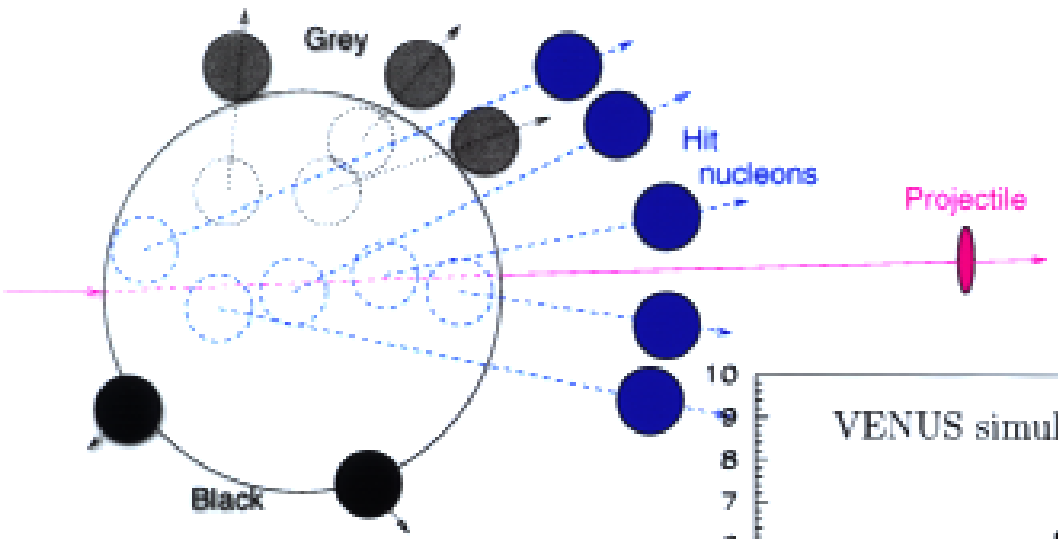
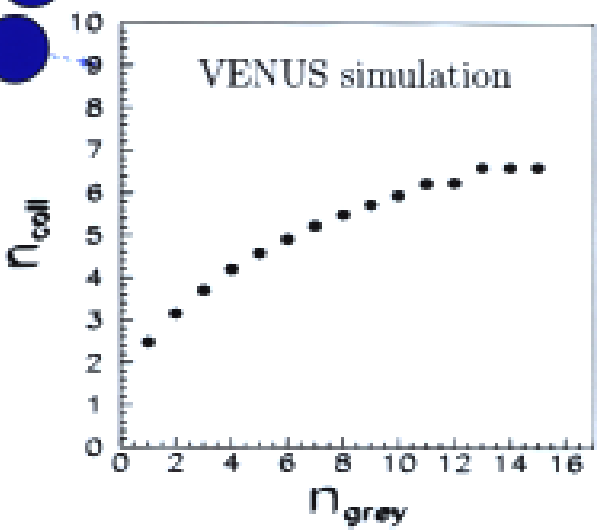
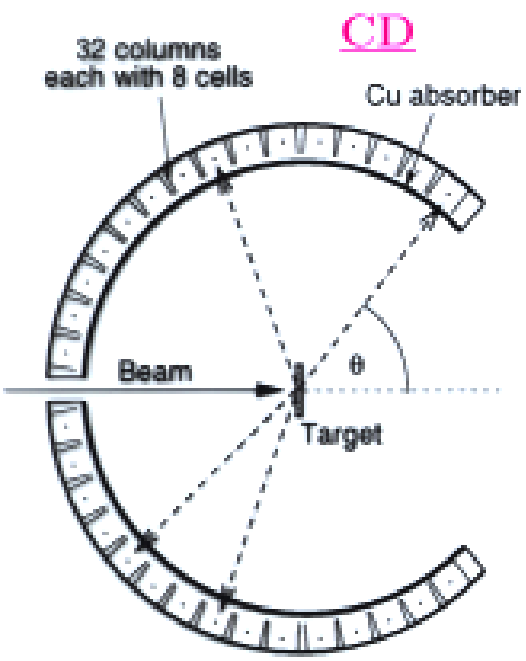
Centrality determination in pPb

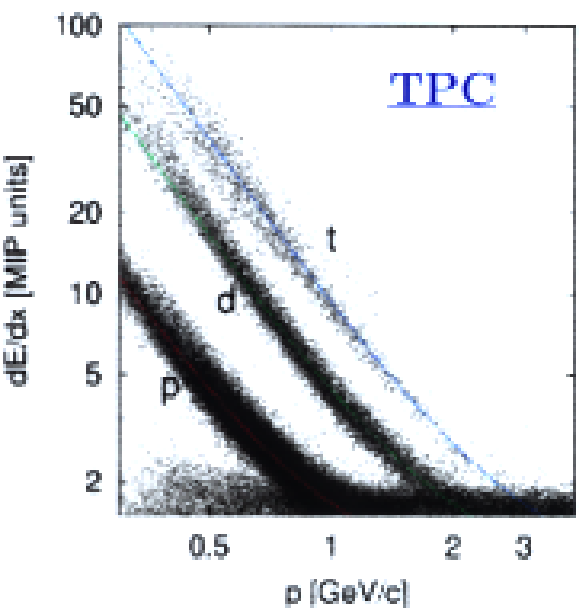


- grey: $0.15 < p < 1.0$ GeV/c
- black: $p < 0.15$ GeV/c





- Cu absorber 200 μ eliminates black protons
- Charge amplitude cut at 3-MIP rejects fast particles



Slow particles, cut on dE/dx takes pions and electrons out

Data Sets and Analysis Methods

Data Sets

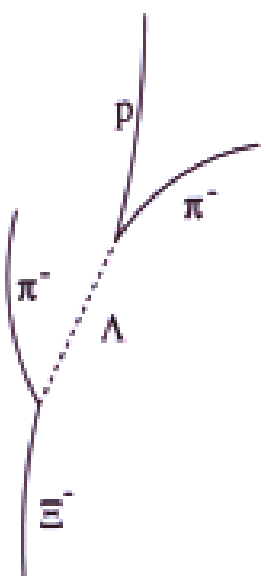
pp: 2 500 000 events $\longrightarrow$ minimum bias trigger

pPb: 820 000 events

- 350 000 events $\longrightarrow \langle\nu\rangle = 3.7$
- 470 000 events $\longrightarrow \langle\nu\rangle = 5.7$

PbPb: 400 000 events $\longrightarrow$ central (10% σ)

Analysis Methods



Ξ reconstructed by finding decay vertices

$\Xi \longrightarrow \Lambda + \pi$ (B.R. 100 %)

$\Lambda \longrightarrow p + \pi$ (B.R. 63.9 %)

Daughter particles identified using dE/dx (pp,pA)

Background subtraction on invariant mass

pp, pA:

Correction for geom.acceptance and efficiency:

VENUS $\rightarrow$ GEANT $\rightarrow$ recon.

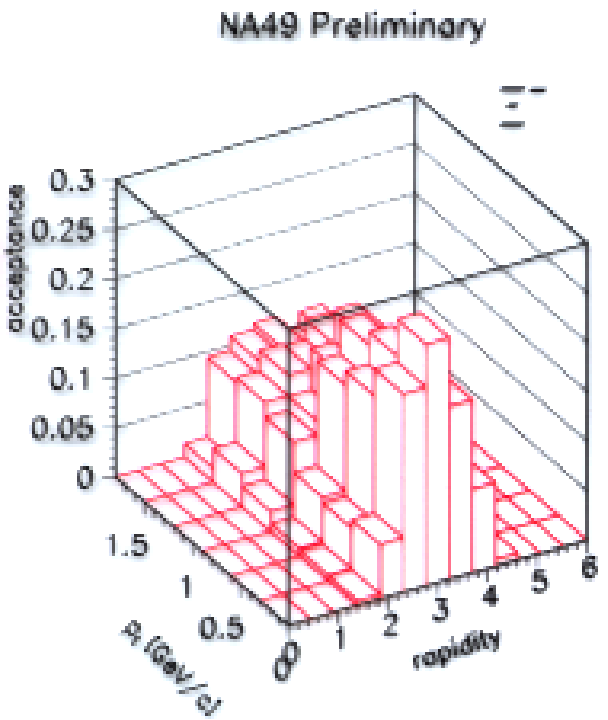
PbPb:

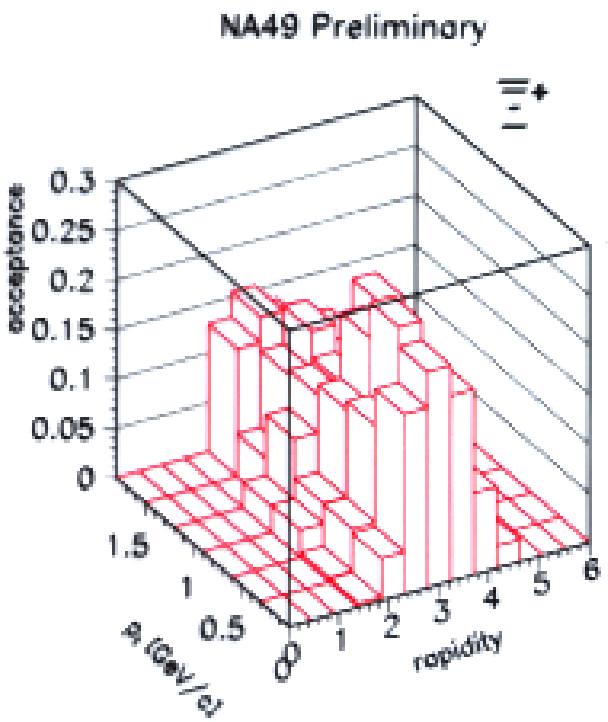
Correction for geometrical acceptance (GEANT)

Correction for efficiency by embedding

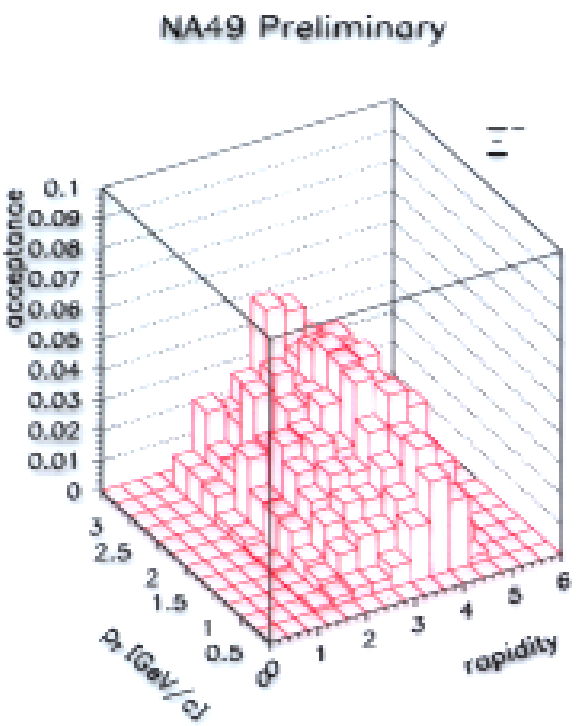
Acceptance

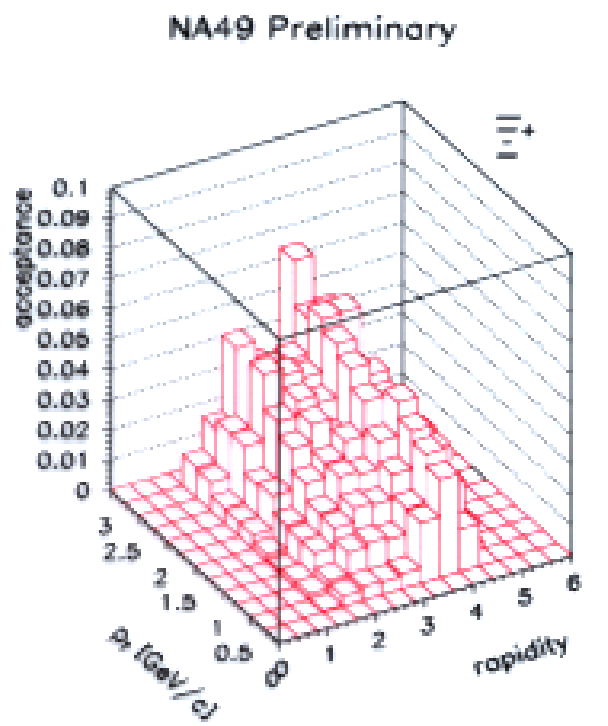
pp, pPb





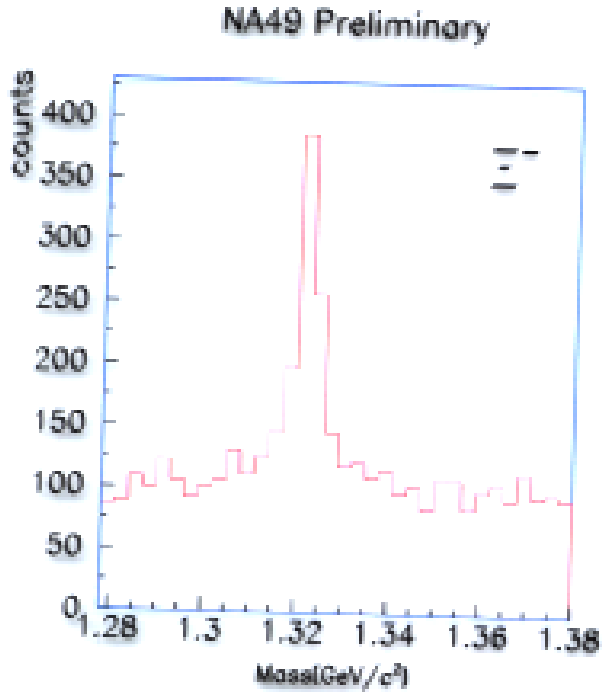
PbPb

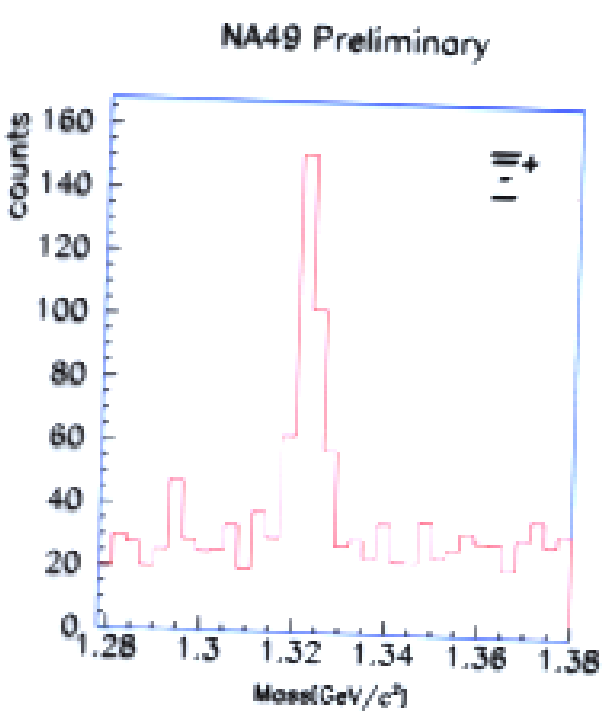




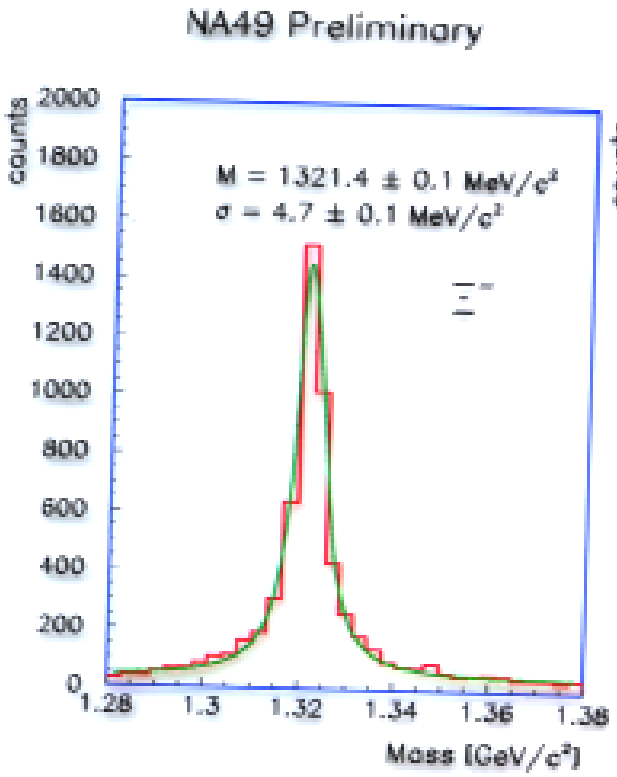
Invariant Mass

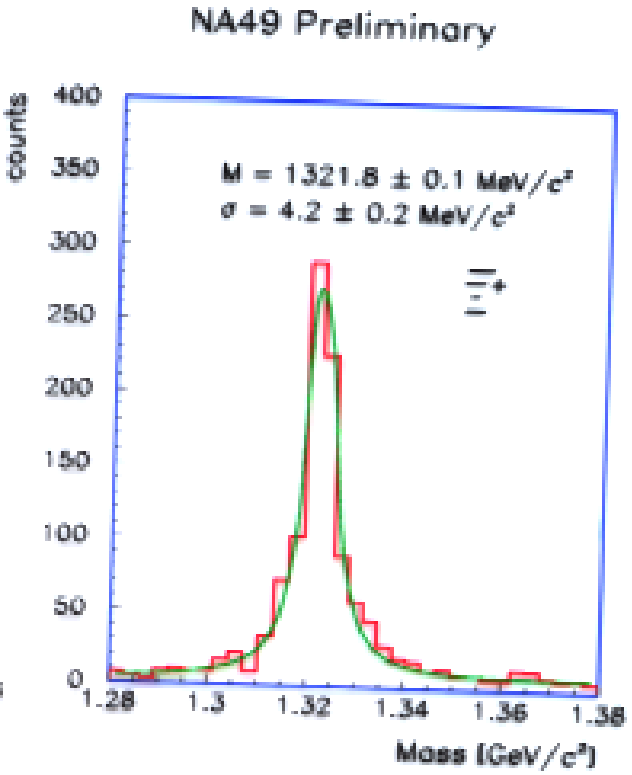
pp





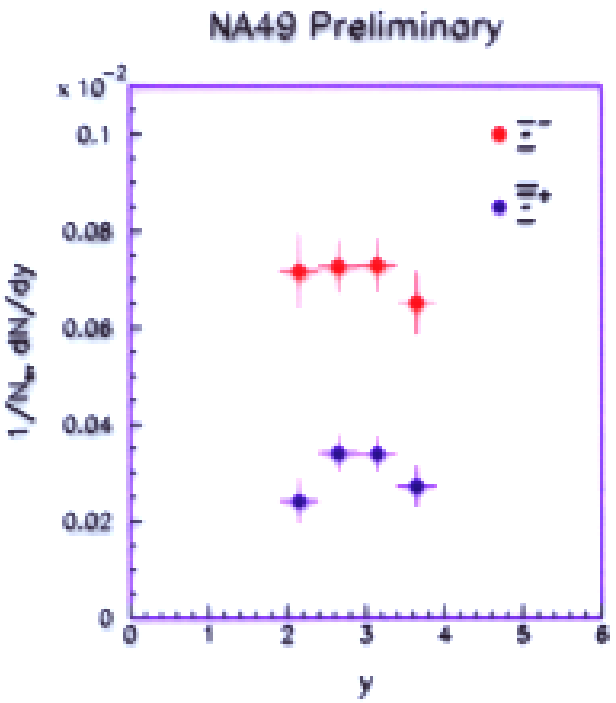
PbPb

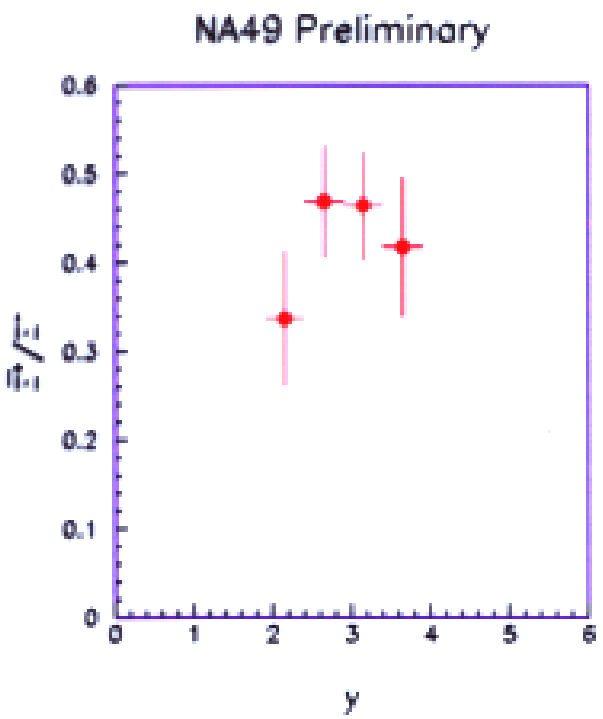




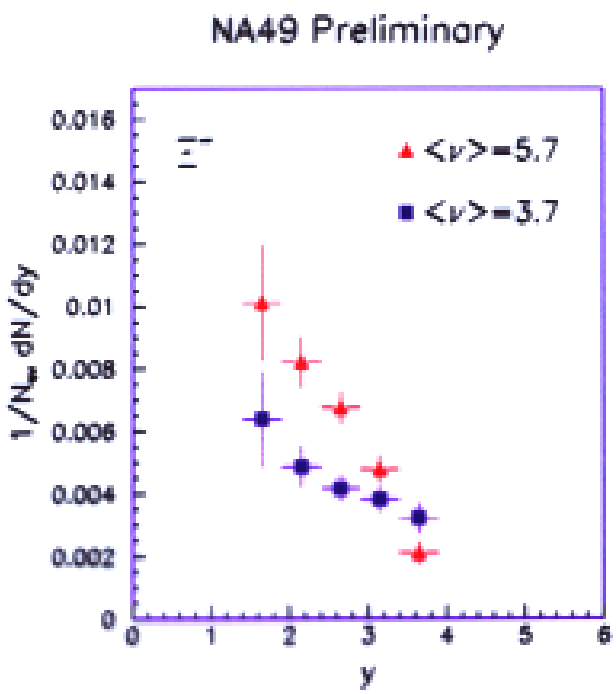
Rapidity distribution pp, pPb

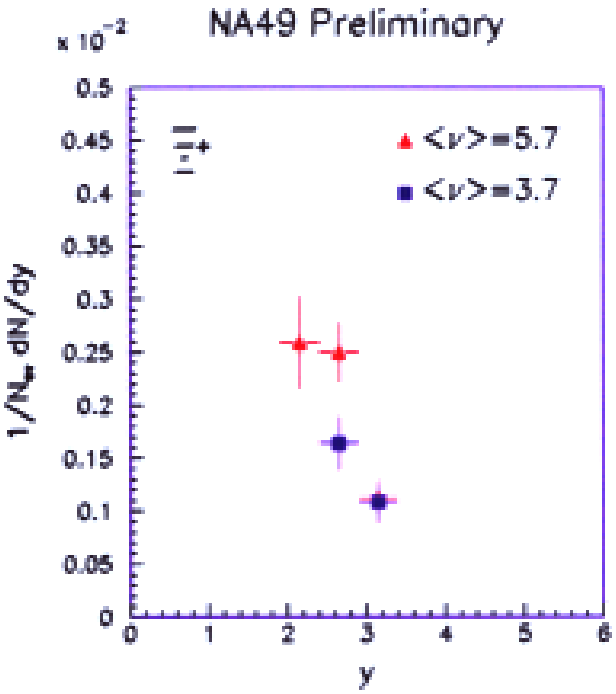
pp



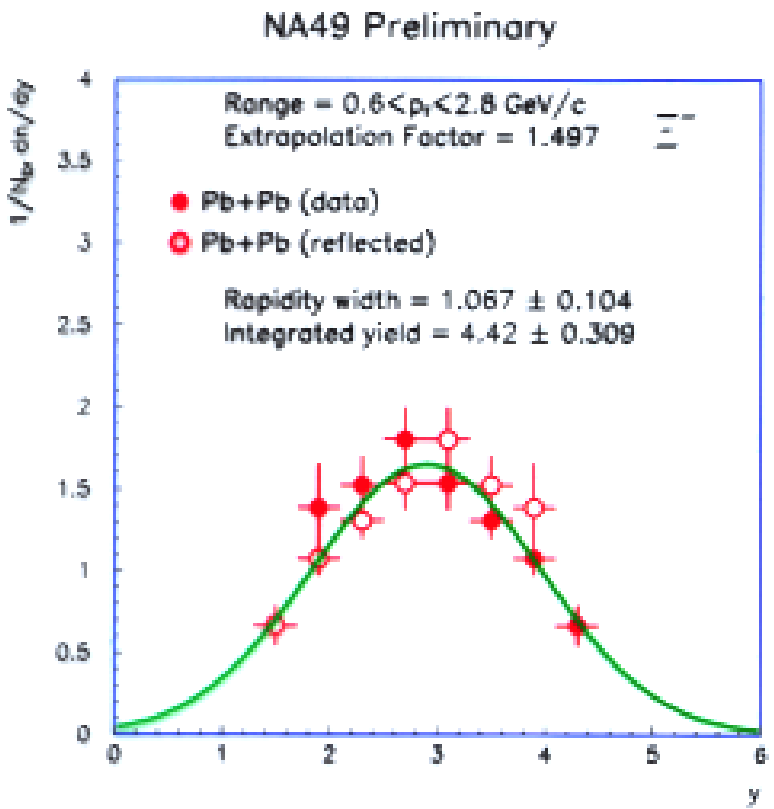


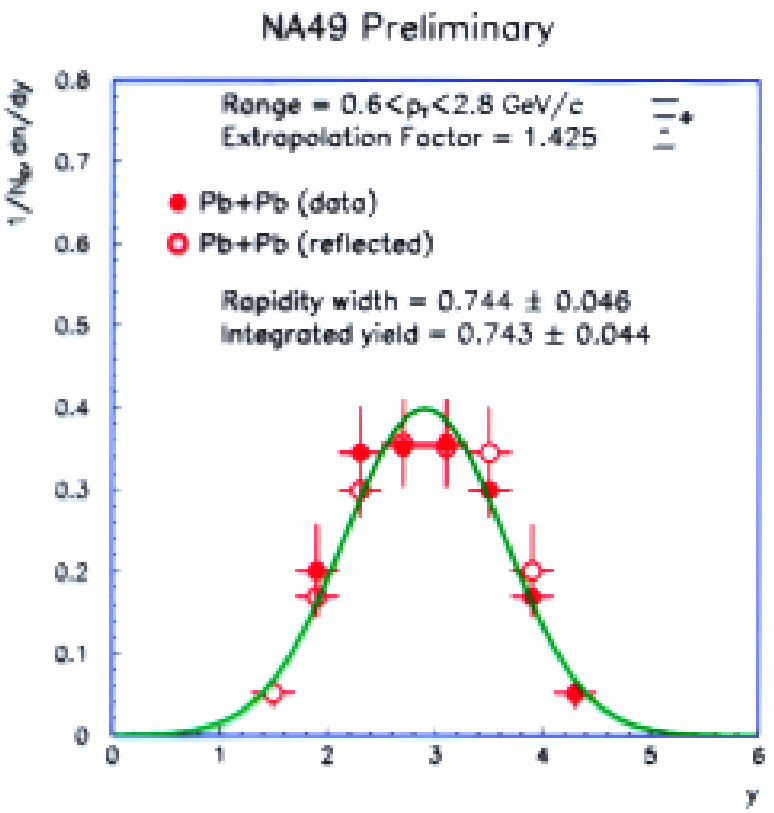
pPb





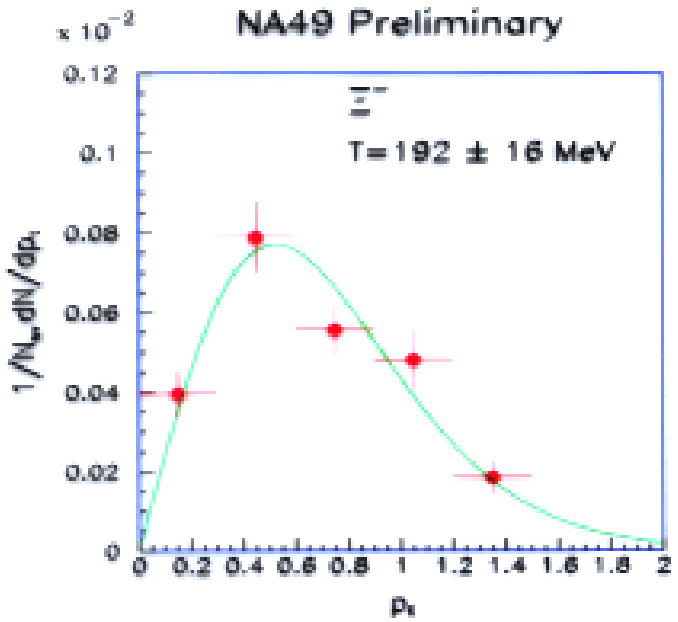
Rapidity distribution PbPb



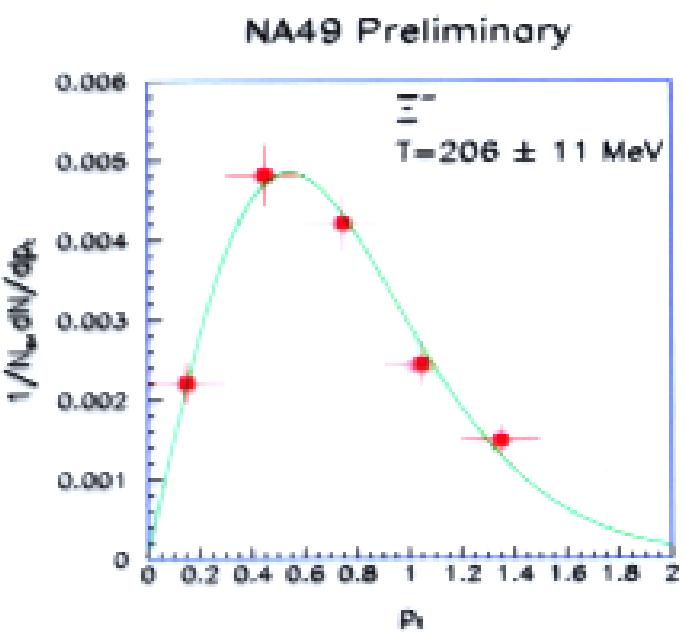


p_t distribution pp pPb

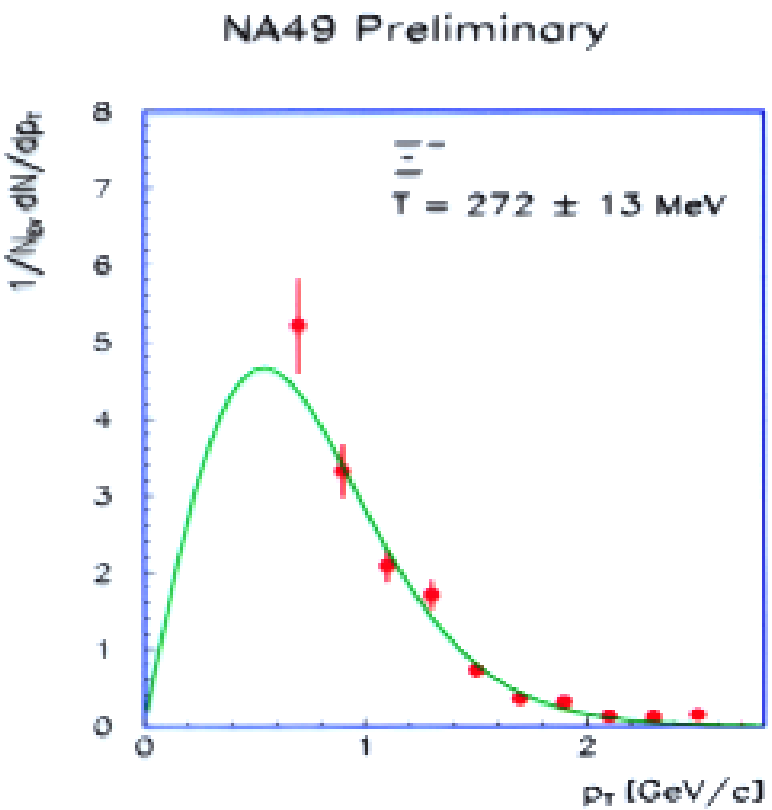
pp

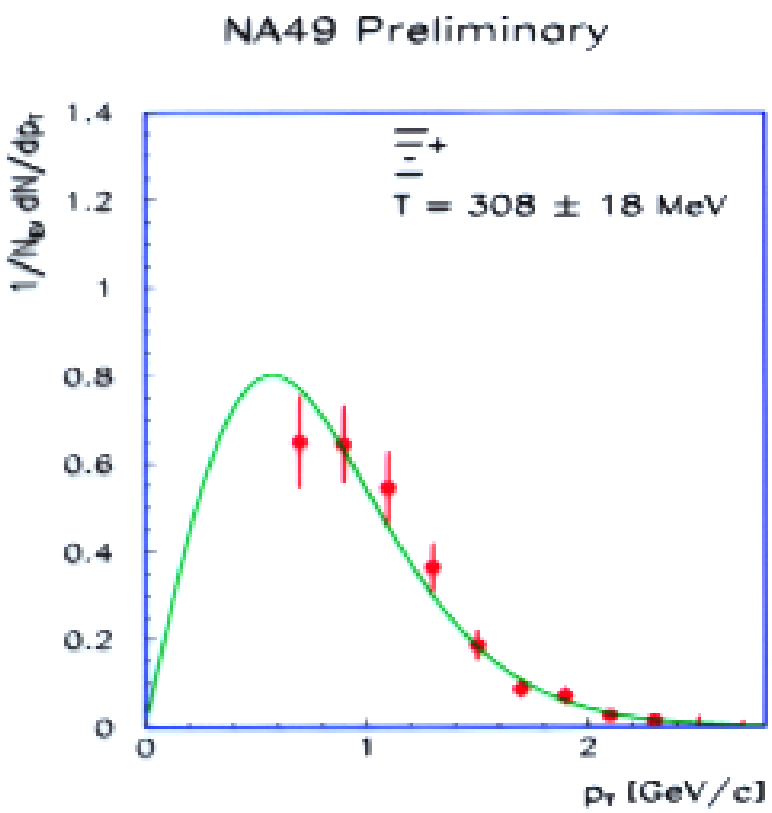


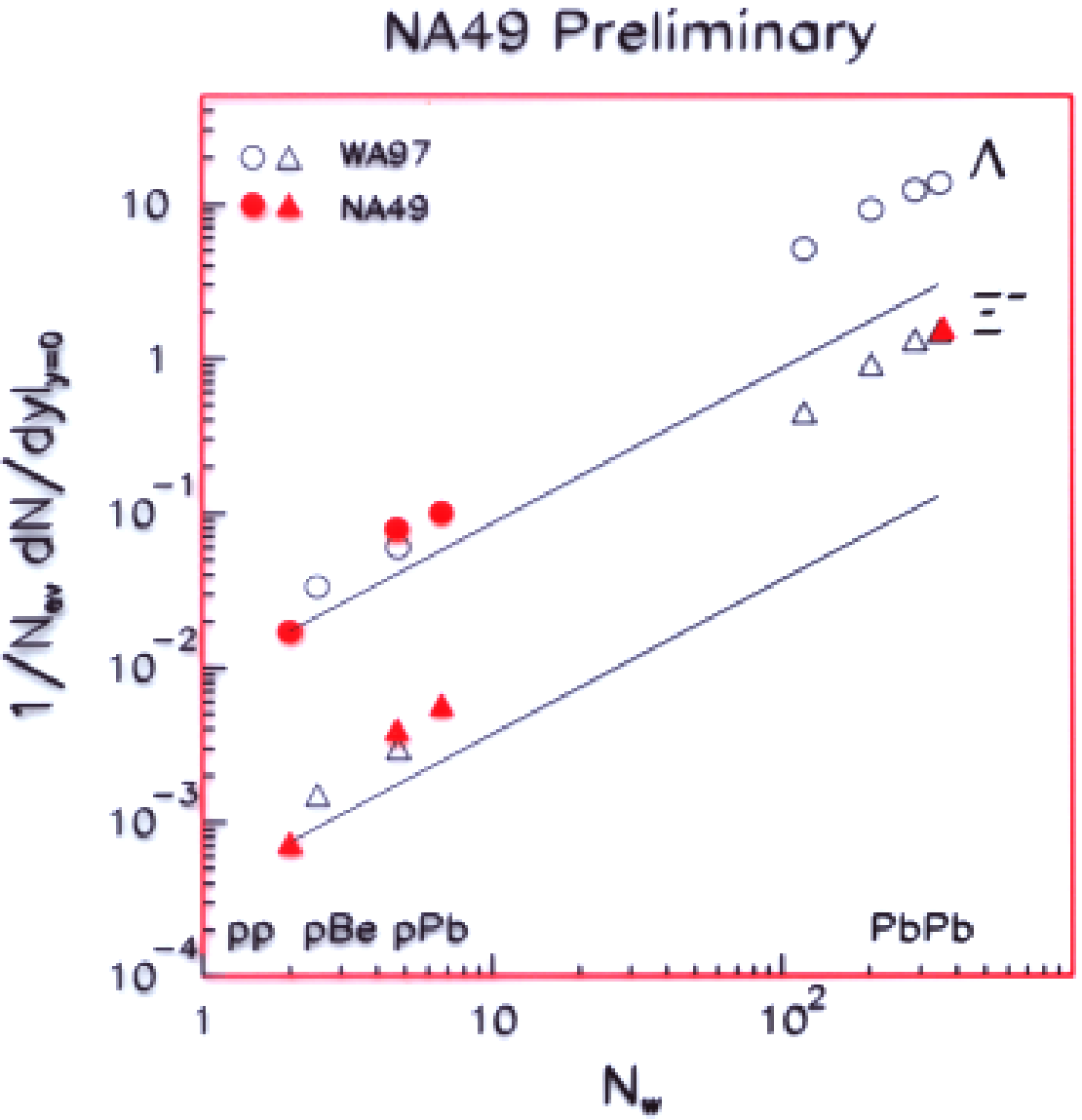
pPb



p_t distribution PbPb



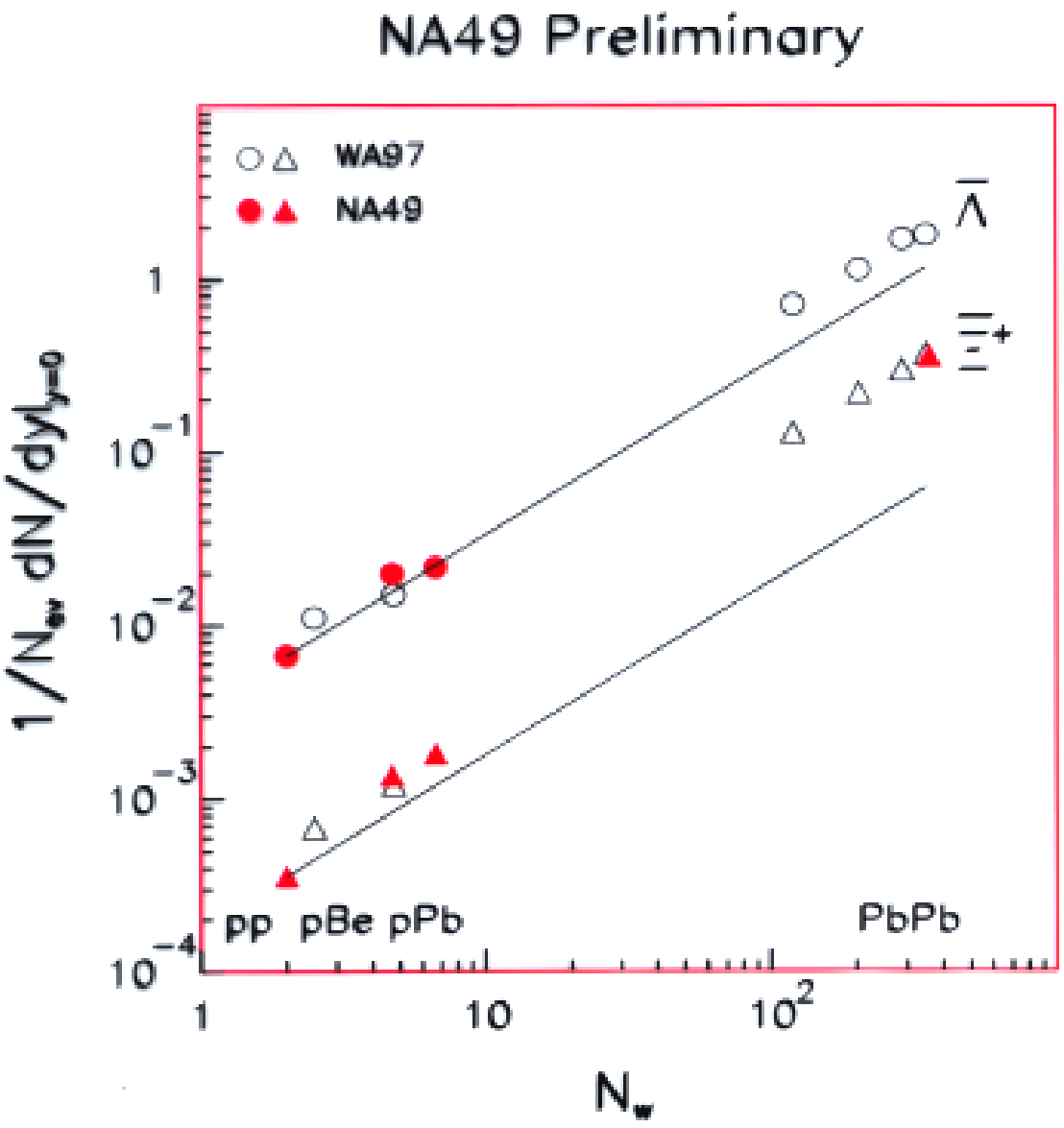




—— Wounded nucleon model prediction:

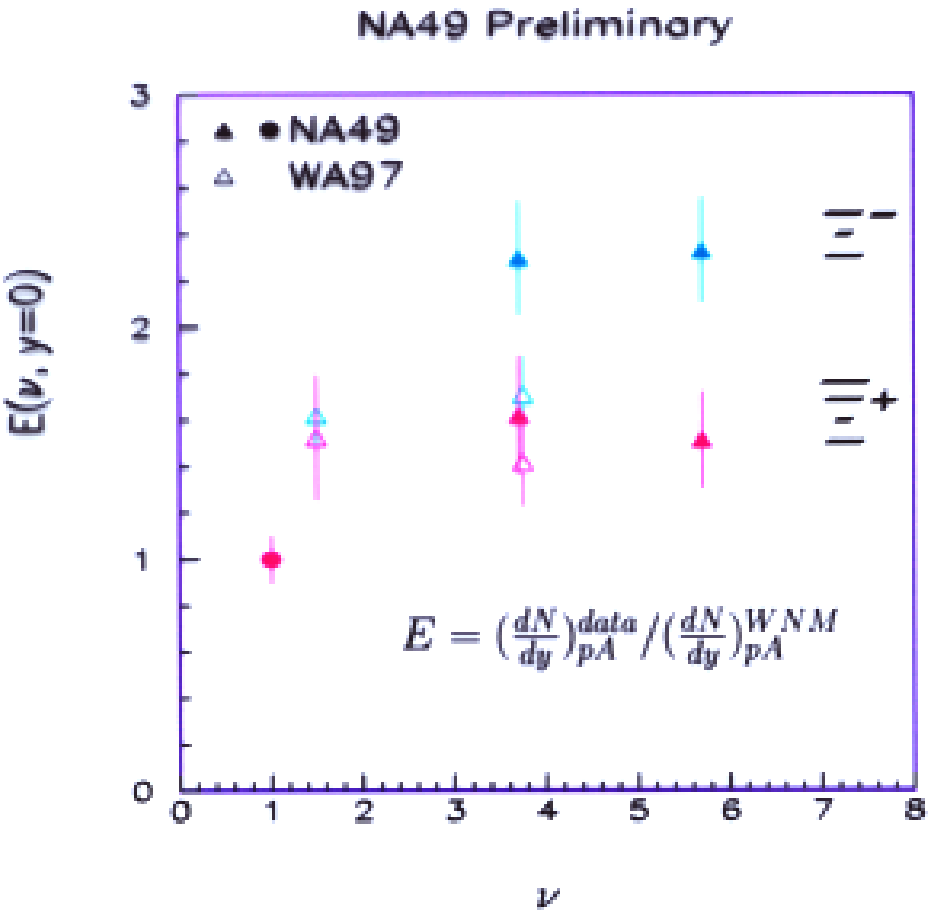
$$\left(\frac{dN}{dy}\right)_{AB} = \frac{N_W(A)+N_W(B)}{2}\left(\frac{dN}{dy}\right)_{pp}$$

• Enhancement seen already in pA



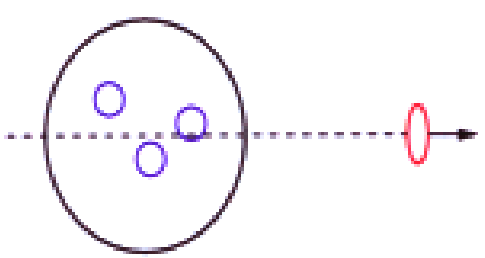
- Smaller enhancement for antibaryons

Enhancement in pA



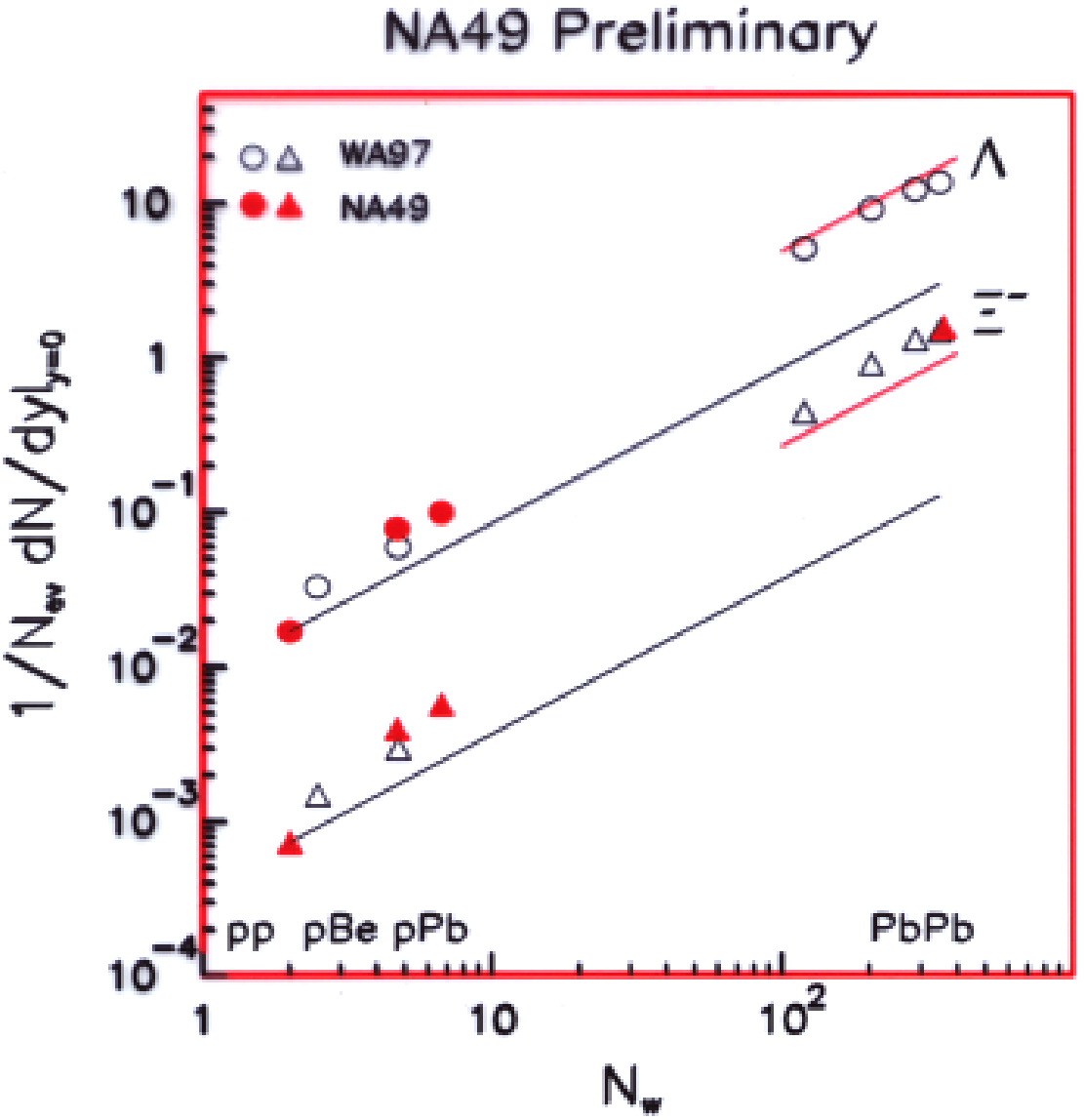
- $(\frac{dN}{dy})_{pA} = E[(\frac{1}{2}\nu + \frac{1}{2})(\frac{dN}{dy})_{pp}]$

- $(\frac{dN}{dy})_{pA} = \frac{\nu}{2} E_T (\frac{dN}{dy})_{pp} + \frac{1}{2} E_P (\frac{dN}{dy})_{pp}$



- $Example: E_T = 1 (\nu = \nu_{pA} = \nu_{AA})$

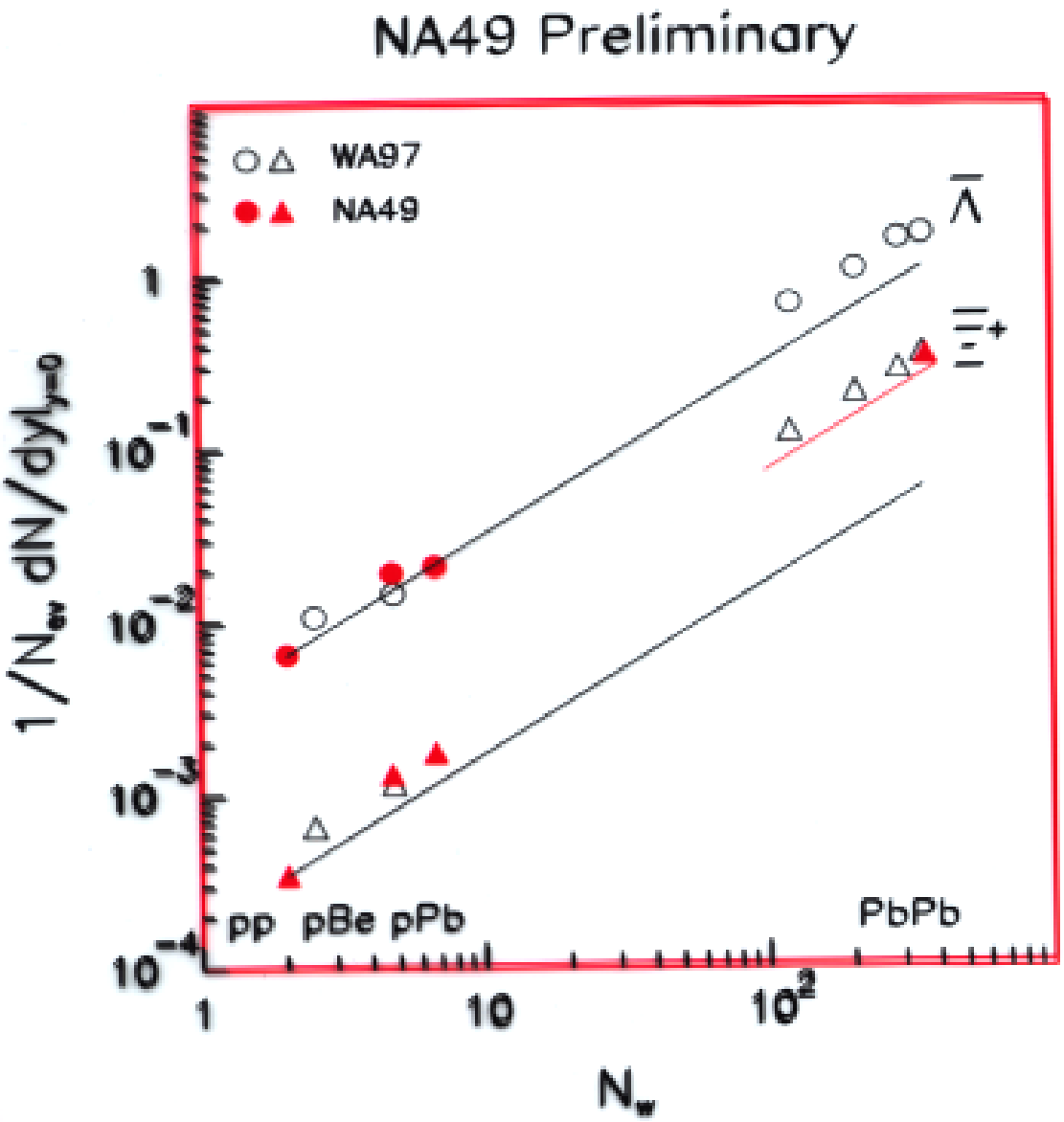
$$\Longrightarrow (\frac{dN}{dy})^{\nu}_{pA} = E_P (\frac{dN}{dy})_{pp}$$



—— Wounded nucleon model prediction:

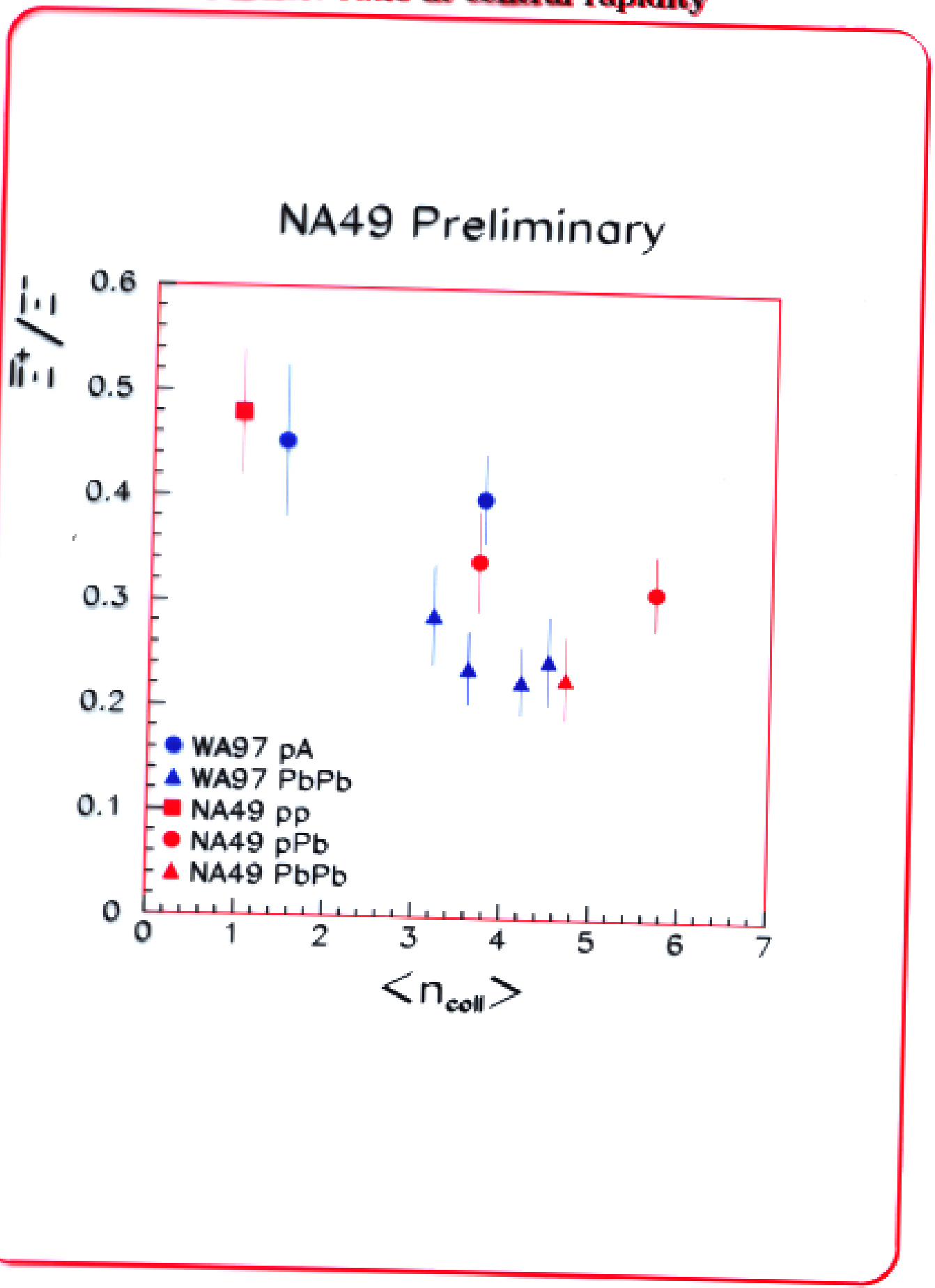
$$\left(\frac{dN}{dy}\right)_{AB} = \frac{N_W(A)+N_W(B)}{2}\left(\frac{dN}{dy}\right)^{\nu}_{pp}$$

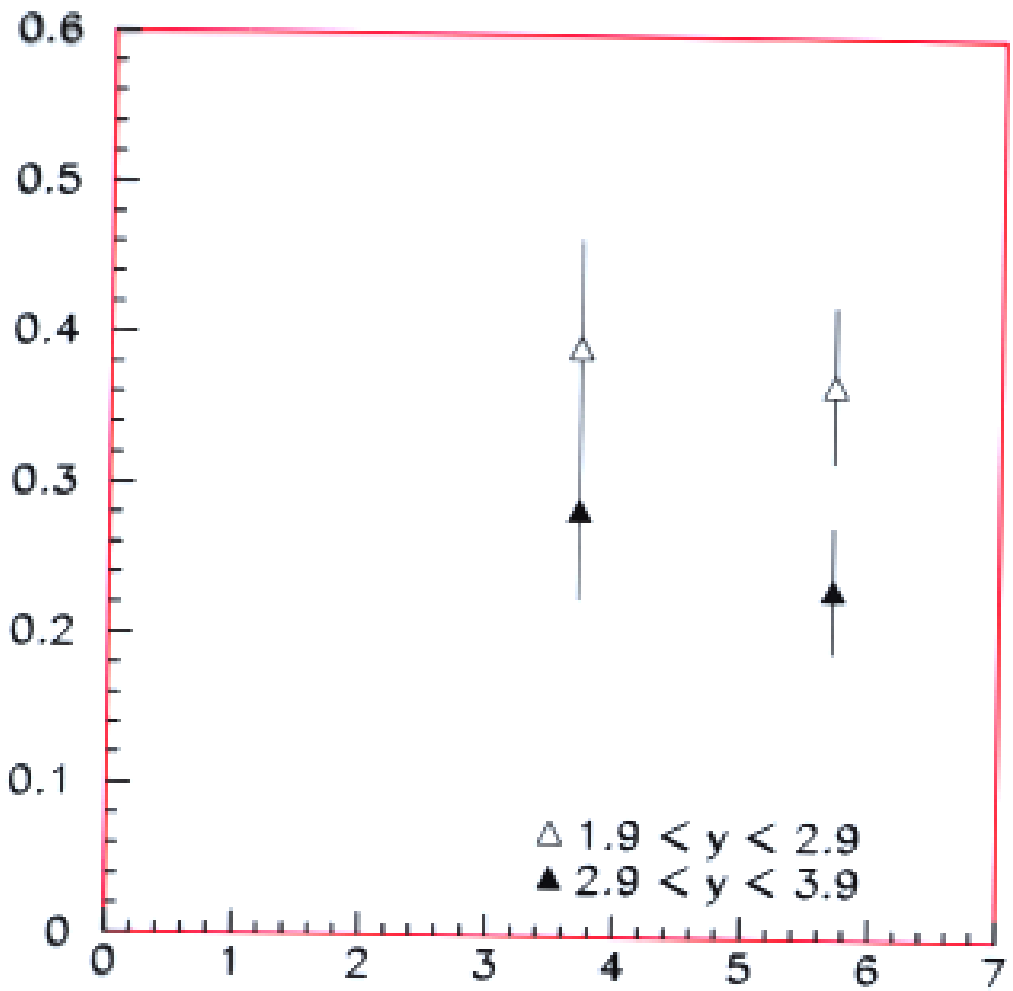
- Enhancement seen already in pA



- Smaller enhancement for antibaryons

Particle ratio at central rapidity




0.6
0.5
0.4
0.3
0.2
0.1
0
0
1
2
3
4
5
6
7
△ 1.9 < y < 2.9
▲ 2.9 < y < 3.9

Conclusions

- A comprehensive set of NA49 data on the production of strange and multistrange baryons and antibaryons in pp, pPb and PbPb collisions is presented.
- Simple wounded nucleon model scaling does not hold between pp and pA interactions. The production of strange and multistrange baryons and antibaryons is enhanced relative to the number of wounded nucleons when going from pp to pA.
- As already observed in AA collisions, the excess in pA is larger for particles of higher strangeness content and is larger for baryons than for antibaryons.
- Study of $\bar{\Xi}^+/\Xi^-$ ratio as a function of centrality shows smooth decrease from pp to central PbPb collisions, indicating the importance of baryon stopping.
- As the observed central rapidity yields are built up by a complex superposition of target and projectile contribution, the possibility of different enhancement factors should be taken into account $\longrightarrow$ work in progress.