

Progress in BRAHMS

K. Hagel, R. Wada, J. B. Natowitz and the BRAHMS Collaboration

BRAHMS completed the baseline program in June, 2006 with the measurement of $p + p$ collisions having $\sqrt{s_{nn}} = 63 \text{ GeV}$ during RHIC Run-VI. The $p + p$ measurement at $\sqrt{s_{nn}} = 63$ provides both a baseline measurement for the RAA studies at $\sqrt{s_{nn}} = 63$ as well as information of the Single Spin Asymmetry studies that a number of researchers in the BRAHMS Collaboration are pursuing.

The BRAHMS collaboration completed the analysis of several topics and submitted results for publication. An example of such analysis is shown in figure 1 where we plot the nuclear modification factor for negative pions and anti-protons at mid-rapidity and forward pseudorapidity ($\eta=2.2$) [1]. We note the well known suppression for the pions, but the anti-protons are not suppressed. Furthermore the stronger pion suppression at forward pseudorapidity suggests that other nuclear effects such as gluon saturation may contribute. The differences in suppression have been noted to depend on whether the hadron is a baryon or a meson. [2] The observations are consistent with a picture of forming a strongly interacting partonic matter with strong collective flow over a large rapidity range that boosts protons to

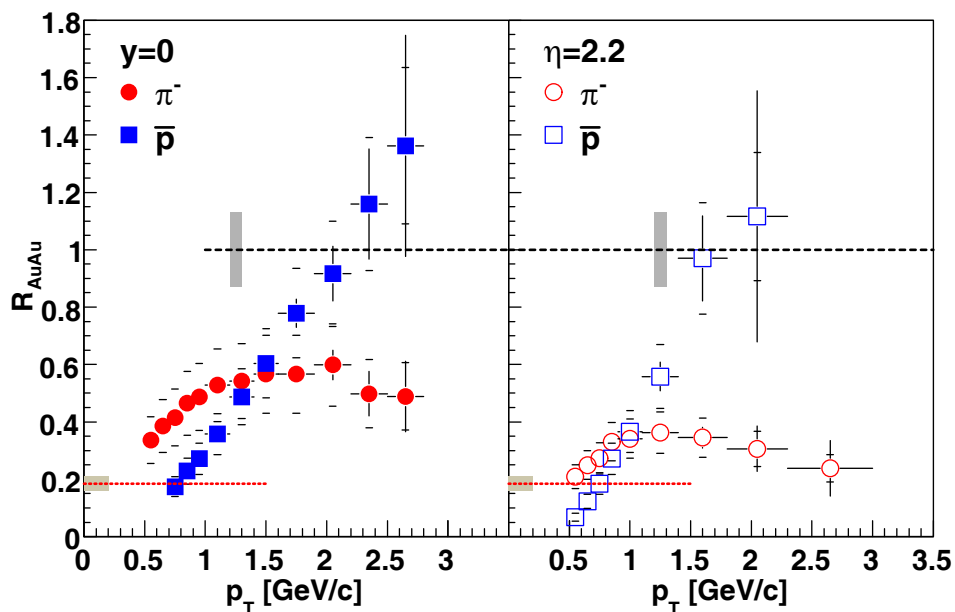


Figure 1. Nuclear modification factor for negative pions and anti-protons at mid-rapidity (left panel) and $\eta=2.2$.

higher transverse momenta and is responsible for the strong suppression of pions.

There is also a study on high p_T baryon and meson production in $p + p$ collisions at $\sqrt{s_{nn}} = 200$ GeV [3] as well as the report of a study on the rapidity dependence of high p_T suppression at $\sqrt{s_{nn}} = 63$ GeV [4].

The local group at Texas A & M is working on the soft physics analysis of the Run V $p + p$. The calibration of the time of flight hodoscopes as well as the vertex counters is basically complete and preliminary versions of the spectra at rapidities less than 1 have been extracted. Preliminary spectra of the 90 deg setting of the mid-rapidity spectrometer are shown in figure 2. We are in the process of refining the details of these spectra as well as generating spectra for the other settings of the mid-rapidity spectrometer, namely the 34, 40, 45, 52.5 and 60 deg settings.

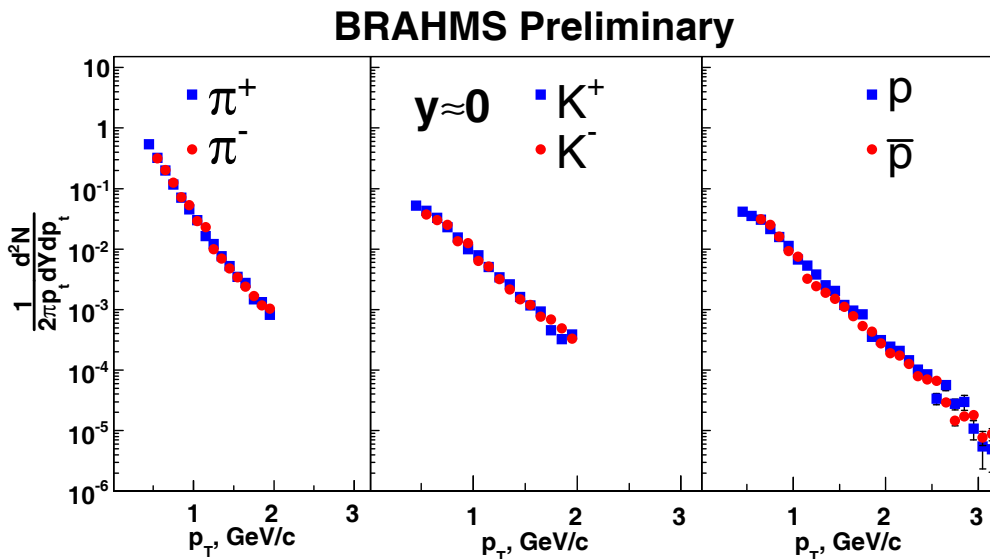


Figure 2. Preliminary spectra at $y=0$ for positive (solid squares) and negative (solid circles) pions, kaons and protons.

- [1] I. Arsene *et al.*, nucl-ex/0602018; Phys. Lett. B (accepted).
- [2] P. Jacobs and Xin-Nian Wang, hep-ph/0405125 (2004).
- [3] I. Arsene *et al.*, hep-ex/0701041nucl-ex/0602018; Phys. Rev. Lett. (accepted).
- [4] I. Arsene *et al.*, nucl-ex/0602018 (2006).