Net-proton at RHIC

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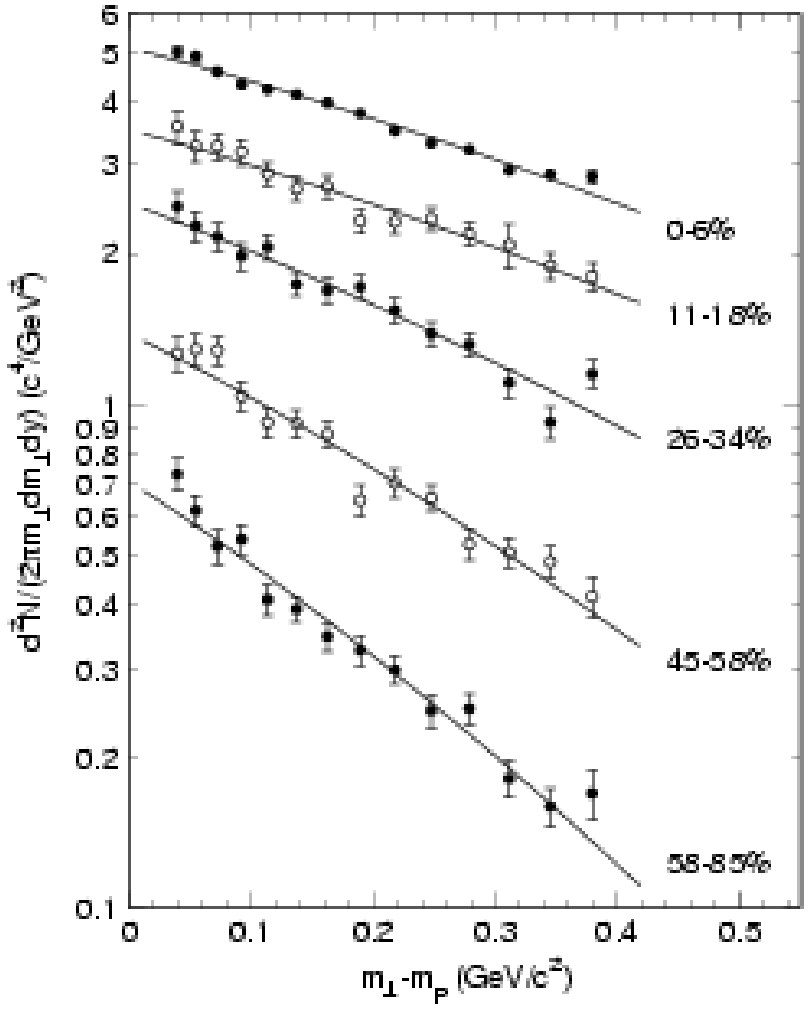
Questions:

Baryon pt and y distributions at RHIC?
Junction mechanism needed?

Physics:

Baryons,
Stopping,
Production,
FSI,
…

STAR Data



Au + Au at 130 GeV

STAR mid-y anti-proton data as a function of centrality.

STAR Data

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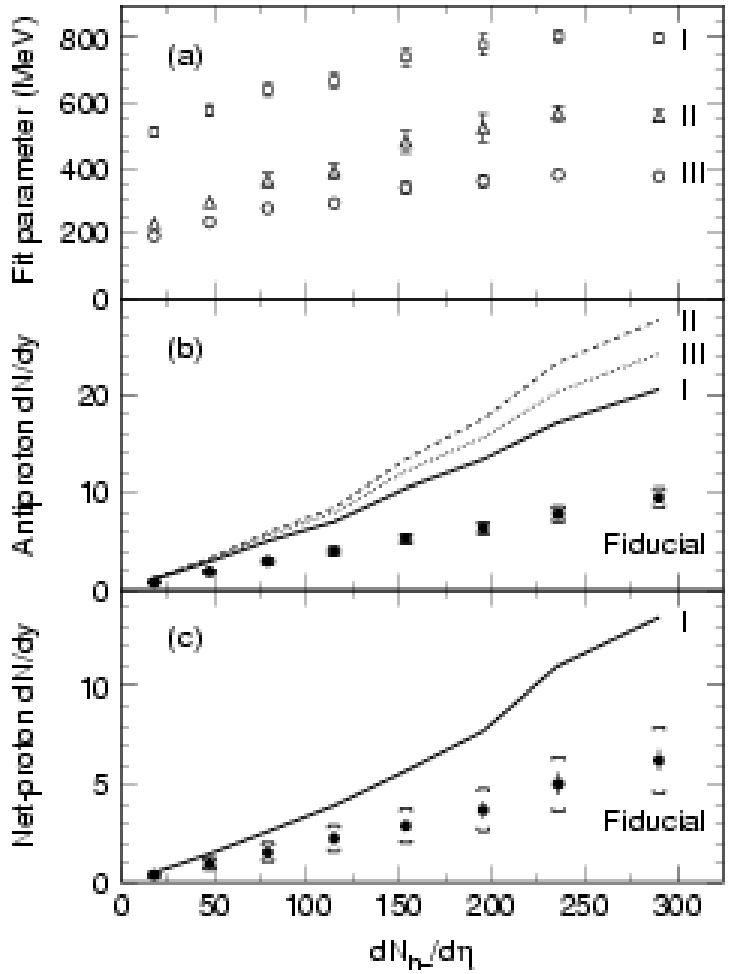

a) Strength of the transverse motion increase with collision centrality;

b) Anti-proton yields increase with centrality;

c) Net-proton at mid-y increase with centrality

Net-Baryon vs. b

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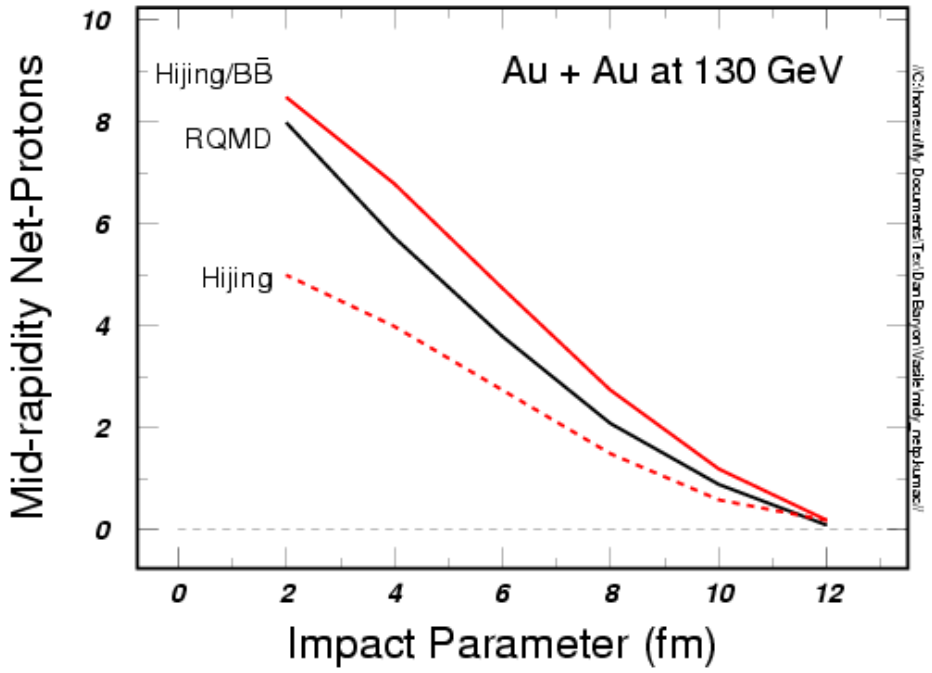
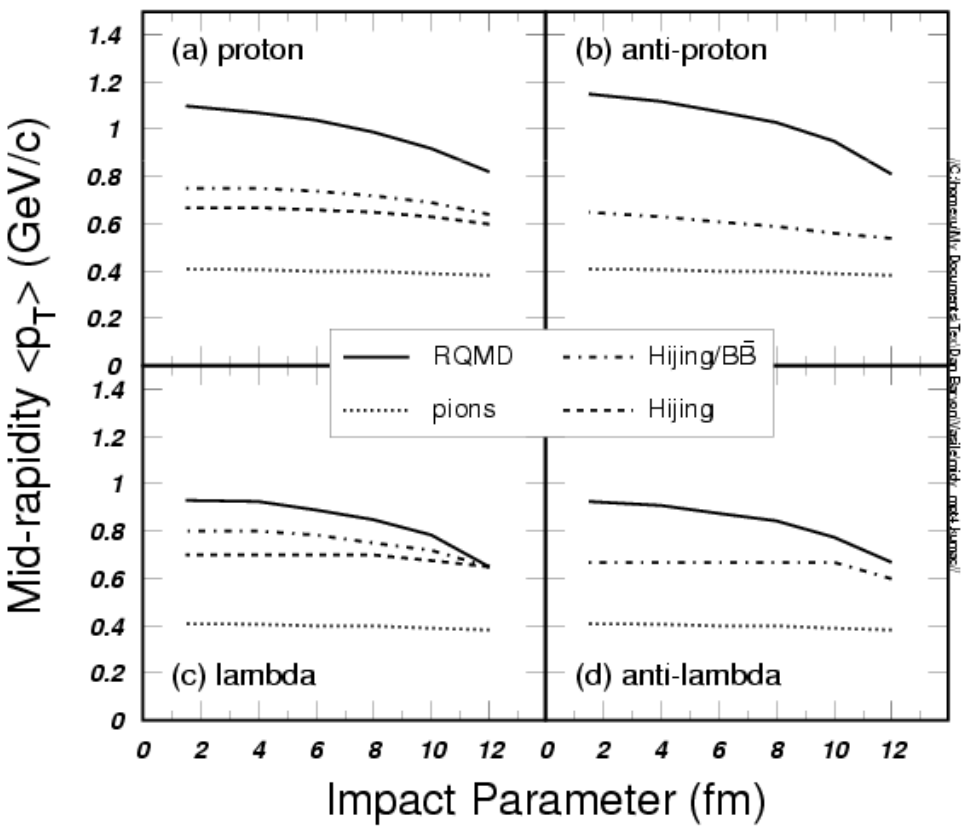


Net-protons as a function of impact parameter from Au+Au collisions at root(s)=130 GeV.

1) In the case of RQMD and Hijing/BB, a strong centrality dependence on the values of net-baryon is seen.

2) On the other hand, the bare Hijing model show a much weaker centrality dependence.

$\langle p_T \rangle$ vs. b



Averaged baryon transverse momentum as a function of impact parameter from Au+Au collisions at root(s)=130 GeV. For reference, the values of pions (dotted-lines) are also shown in the figure. From all of the three model calculations, it is clear that pions gain little or none increase in mean pt.

1) In the case of RQMD, a strong centrality dependence on the mean pt is seen for all baryons. In addition, the dependence is stronger for protons than that of the lambdas. This may be understood that RQMD generates the transverse motion through rescatterings among produced hadrons. The input values of the cross sections for strange particles are smaller than protons.

2) On the other hand, Hijing model show a much weaker centrality dependence. This perhaps is due to the fact that in the model, there is no rescatterings implemented in the final stage of the collisions. Unlike the case for the net-baryon distribution, the difference in the values of mean pt from Hijing and Hijing/BB is small.

Summary

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Just the beginning:

1) HIJING/BB works well for integrated net-proton;

2) RQMD – with FSI, seems also fit to the transverse momentum distributions.

Needed:

More data on net-lambda;

More understand the codes;

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