Kaon Production in d+Au and p+p Collisions at $\sqrt{s_{NN}} = 200\ GeV$

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Outline

- BRAHMS Experimental Setup
  - ⋆ experimental setup
  - ⋆ data selection
  - ⋆ particle identification
- Data Analysis and Results
  - ⋆ identified particles' spectra
  - ⋆ rapidity dependence of effective temperature
  - ⋆ rapidity dependence of net proton yields
  - ⋆ particle ratios
  - ⋆ R_{CP} in d+Au system
- Summary and Outlook

BRAHMS Experimental Setup

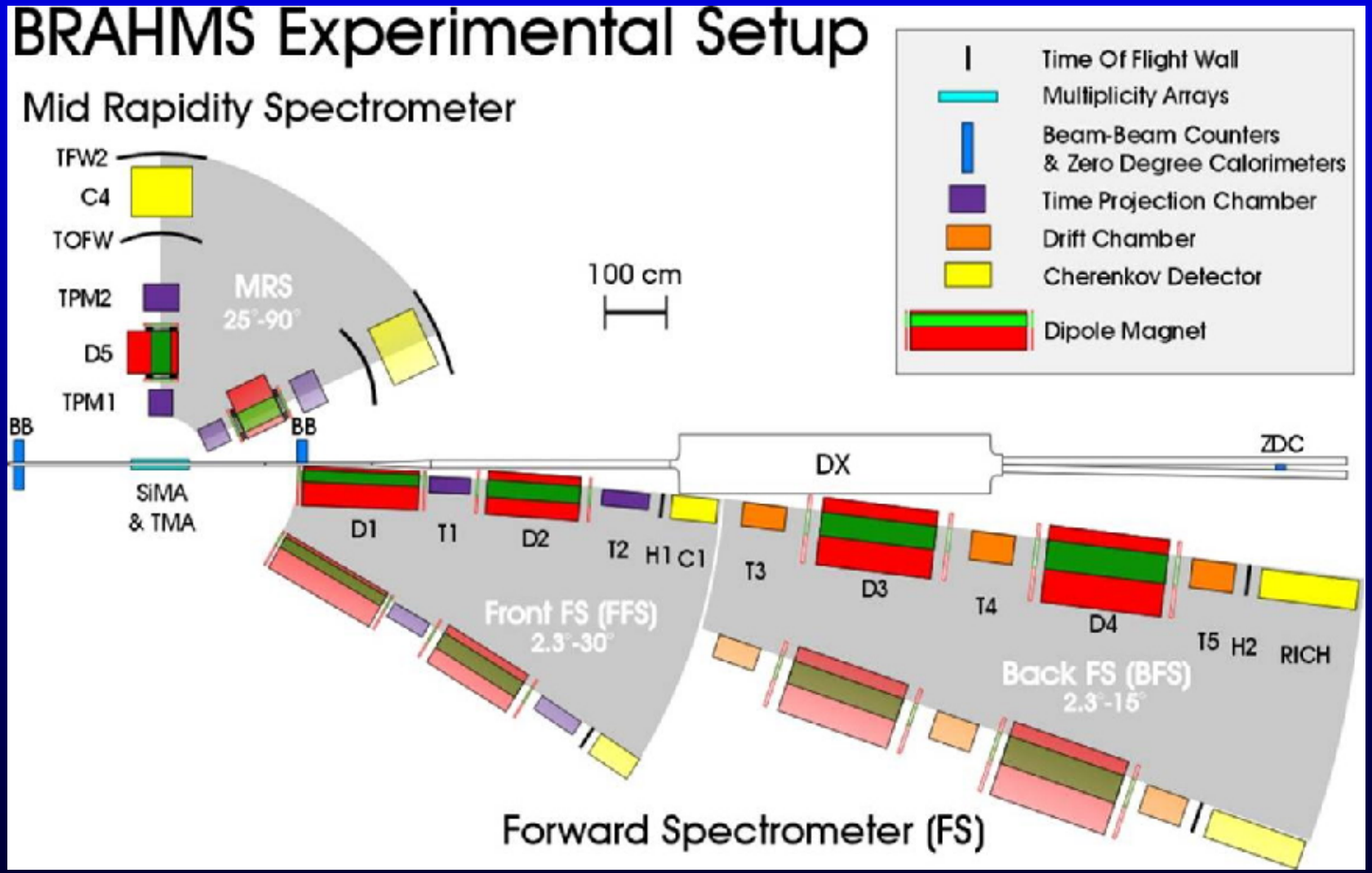

Figure 1: Schematic top view of the BRAHMS detector

Data Selection

- data selection
  - ⋆ d+Au collisions at $\sqrt{s_{NN}} = 200\ GeV$ in Run03: $3.4 > y > -0.1$
  - ⋆ pp collisions at $\sqrt{s} = 200\ GeV$ in Run05: $4.0 > y > 0$
- event and track selection
  - ⋆ MB events in both d+Au and pp collisions are used for this analysis, for d+Au, events with different centralities (central, semi-central, and peripheral) are used;
  - ⋆ IP determination: BB counter for d+Au, and INEL counter in pp, using wide vertex cut for MB events selection and 3-σ cut on the (VtxTrkZ−VtxZ)
- particle identification (see next slide)
  - ⋆ RICH in FS: Ring Radius VS Momentum (3-σ cuts on ring radius)
  - ⋆ TOF in MRS: Mass^2 VS Momentum (3-σ cuts on m^2)

Particle Identification(1)

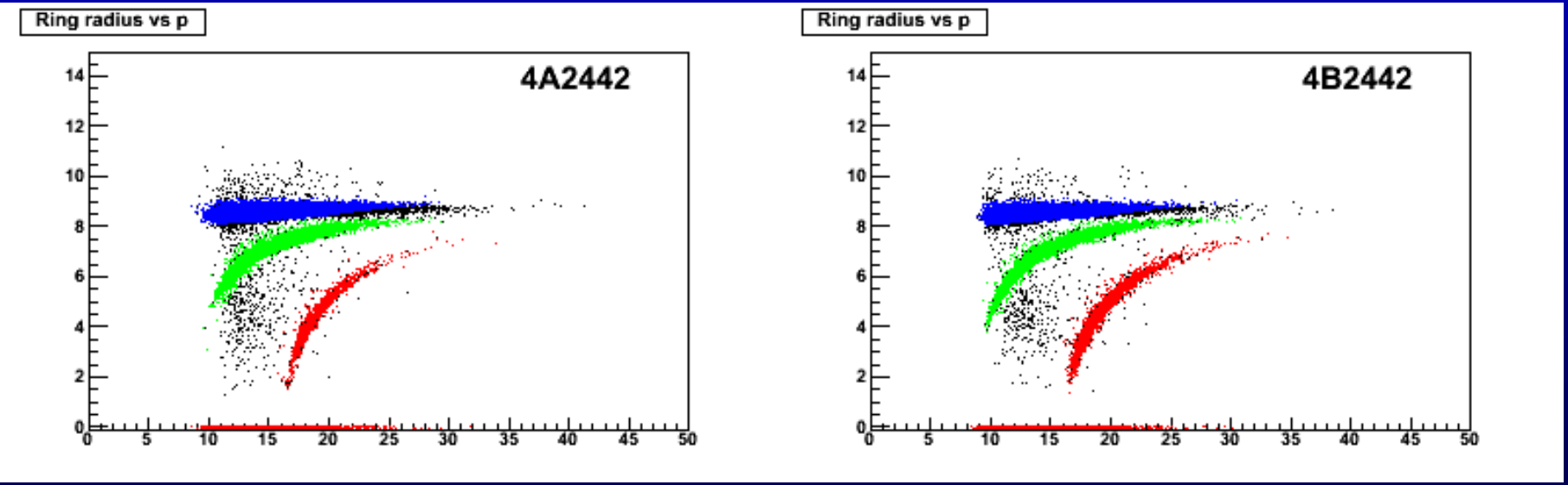

Figure 2: Particle identification by RICH in FS: 25-30 GeV/c for particle separation

Particle Identification(2)

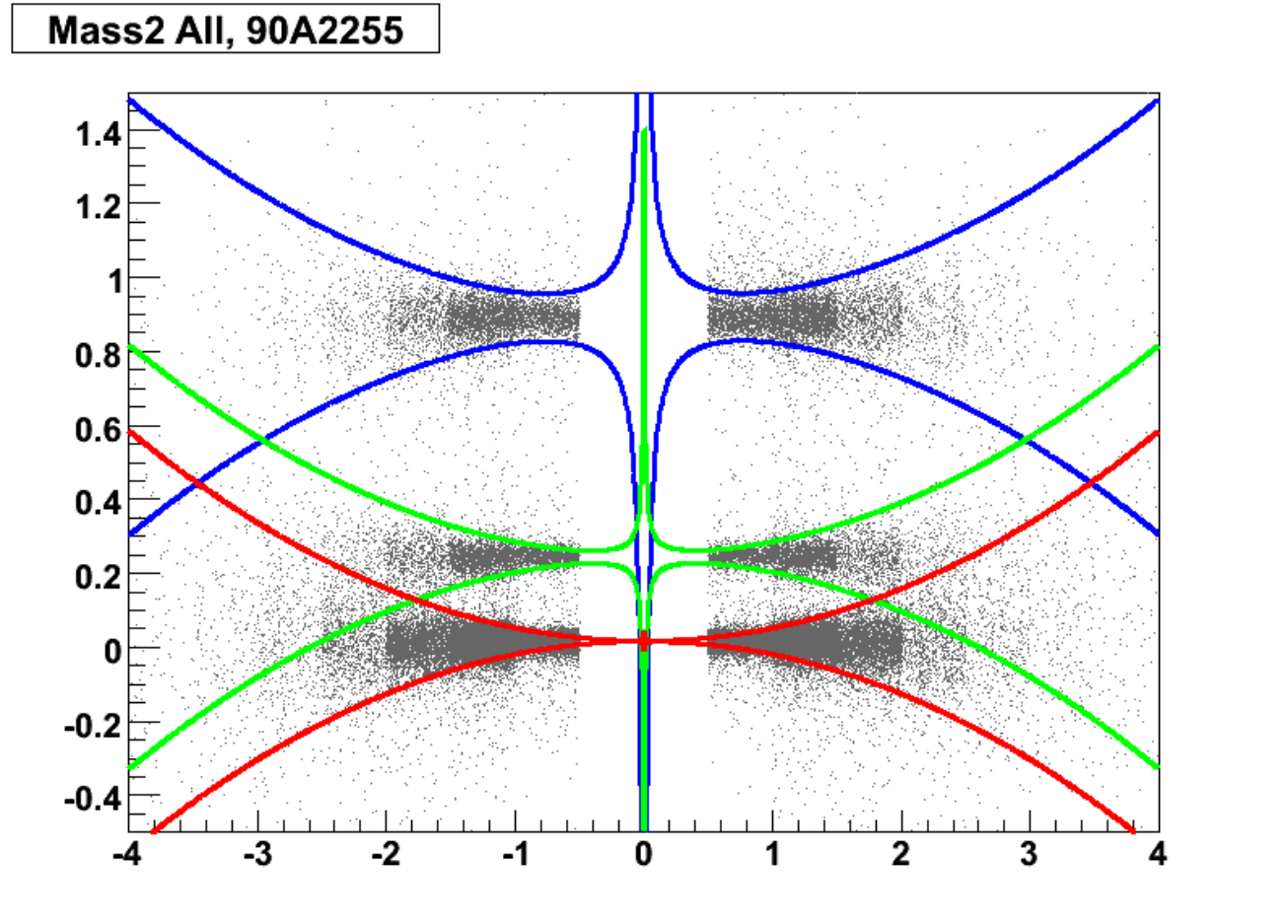

Figure 3: Particle identification by TOFW in MRS: m^2 VS $charge \times momentum$

separate kaons and pions up to 2 GeV/c, and 3 GeV/c for kaons and protons

m_T spectra

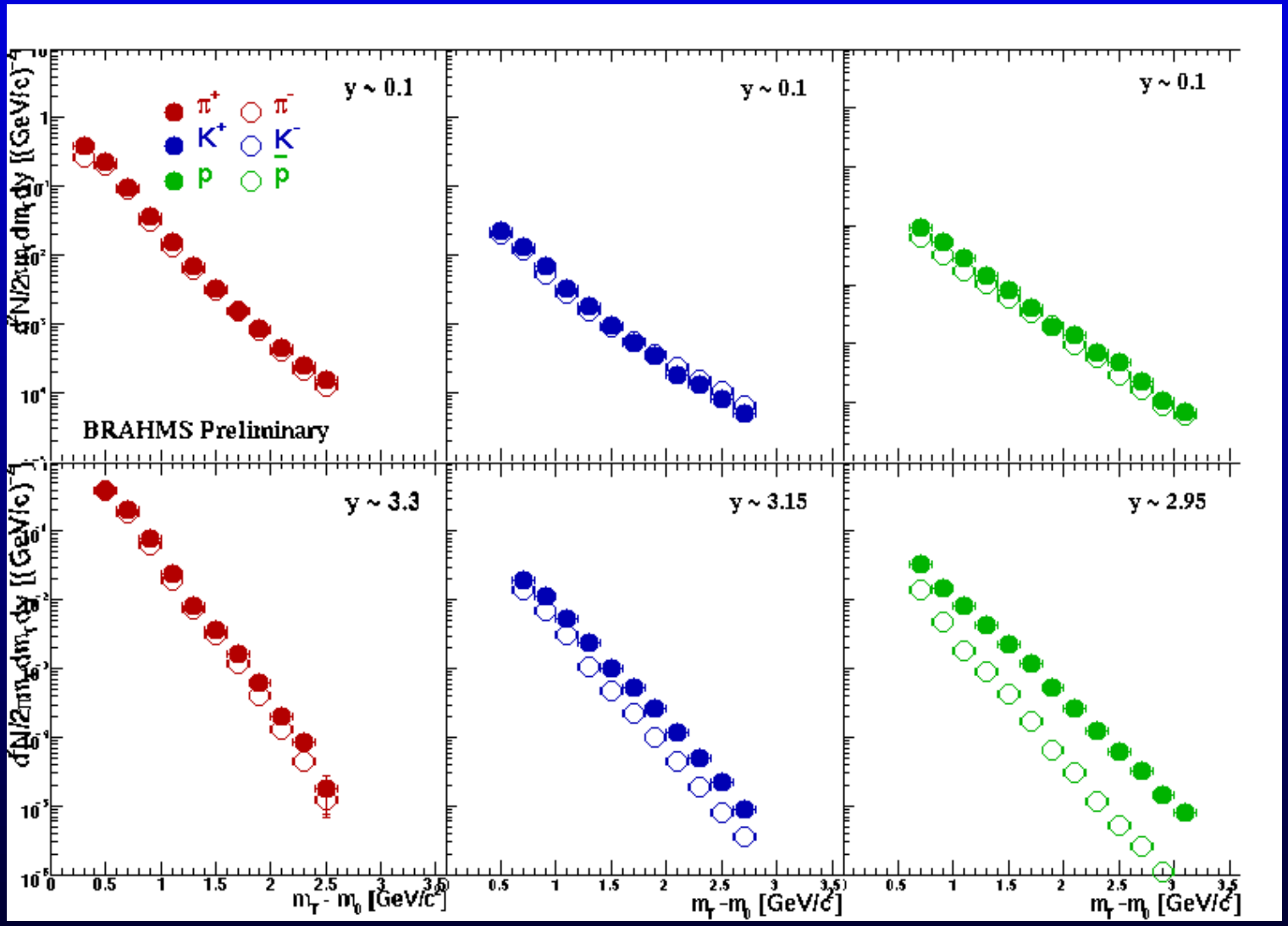

Figure 4: m_T spectra of identified particles in pp collisions

rapidity dependence of effective temperature in pp

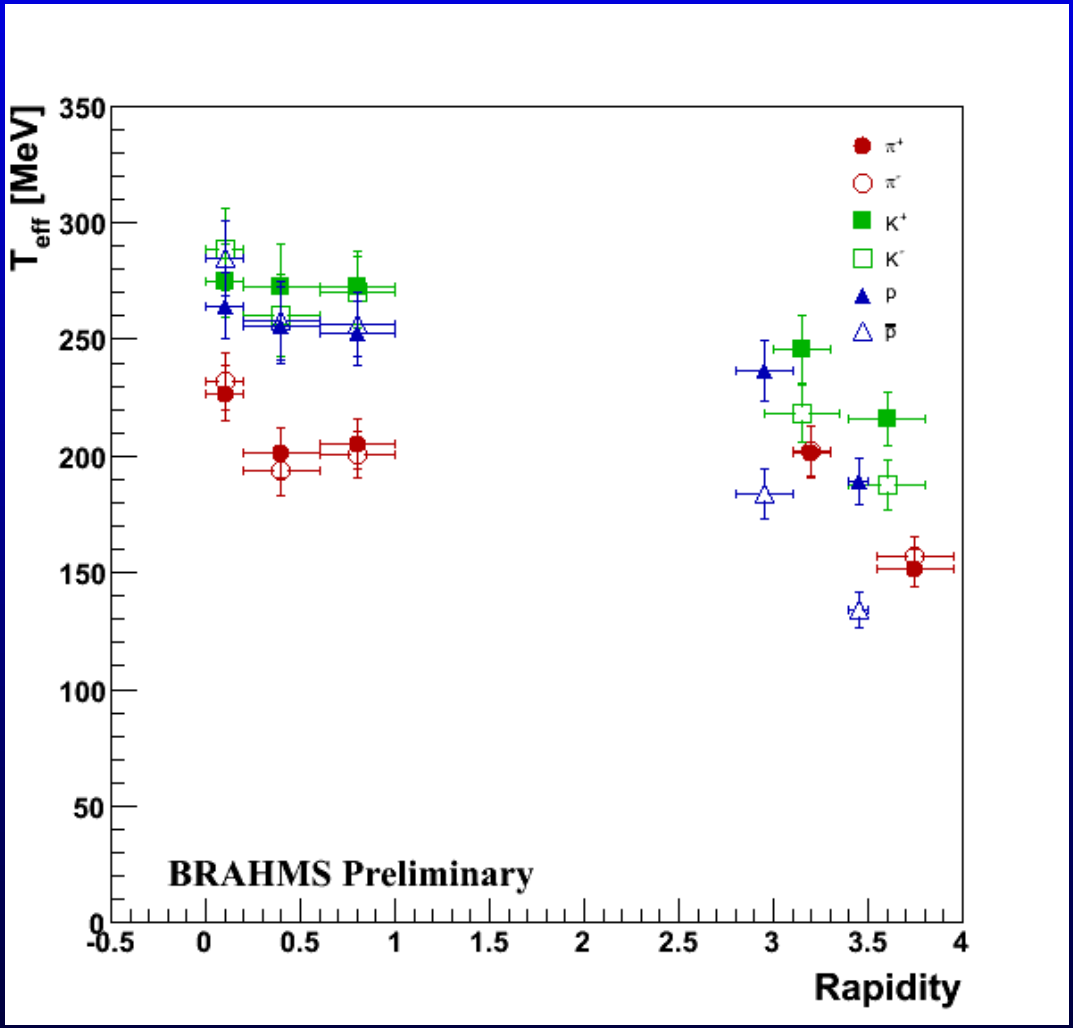

Figure 5: Effective temperatures are extracted by an m_T exponential fit of the m_T spectra

Stopping (1)

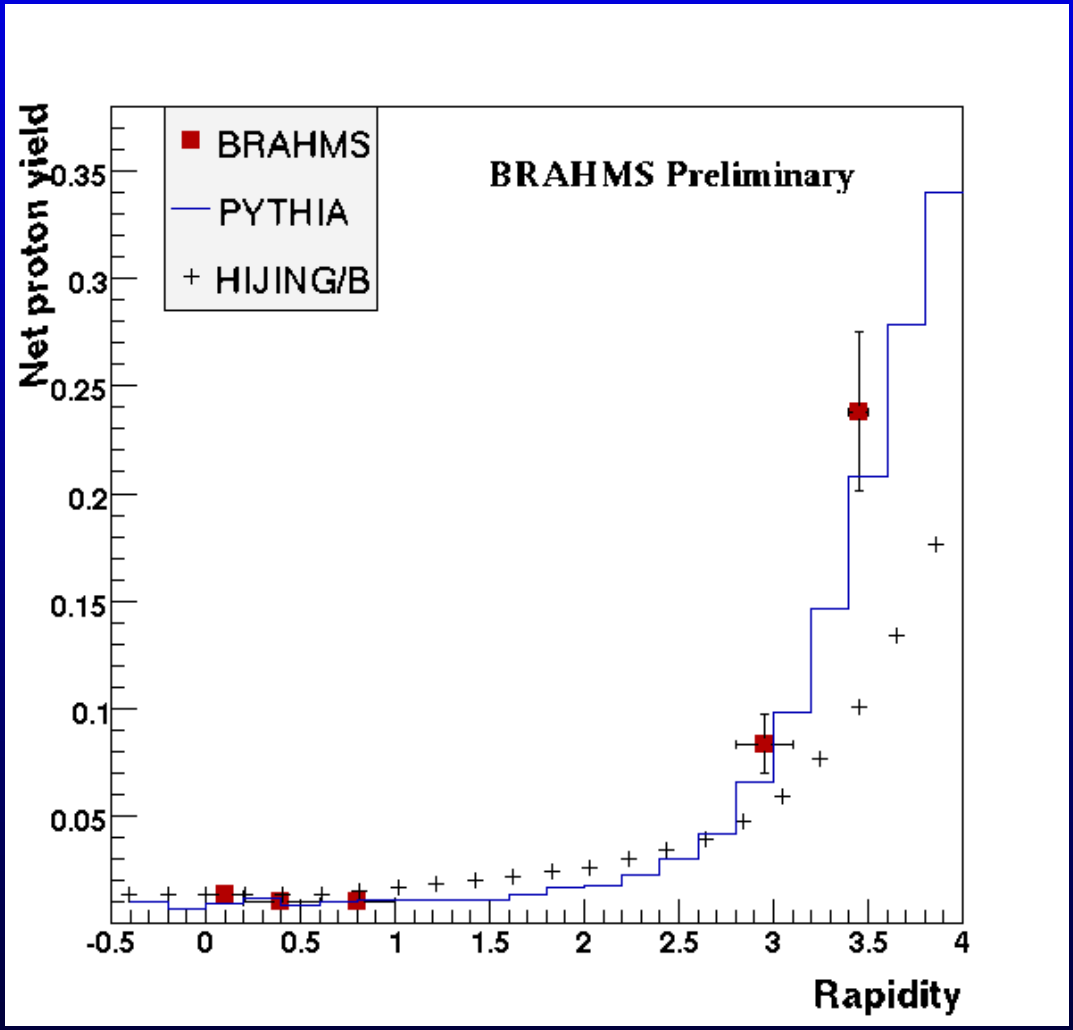

Figure 6: net proton rapidity density in pp collisions, and comparison with HIJING/B and PYTHIA model

Stopping (2)

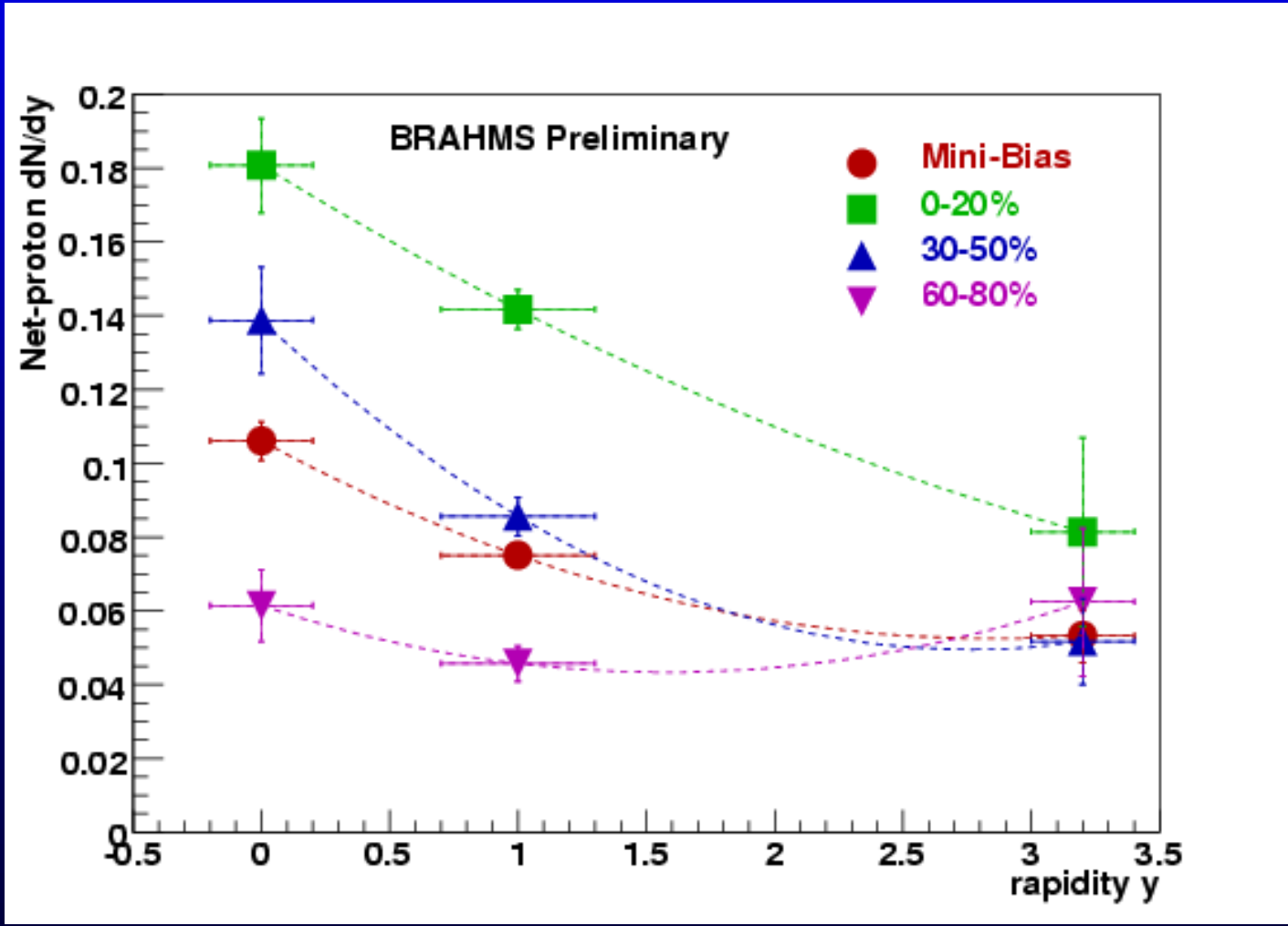

Figure 7: net proton rapidity density in d+Au collisions

particle ratios (1)

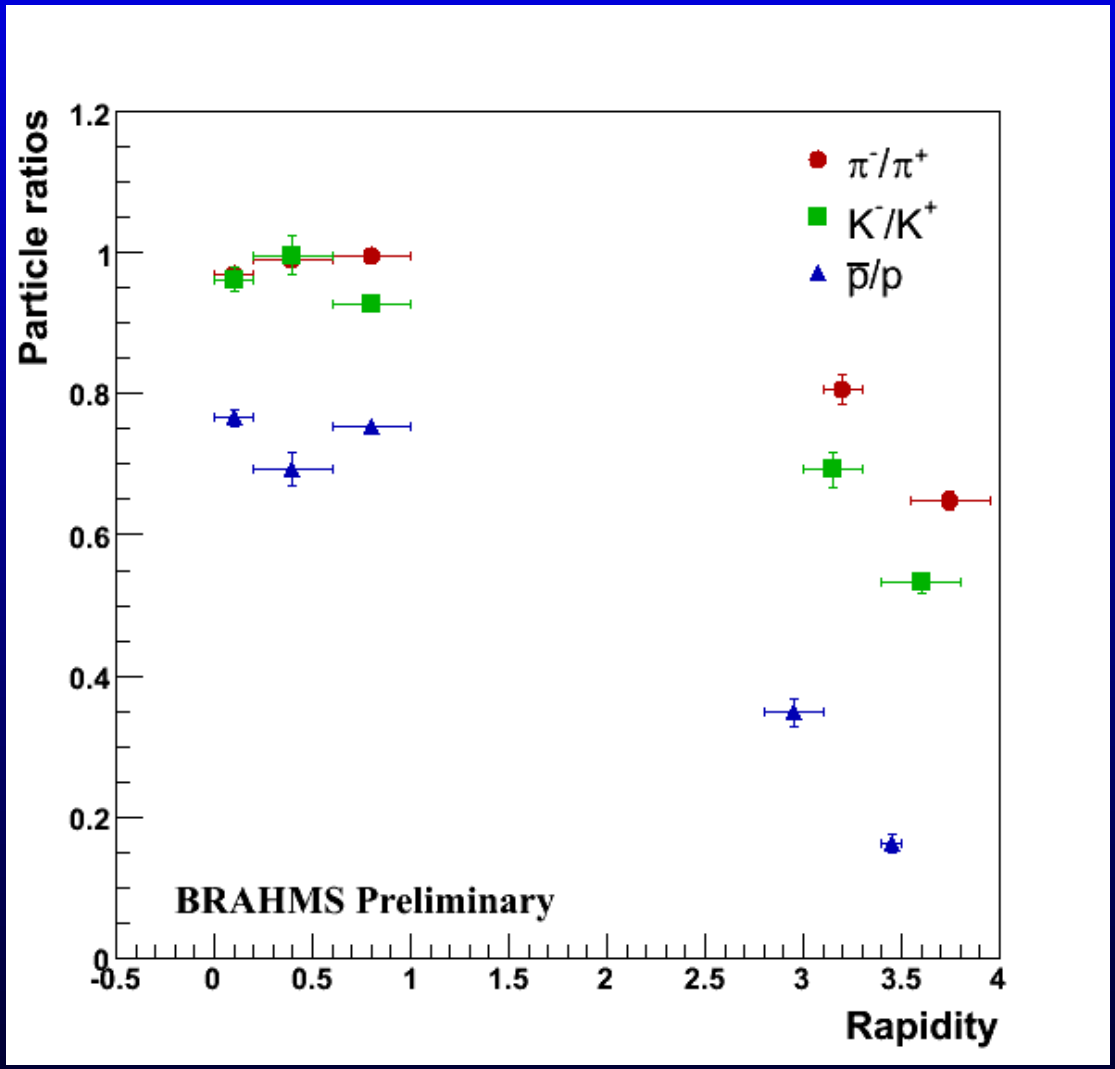

Figure 8: rapidity dependence of π^-/π^+, K^-/K^+ and $\bar{p}/p$ in pp collisions

particle ratios (2)

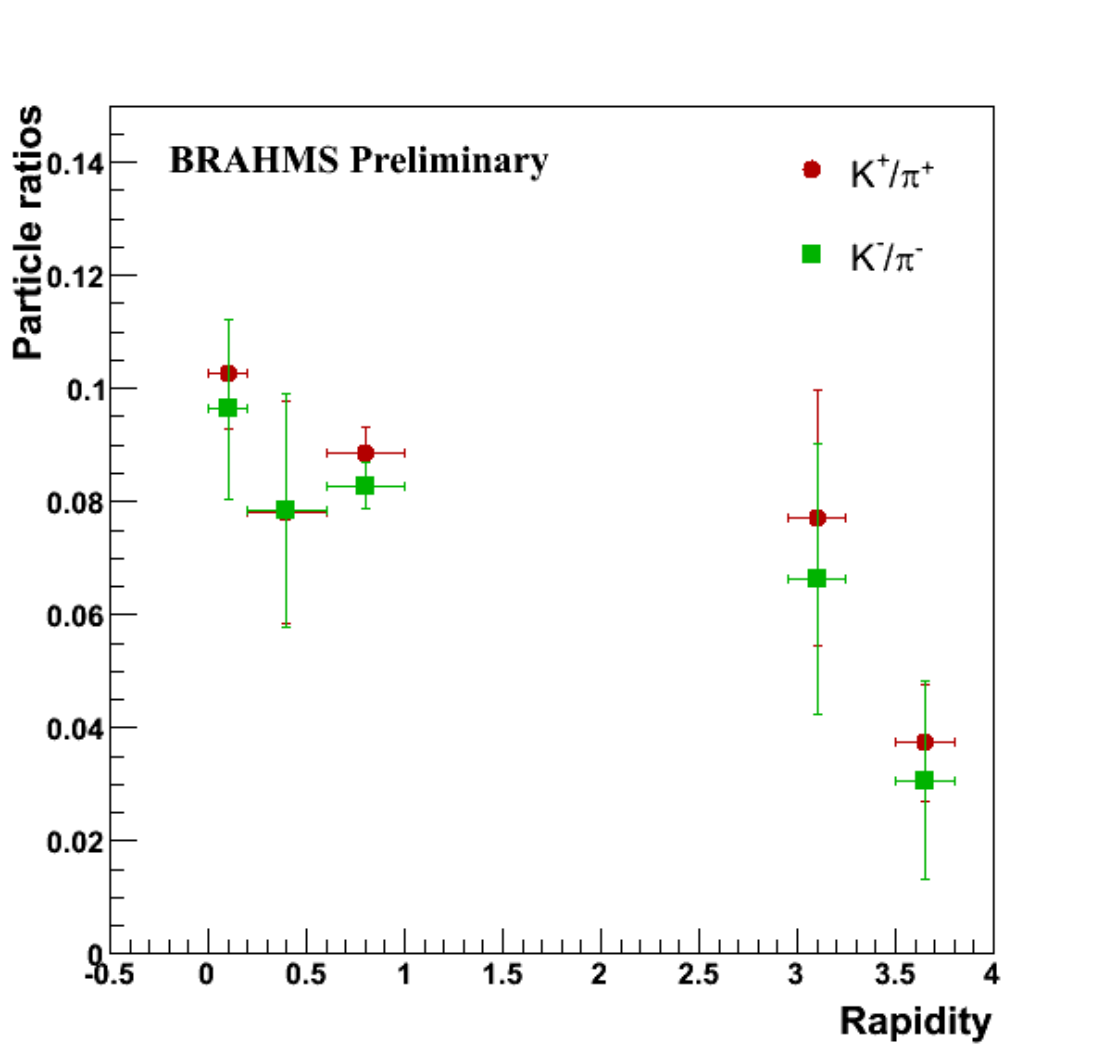

Figure 9: rapidity dependence of K/π ratios in pp collisions

particle ratios (3)

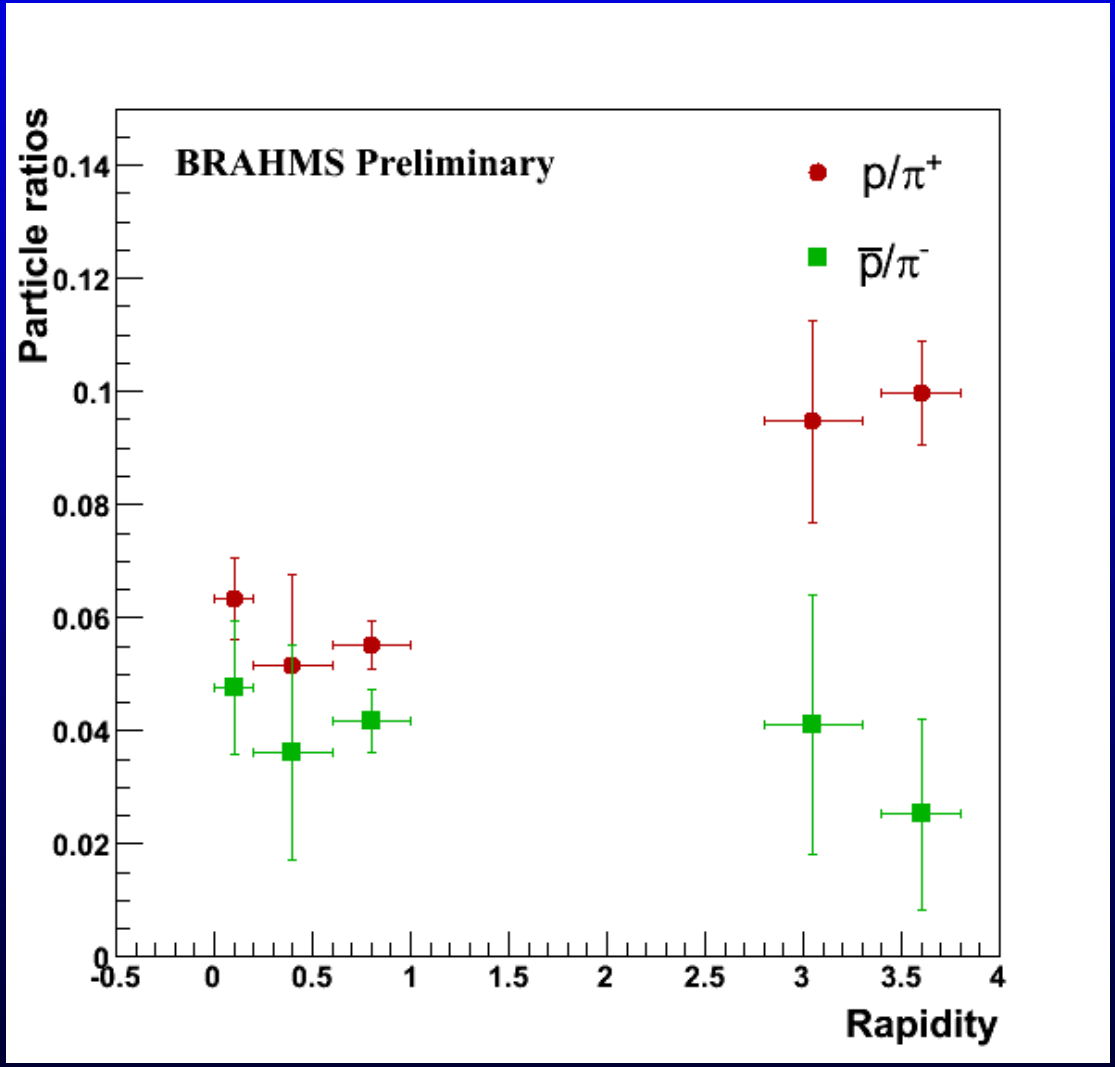

Figure 10: rapidity dependence of p/π ratios in pp collisions

R_{CP} in d+Au collisions

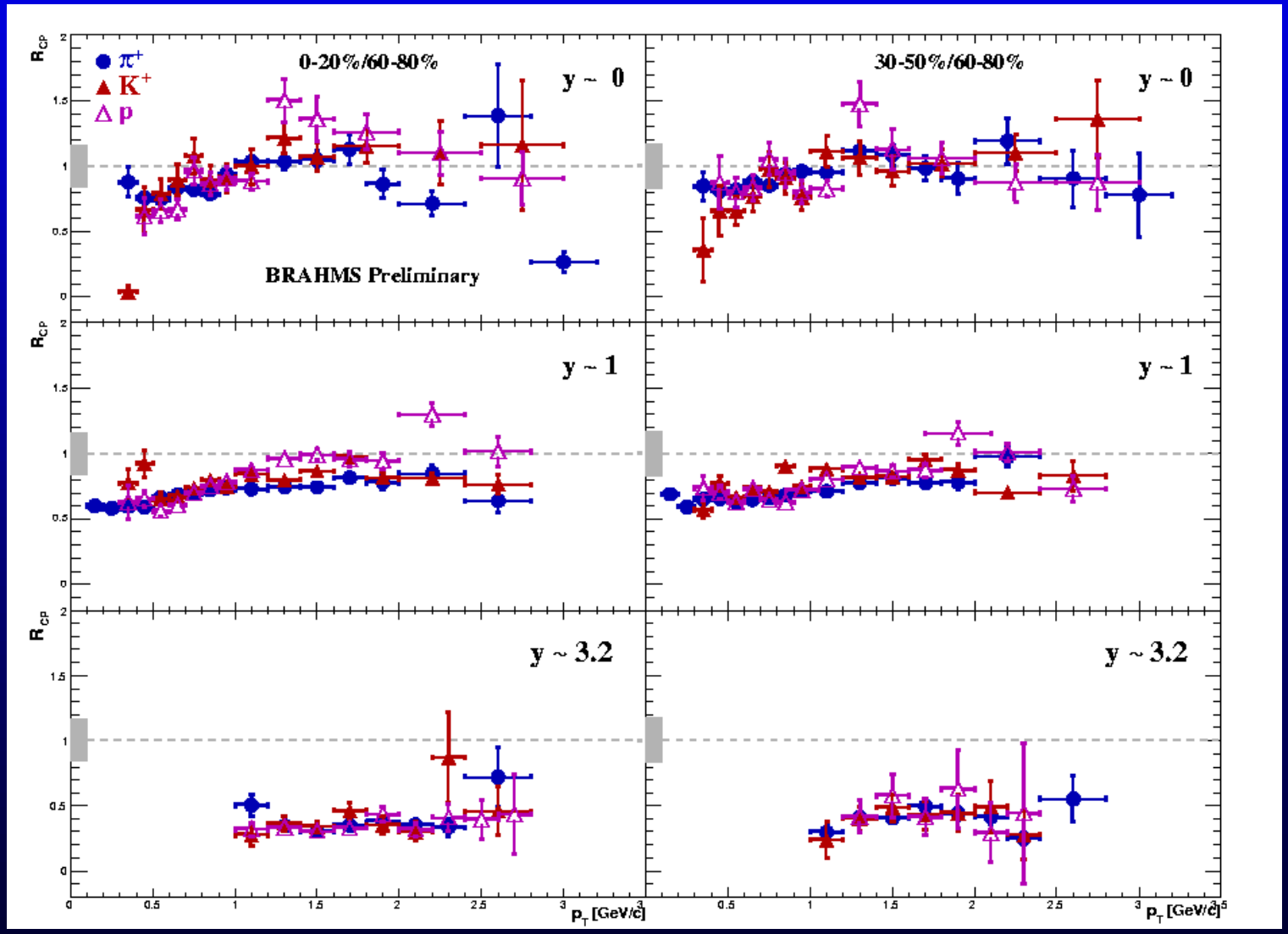

Figure 11: centrality and rapidity dependence of R_{CP} in d+Au collisions

Summary and Outlook

- a decreasing of effective temperature extracted from m_T spectra of all hadrons is observed when goes to forward rapidity;
- we have a lot of net-proton in the most forward region (pp collisions), which is consistent with the prediction by PYTHIA, and HIJING/B did underestimate the net-proton production in the forward region; the tendency of the production of net-proton rapidity density is consistent with the results by NA35 at SPS energies;
- the K/π ratios in pp collisions are lower at more forward rapidity, and the K^-/π^- ratios are lower than K^+/π^+;
- the p/π^+ and $\bar{p}/\pi^-$ ratios show significant difference at forward rapidity;
- Cronin effect plays more important role in more central collisions, and the suppression of R_{CP} for all the identified particles at forward rapidity are observed, and no specie dependence of this suppression is seen.
- R_{dAu} may provide more information about nuclear effect - to be done.

- yields of identified hadrons in pp and d+Au (centrality dependence) collisions are coming.

BRAHMS Collaboration

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Thank you!