



First Look at Strangeness at RHIC with The STAR Detector

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For the STAR Collaboration

Outline :



1. Introduction

- Physics of strange particles in nucleus-nucleus collisions
- STAR capability for strangeness measurement

2. Preliminary results on strangeness measurements

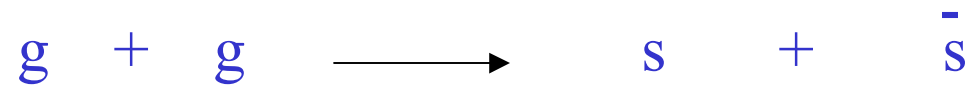
(K_S^0 , Λ , $\bar{\Lambda}$, Ξ^- , $\bar{\Xi}^+$, K^+ , K^- , Φ , Ω^-)

3. Outlook and summary

Some of the physics on strange particles



a) Possible strangeness enhancement due to QGP formation



$$E_{\text{th}} = 300 \text{ MeV}$$

b) Net baryon density (ratio of baryon and its anti-baryon)

c) Φ meson mass shift

d) K_s HBT and others

Physics of $\Lambda/\bar{\Lambda}$ and p/\bar{p}



Production Mechanism: $\Lambda \bar{\Lambda}$ and $p \bar{p}$ pair production

Net baryon density $p(n) + X \rightarrow \Lambda K^+ X'$
associated production

“Particle Ratio From the $\sqrt{s}=130$ AGeV Au+Au Collisions”

————— N. Xu

Strange particle measurements at STAR



| | | | | | | |
|-----------------|-------------------|-----------|---|-----------|----------|-------|
| K_S^0 | \longrightarrow | π^+ | + | π^- | 2.68 cm | 68.6% |
| Λ | \longrightarrow | p | + | π^- | 7.89 cm | 63.9% |
| $\bar{\Lambda}$ | \longrightarrow | \bar{p} | + | π^+ | 7.89 cm | 63.9% |
| Φ | \longrightarrow | K^+ | + | K^- | 4.43 MeV | 49.1% |
| Ξ^- | \longrightarrow | Λ | + | π^- | 4.91 cm | 99.9% |
| $\bar{\Xi}^+$ | \longrightarrow | Λ | + | π^+ | 4.91 cm | 99.9% |
| Ω^- | \longrightarrow | Λ | + | K^- | 2.46 cm | 67.8% |
| $K^{(+,-)}$ | \longrightarrow | μ | + | ν_μ | 371 cm | 63.5% |

General information about year 2k summer data



Collision energy for most of the data: $\sqrt{s}=130$ GeV

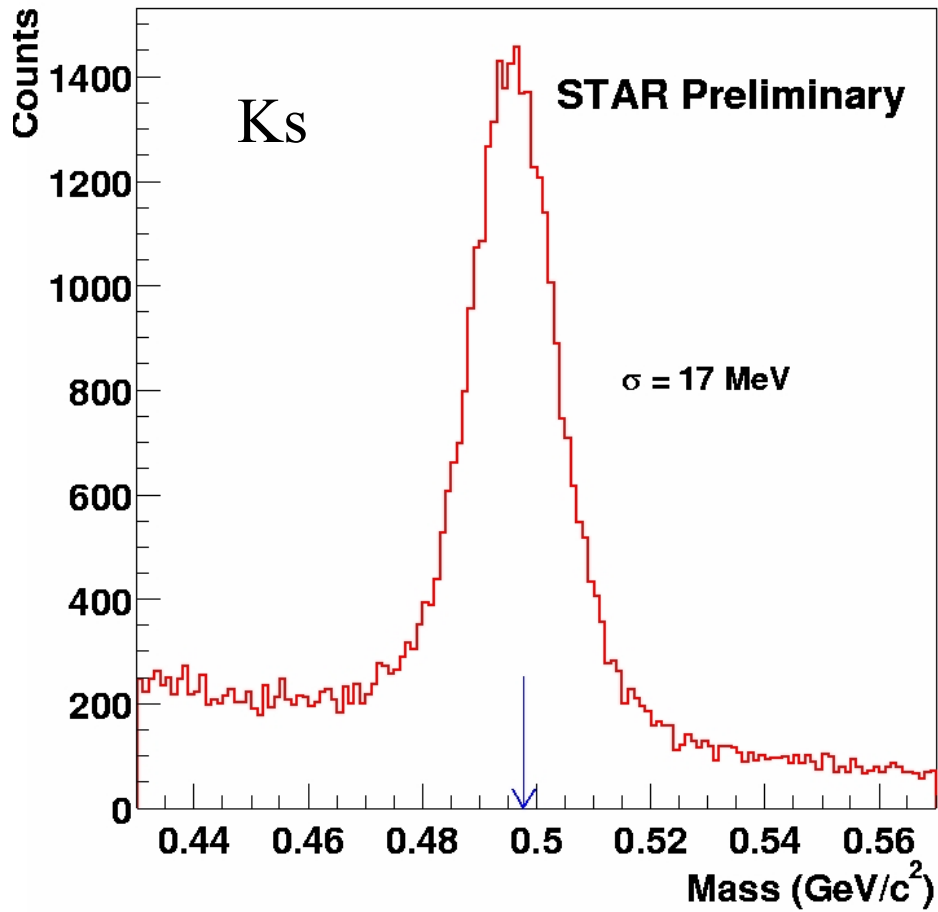
$B=0.25$ T

$|\eta|<1.5$

2π coverage in azimuthal direction

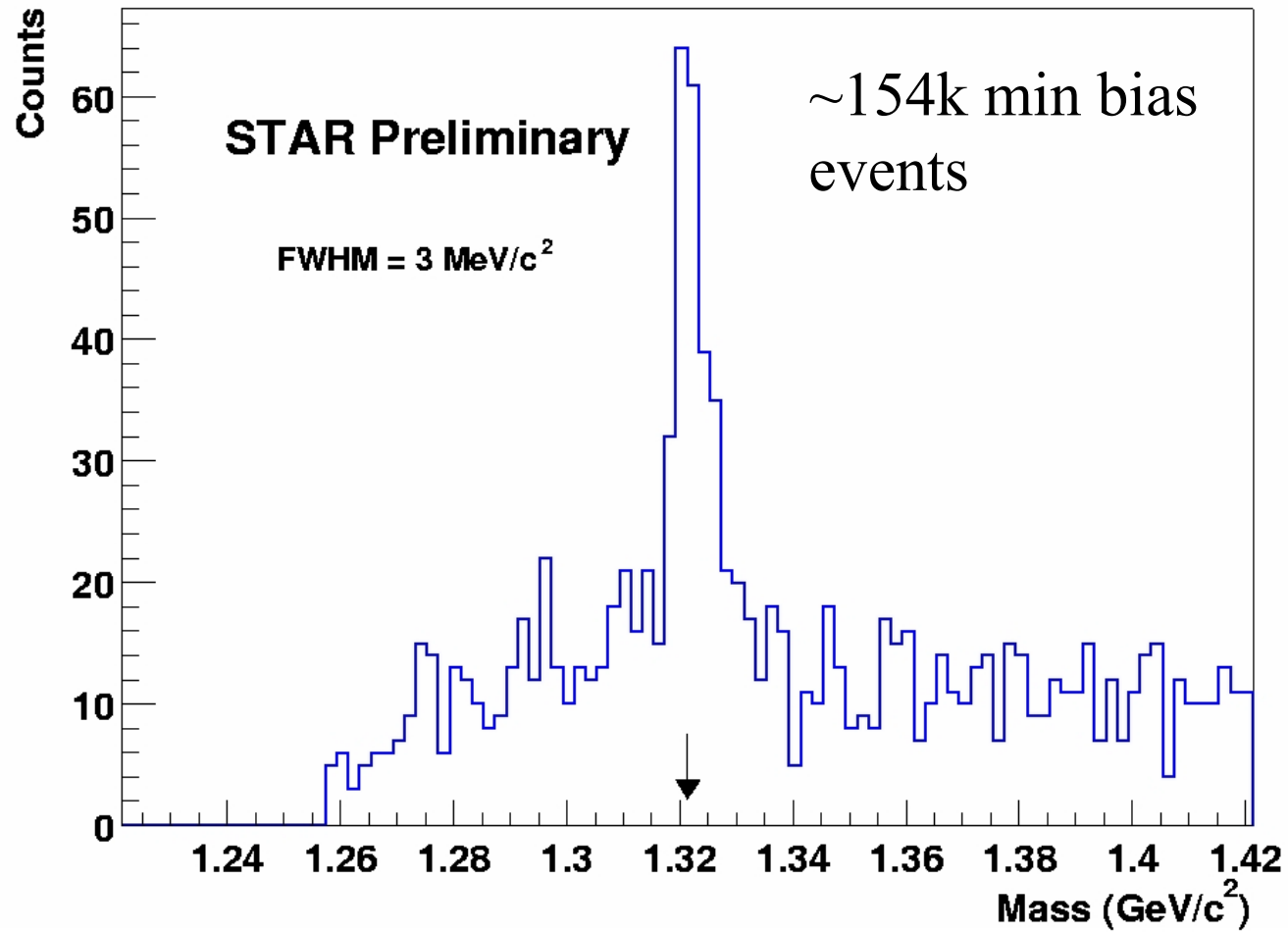
~ 1.5 M events

Preliminary results: Ks Invariant Mass



~154k min bias events

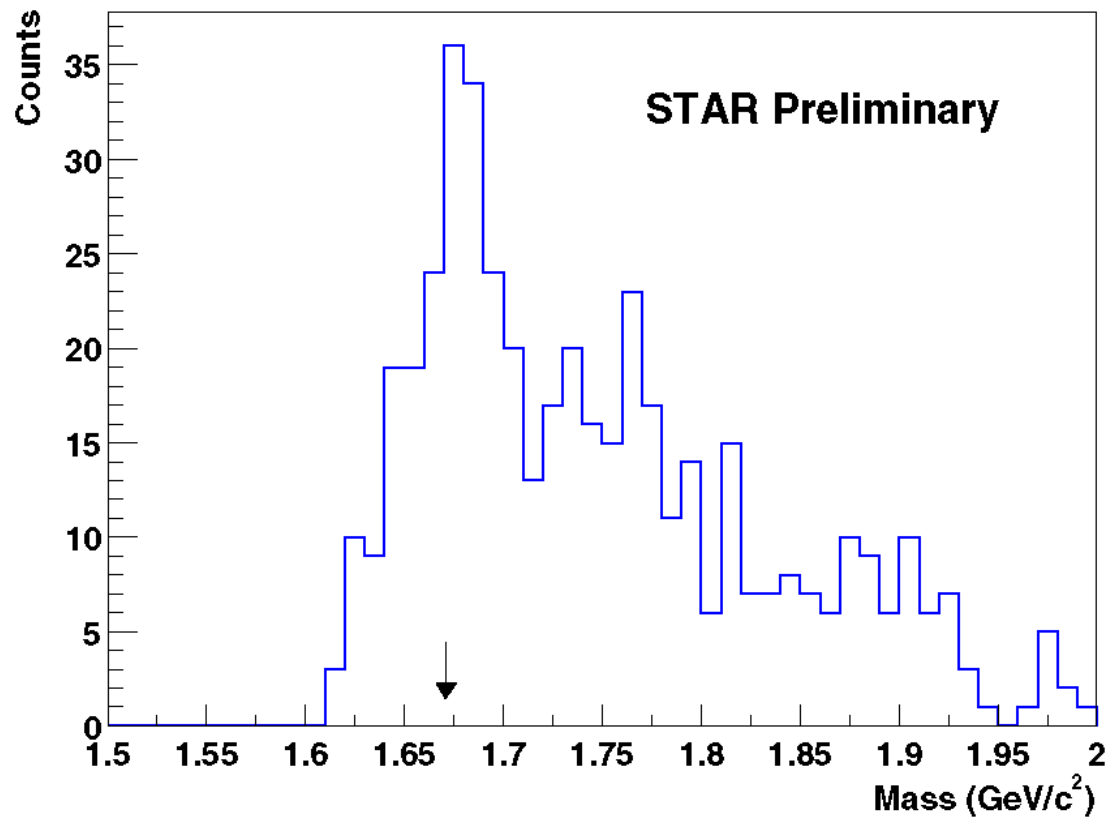
Preliminary results : Ξ^- Mass plot



Preliminary results : Ω Mass plot

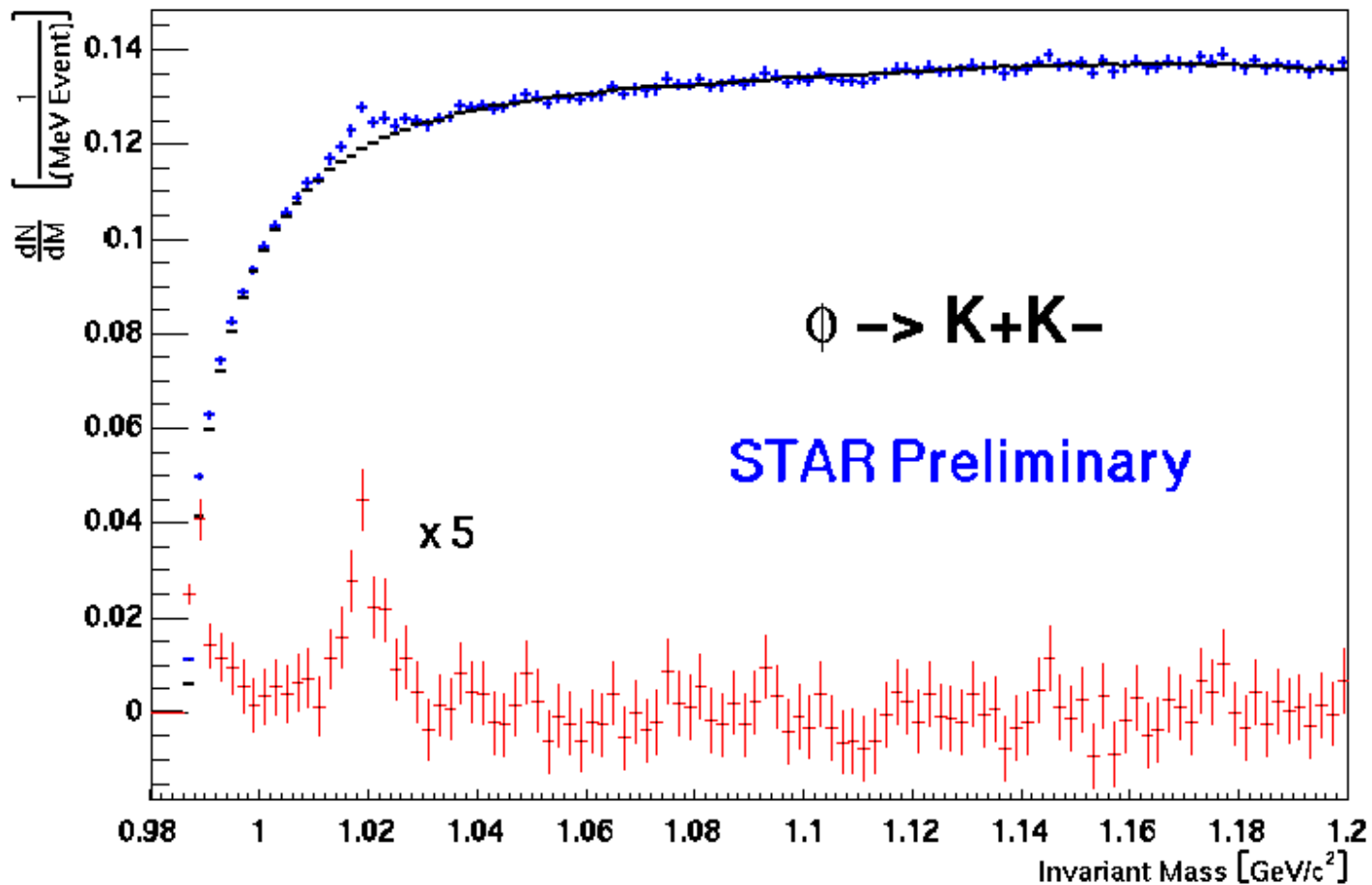


Omega Invariant Mass

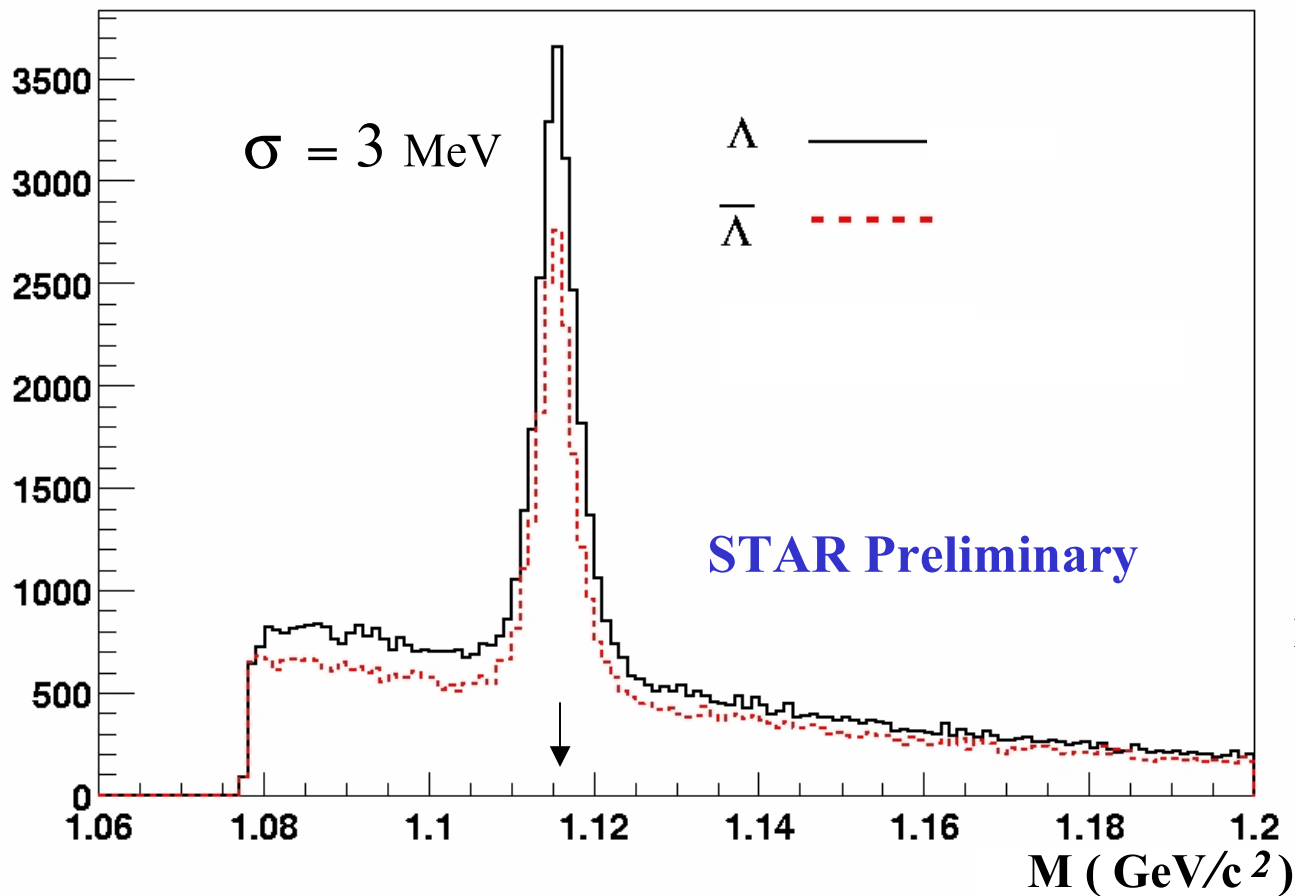


~154K
min bias events

Preliminary results : Φ Mass Plot



Preliminary results: Λ , $\bar{\Lambda}$ Mass Plot



Min bias events

Rapidity : $-0.5, 0.5$

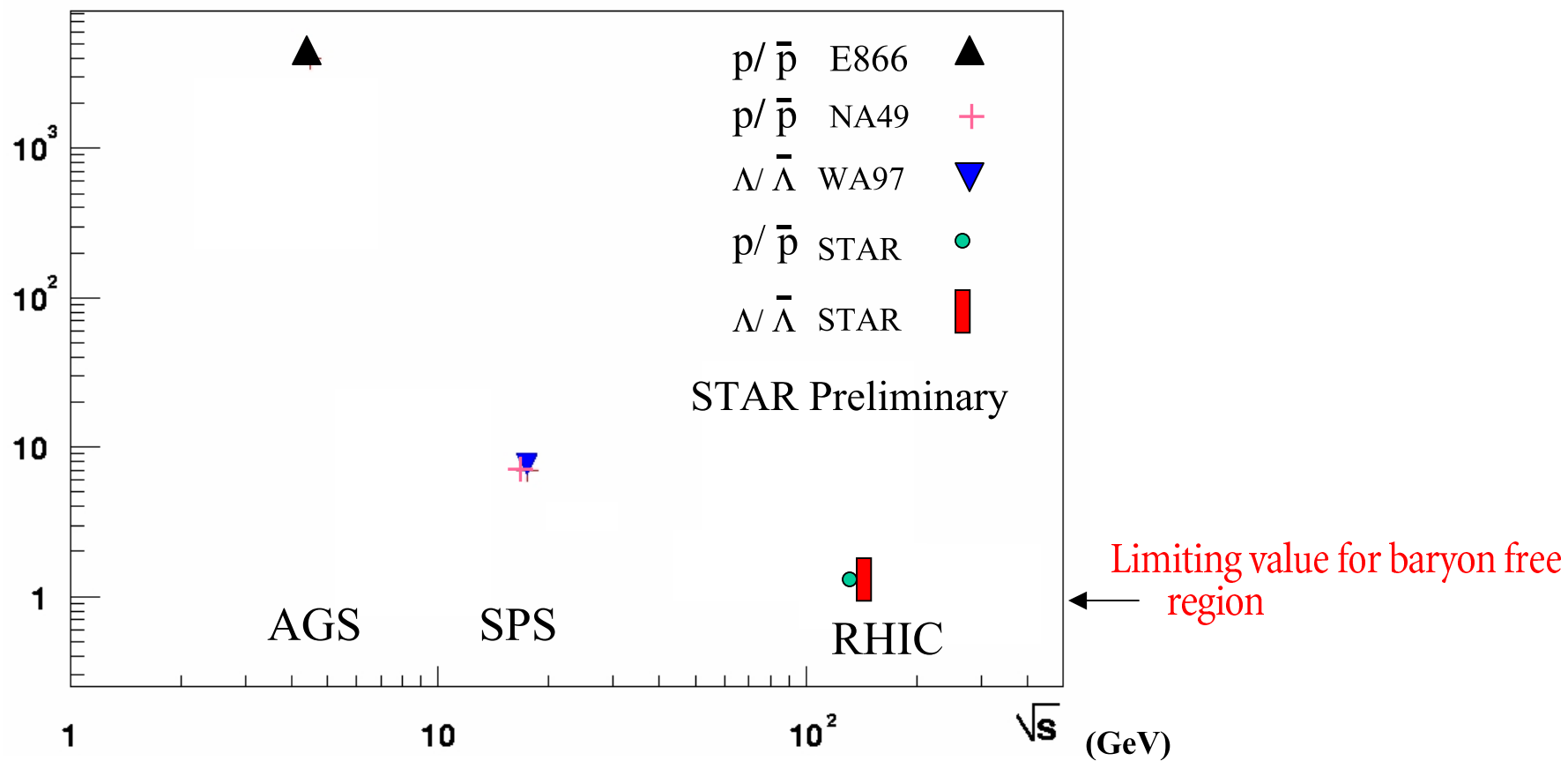
p_t : $0.3 - 2.3$ GeV/c

Primary Vertex : $|z_0| < 50$ cm

Preliminary results: $\Lambda / \bar{\Lambda}$



Approaching low net baryon density



Outlook and Summary



1. Ratio of $\bar{\Lambda}/\Lambda$ as a function of pt,rapidity or multiplicity
2. Spectra (pt, rapidity) on $\Lambda, \bar{\Lambda}, K_s$ and Φ
3. Ξ yield measurements and K^+, K^- yield measurements
4. Ξ, Ω spectra in next year with SVT installation
and running

STAR has had a very successful year 1 data taking and we will be able to make lots of solid strangeness measurements.
