

Rapidity and centrality dependence of identified hadrons in Au+Au and p+p collisions at 200 GeV

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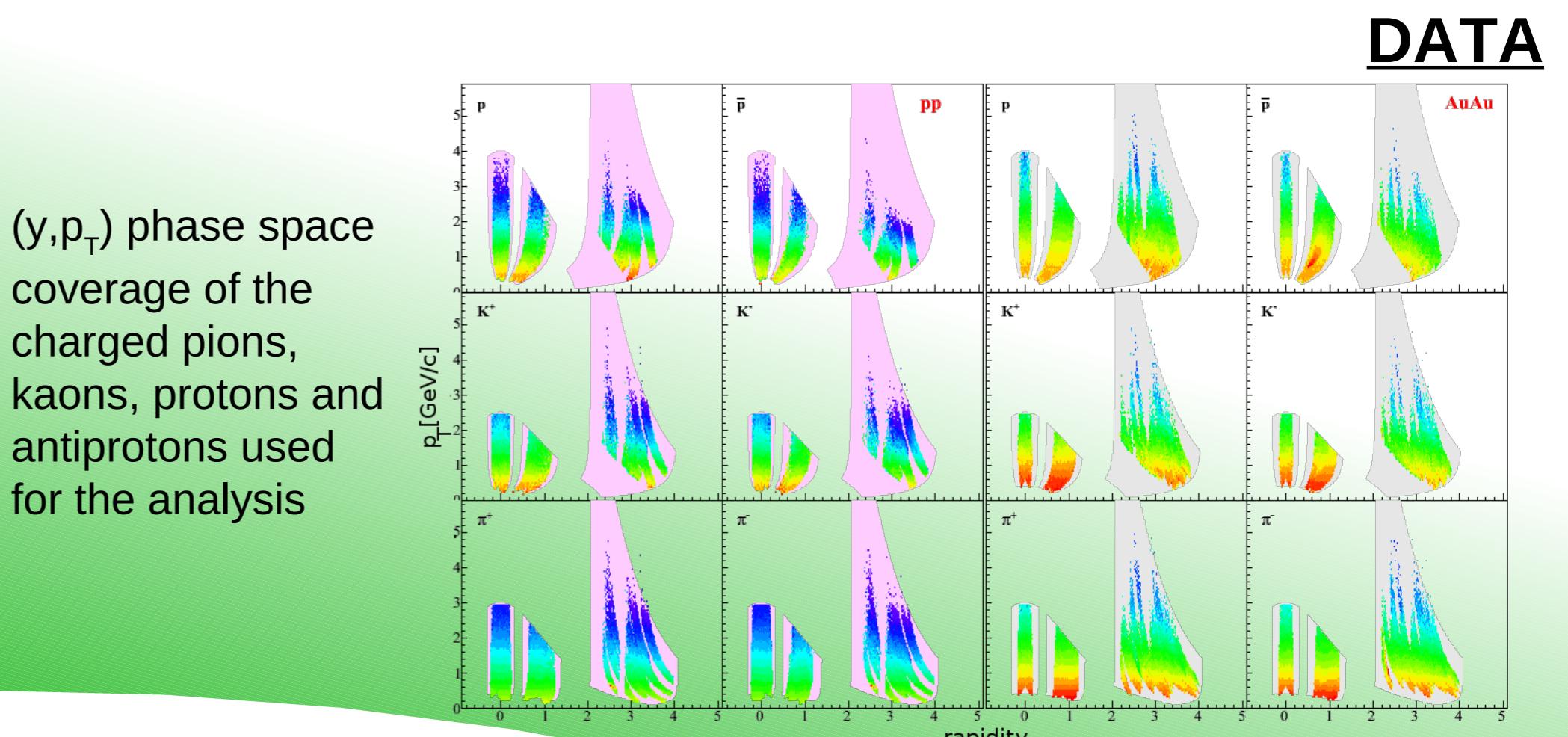
INTRODUCTION

The BRAHMS experiment [1] has measured identified particles from AuAu and pp collisions at 200GeV over 3 units of rapidity. We investigate the scaling of pion and kaon production with N_{coll} and N_{part} at both central and forward rapidities.

The kaon to pion ratio serves as a measure of equilibration of strange quarks. BRAHMS has found that for central collisions the K/K^+ ratio is strongly correlated to the \bar{p}/p ratio [2]. We show how this correlation evolves with the centrality of the system. We also show the centrality dependence of $R_{\text{AA}}(p_T)$ at both central and forward rapidity for both mesons and baryons.

For central collisions BRAHMS has already shown that R_{AA} does not depend strongly on rapidity [3]. These data represent a new analysis focused on the centrality dependence of R_{AA} over the rapidity range covered by our experiment.

These data thus provide a summary of hadron production over a very wide rapidity and centrality range.



In the MRS, PID was done with TOFW and in the FS with RICH

BRAHMS

Projection Chambers: TPM1, TPM2, T1, T2

Drift Chambers: T3-T5

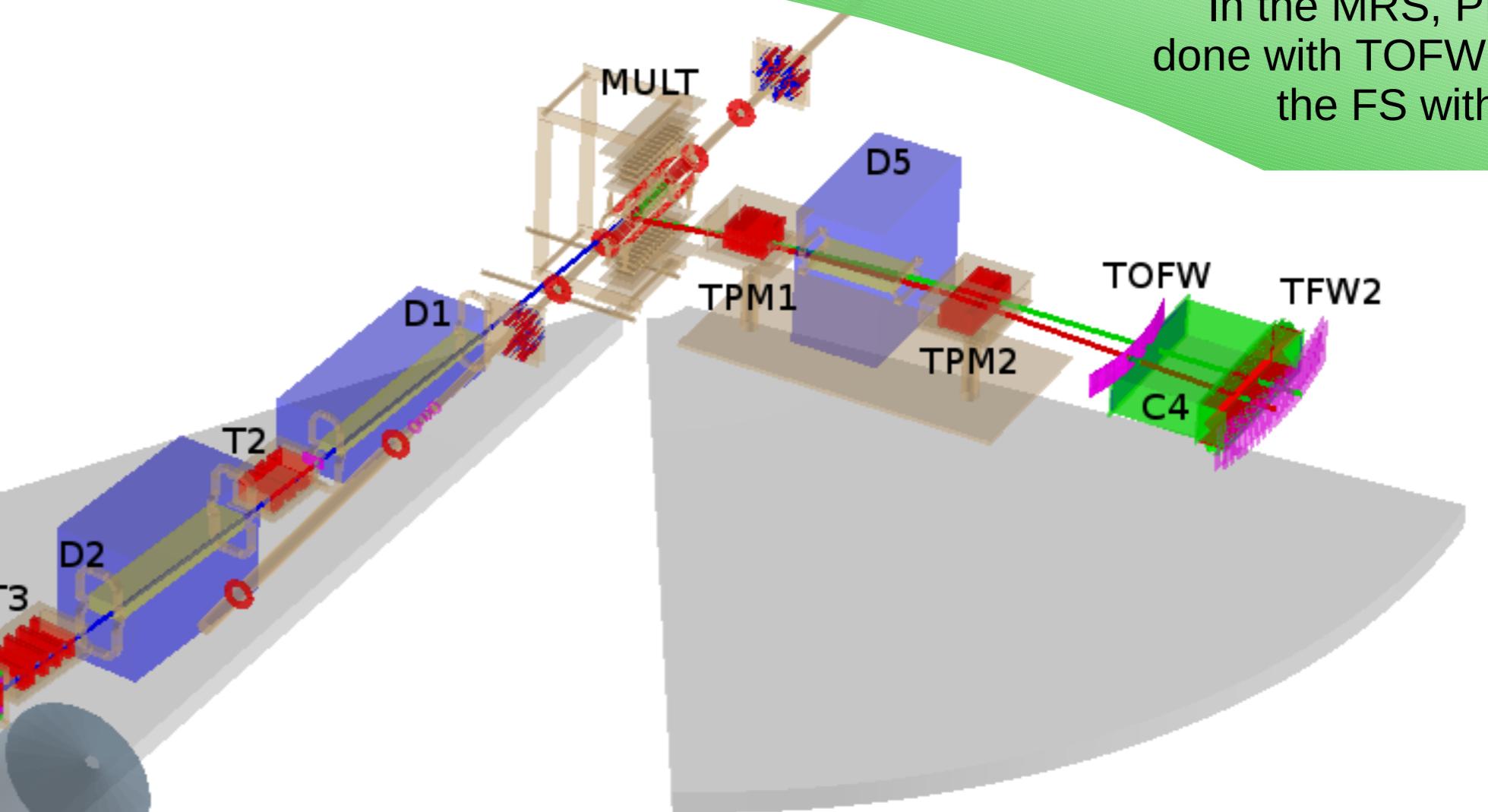
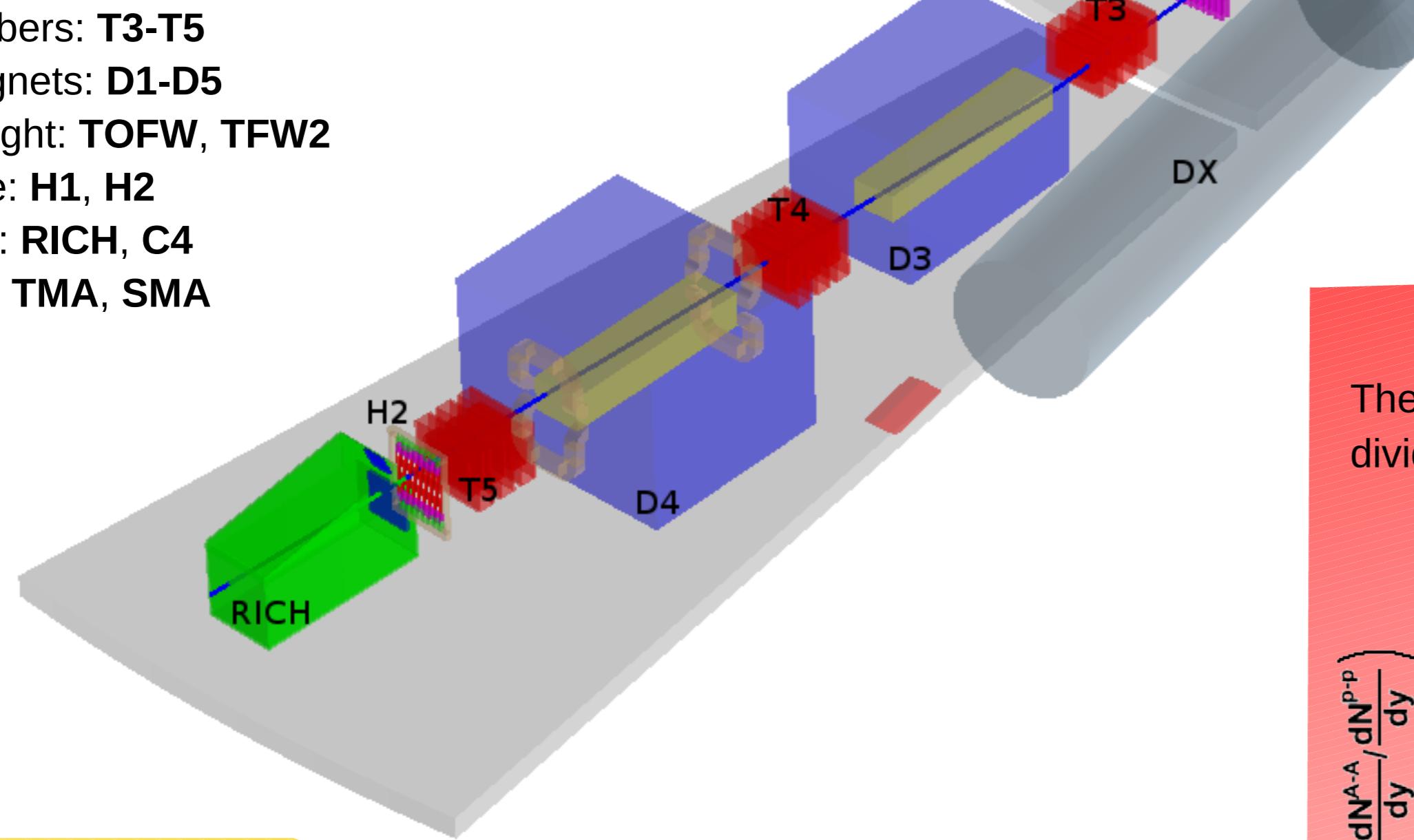
Dipole Magnets: D1-D5

Time Of Flight: TOFW, TFW2

Hodoscope: H1, H2

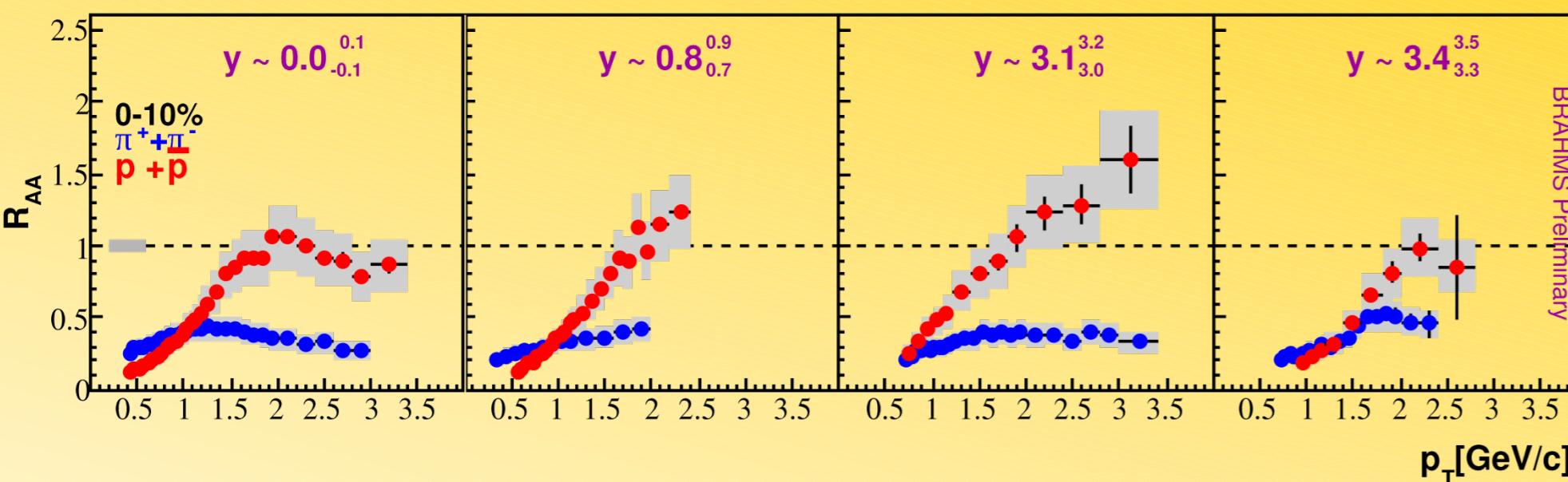
Cherenkov: RICH, C4

Multiplicity: TMA, SMA

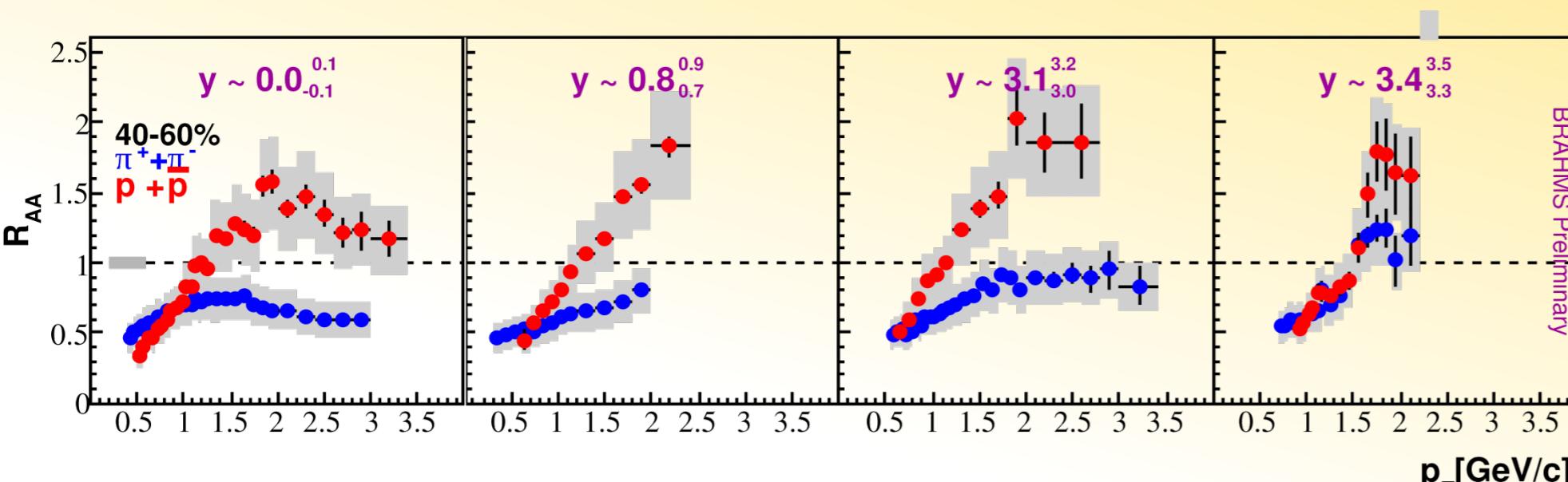


R_{AA}

Hard particle production



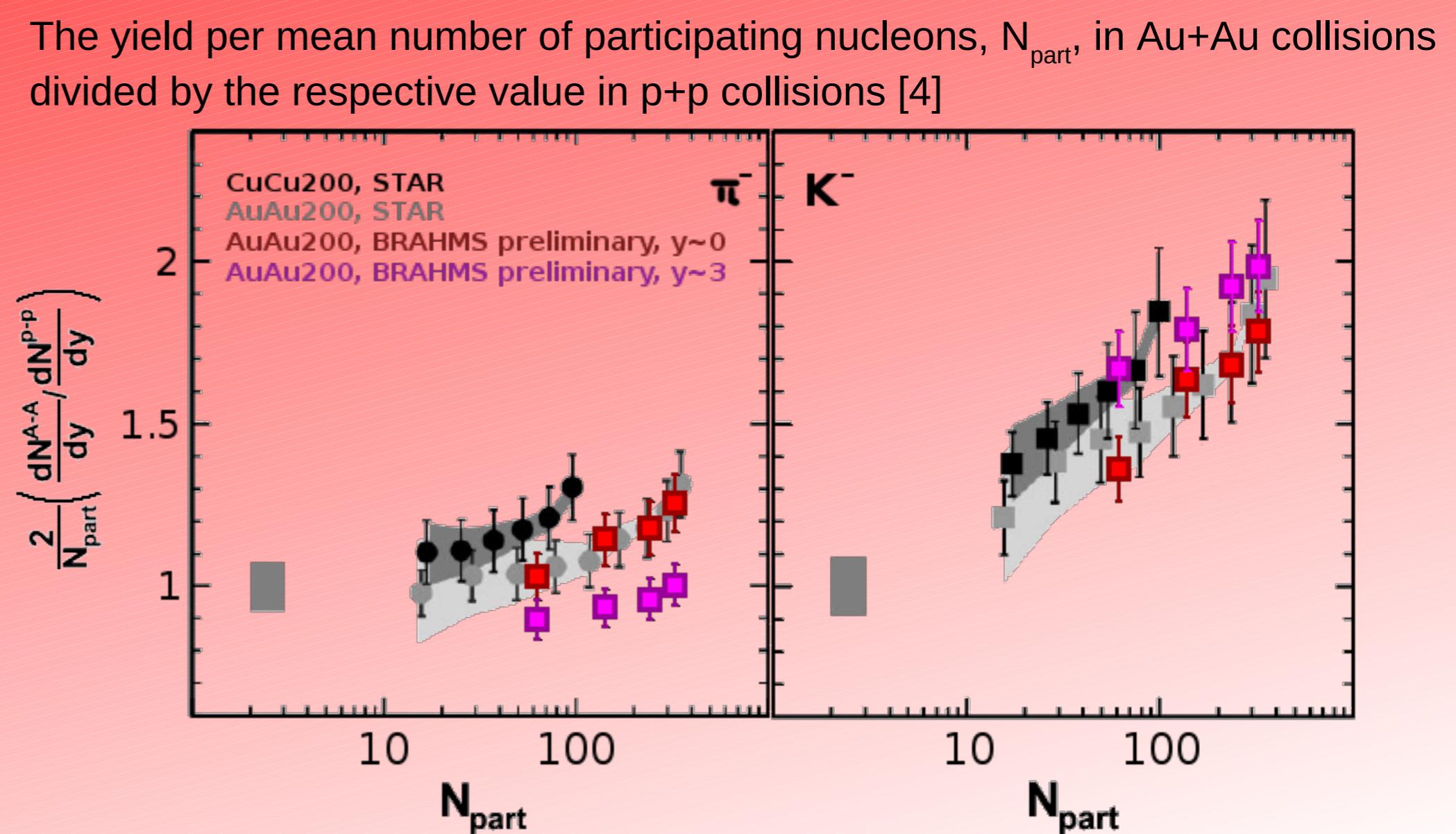
In 0-10% Au+Au collisions at 200 GeV, the charged pion yields are suppressed as compared with binary scaled p+p collisions, from midrapidity to forward rapidity. Proton and antiproton yields in Au+Au collisions do not show suppression with respect to binary scaling in the intermediate p_T range for all the rapidities.



In 40-60% Au+Au collisions, the charged pion yields are still suppressed for $p_T > 1.5$ GeV/c as compared with binary scaled p+p collisions, at midrapidity. At forward rapidity ($y \sim 3.1$ and $y \sim 3.4$), pions do not show suppression with respect to scaled p+p collisions, for $p_T > 1.5$ GeV/c.

ENHANCEMENT FACTORS

Soft particle production



Pion and kaon production are enhanced as a function of collision centrality. At forward rapidity ($y \sim 3$), enhancement factors of about 2 for negative kaons with respect to elementary interactions. Different behavior for pion and kaon enhancement factors at forward rapidity.

CONCLUSIONS

The high p_T suppression is almost independent of rapidity but does depend on the particle type. This might indicate an interplay between (partonic) energy loss and hydrodynamics. For soft particle production the rapidity dependence of the enhancement factors may suggest that there are different particle production mechanisms at work as a function of rapidity.

BIBLIOGRAPHY

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3. <http://www4.rcf.bnl.gov/brahms/WWW/presentations/2008/RDebbeQM08plenary-1.ppt>; Catalin Ristea, Ph.D. Thesis, University of Copenhagen, 2007, http://www4.rcf.bnl.gov/brahms/WWW/thesis/catalinRistea_phd.pdf
4. STAR Collaboration, Phys. Rev. C 83 (2011) 34910 (nucl-ex/1008.3133)