Status of Ω Analysis at 40 A·GeV Central Pb+Pb

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CERN

Outline

- Status of analysis at 40 A·GeV Pb+Pb
  - Cut Variables
  - Ω Invariant Mass Spectra
  - p_t - spectra
  - y - spectra
- First look at 30 A·GeV Pb+Pb.
- Ω Invariant Mass Spectra at 158 GeV p+p.
- $\overline{\Omega^+}$ / Ω^- - Ratio.
- $\overline{B}$ / B - Ratio.
- Outlook.

Status of Ω analysis

- 579k 40 A·GeV central (7%) Pb+Pb (00C,std-/00W,std+) Events analyzed.

Event Cuts :

std- -Data :

- Z_{fit} (-582.0;-580.25)	(0.13 %)
- X_{bpd} - X_{fit} (-0.08;0.1)	(0.05 %)
- Y_{bpd} - Y_{fit} (-0.082;0.041)	(0.26 %)

std+ -Data :

- Z_{fit} (-582.0;-580.25)	(0.10 %)
- X_{bpd} - X_{fit} (-0.08;0.1)	(0.06 %)
- Y_{bpd} - Y_{fit} (-0.060;0.04)	(0.35 %)
	≈ 1 %

Cut Variables

Ω Candidate :

- $Z_{vertex} > -555$ cm
- $|X_{target}| < 0.5$ cm
- $|Y_{target}| < 0.25$ cm
- Ξ mass excluded
- K + Λ vertex same side (new)
- $p_t > 0.9$ GeV/c (new)

Daughter Λ candidate :

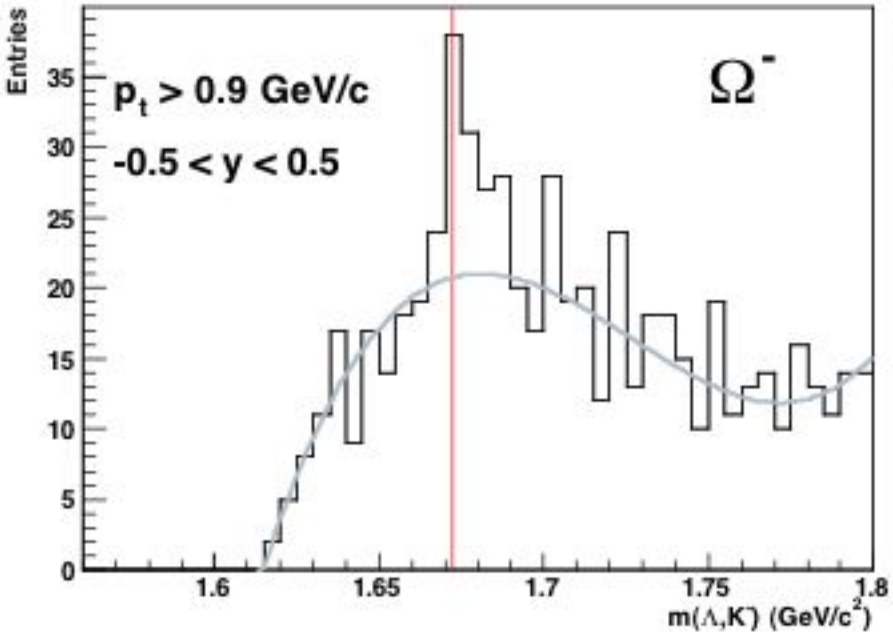
- GSI type
- $|Y_{target}| > 0.4$ cm
- dE/dx of decay proton

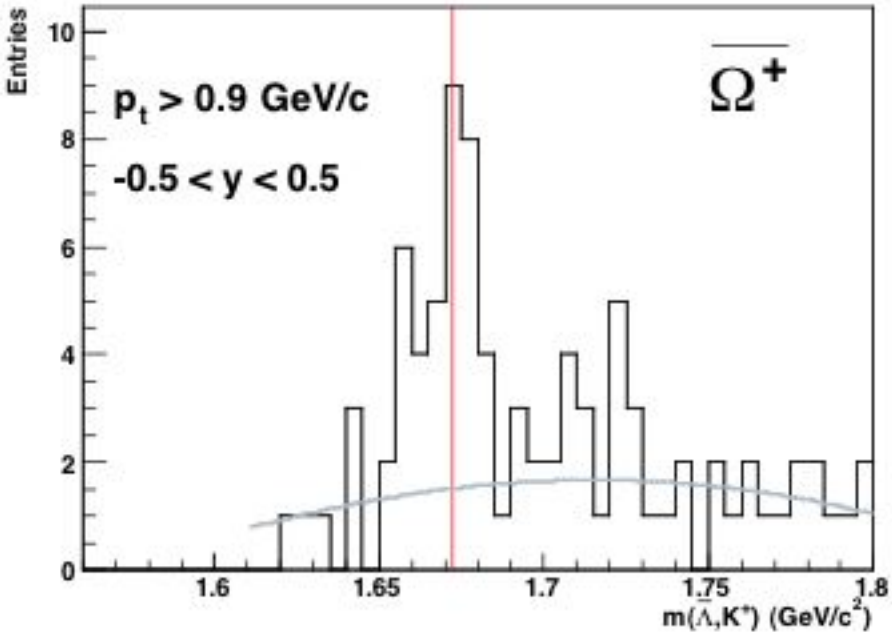
Daughter Kaon candidate :

- $|b_y| > 1.0$ cm
- dE/dx of decay Kaon

Ω Invariant Mass Spectra

- Integrated signal
  - Peak content : Ω^- : 42.3 ± 12.3 $\quad\quad$ $\overline{\Omega^+}$: 17.3 ± 5.7



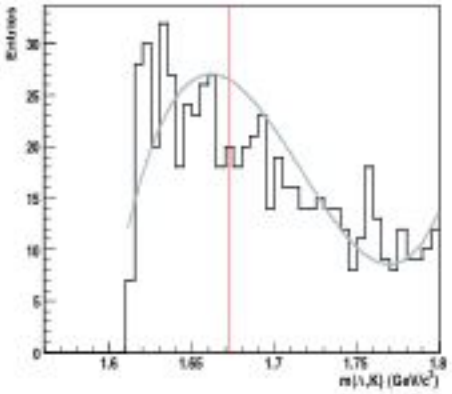


$$\frac{\overline{\Omega^+}}{\Omega^-} = 0.41 \pm 0.18\ (\text{stat.})$$
(mid-rapidity)

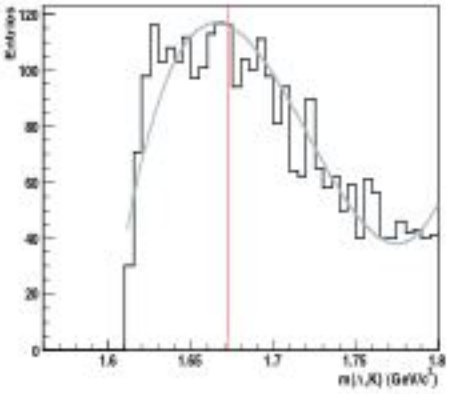
$$\underline{\text{NA57}}: \frac{\overline{\Omega^+}}{\Omega^-} = 0.25 \pm 0.17$$
(mid-rapidity)

Pt-spectra

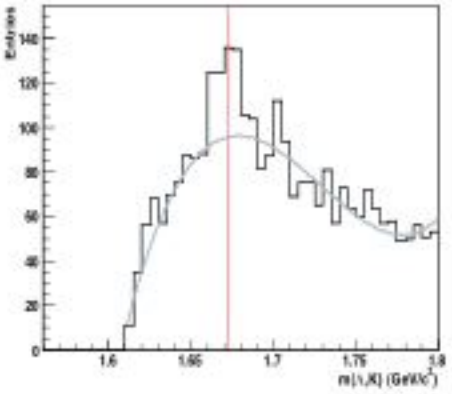
0.0 - 0.3 GeV/c



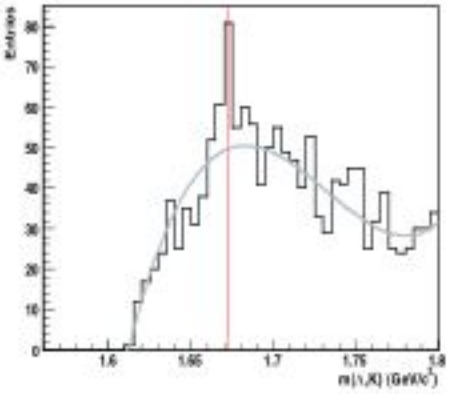
0.3 - 0.6 GeV/c



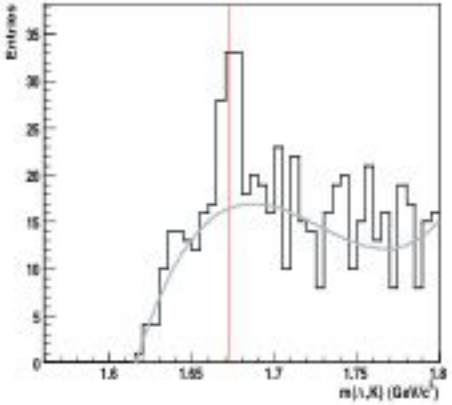
0.6 - 0.9 GeV/c



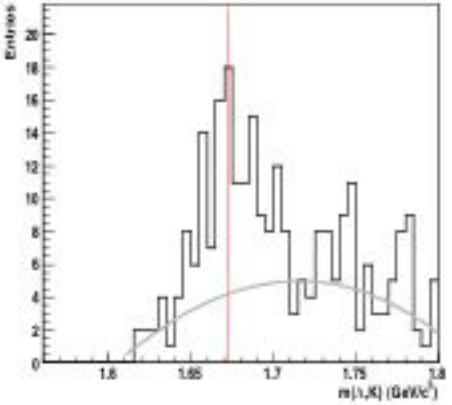
0.9 - 1.2 GeV/c



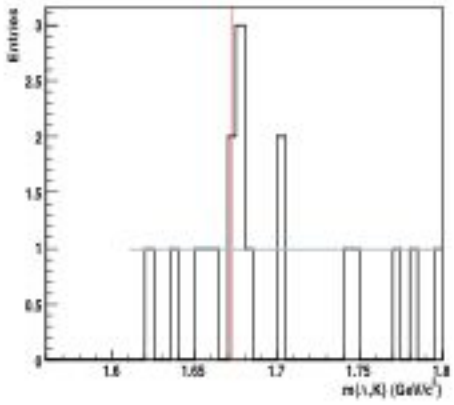
1.2 - 1.5 GeV/c



1.5 - 2.1 GeV/c

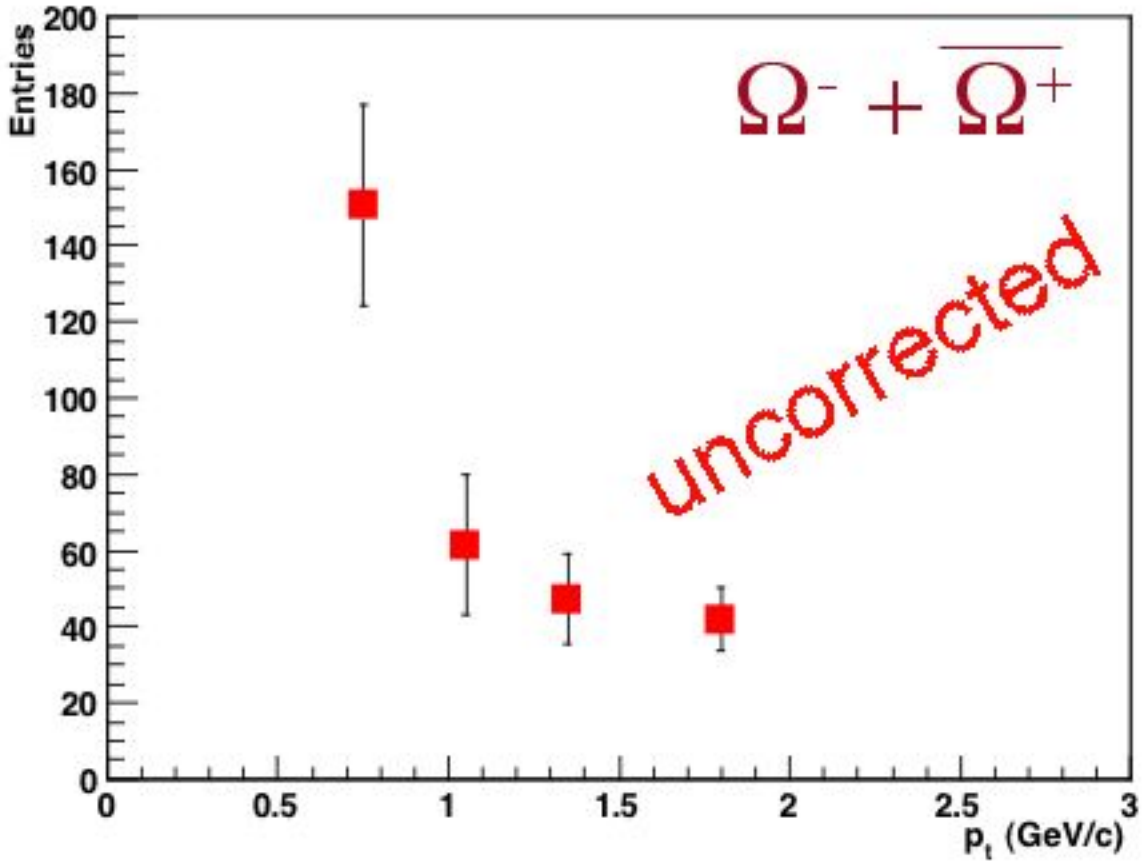


2.1 - 2.4 GeV/c



$\Omega^- + \overline{\Omega^+}$

Pt-spectra

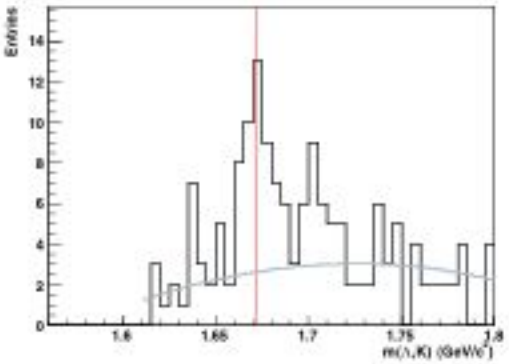

Entries
200
180
160
140
120
100
80
60
40
20
0
0
0.5
1
1.5
2
2.5
3
p_t (GeV/c)
$\Omega^- + \overline{\Omega^+}$
uncorrected

y-spectra

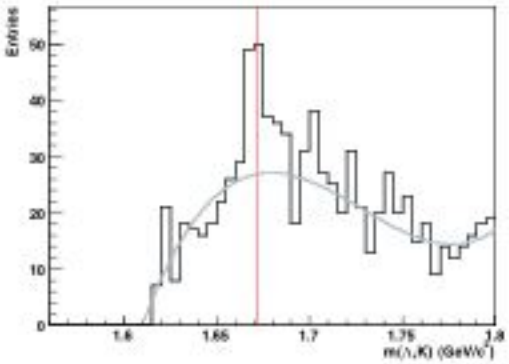
$p_t > 0.9$ GeV/c

$\Omega^- + \overline{\Omega}^+$

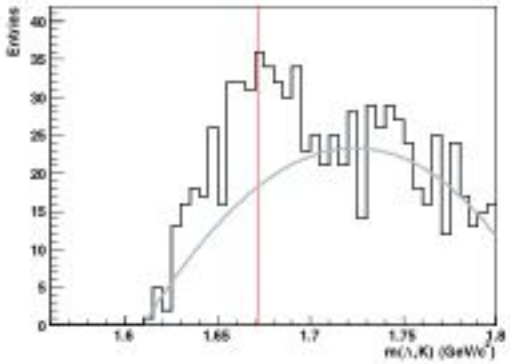
0.9 - 1.4



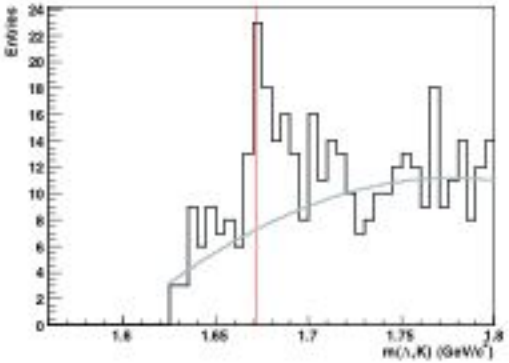
1.4 - 1.9



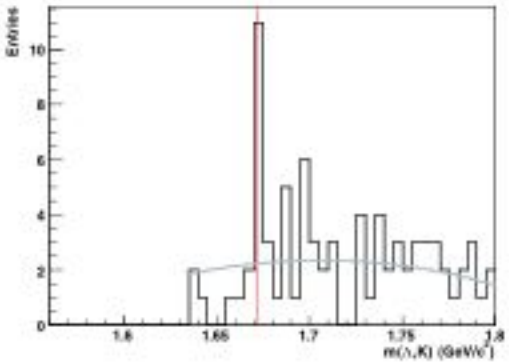
1.9 - 2.4



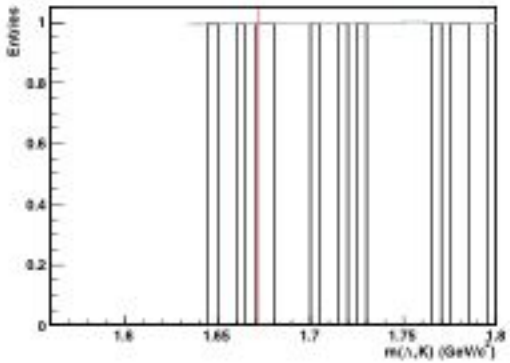
2.4 - 2.9



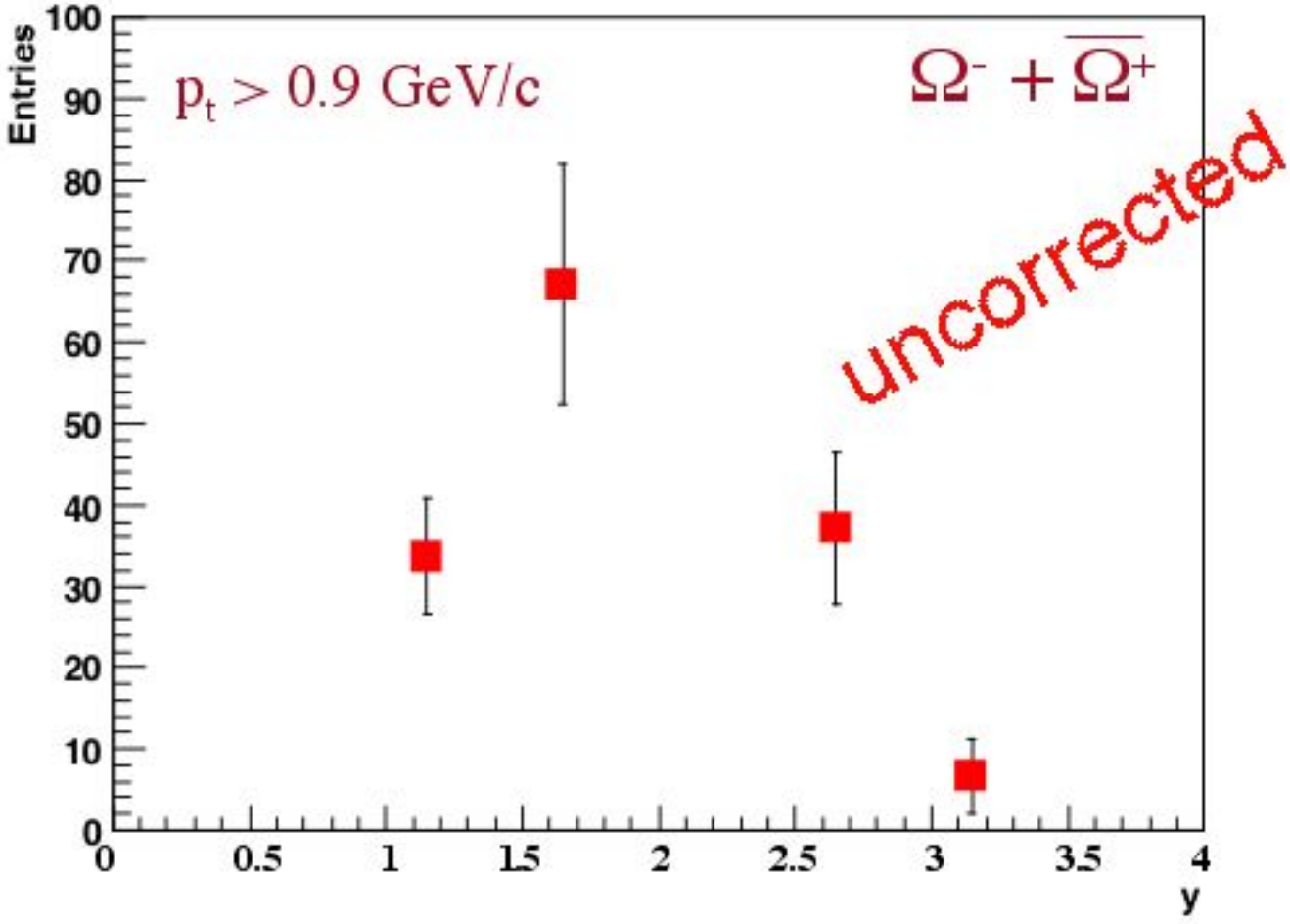
2.9 - 3.4



3.4 - 3.9



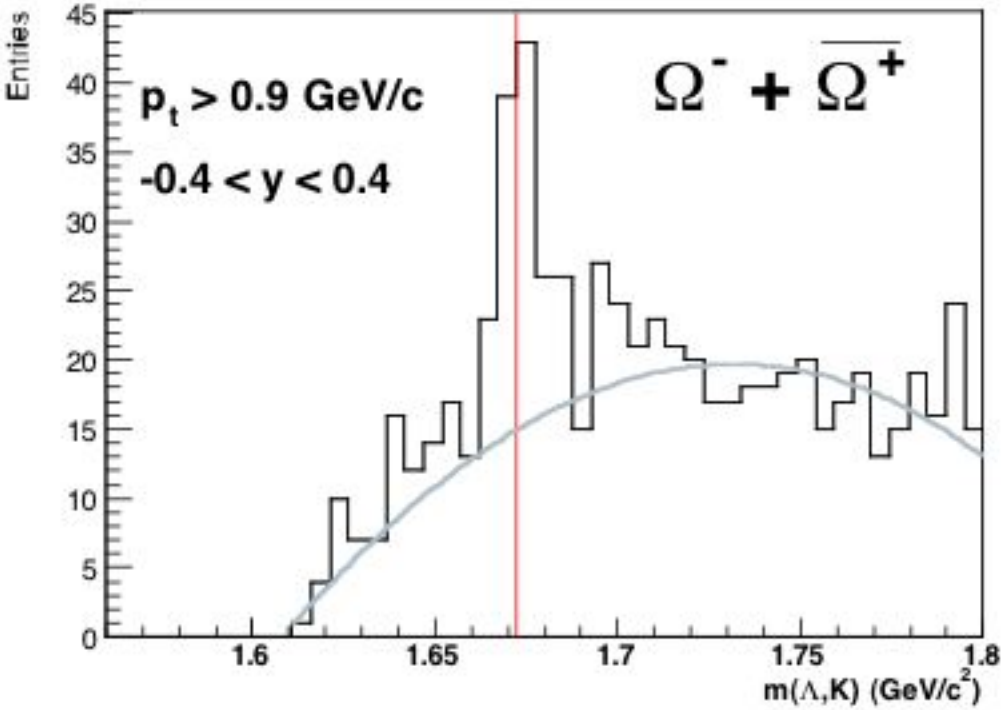
y-spectra


Entries
100
90
80
70
60
50
40
30
20
10
0
0
0.5
1
1.5
2
2.5
3
3.5
4
y
$p_t > 0.9$ GeV/c
$\Omega^- + \overline{\Omega^+}$
uncorrected

First look at 30 A·GeV Pb+Pb

Pb + Pb at 30 A·GeV

(7 % most central, 270k events)

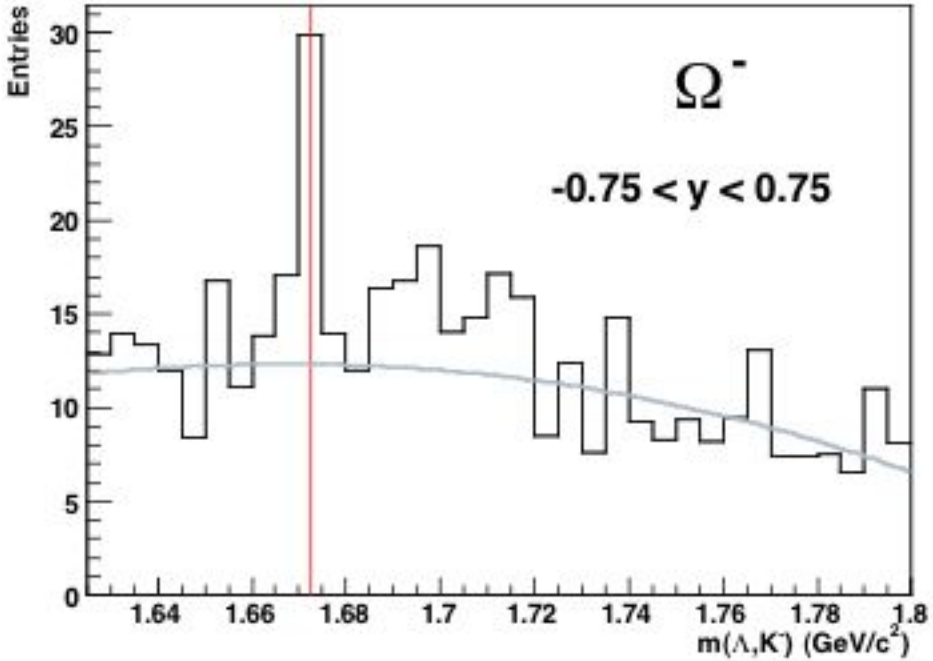


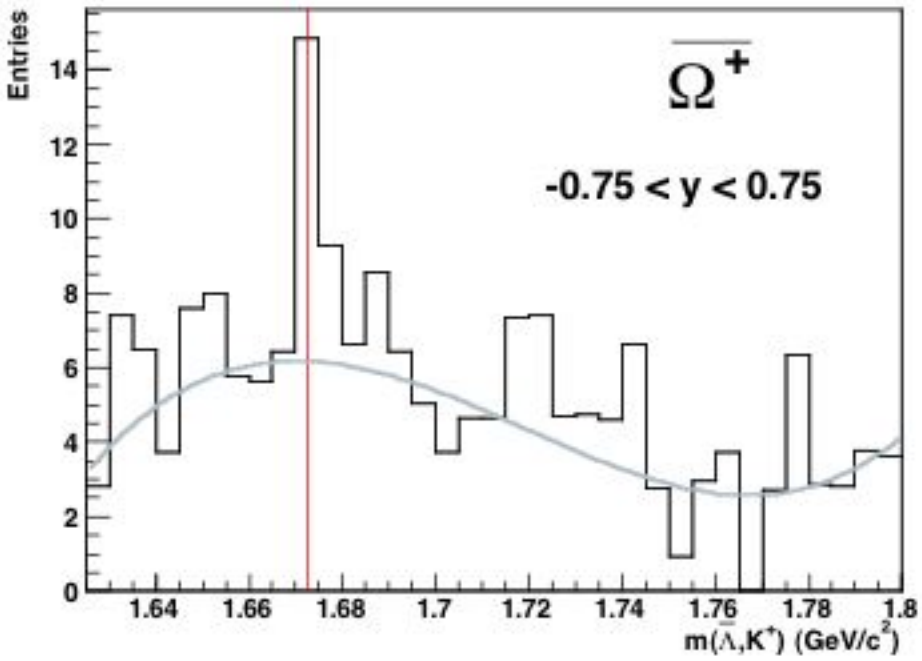
- Very first Ω signal at 30 A·GeV.
- Same cuts like 40 A·GeV
  - no same side cut

Ω Invariant Mass Spectra

p + p at 158 GeV

(minimum bias, 2.5M events)

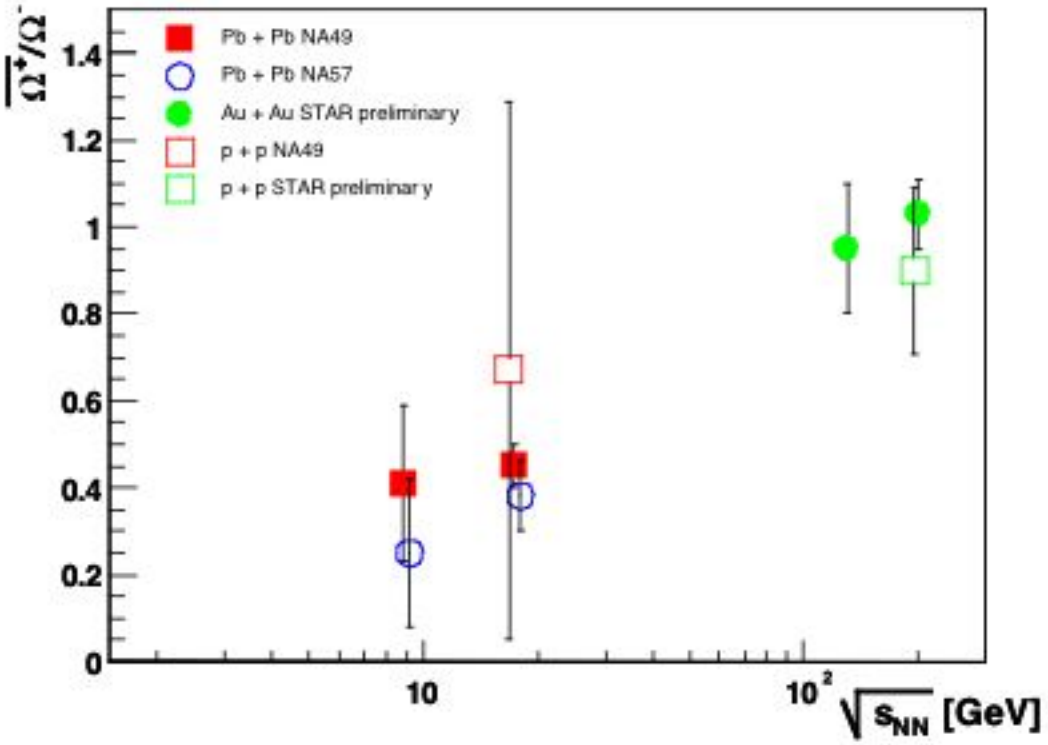




$$\frac{\overline{\Omega^+}}{\Omega^-} = 0.67 \pm 0.62 \text{ (stat. + sys.)}$$

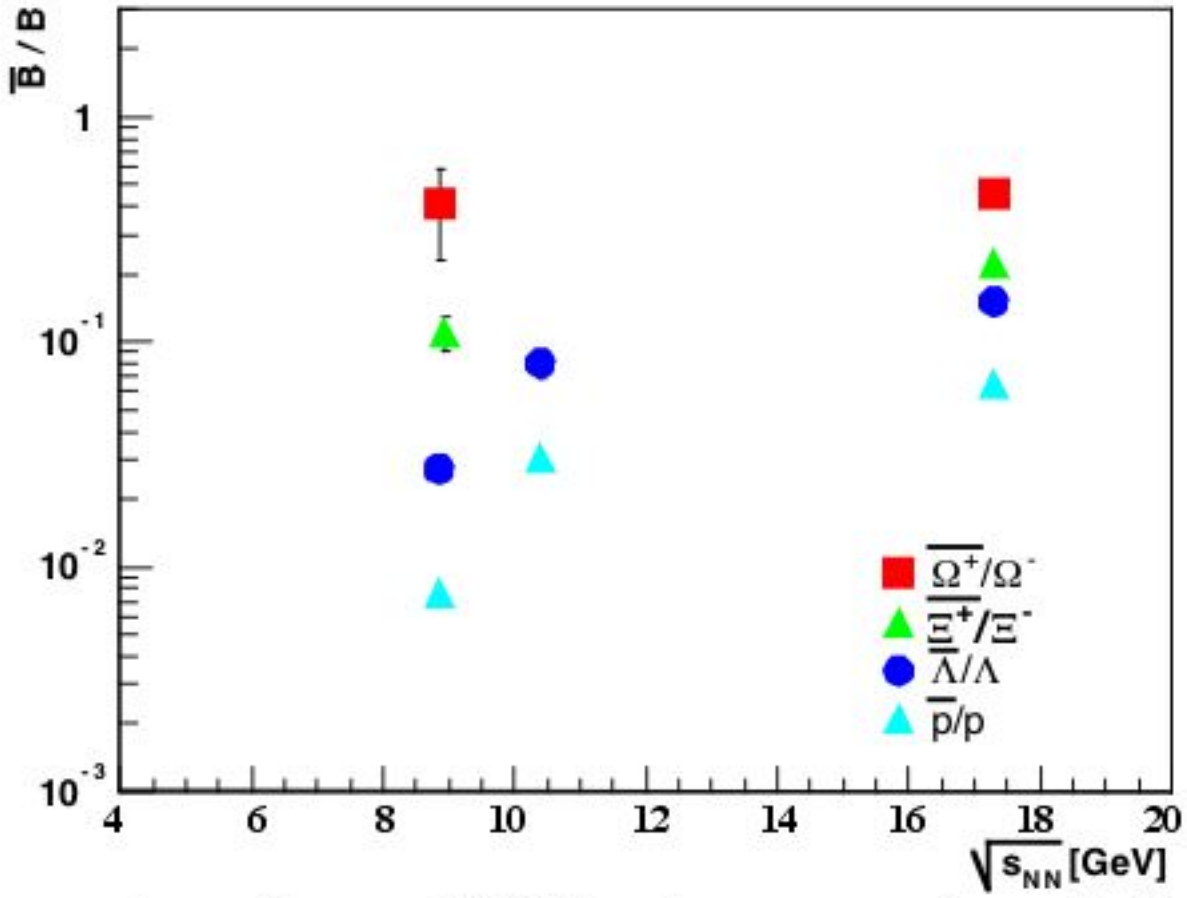
(mid-rapidity)

$\overline{\Omega^+}/\Omega^-$ Ratio



- No significant energy dependence in central Pb + Pb at SPS.
- The ratio at SPS is $\overline{\Omega^+}/\Omega^- \approx 0.4$.

$\overline{B}$ / B Ratio



- Energy dependence of $\overline{B}$ / B ratio gets weaker with increasing strangeness content.

Outlook

40 A·GeV :

- Embedding in real events.
- Final efficiency.
- Final spectra.
- Final yields.

30 A·GeV :

- $\overline{\Omega^+}$ / Ω^- - Ratio (full statistic).
- Embedding in real events.
- Final spectra (?).
- Final efficiency (?).
- Final yields (?).

Upcoming :

- Diploma.
- Ω^-, $\overline{\Omega^+}$ - Signal at 20 and 80 A·GeV Pb+Pb (?).
- Ω^-, $\overline{\Omega^+}$ - spectra and yields at 20 (?), 80 (?) A·GeV Pb+Pb.
- Publication.