect (~40% at 0.6 GeV/c, ~25% at 4 GeV/c).
- **Strong centrality dependence in spectra shape at low p_T (< 1.5 GeV/c).**

N_{coll} scaled p_T spectra for p and pbar



Ncoll scaling (p_T > 1.5 GeV) for all centrality bins

BRAHMS

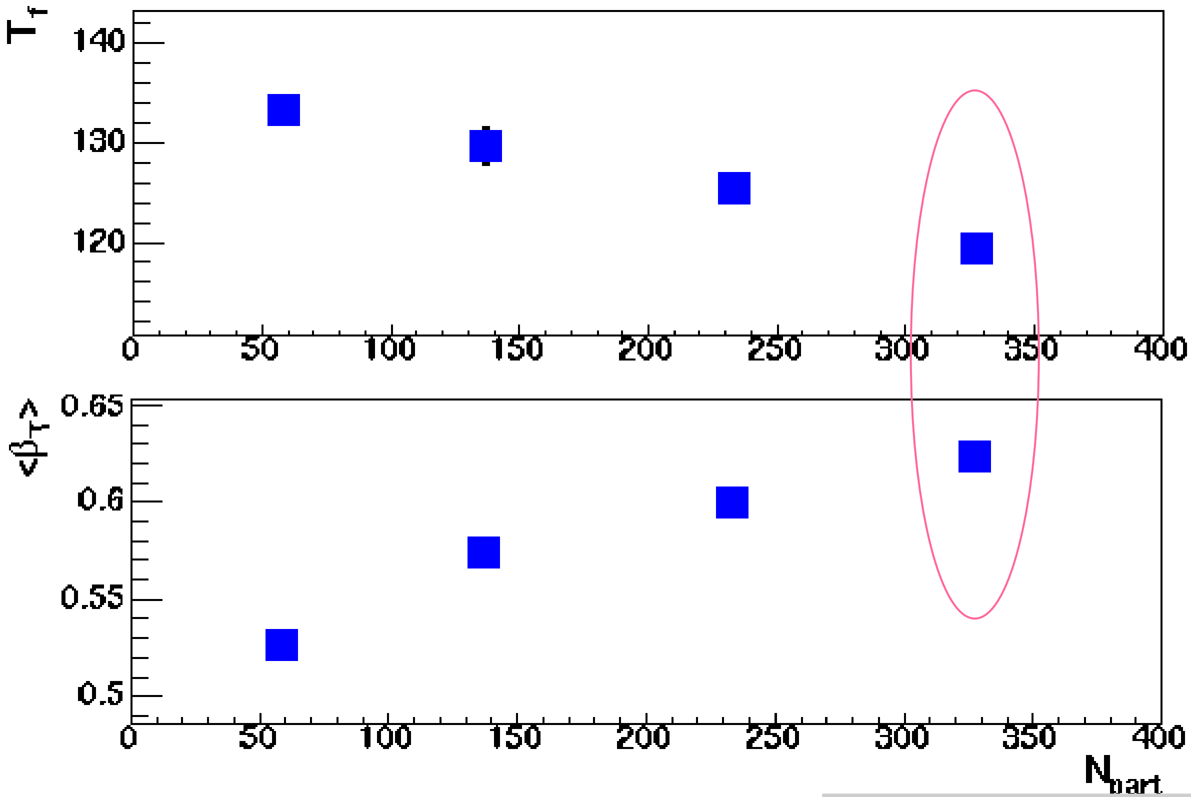

centrality 0-10%
β_t = 0.623 ± 0.004
T = 119.3 ± 0.99
χ²/NDF = 569.0 / 172
centrality 10-20%
β_t = 0.599 ± 0.005
T = 125.4 ± 1.32
χ²/NDF = 549.7 / 172
centrality 20-40%
β_t = 0.574 ± 0.007
T = 129.6 ± 1.84
χ²/NDF = 496.1 / 172
centrality 40-60%
β_t = 0.526 ± 0.003
T = 133.1 ± 0.10
χ²/NDF = 385.3 / 172
Overweighted PID
1/(N_ev)*dN/(2π*m_t*dm_t*dy)
m_t-m_0(GeV)

BRAHMS

Thermal Freeze-out Parameters from Hydrodynamic Fit

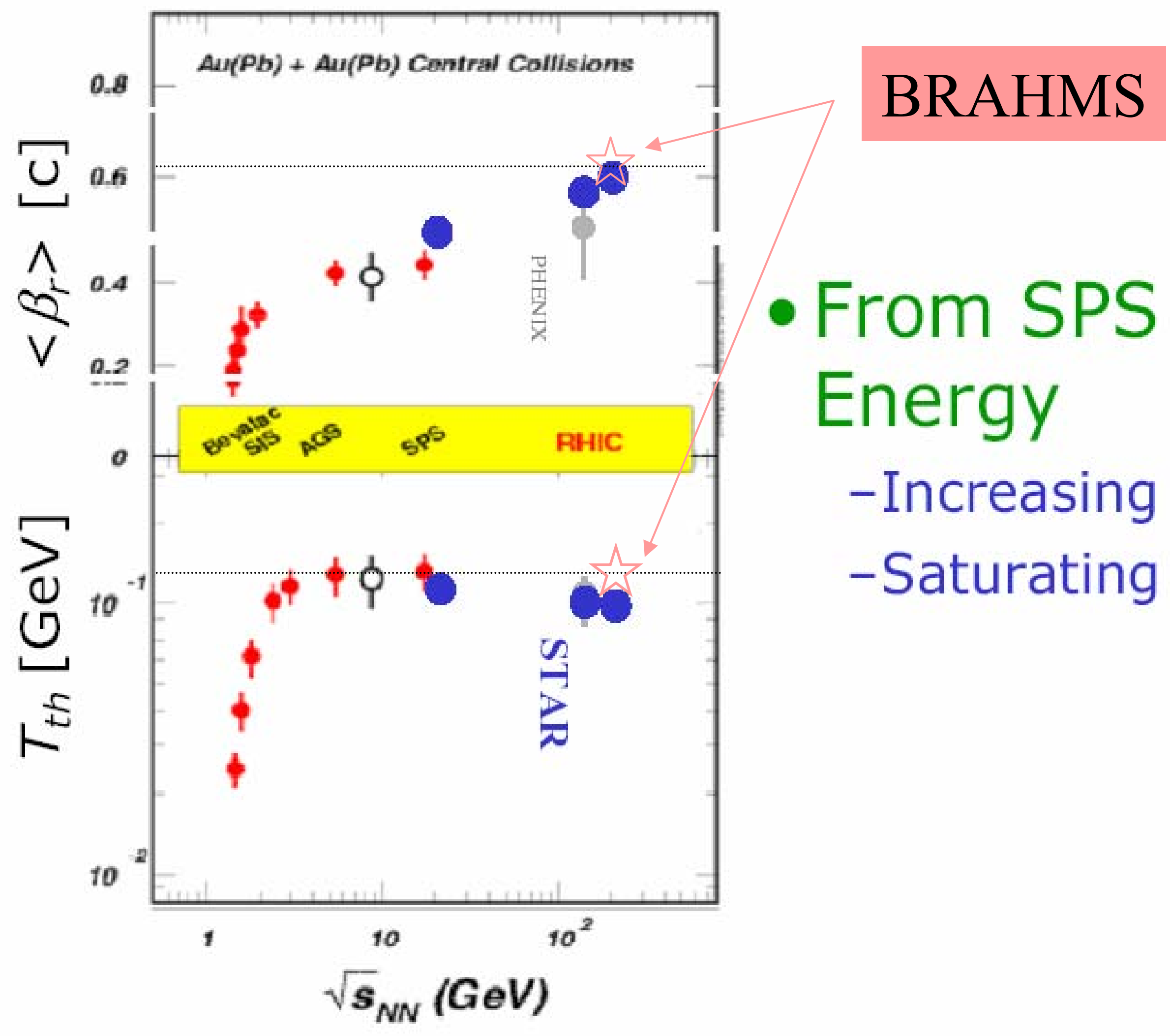
Assuming local thermal equilibrated source or boosted system

Fit all particles simultaneously with velocity and temperature



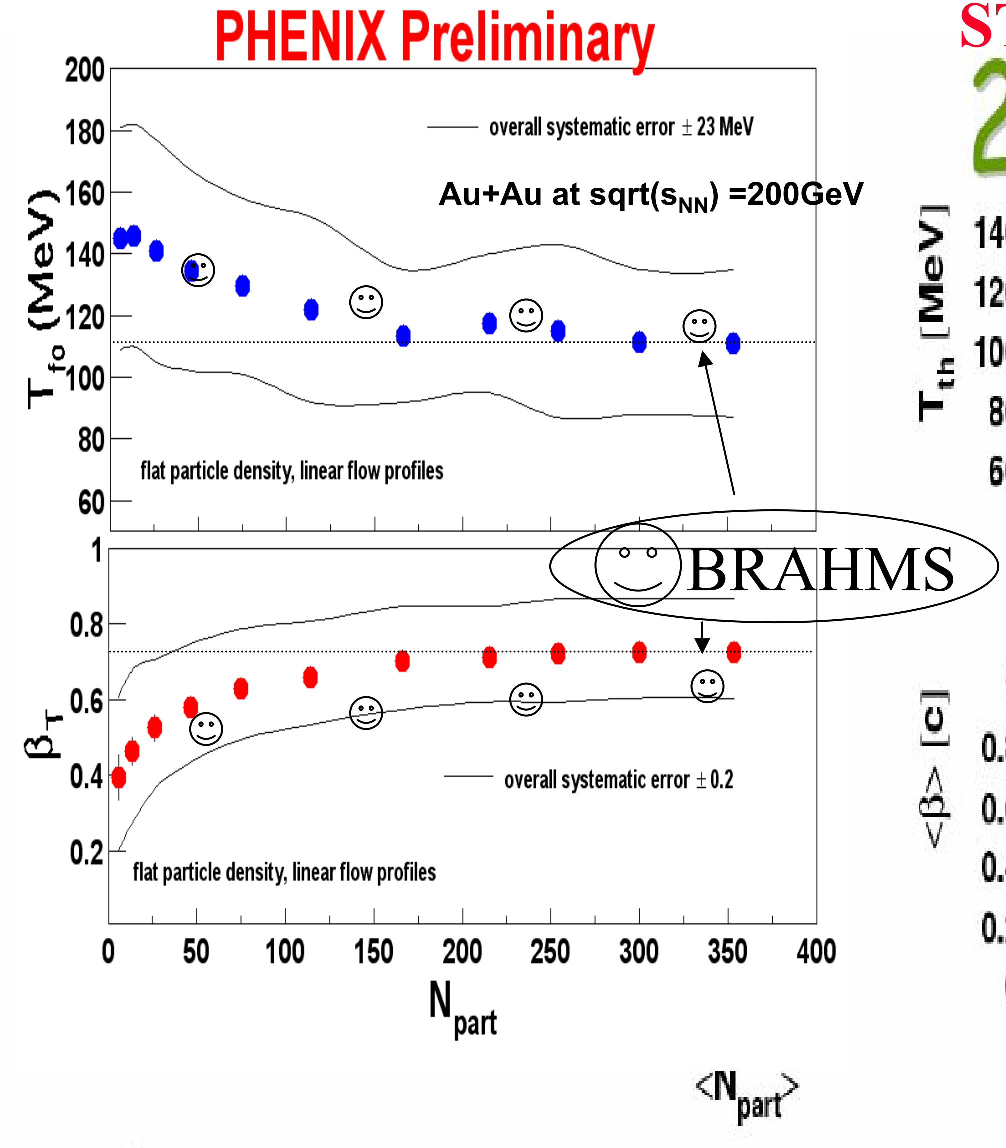
Ref. : E.Schnedermann et al, PRC48 (1993) 2462

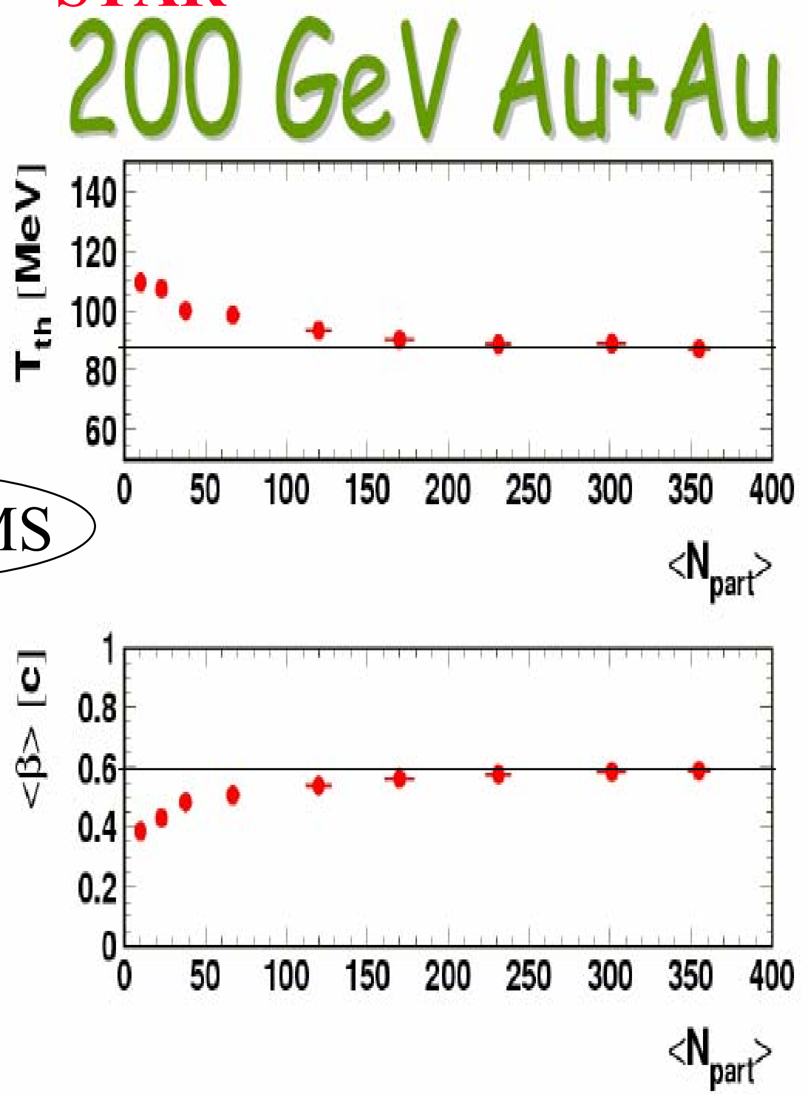
- Spectra are described by T_{FO} and $\langle\beta_T\rangle$:
  - – $\langle\beta_T\rangle$ ~ 0.62 - 0.53, T_{FO} ~ 119 - 133 from 0-10% to 40-60% central
  - – $\langle\beta_T\rangle$ Increase at RHIC, T_{FO}~ AGS ~SPS?



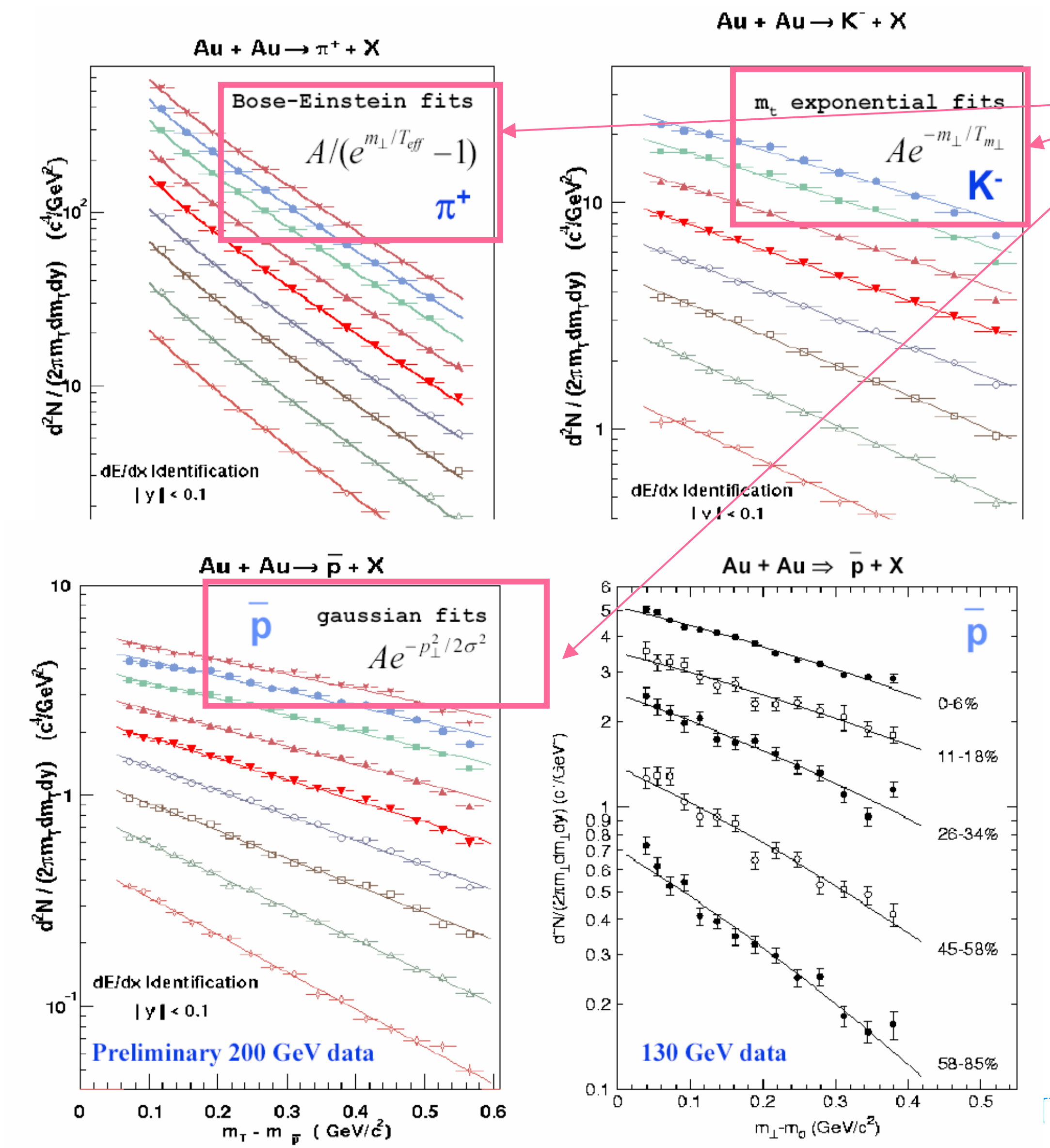
- From SPS to RHIC Energy
  - Increasing flow
  - Saturating temperature

PHENIX and STAR





STAR and PHENIX Fits

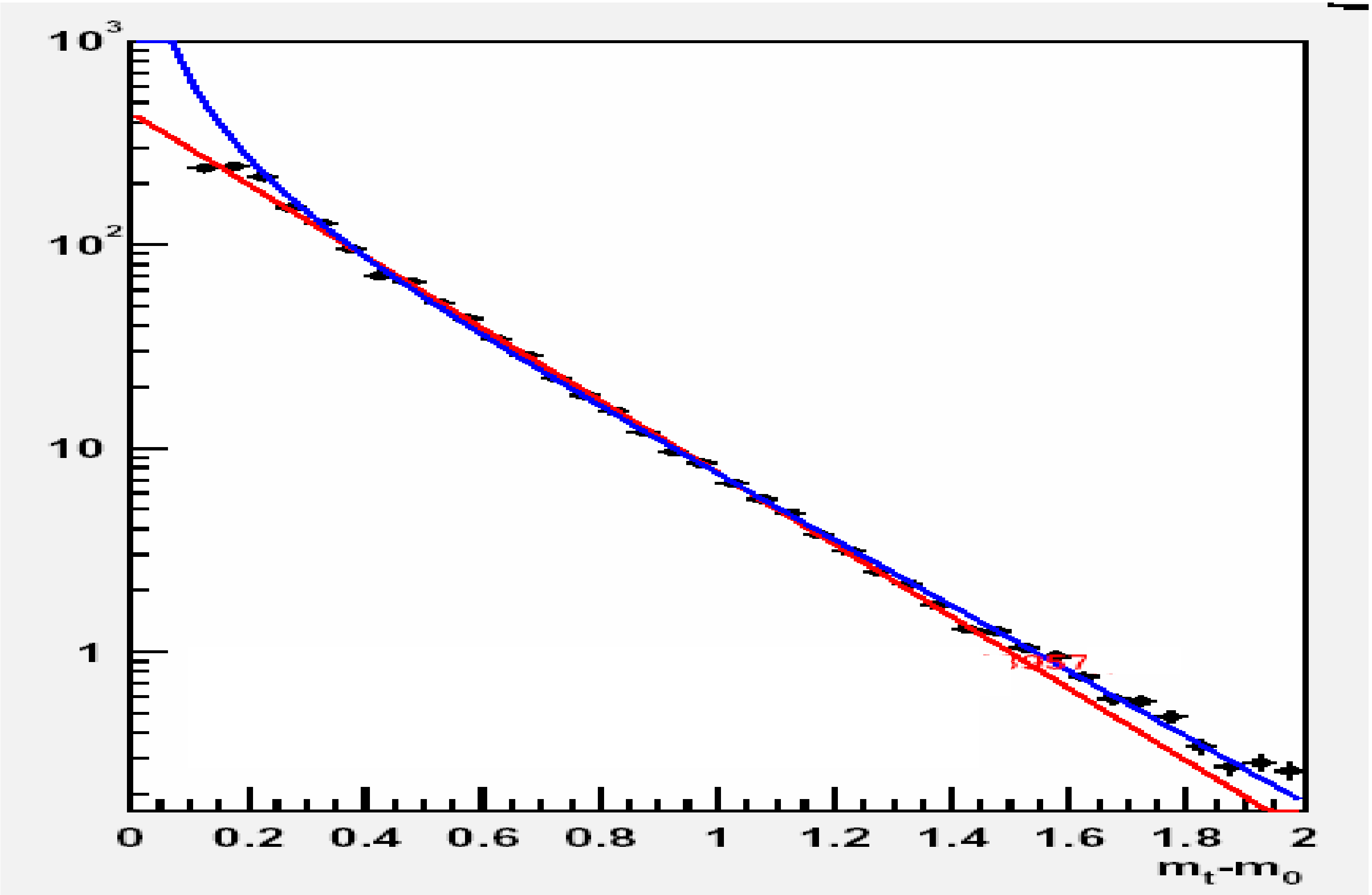


STAR

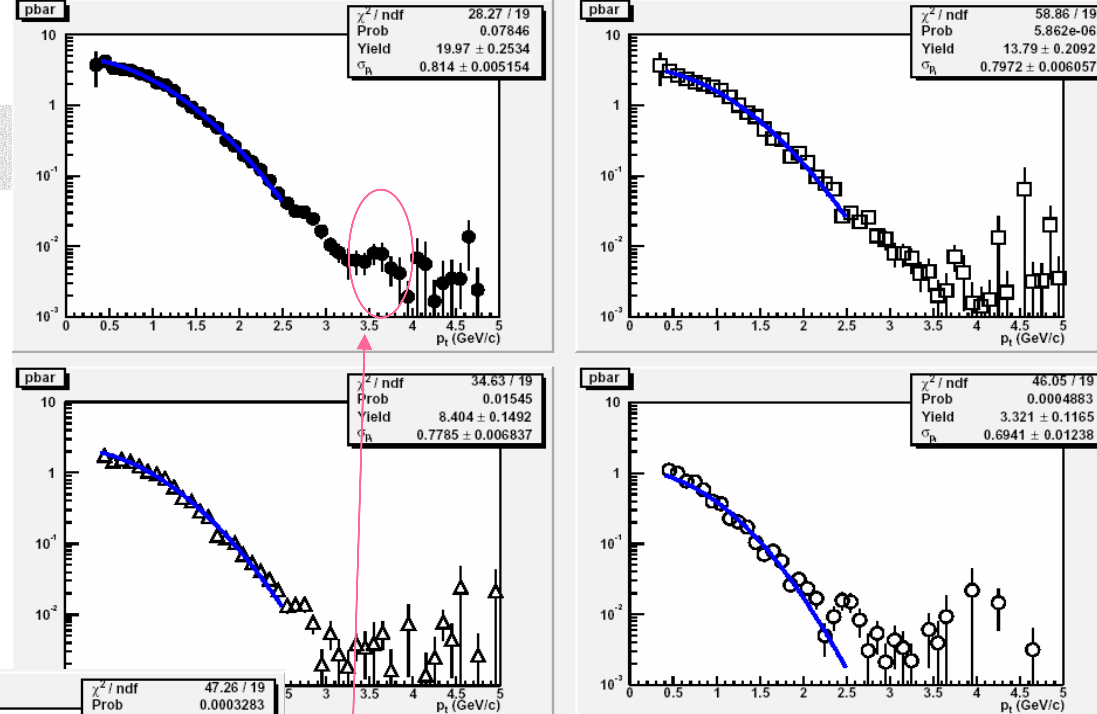
PHENIX

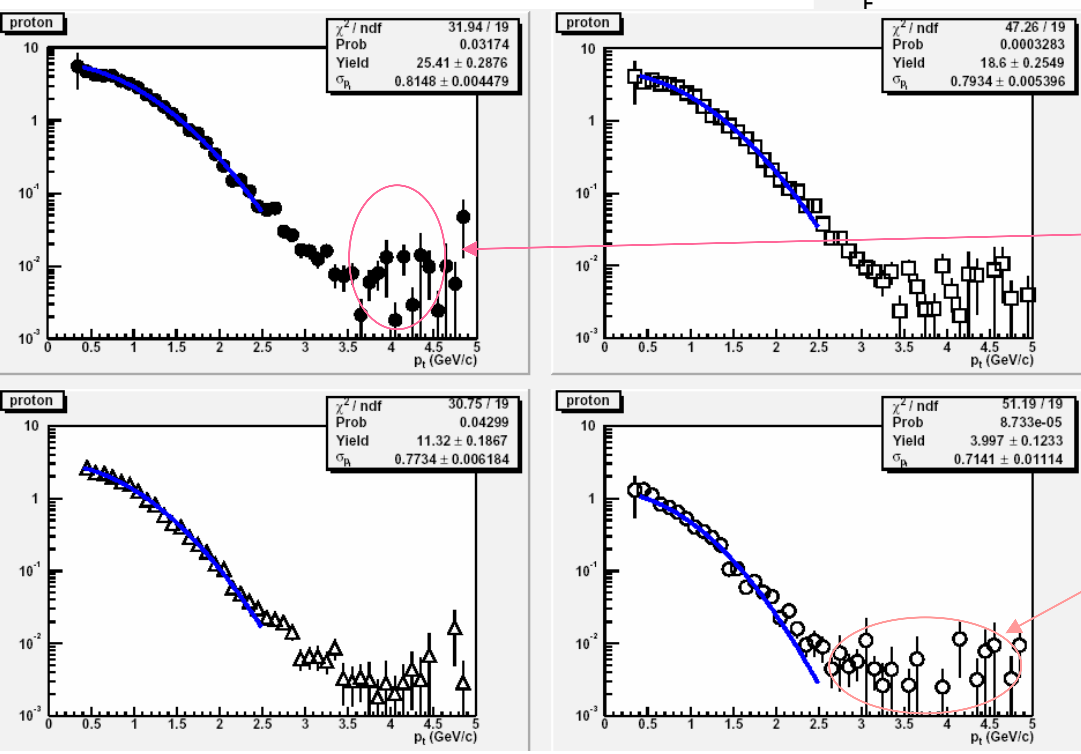
- π: Power Law
  A (p0+pt)$^{-n}$
- K: mt exp
- p: Boltzman

Bose-Einstein Function vs. exponential



Gaussian Fit





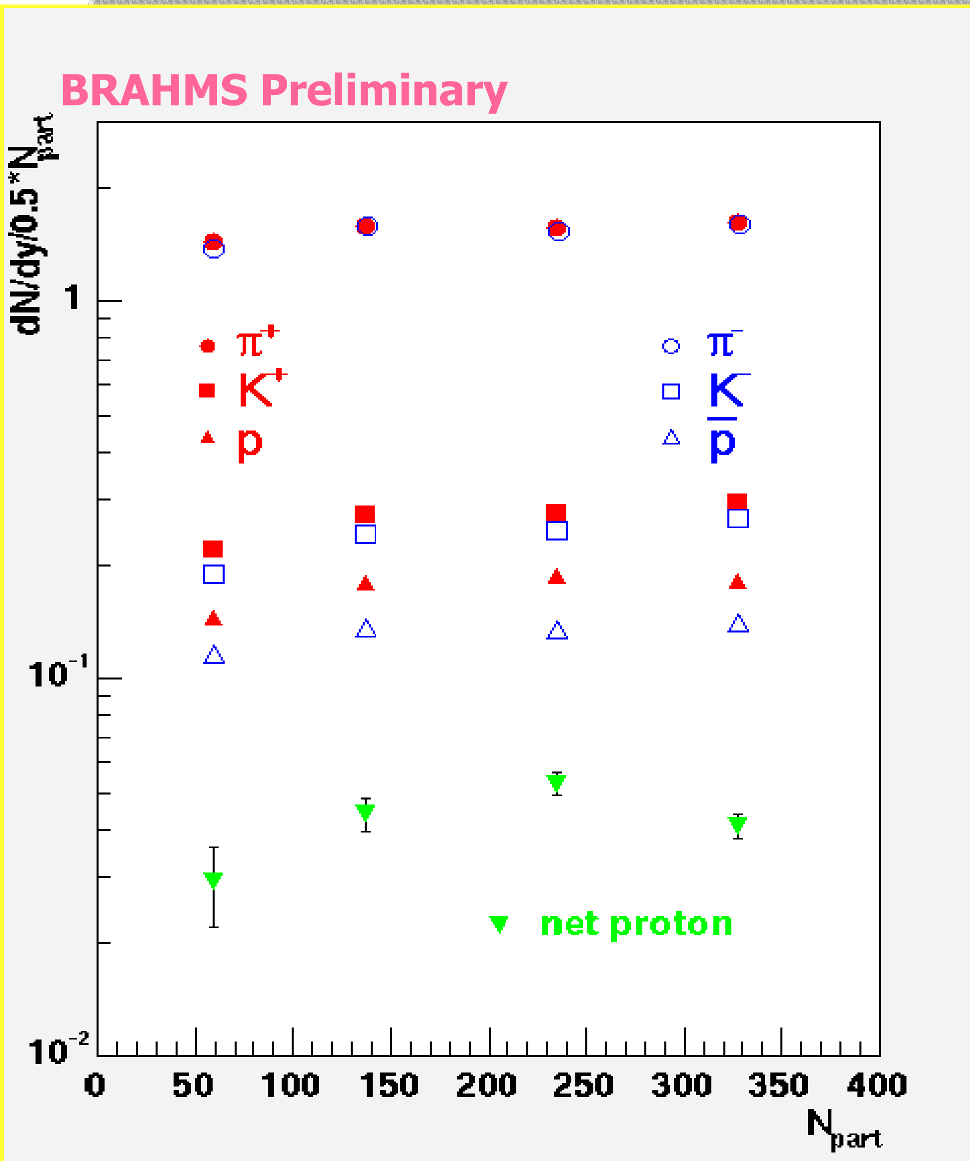
Kink in raw hadron spectra

PID overweighting

NL)

BRAHMS

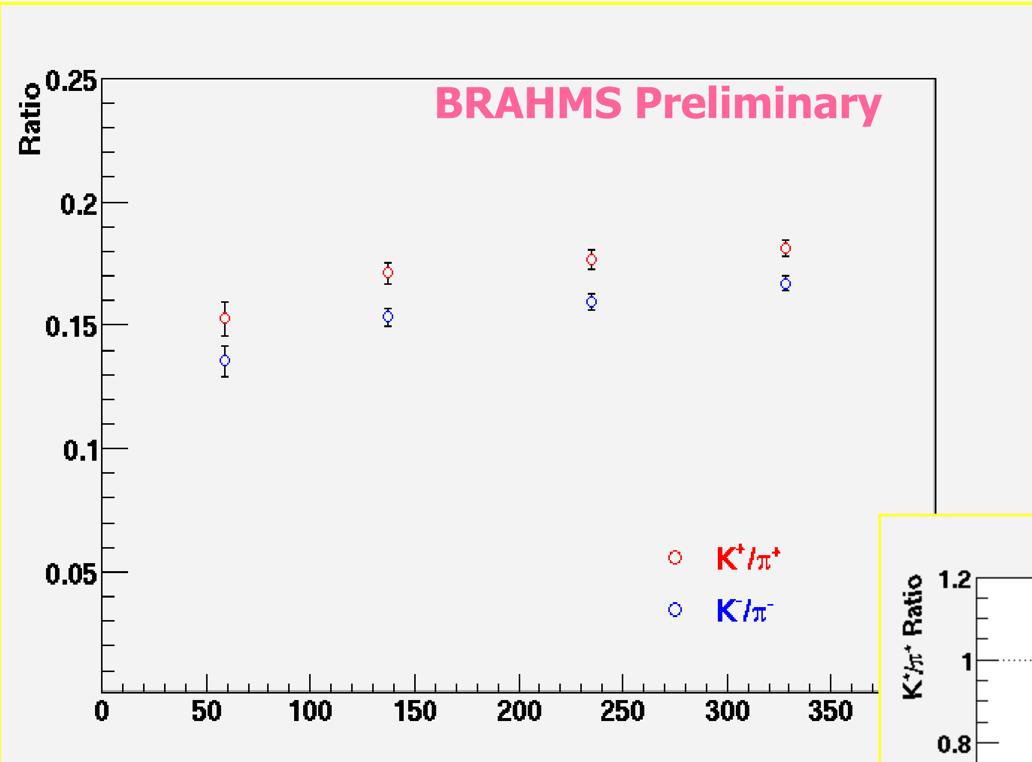
dN/dy per participant at y=0 $\sqrt{s_{NN}}$ =200 GeV



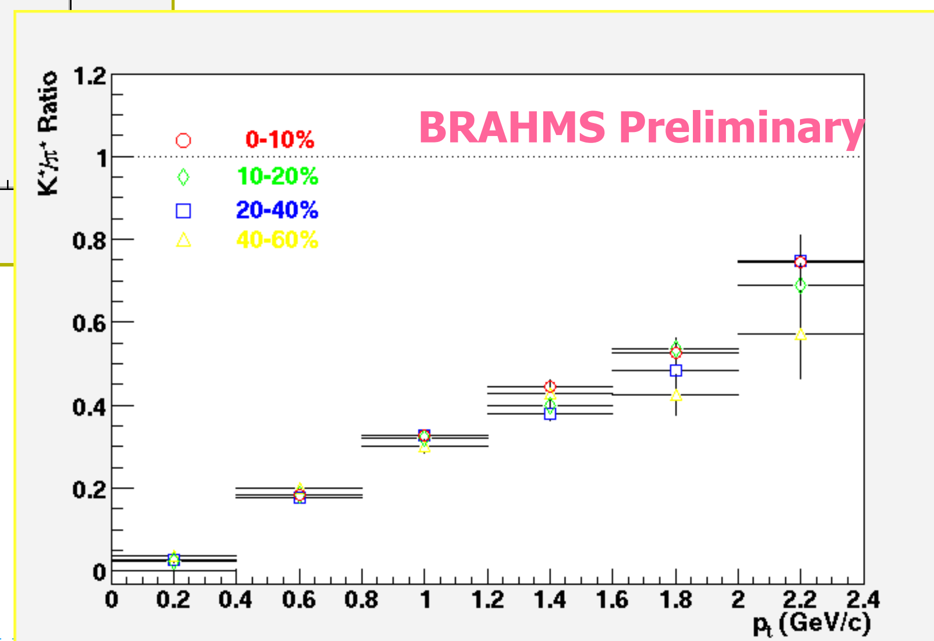
- For all the particle species, the yield per participant increase with N_{part}.
- $K^{\pm}$, p, pbar yields per participant rise faster than $\pi^{\pm}$ yield.
- Errors statistical only on plot.
- Systematic error ~10-20%
- Dominant syst. error from Npart determination, and extrapolation of yields.

(BNL)

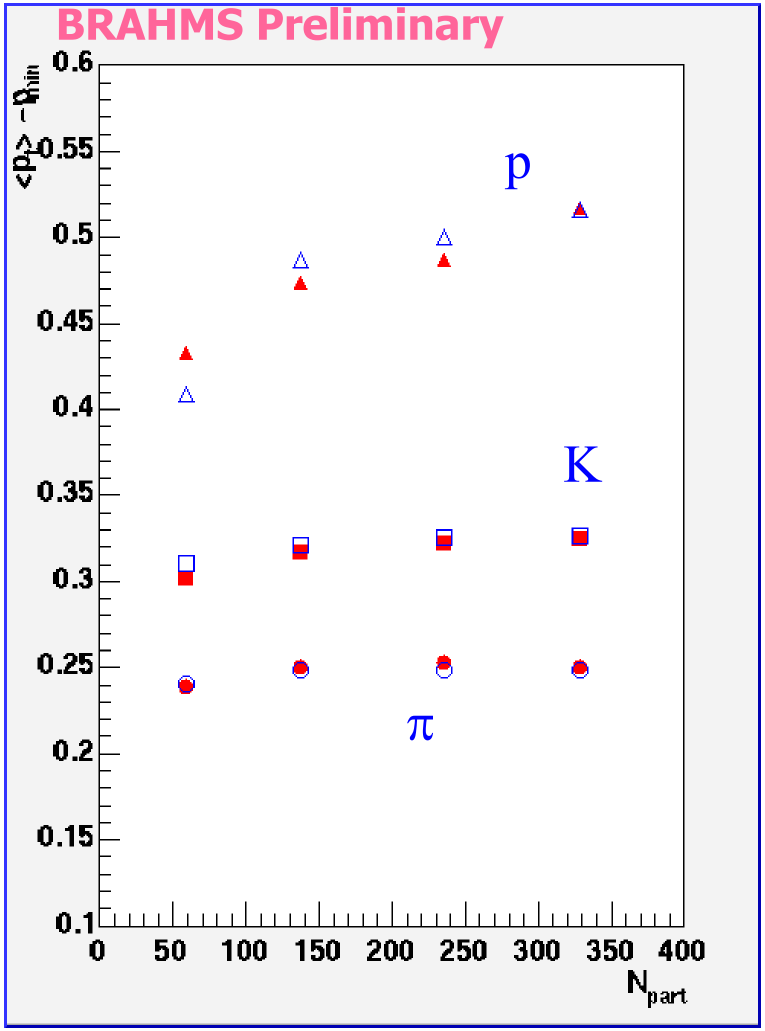
K/π ratios at y = 0 $\sqrt{s_{NN}}$ =200 GeV



K/π ratios increase with p_T and centrality at y=0



$\langle pt \rangle$ vs N_{part} at y=0



- $\langle p_T \rangle - p_T^{min}$
- 0.4-2.4 for pion
- 0.6-2.2 for kaon
- 0.5-3.4 for p/pbar
- $\langle pt \rangle$ increase with $\langle N_{part} \rangle$ and mass: p and pbar increase fast with $\langle N_{part} \rangle$: consistent with radial expansion picture

MRS Analysis:

- Need some more checks.

  Still some room for improvement to be finalized

  -PID cut to extend higher p (include "Hubble" effect...)

  -Finding Best Fit

  -Understanding systematics for BW fit (fitting range, equal statistical weighting, separate fit, source profile...)

  -Test one more time with acceptance from Track-by-track method (removing Vertex binning effect, fiducial cuts...)

  -Consistency with Djamel's results
- Aiming for publication (PRC?) in a few months