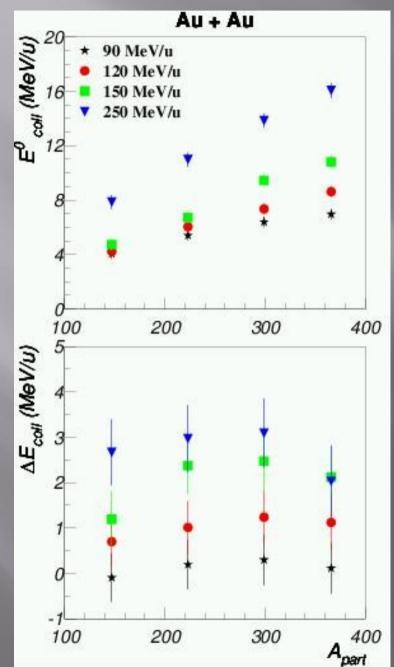
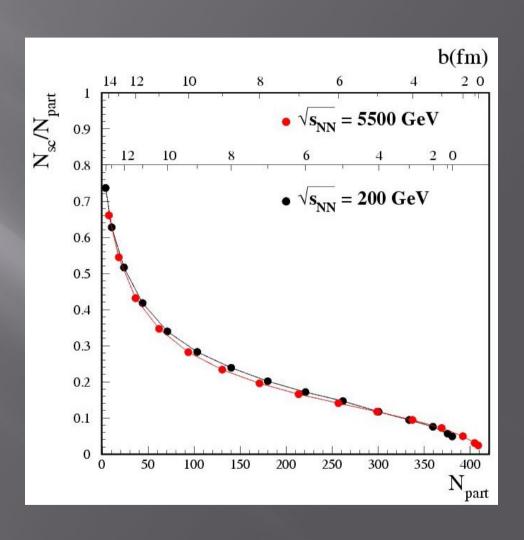
Collective phenomena in heavy ion central collisions

C. Andrei, I. Berceanu, A. Herghelegiu, M. Petrovici, A. Pop, C. Schiaua

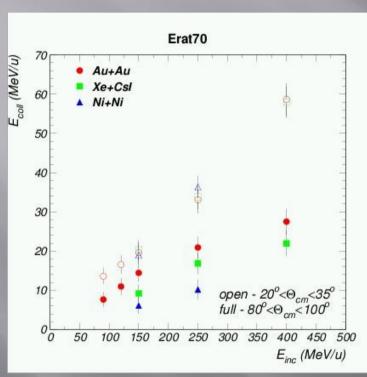
- Azimuthally isotropic flow very short review
- <p_t> as a function of mass at ultra-relativistic energies
- Pb + Pb 5.5 TeV HIJING analysis
- Outlook

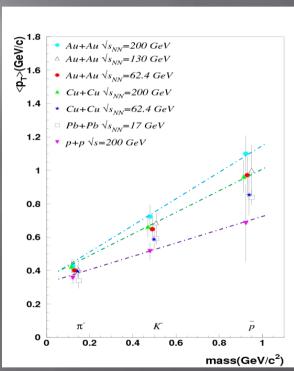
Why highly central collisions?

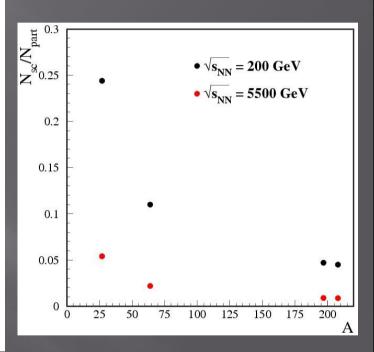




Why heaviest combinations?

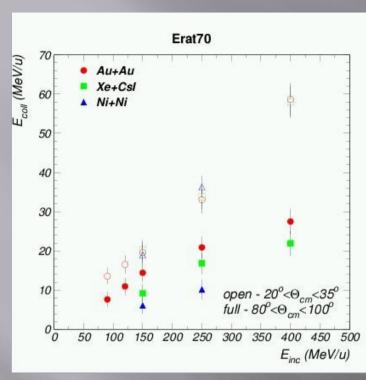


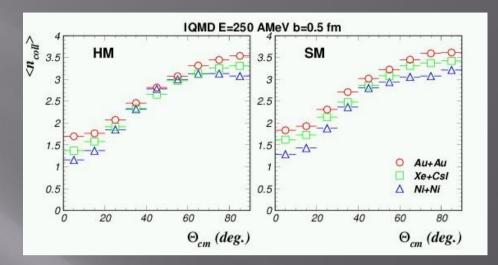


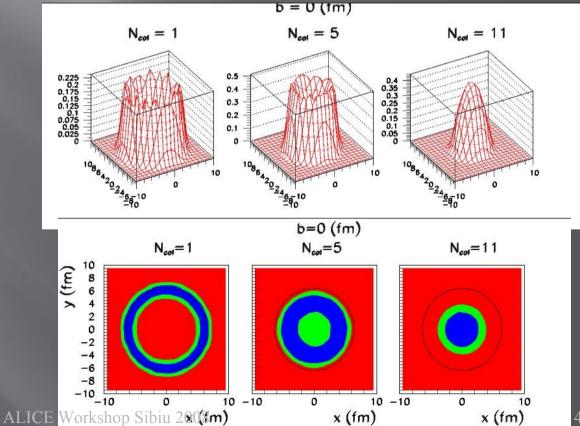


M.Petrovici & A.Pop, Selected Aspects of Flow Phenomena in Heavy Ion Collisions, AIP Conf. Proc. 972, pg 98 and refs. that are in

Why transversal direction @ mid rapidity?







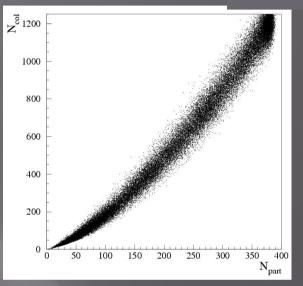
How to select highly azimuthally isotropic central collisions?

RHIC 200GeV

- charged particle multiplicity

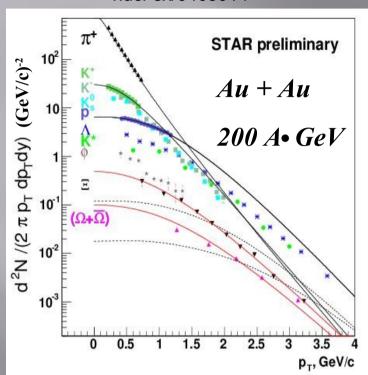
$$-E_{rat} = \frac{E \perp}{E \parallel}$$

$$-Directivity = \frac{\begin{vmatrix} n & p_t^i \\ i=1 & n \end{vmatrix}}{\begin{vmatrix} n & p_t^i \\ i=1 & n \end{vmatrix}}$$



Transverse Flow @ RHIC

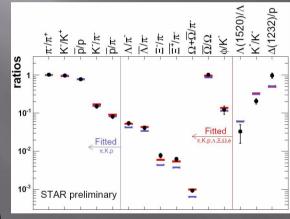
nucl-ex/0403014

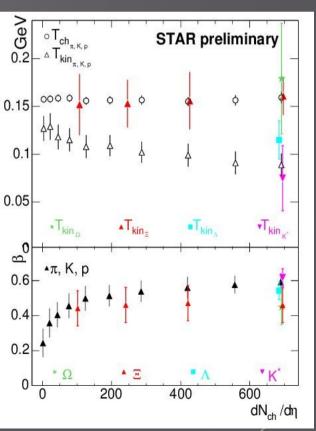


$\frac{dN}{m_t dm_t} \sim \int_0^R r dr \; m_T$	$K_1\left(\frac{m_t\cosh\rho}{T_{t0}}\right)$	$I_0\left(\frac{p_t \sinh \rho}{T_{f0}}\right)$
$\rho = \tanh^{-1} \beta_r$	$\beta_r = \beta_s \left(\frac{r}{R}\right)^0$	$\alpha = 0.5, 0.7, 1, 2$

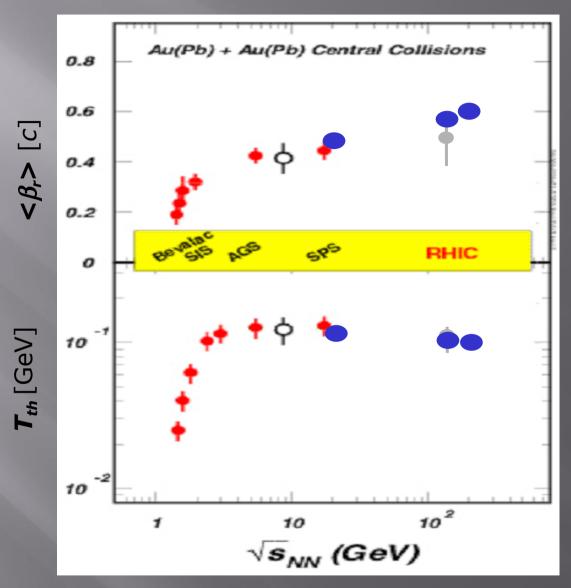
Schnedermann et al nucl-th/9307020

Particle	T_{kin} (MeV)	$ $ $\langle \beta \rangle$ (c)
π, K, p	89 ± 10	0.59 ± 0.05
K^*	75 ± 35	0.62 ± 0.05
$\Lambda,\ \bar{\Lambda}$	115 ± 20	0.54 ± 0.05
$\Xi^-, \bar{\Xi}^+$	161 ± 20	0.46 ± 0.10
$\Omega,\ ar{\Omega}$	179 ± 60	0.45 ± 0.10



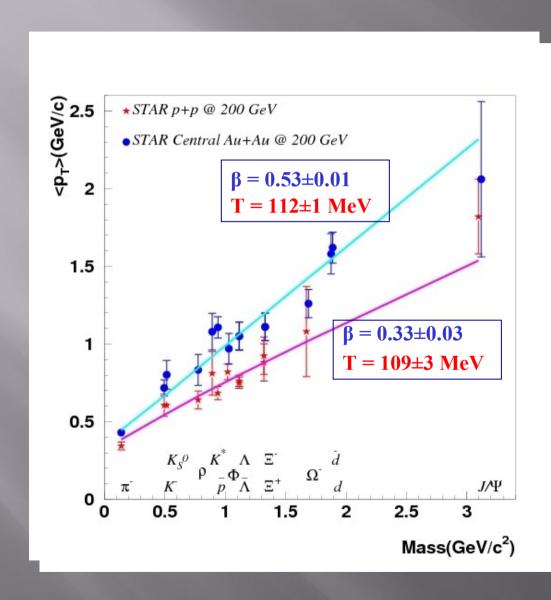


Transverse Flow excitation function



Xu N and Kaneta M 2002 Nucl. Phys. A 698 306

Transverse Flow



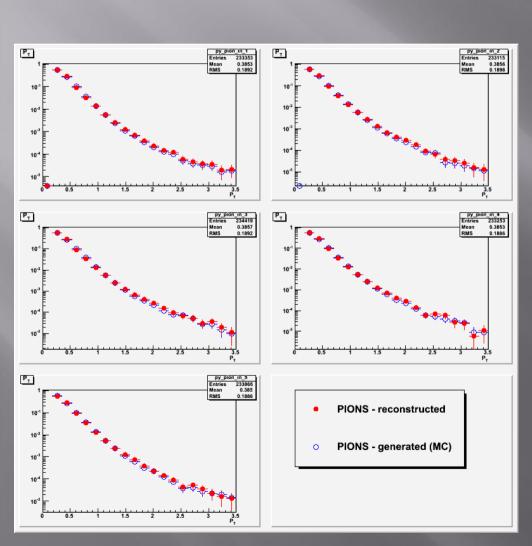
$$Λ$$
, $\overline{Λ}$, Ξ^{\pm} , Ω^{-} , J/ψ

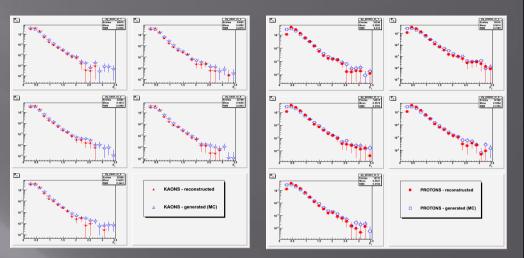
$$β = 0.36, T = 172 \text{ MeV}$$

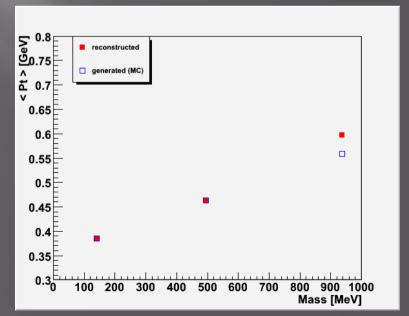
$$\pi$$
, K, \overline{p} , d, \overline{d}
 $\beta = 0.59$, T = 104 MeV

p_t spectra for π , K, p - HIJING

5.5 TeV



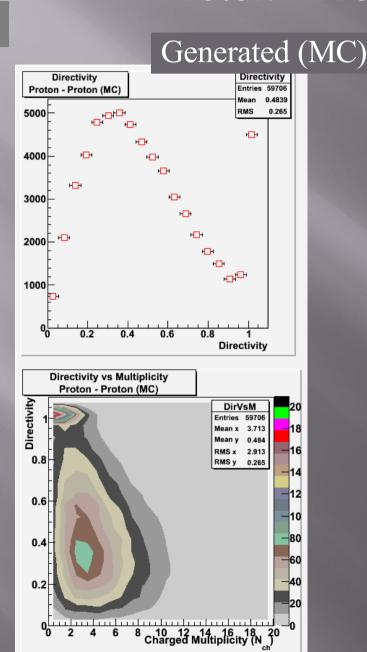




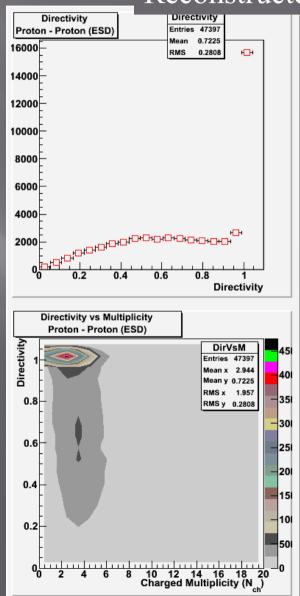
Directivity vs. Multiplicity Proton –Proton PYTHIA

ALICE Workshop Sibiu 2008

5.5 TeV

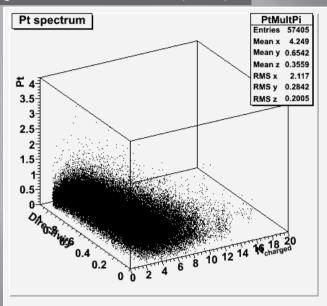


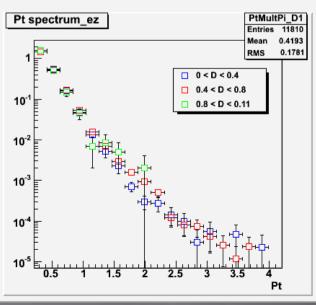
Reconstructed (ESD)



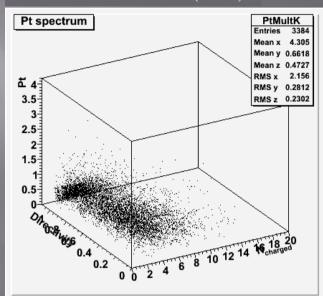
p_t spectra for π, K, p – conditioned by cuts in Directivity, multiplicity or both Proton – Proton PYTHIA

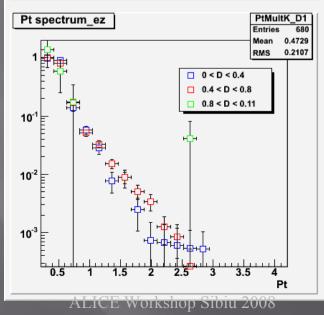
pions reconstructed (ESD)



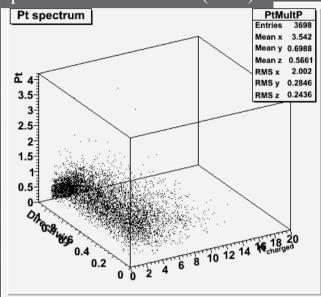


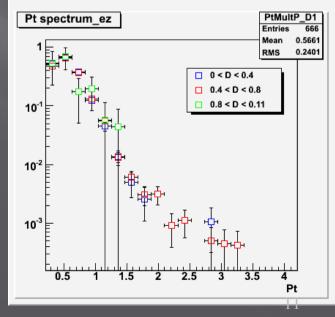
kaons reconstructed (ESD)



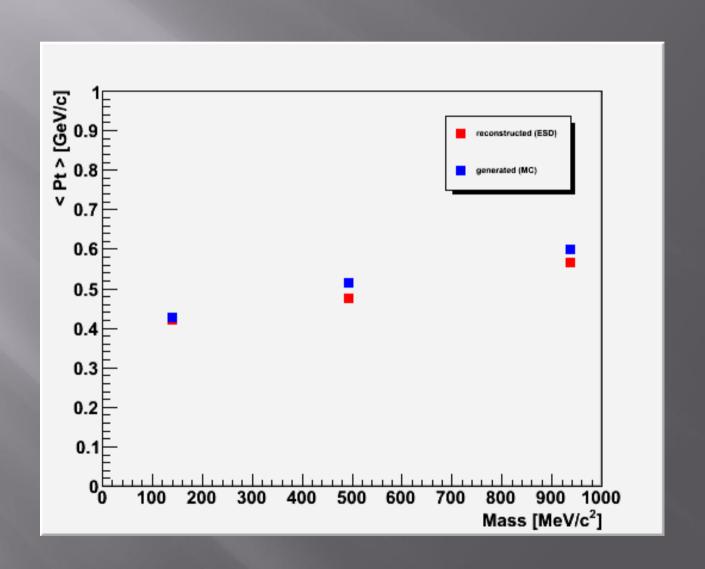


protons reconstructed (ESD)





as a function of mass conditioned by cuts in Directivity, multiplicity or both Proton – Proton PYTHIA



Directivity vs. Multiplicity Pb -Pb HIJING

5.5 TeV

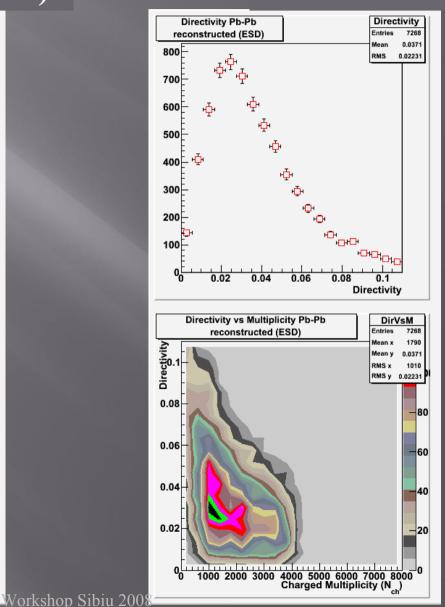
Generated (MC)

20

Directivity Pb-Pb Directivity generated (MC) 0.02878 RMS 0.01974 1000 800 | 600 ф 400 200 0.04 0.02 0.06 Directivity Directivity vs Multiplicity Pb-Pb generated (MC) Directivity DirVsM 90 2827 Mean x 80 Mean v 0.02878 1755 RMS y 0.01974 0.06 50

1000 2000 3000 4000 5000 6000 7000 8000 Charged Multiplicity (N)

Reconstructed (ESD)



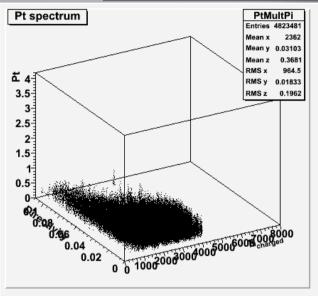
p_t spectra for π , K, p – conditioned by cuts in

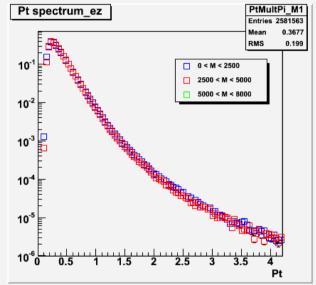
Directivity, multiplicity or both

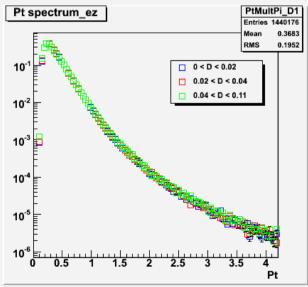
Without cuts

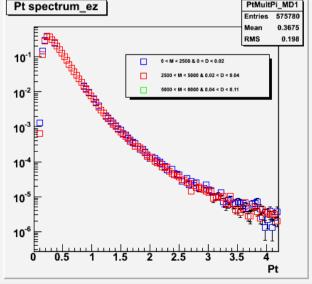
Pb-Pb HIJING

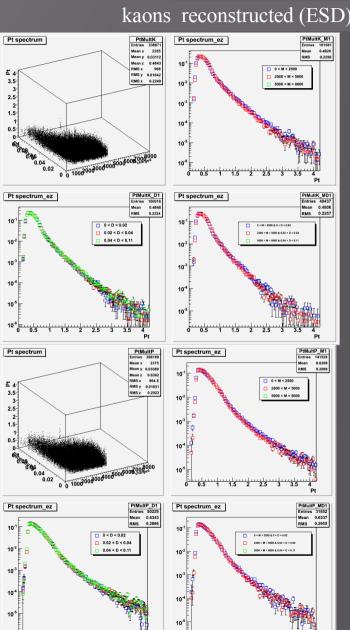
pions reconstructed (ESD)











ALICE Workshop Sibiu 2008

protons reconstructed (ESD)

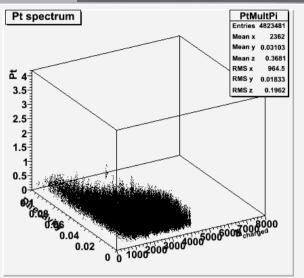
p_t spectra for π , K, p – conditioned by cuts in

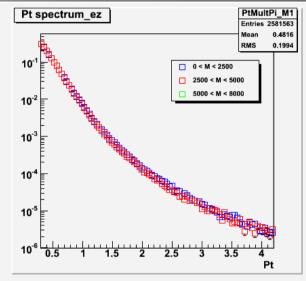
Directivity, multiplicity or both

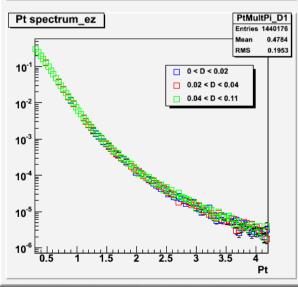
Cut: pt > 0.3 GeV

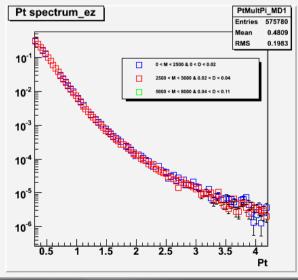
Pb-Pb HIJING

pions reconstructed (ESD)

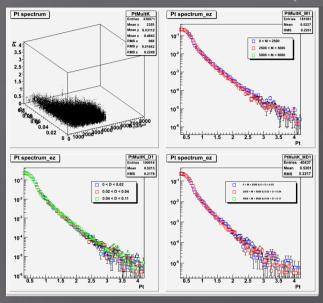


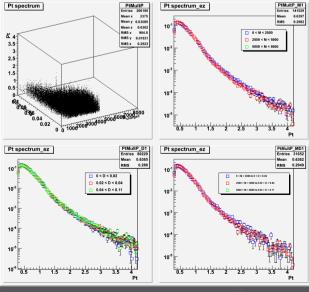






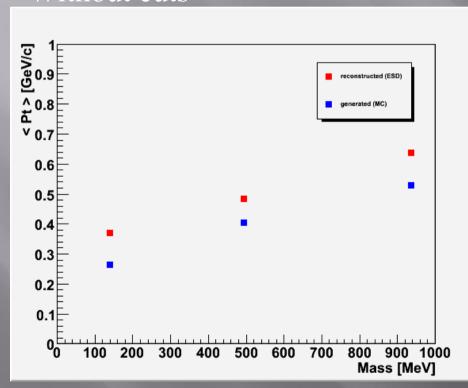
kaons reconstructed (ESD)



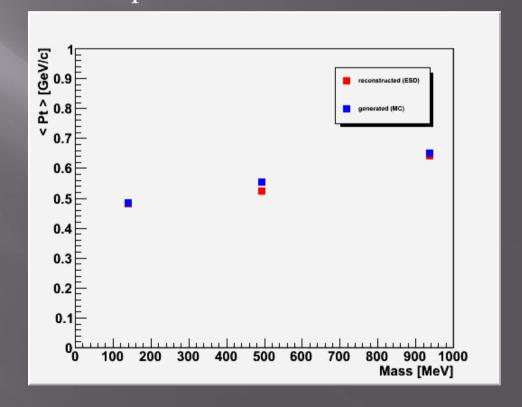


cuts in Directivity, multiplicity or bothPb-Pb HIJING

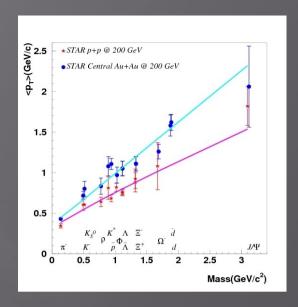
Without cuts



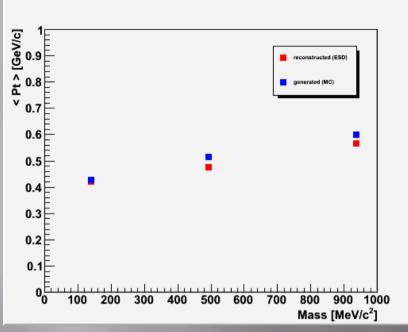
Cut: pt > 0.3 GeV

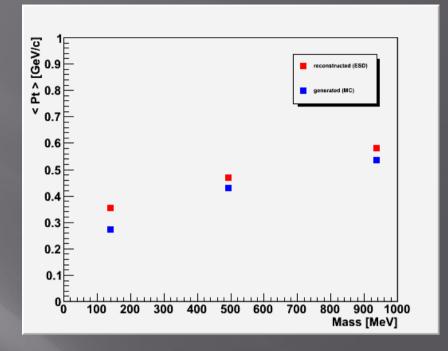


Conclusions

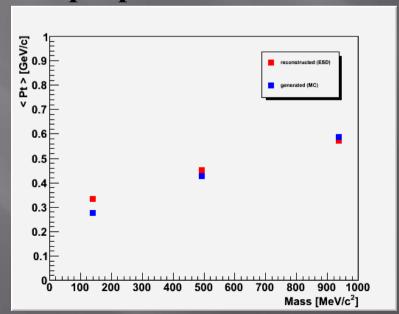


- Very preliminary results
- pt spectra are well reconstructed
- This analysis will be expanded for multistrange baryons and J/ψ
- $\cdot < p_t > > T$





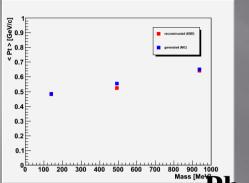
p – p Dir cut 3



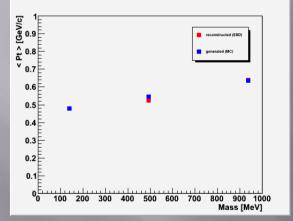
<pt> vs mass —without pt cut Pb – Pb Mult cut 1 Pb – Pb Mult cut 2 100 200 300 400 500 600 700 800 900 1000 100 200 300 400 500 600 700 800 900 1000 Pb - Pb Dir cut 1 Pb – Pb Dir cut 2 100 200 300 400 500 600 700 800 900 1000 100 200 300 400 500 600 700 800 900 1000 100 200 300 400 500 600 700 800 900 1000 - Pb Both cut 2 Pb – Pb Both cut 1 V 0.7 100 200 300 400 500 600 700 800 900 1000 100 200 300 400 500 600 700 800 900 1000 Mass [MeV]

<pt> vs mass –with pt cut

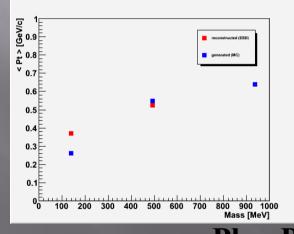
Pb – Pb Mult cut 1 Pb – Pb Mult cut 2



Pb – Pb Dir cut 1

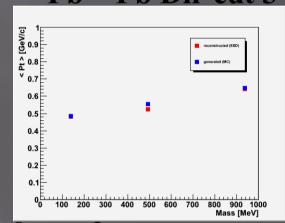


Pb — Pb Dir cut 2

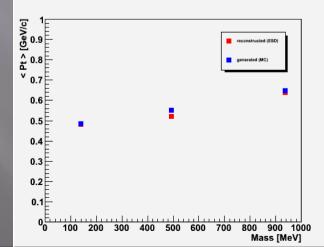


0.8 - 0.6 - 0.5 - 0.4 - 0.3

Pb – Pb Dir cut 3



Pb - Pb Both cut 1



Pb – Pb Both cut 2

