

Reconstructing Σ^0 Decays in STAR

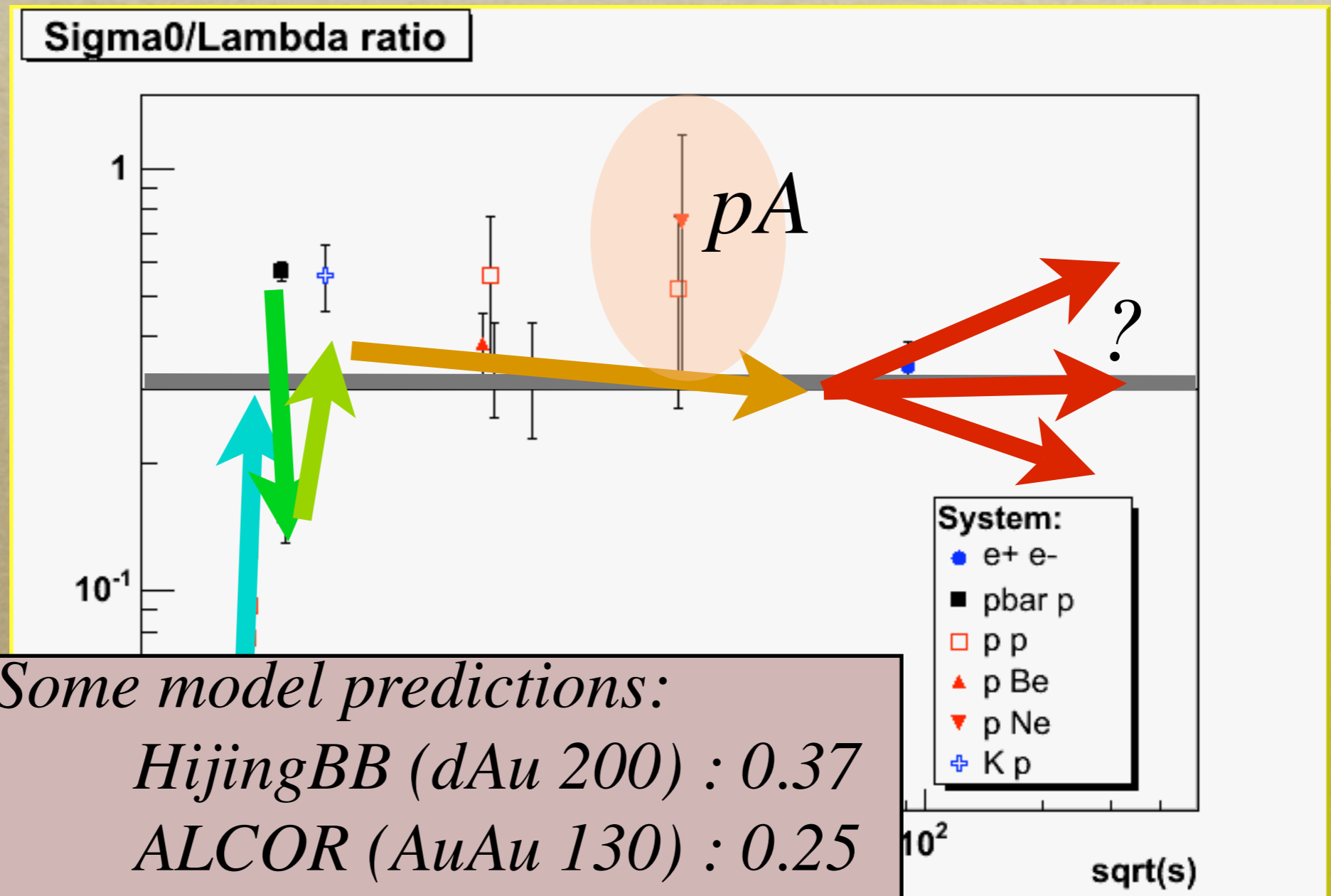
Gene Van Buren
Brookhaven National Lab



Hot Quarks '04
Taos, New Mexico

Σ^0 / Λ : Previous Findings

- Same quark content
- Isospin says: 1/3
- Larger system size?



Some model predictions:

HijingBB (dAu 200) : 0.37

ALCOR (AuAu 130) : 0.25

(thanks Peter Levai)

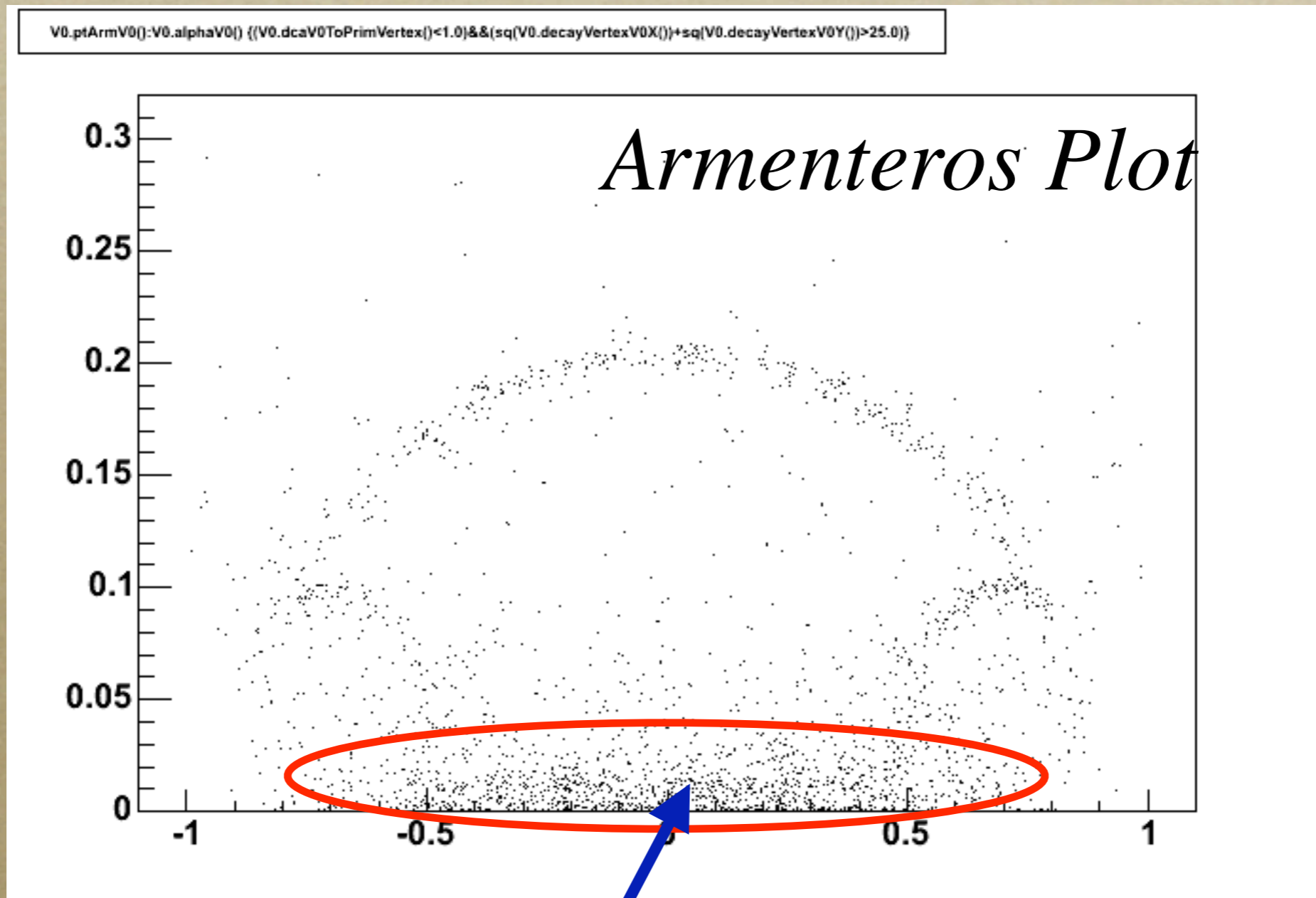
Stat. Model (AuAu 200) : 0.37

(thanks Dan Magestro)

Disentangling the Λ

- $\bar{\Lambda}/\bar{p}$: *relevance for strangeness enhancement*
- Λ *pt spectrum* : *flow interpretations*
- *How does Λ really scale with h -?*

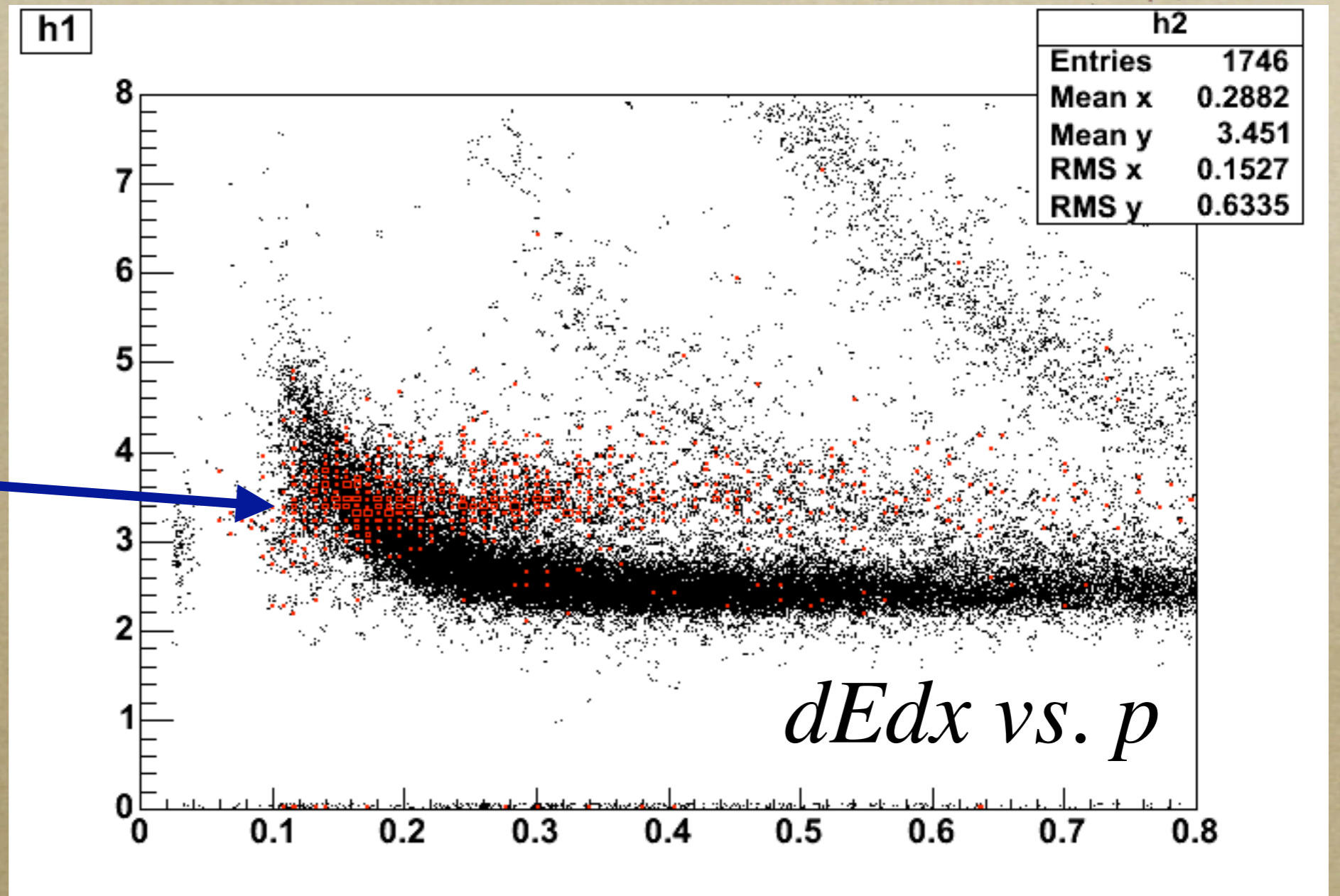
Must identify Gammas



Photon conversions!

Confident they're gammas?

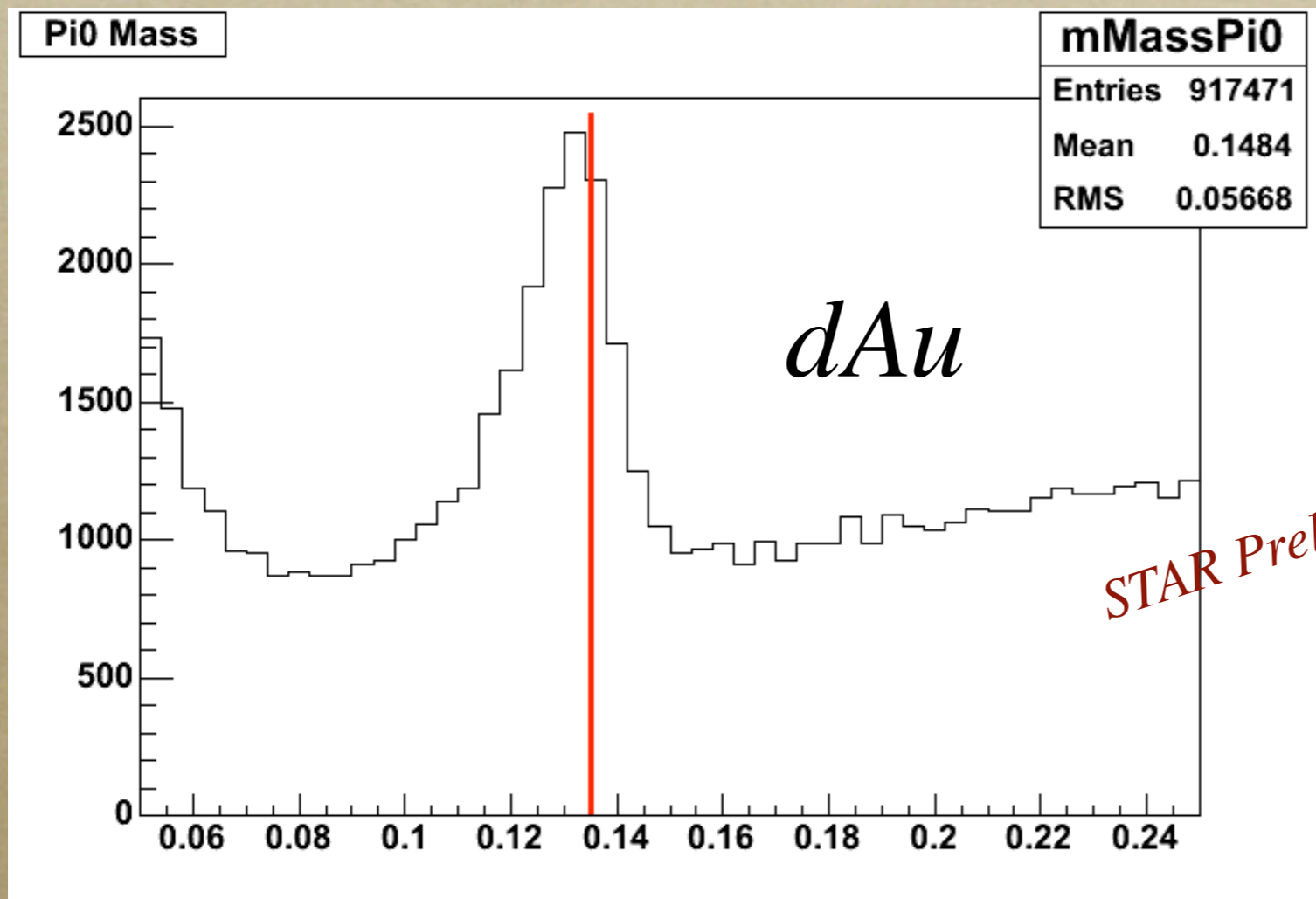
*Electron
band*



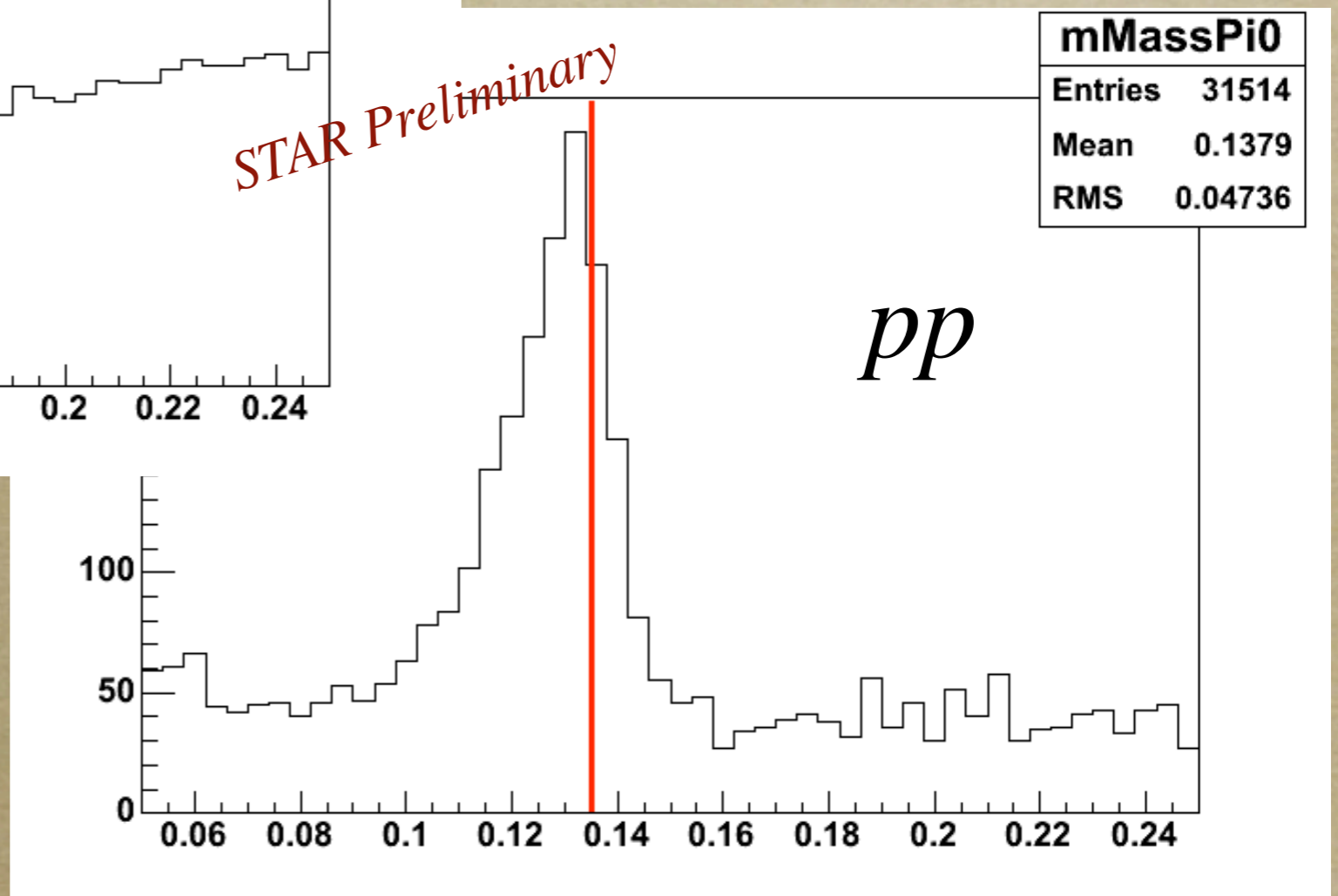
Black - All V0 daughters

Red - Gamma candidate daughters

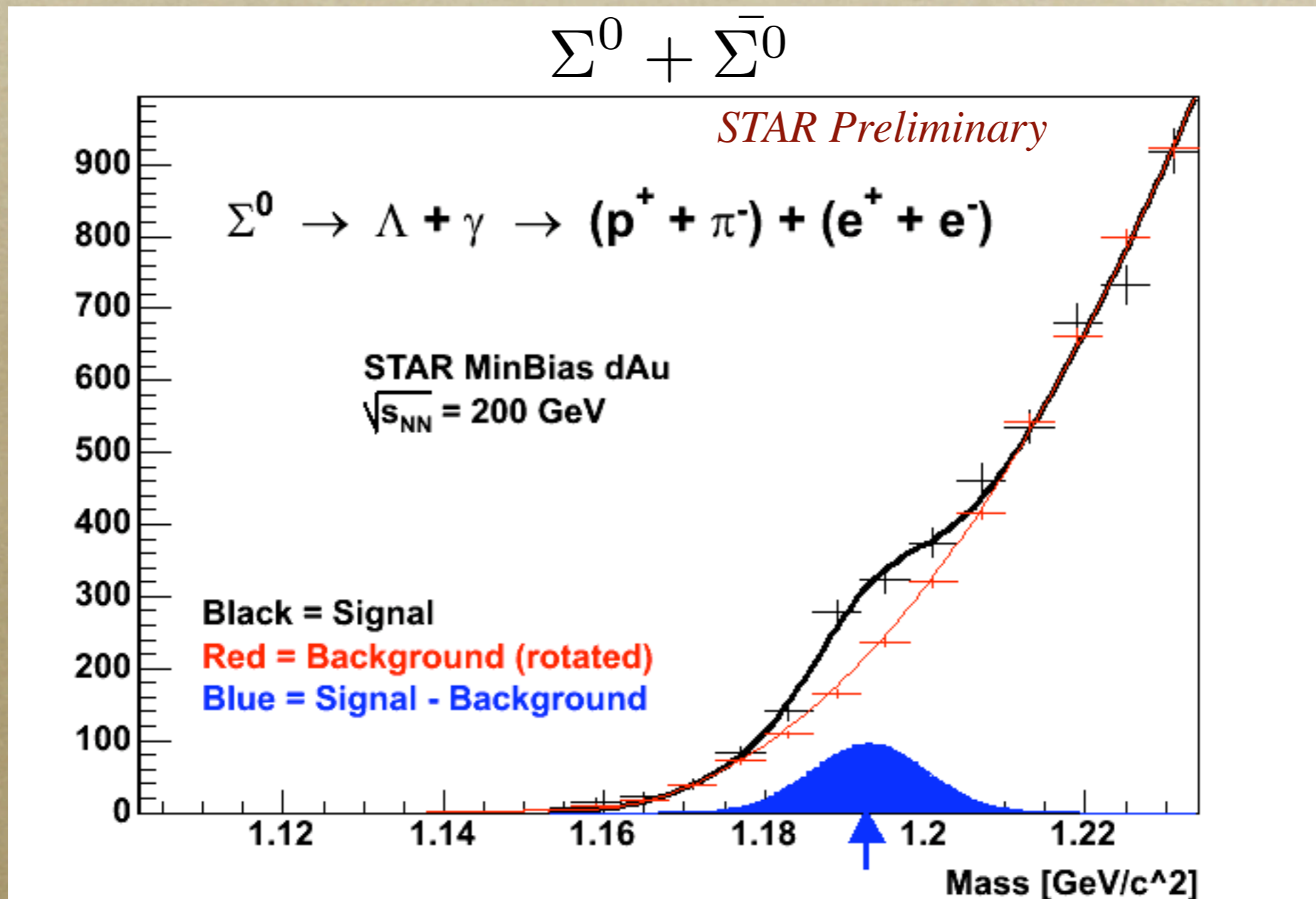
Definitely some gammas!



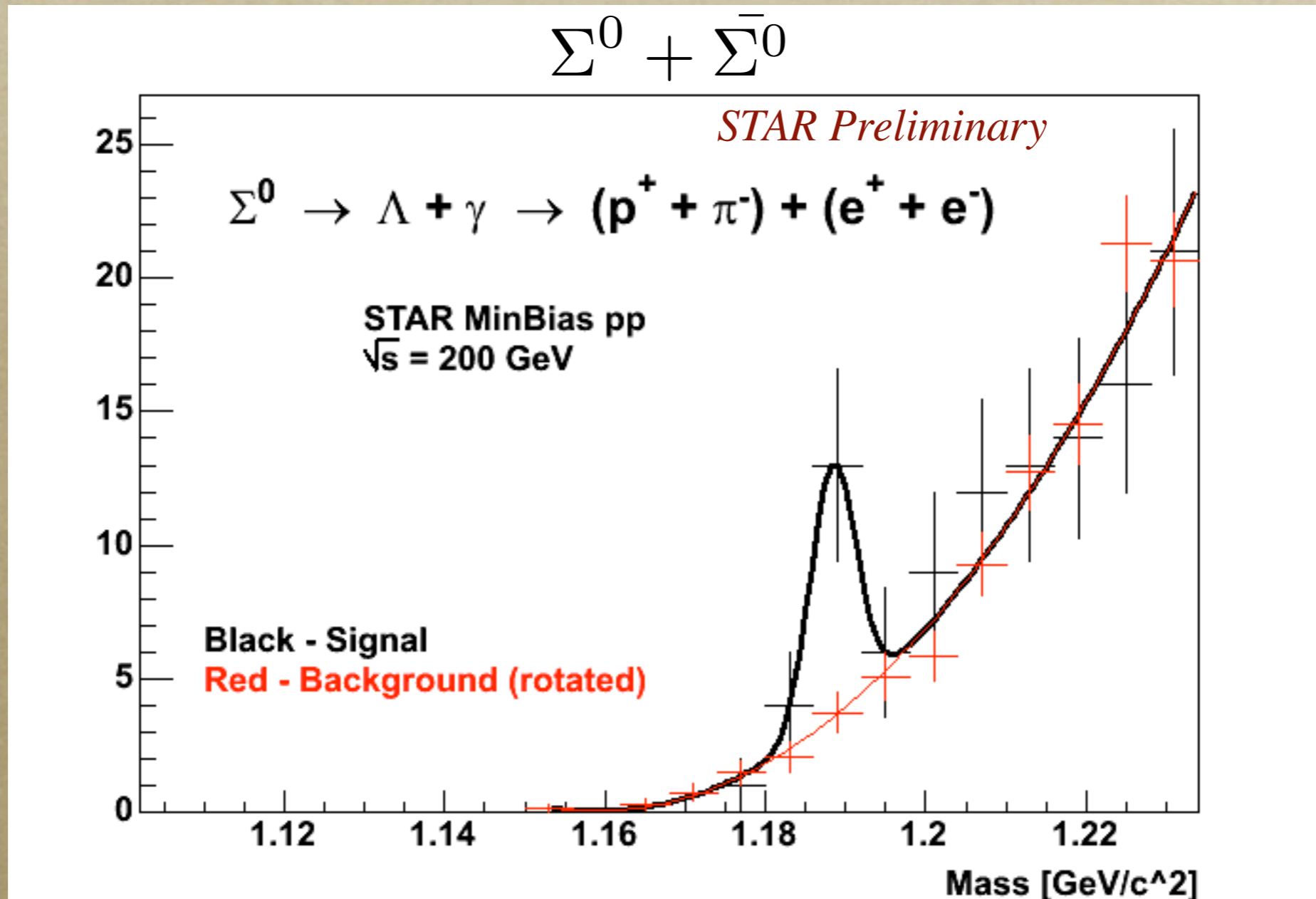
π^0



Reasonable signal in dAu!



Small signal in pp too



$\bar{\Sigma}^0 / \Sigma^0$ ratio

- *Integrated over all P_t*
- *Integrated over $|y| < 0.75$*
- *No annihilation corrections*
 - *Negligible compared to statistical errors anyhow where data peaks (~ 2 GeV/c)*

$$\frac{\bar{\Sigma}^0}{\Sigma^0} = 0.6 \pm 0.3$$

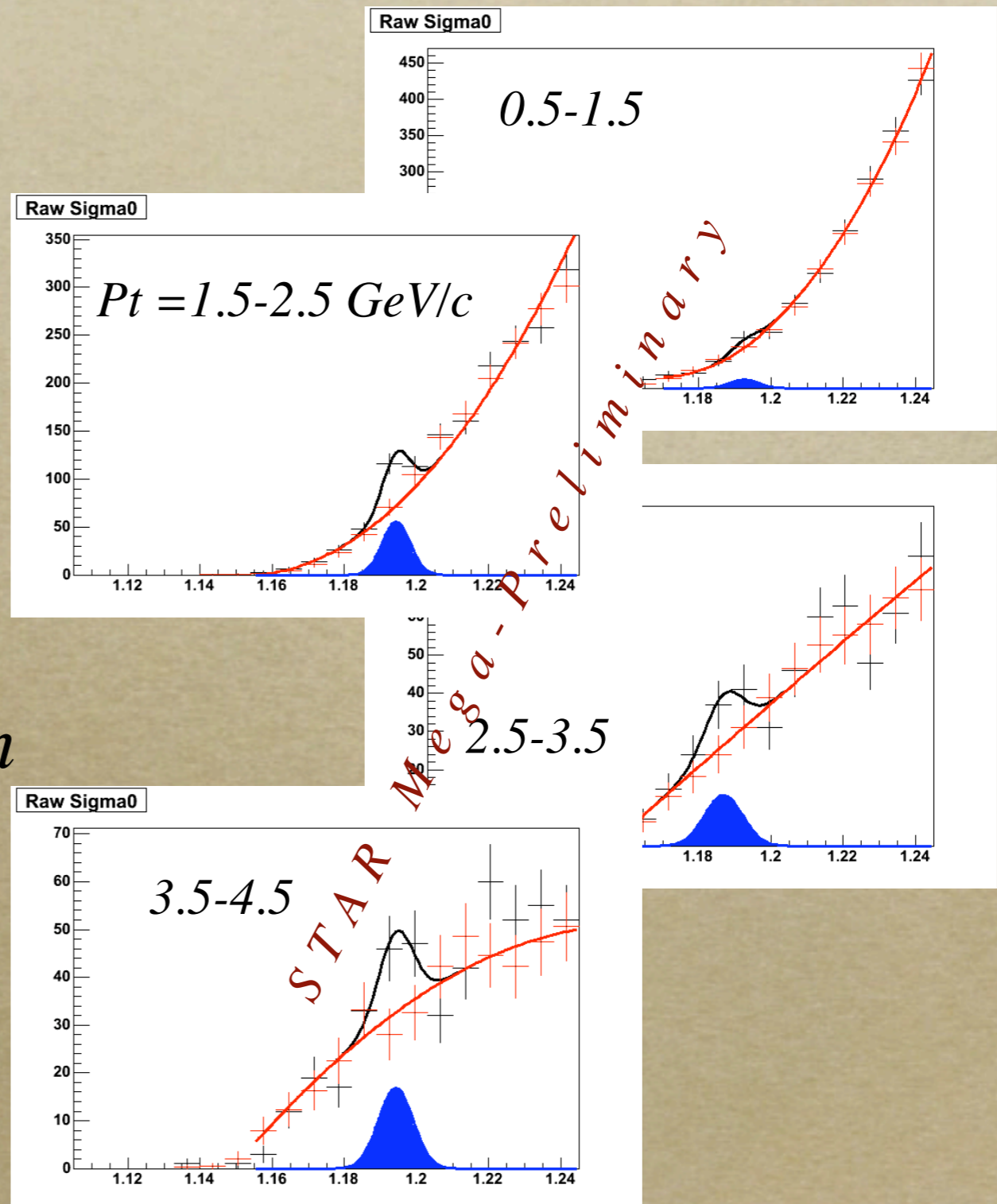
A bit low, perhaps, but large statistical errors

$\Sigma^0 + \bar{\Sigma}^0$ raw data:

- Rotated events fit to $bgnd = poly(3)$
- Real events fit to $Gaus + C * bgnd$

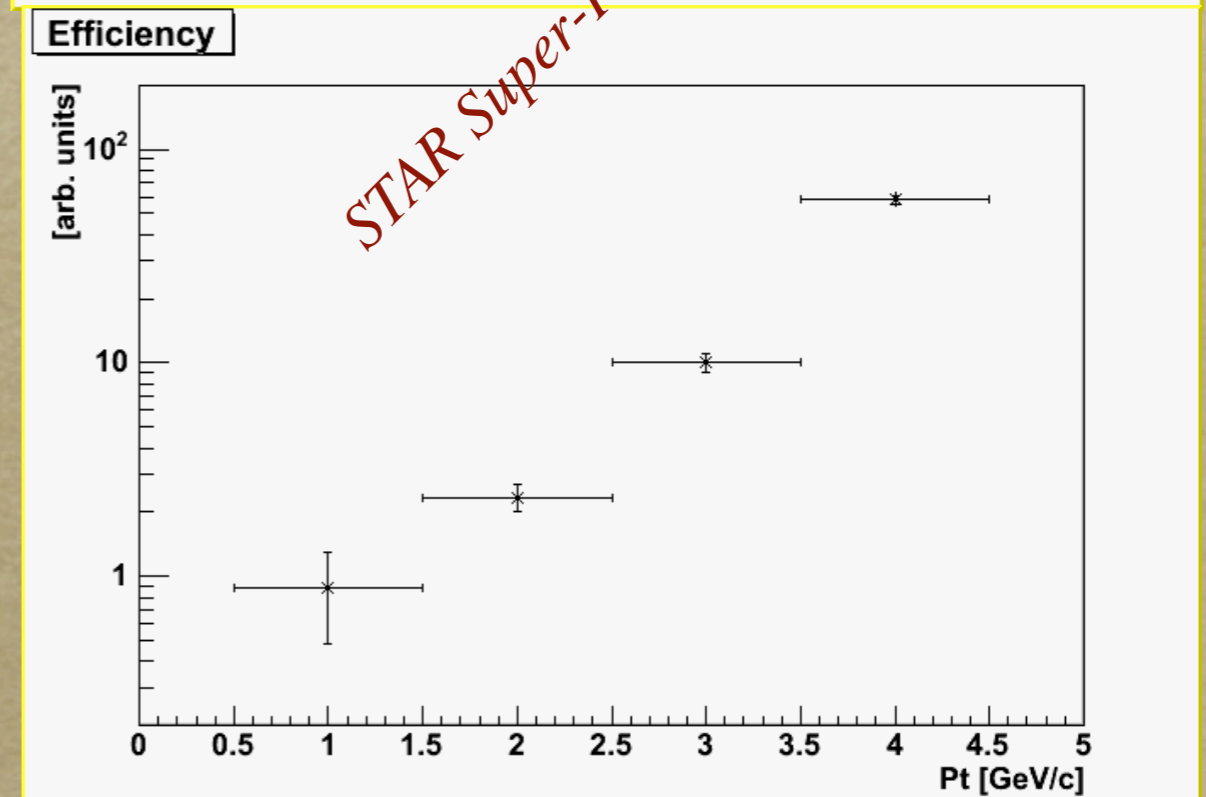
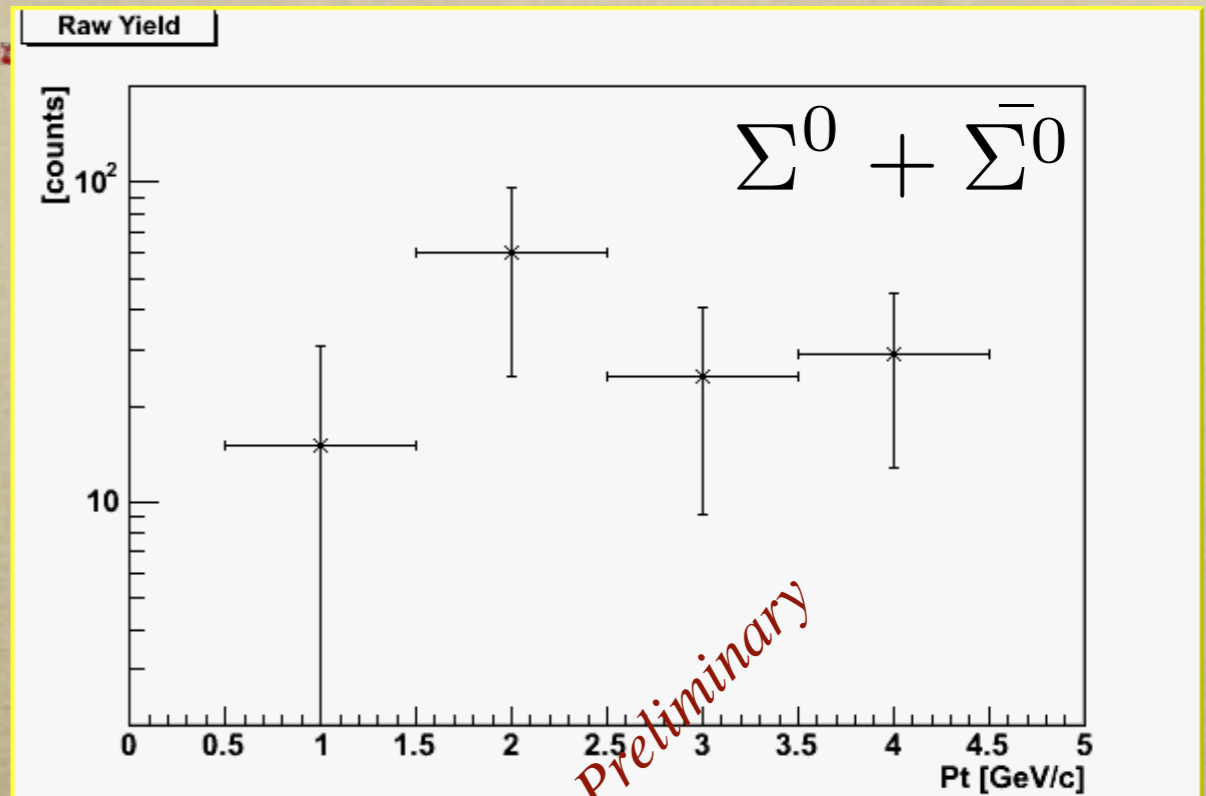
Bin counting and Gaussian area are within errors of each other (errors are large!)

Some systematic errors from varying fit ranges



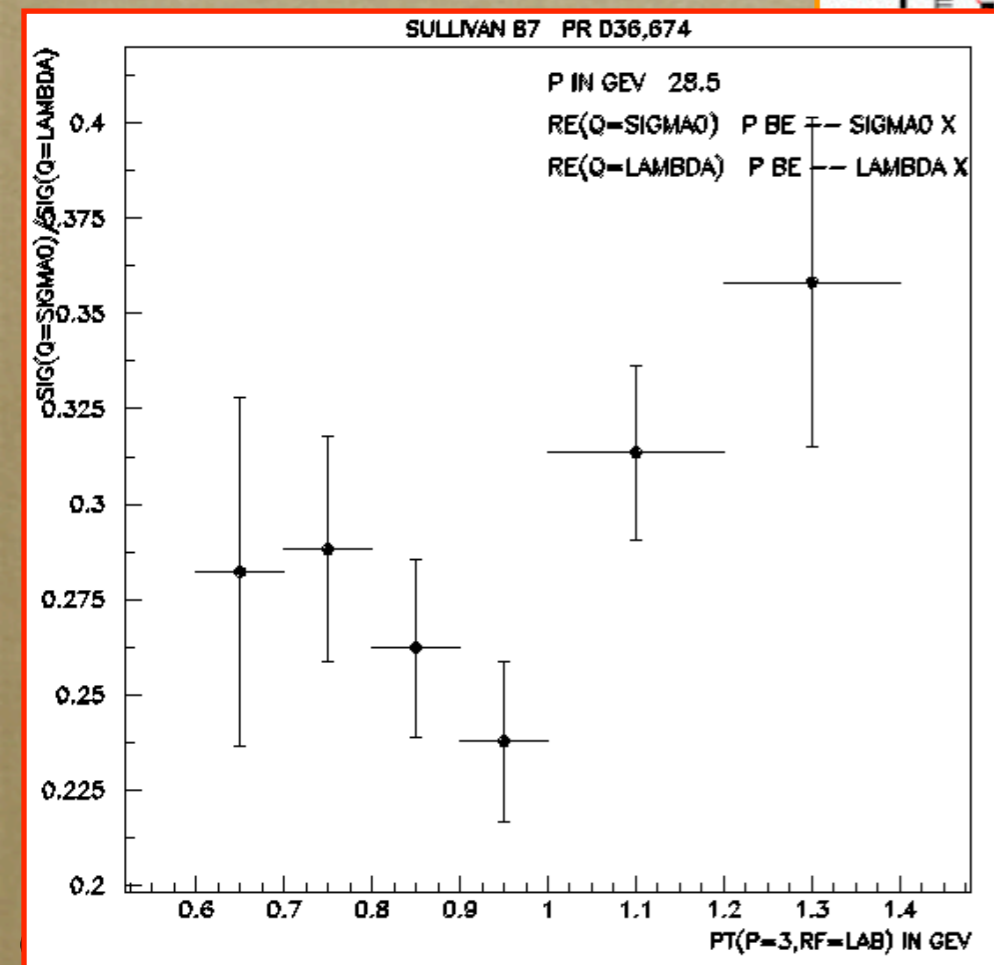
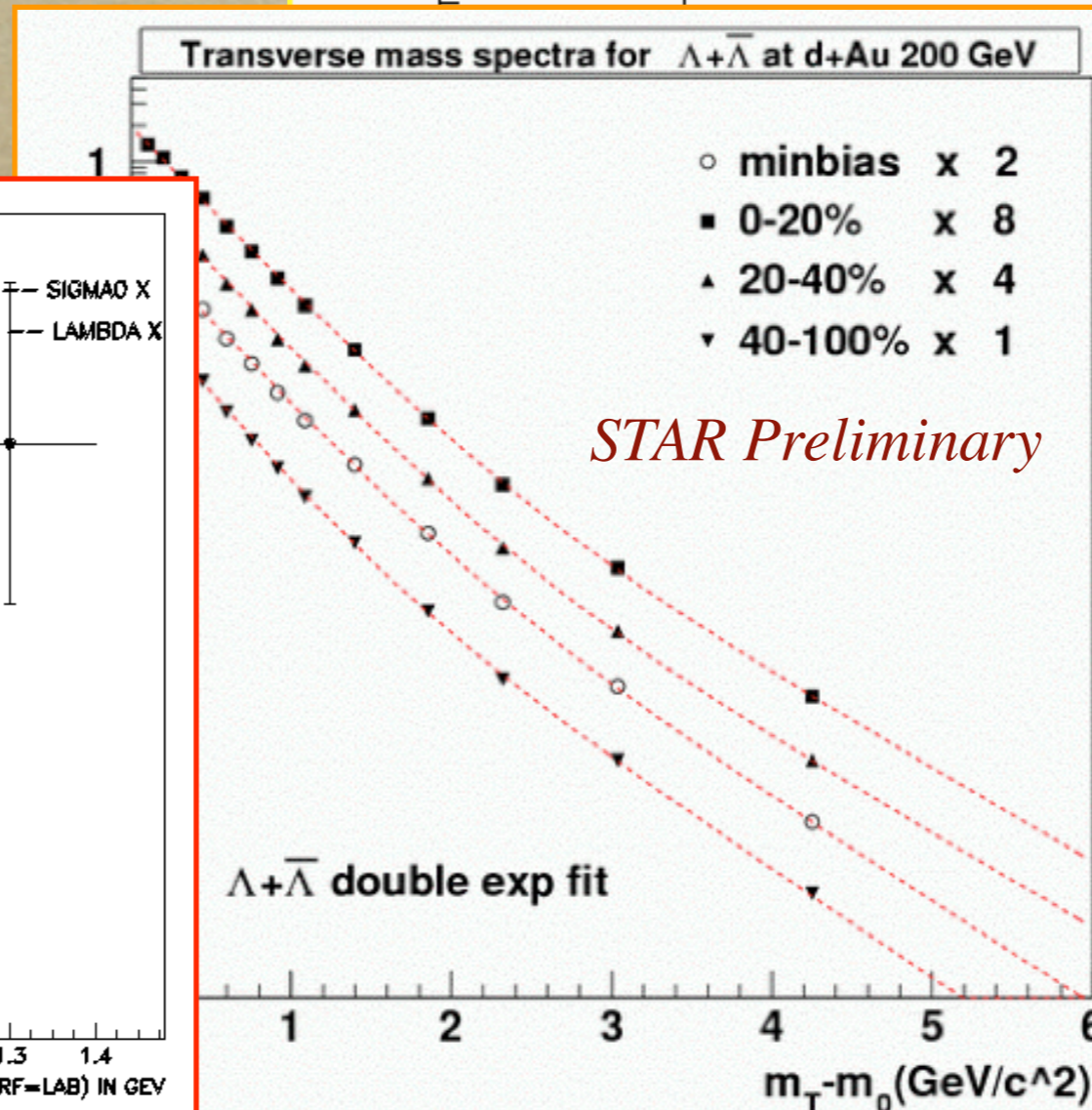
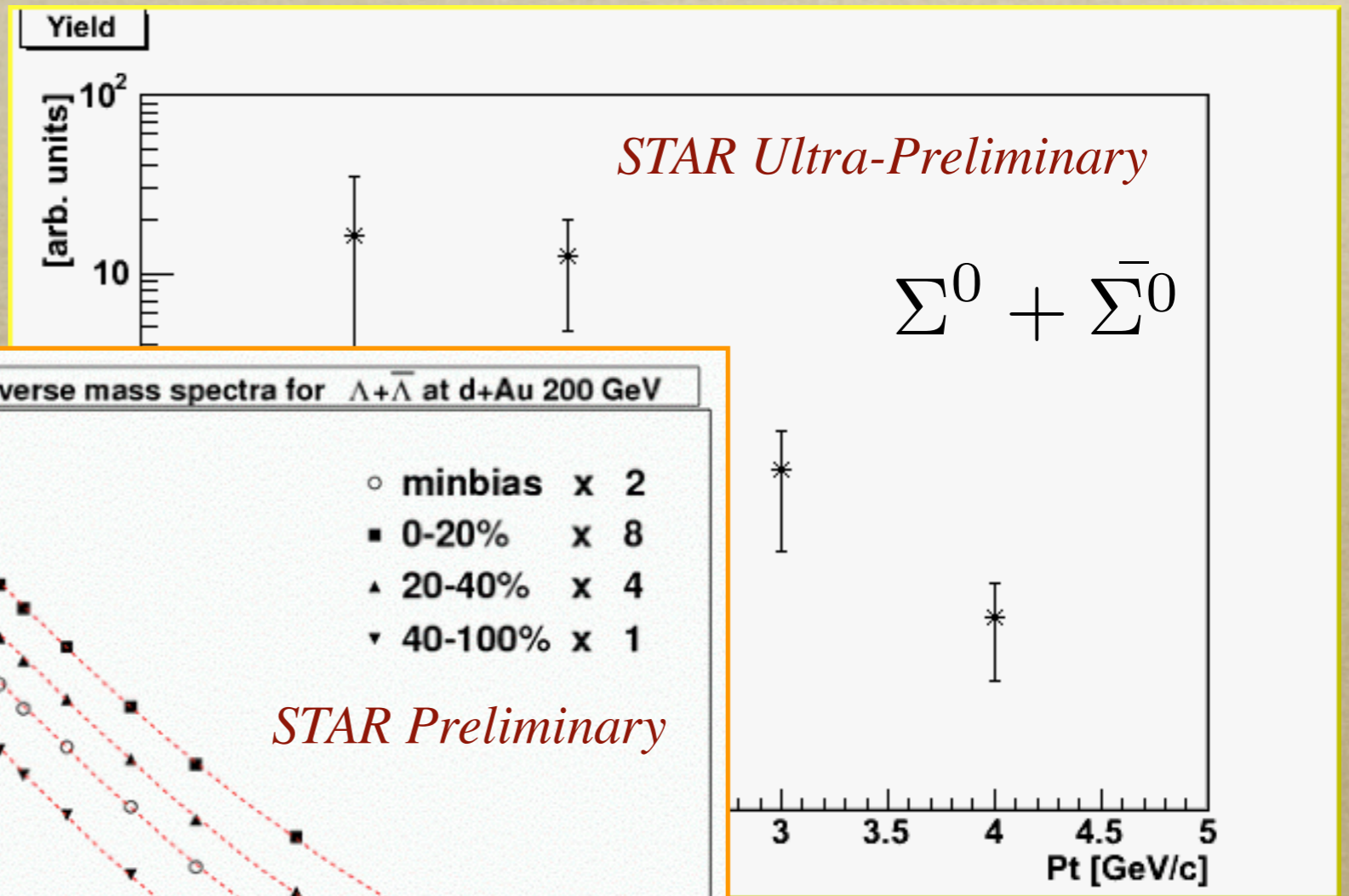
Reconstruction efficiency

- *Simple GEANT simulation run through full reco*
- *Needs:*
 - *realistic vtx Z dist*
 - *embedding*
 - *cross checks (Λ , γ)*



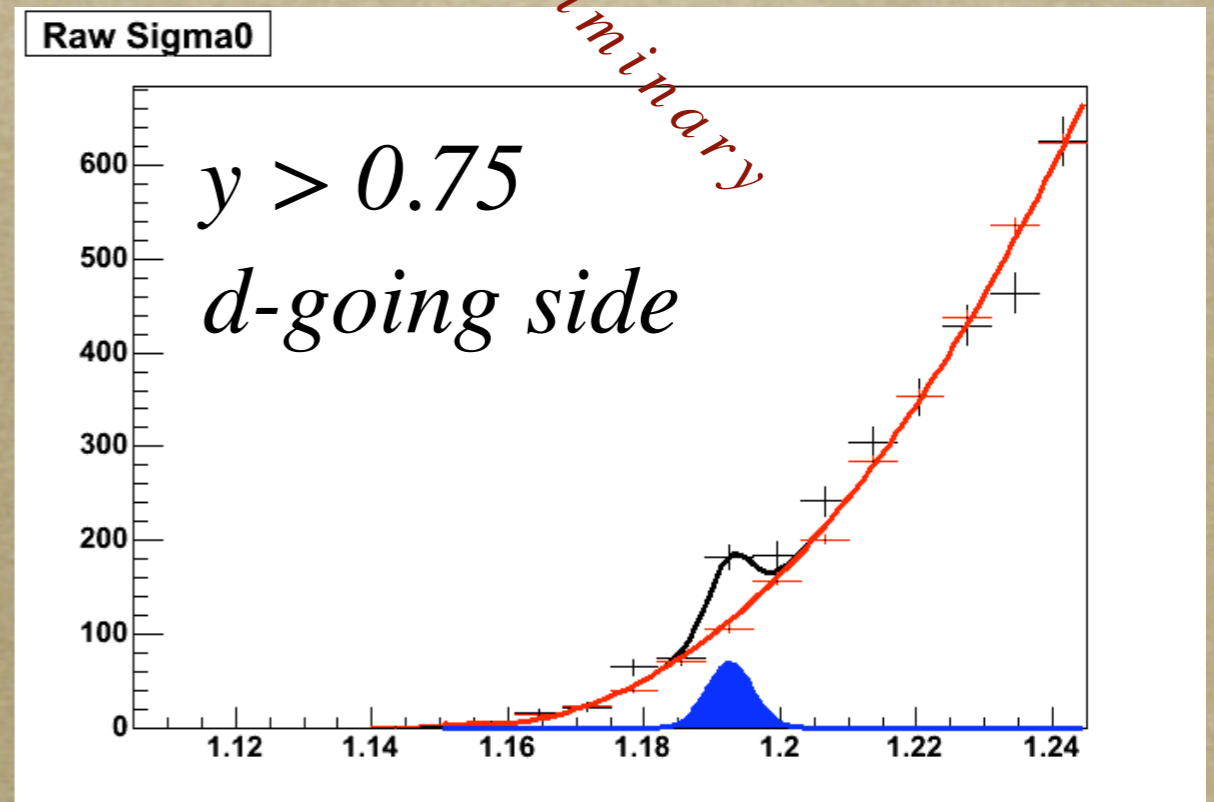
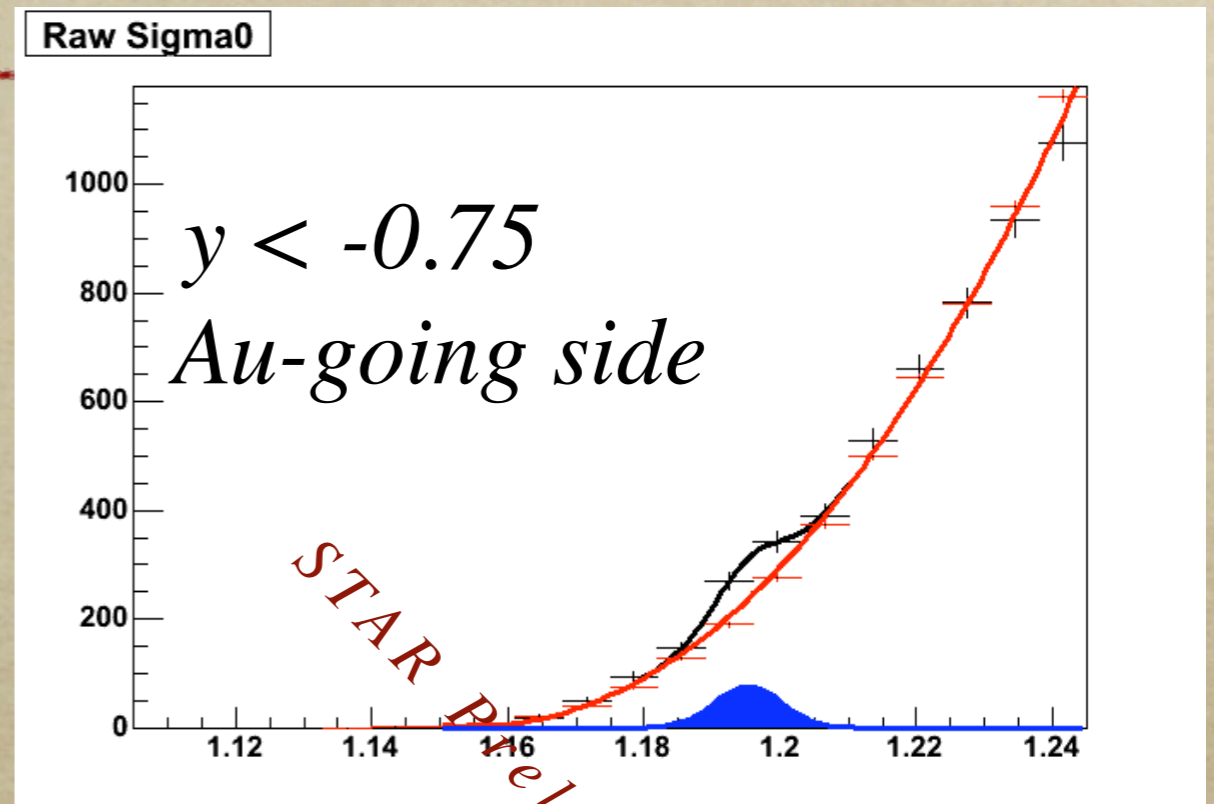
Pt spectrum

- Will compare to Λ spectra



Signals at large rapidity

- *Considerable signal!*
- *Particles pass at big angles to detector material.*
- *Thanks to a large spread in collision vertices along the beam axis!*



Future:

- *200 GeV AuAu from 2004 with much better statistics!*
- *62 GeV AuAu from 2004 with better combinatorics than 200 GeV!*
- *Future pp runs to beef up the stats!*
- *More detector material to convert gammas!*
- *EMC to measure gammas?*