

Centrality and energy dependence of the Ξ^- and Ξ^+ production in Pb+Pb collisions at 40 A GeV

at  SPS

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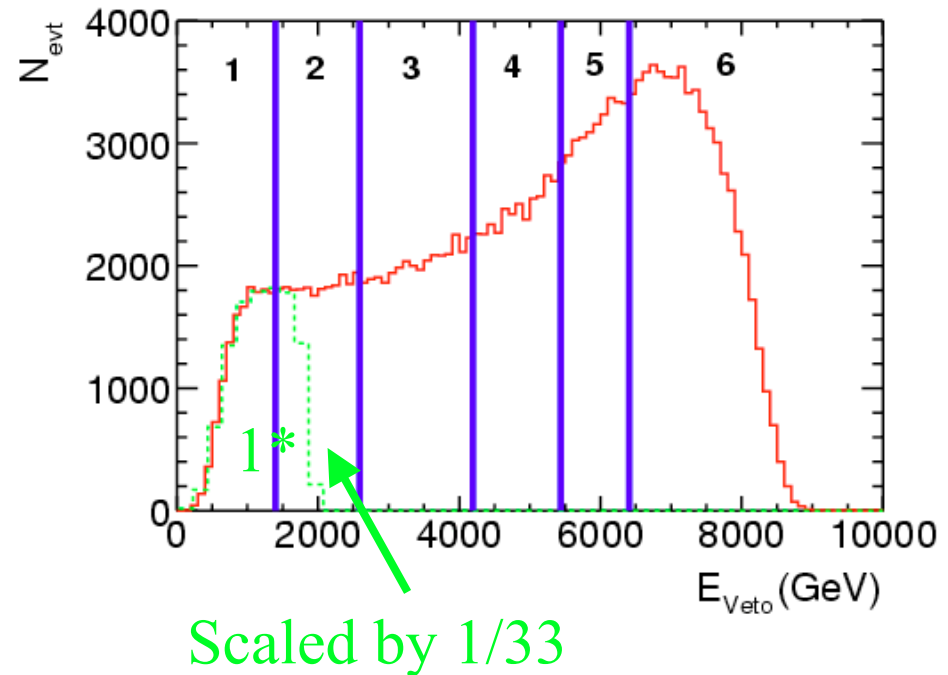
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1. Datasets

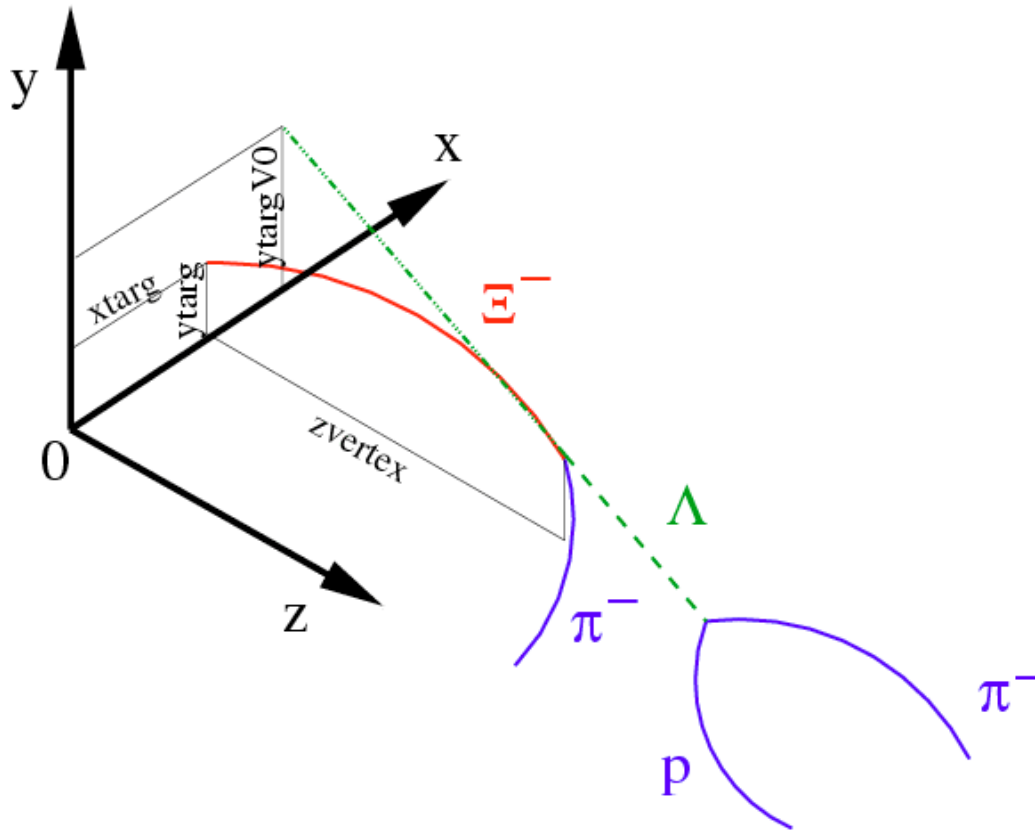
	Dataset	Number of used events
Central (7%)	00C	216,419
	00W	361,186
Minimum bias	01D	189,440
	02C	198,176

2. Centrality classes

Class	N_{evt}	E_{veto} (GeV)	N_w
1	29,780	< 1398	352
1*	577,605		349
2	45,151	1398-2586	281
3	67,241	2586-4191	204
4	64,354	4191-5436	134
5	63,279	5436-6406	88
6	117,506	> 6406	42



3. Analysis cuts

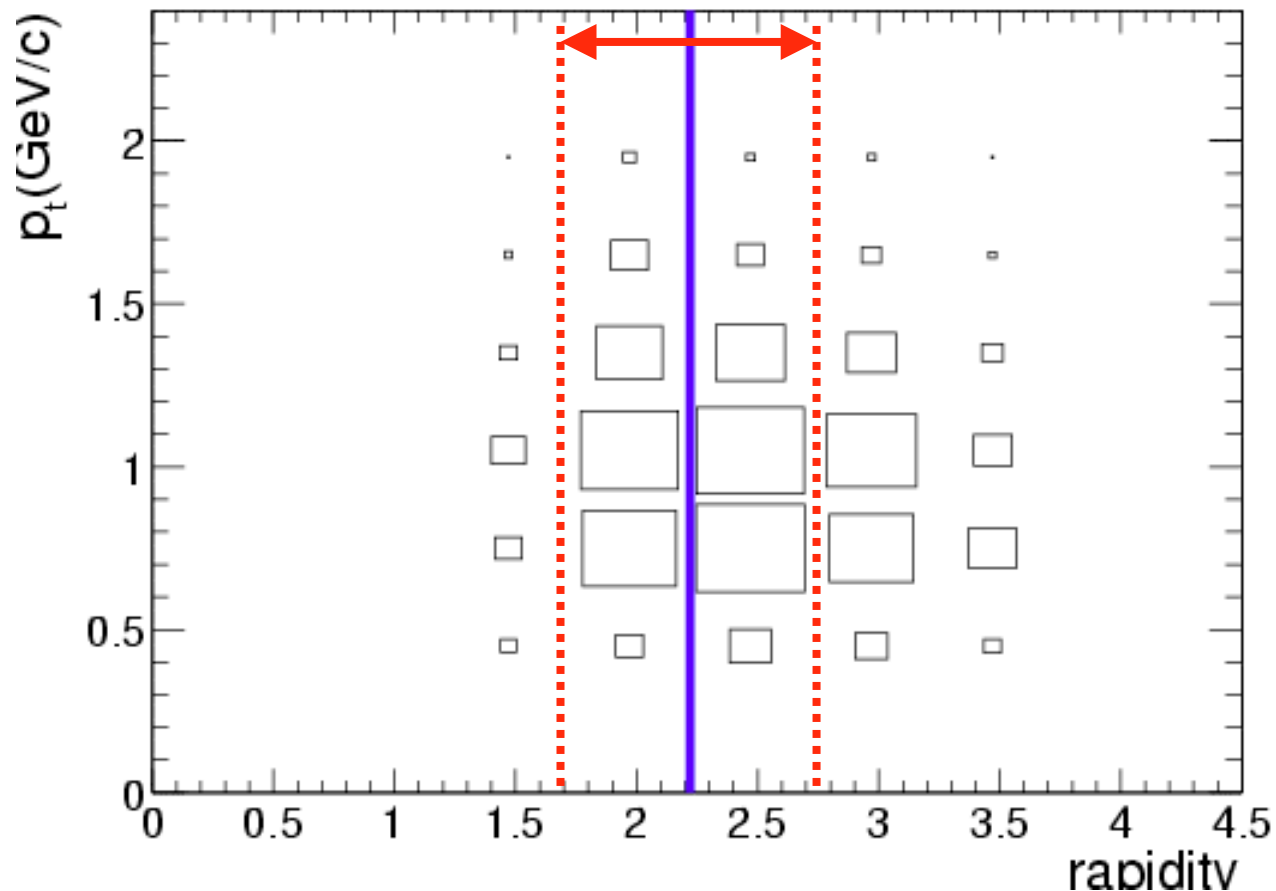


Observable	Range
xtarg (cm)	[-0.4;0.4]
ytarg (cm)	[-0.2;0.2]
zvertex (cm)]-555;∞[

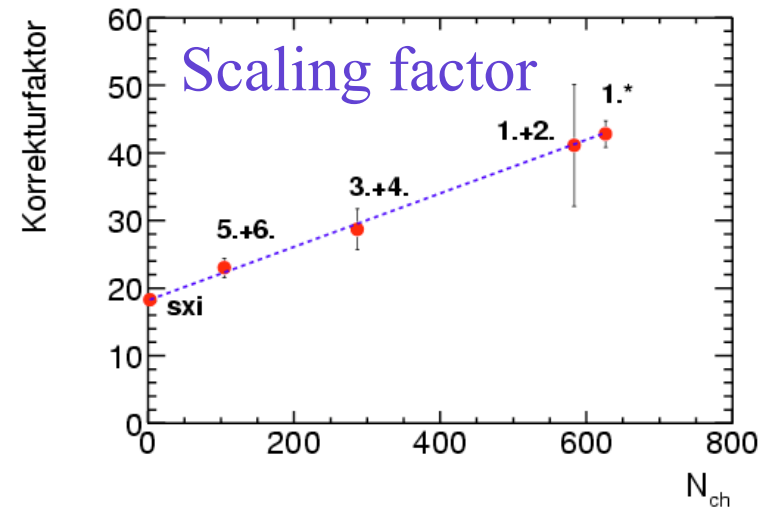
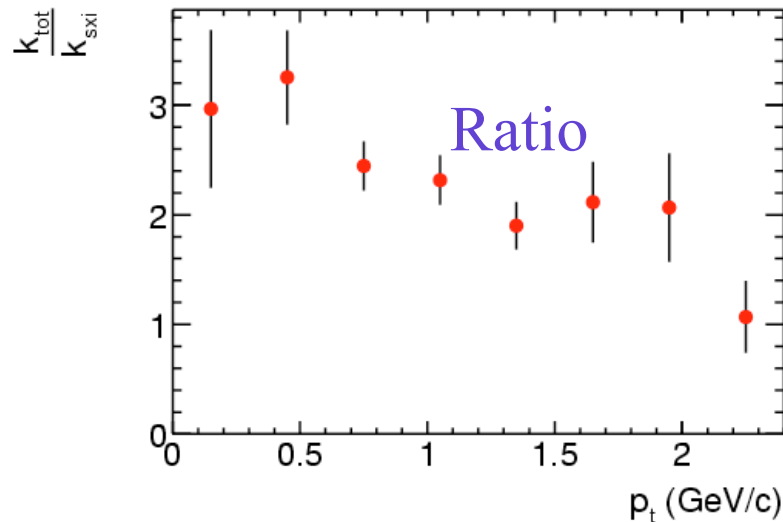
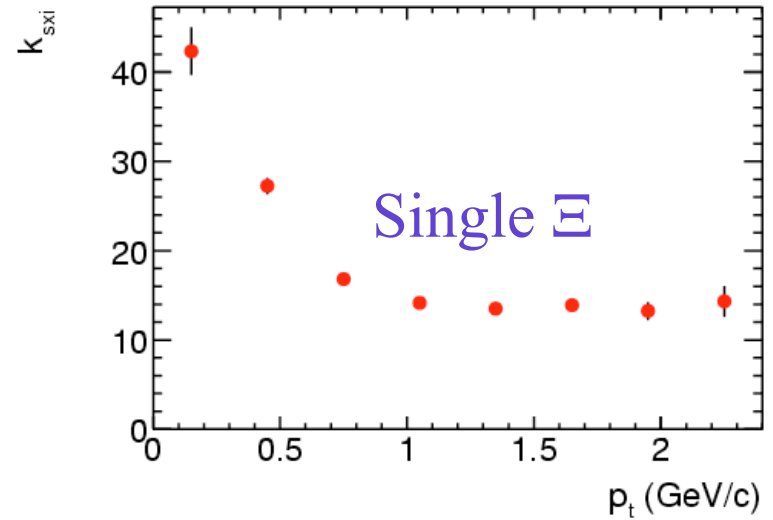
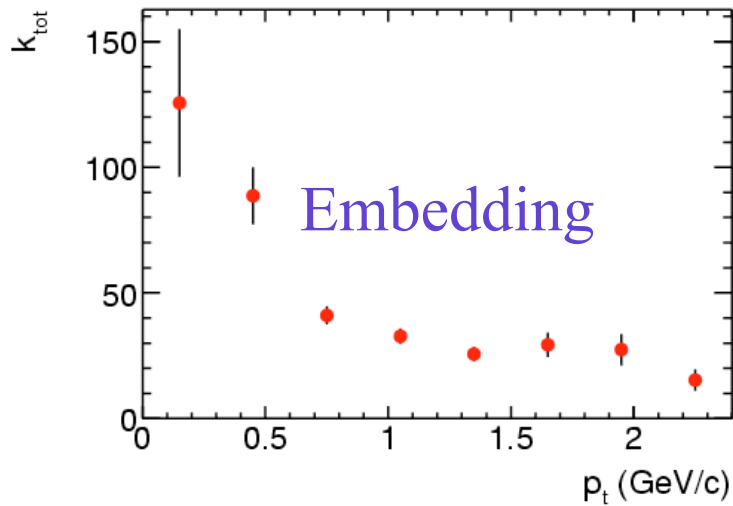
dE/dx-cut on the proton:
 $+ 3.5\sigma$ for $p > 3 \text{ GeV}/c$

4. Phasespace distribution of the Ξ^-

mid-rapidity range: 2.22 ± 0.5

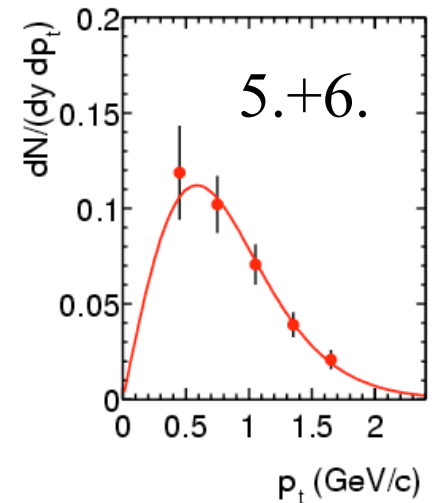
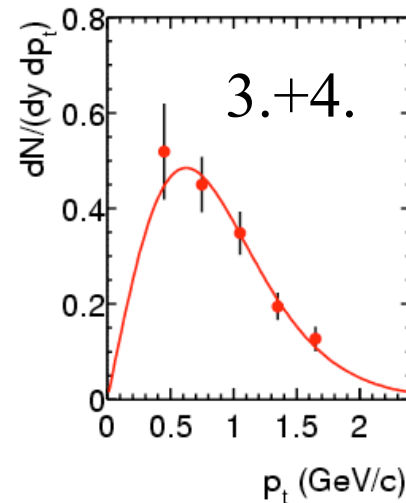
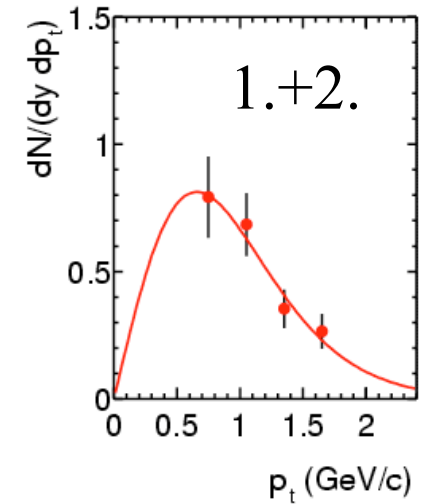
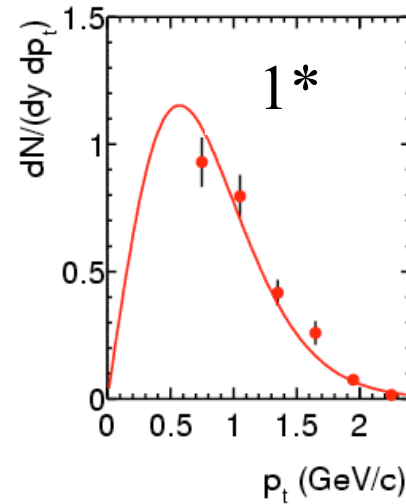


5. Correction for Ξ^- at mid-rapidity



6. Pt-spectra of the Ξ^- at mid-rapidity

Class	dN/dy	T (MeV)
1*	1.23 ± 0.07	226 ± 9
1.+2.	1.00 ± 0.12	292 ± 48
3.+4.	0.58 ± 0.05	265 ± 24
5.+6.	0.12 ± 0.01	238 ± 22



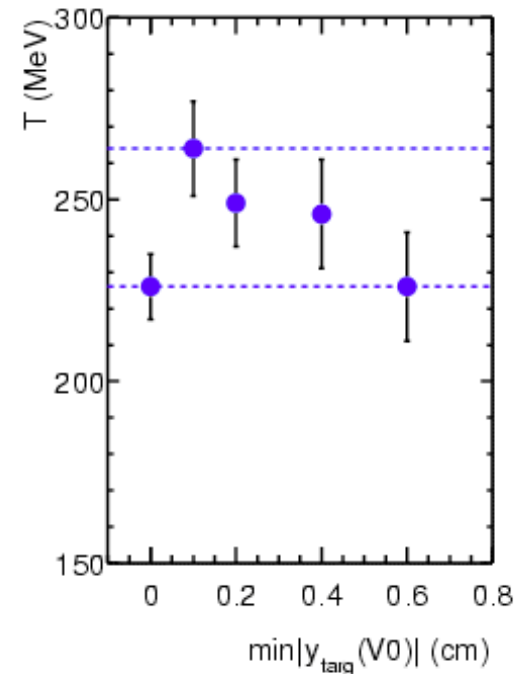
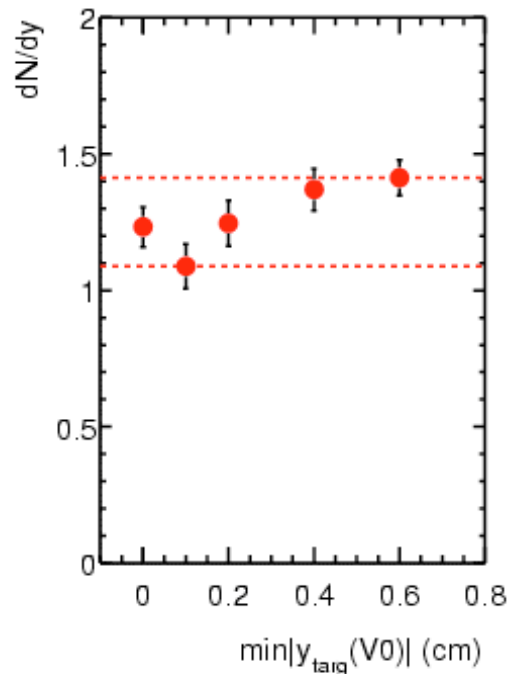
7. Systematical checks

a) Variation of the $y_{\text{targ}}V0$ cut

Systematic errors:

$dN/dy: \pm 10.6\%$

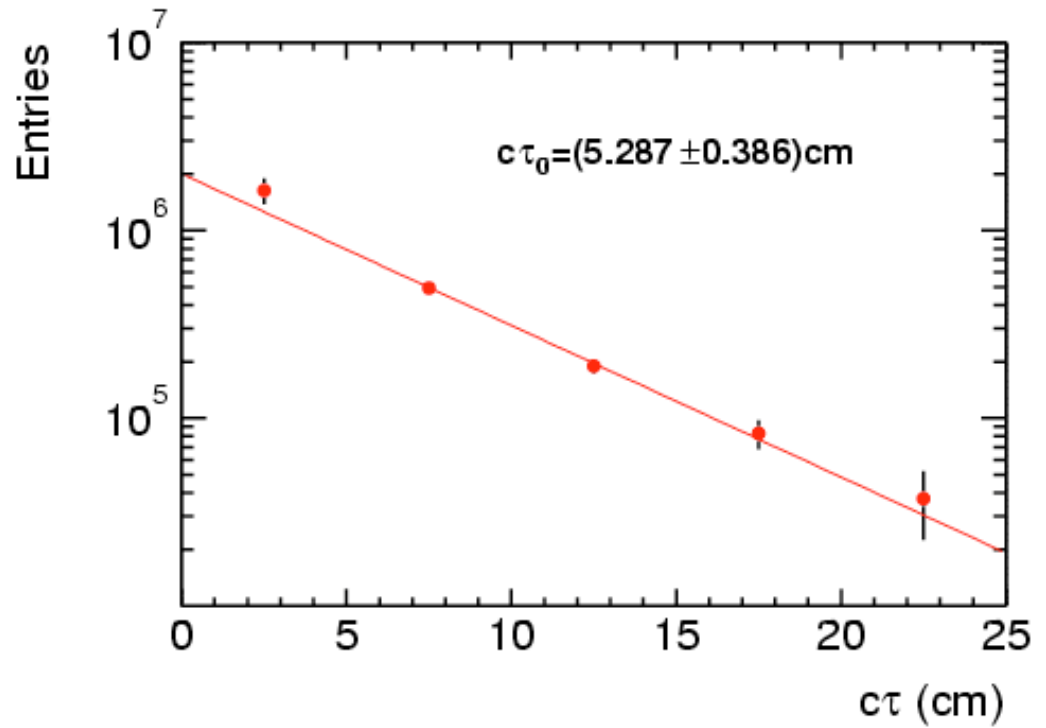
$T: \pm 7.8\%$



a) Lifetime

PDB:

$c\tau = 4.91 \text{ cm}$

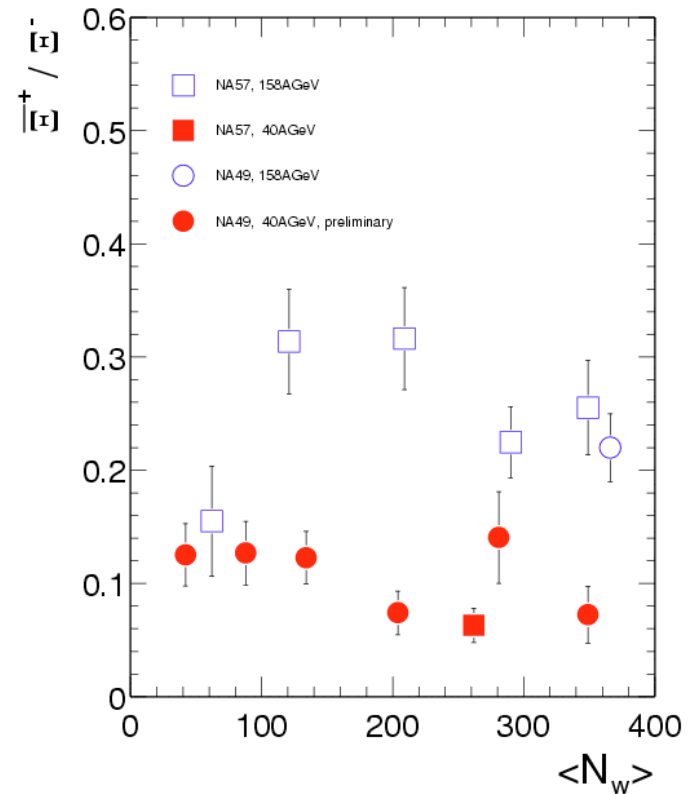


8.Results: I. The $\bar{\Xi}^+/\Xi^-$ ratio

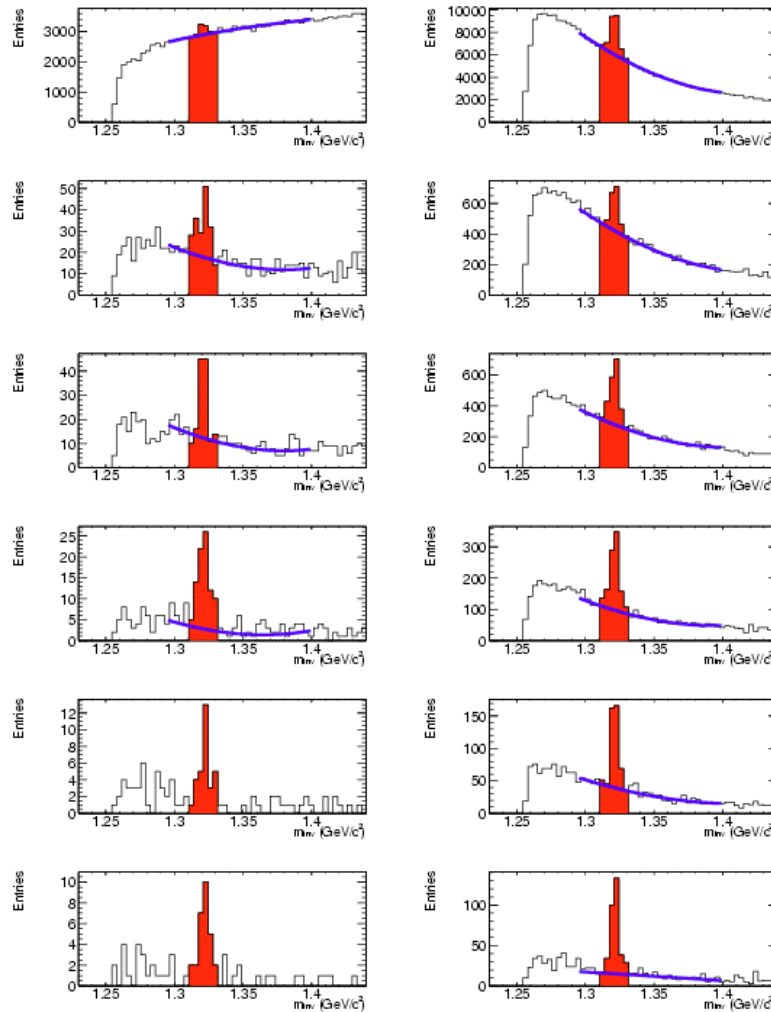
a) Centrality dependence:

The ratio shows no centrality dependence.

$\bar{\Xi}^+/\Xi^- = 0.072 \pm 0.025$ for the most central point is in good agreement to the hadron gas model prediction (Becattini): 0.06



M_{inv} -spectra used for the ratio



central

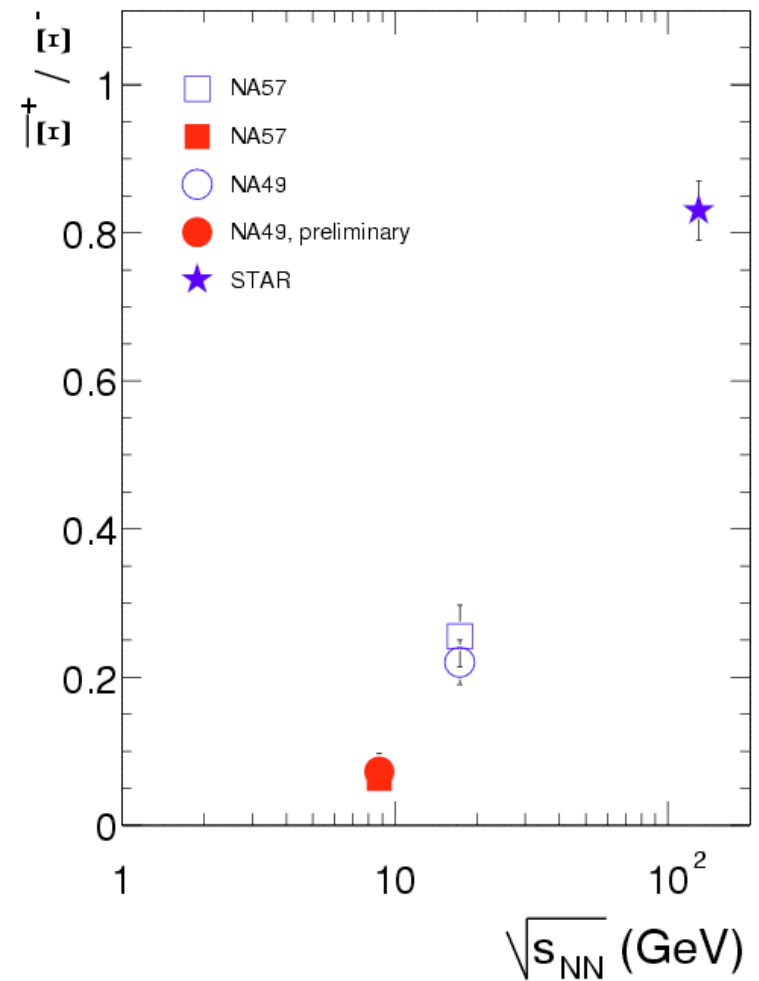
peripheral

$[E]^+$

$[E]^-$

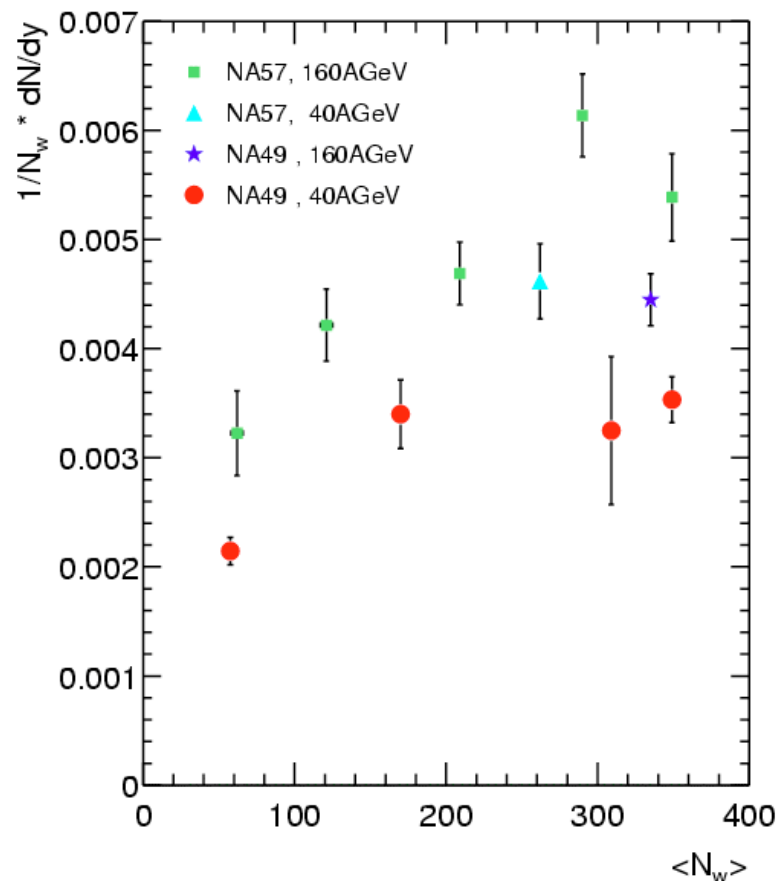
b) Energy dependence:

The ratio increases strongly with the collision energy.



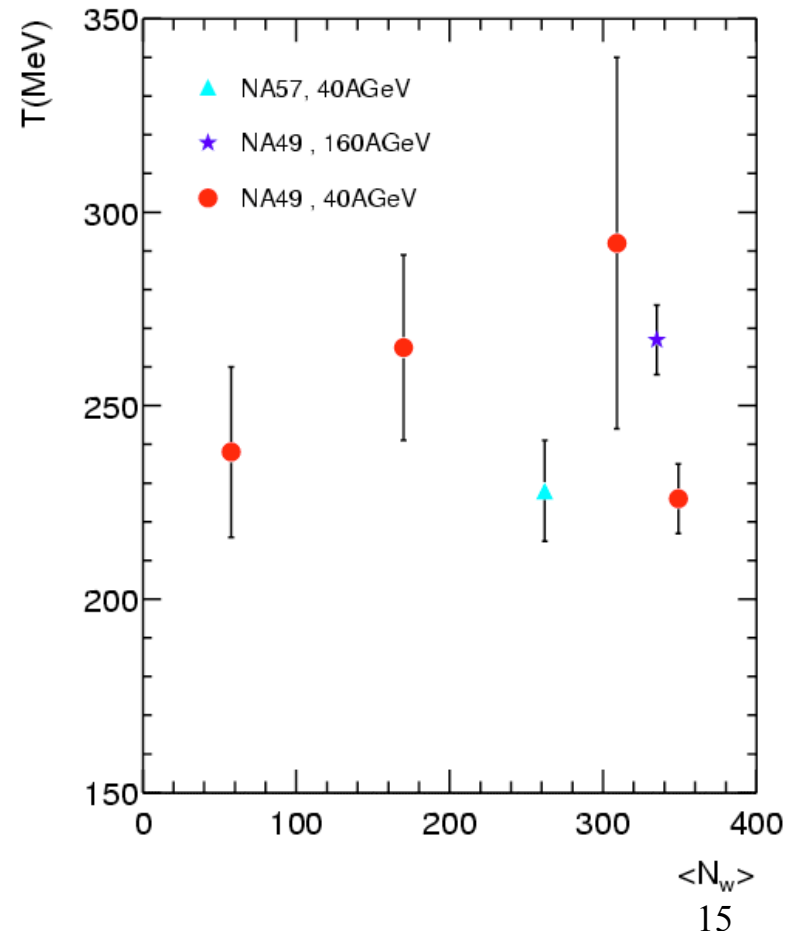
II. Centrality dependence of the Ξ^- production

- The dN/dy at mid-rapidity normalized by N_w shows a steep rise from peripheral to mid-central collisions.
- From mid-central to central collisions no significant rise is to see.



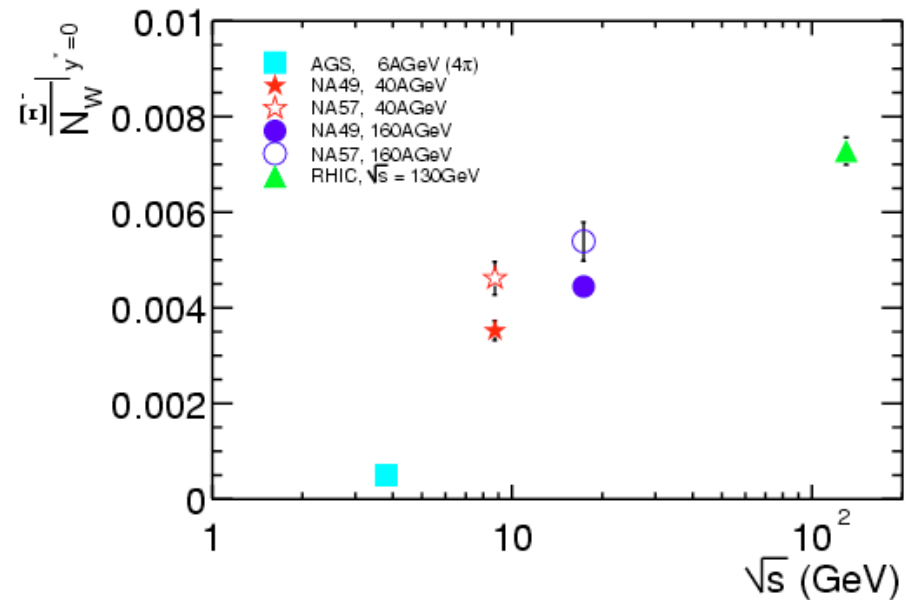
III. Centrality dependence of T

The inverse slope parameter T shows no significant centrality dependence.



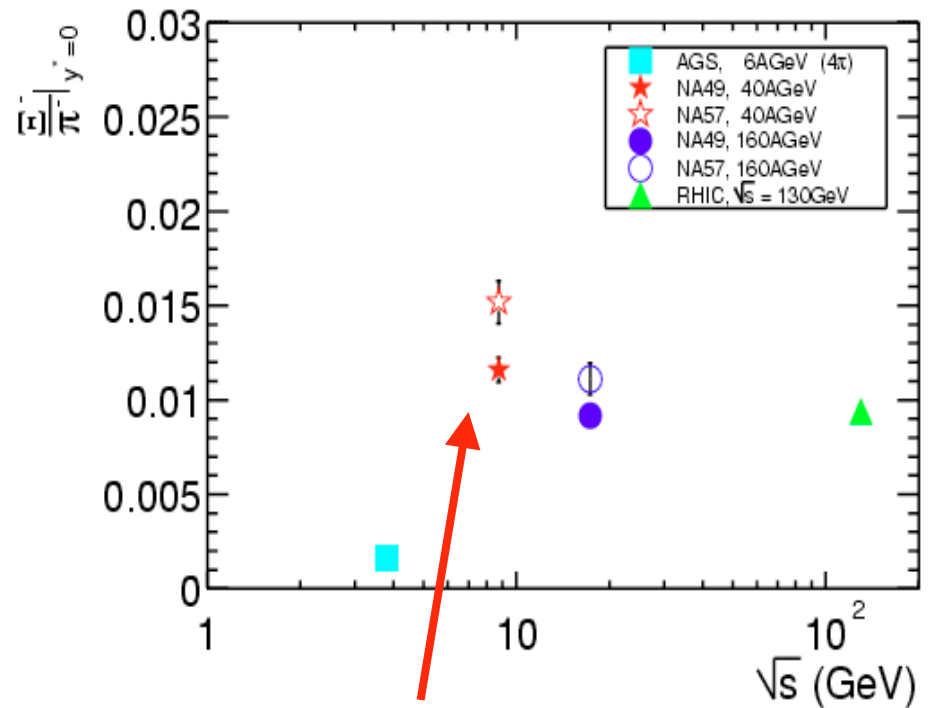
IV. Energy dependence of the Ξ^- production

1. Ξ^-/N_w shows a clear increase with the collision energy.
2. There is a systematical discrepancy between the measurement of NA49 and NA57 at 40 and 160 A GeV.



V. Ξ^-/π^- in dependence on the energy

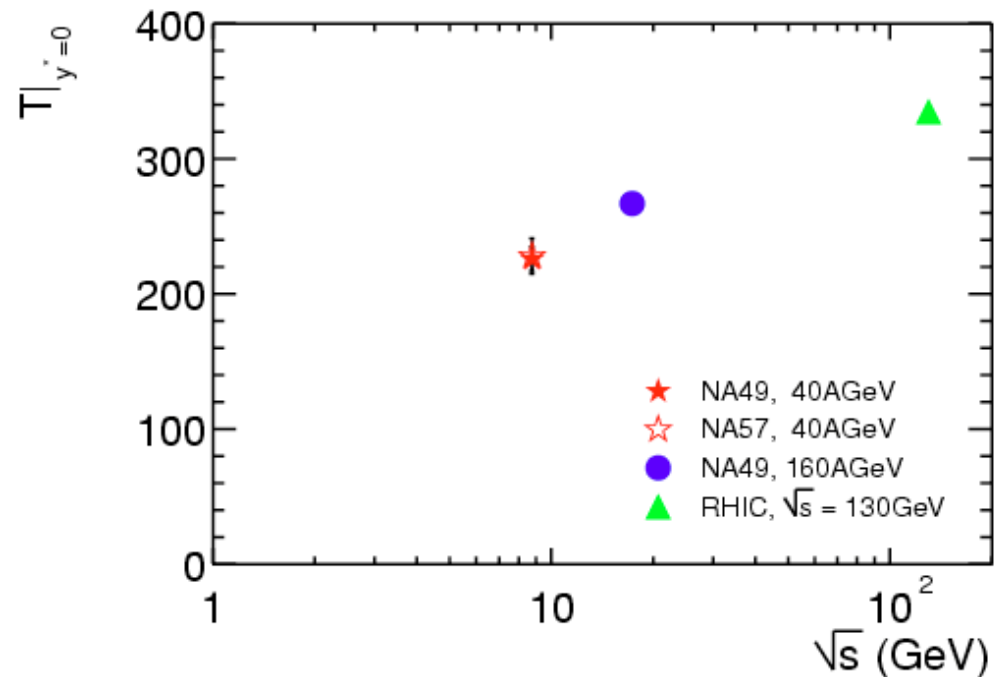
This energy dependence shows a maximum at 40 A GeV or perhaps at lower energies like the K^+ production.



Maximum at 40 A GeV
or at lower energies.

VI. Energy dependence of T

- T increases with the energy.
- The measurements of NA49 and NA57 at 40 A GeV are in good agreement.



9. Outlook

- Rapidity spectrum for Ξ^- at 40 A GeV in central collisions \longrightarrow 4π yield
- Systematical checks of the presented results in order to publish this data and present at QM04
- Preparation for three oral diploma examinations!