- Initial scattering of two contracted relativistic Nuclei.
- (z,ct) picture –
  - initial parton cascading (ct~1 fm)
  - Hydro development
  - Chemical freeze out, kinetic freeze-out
  - The freezeout surfaces are reflected in rapidity/angular distribution
- Bjorken Picture dN/dy flat, transparent, properties independent of frame (y).

  Actually the flatness is an assumption not anything derived.
- How far in rapidity is the systems thermalized..

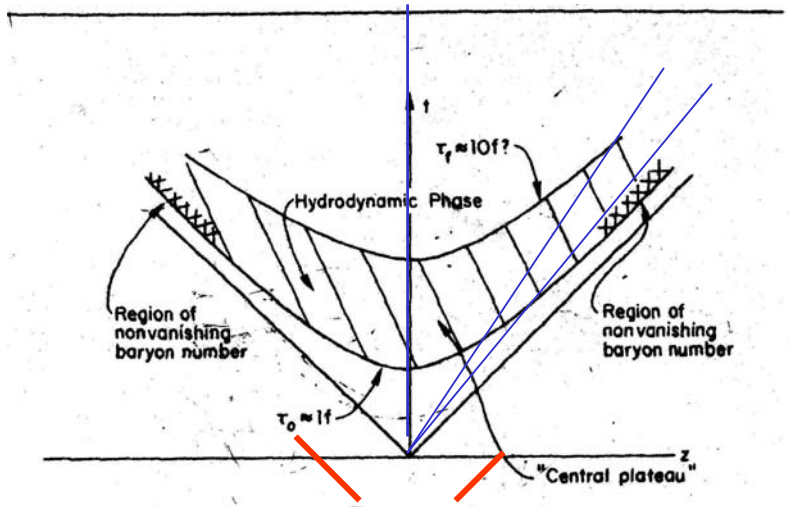


FIG. 3. Space-time diagram of longitudinal evolution f the quark-gluon plasma.

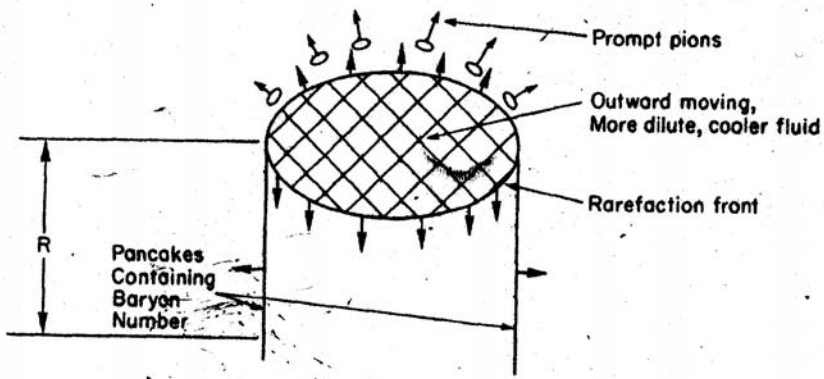


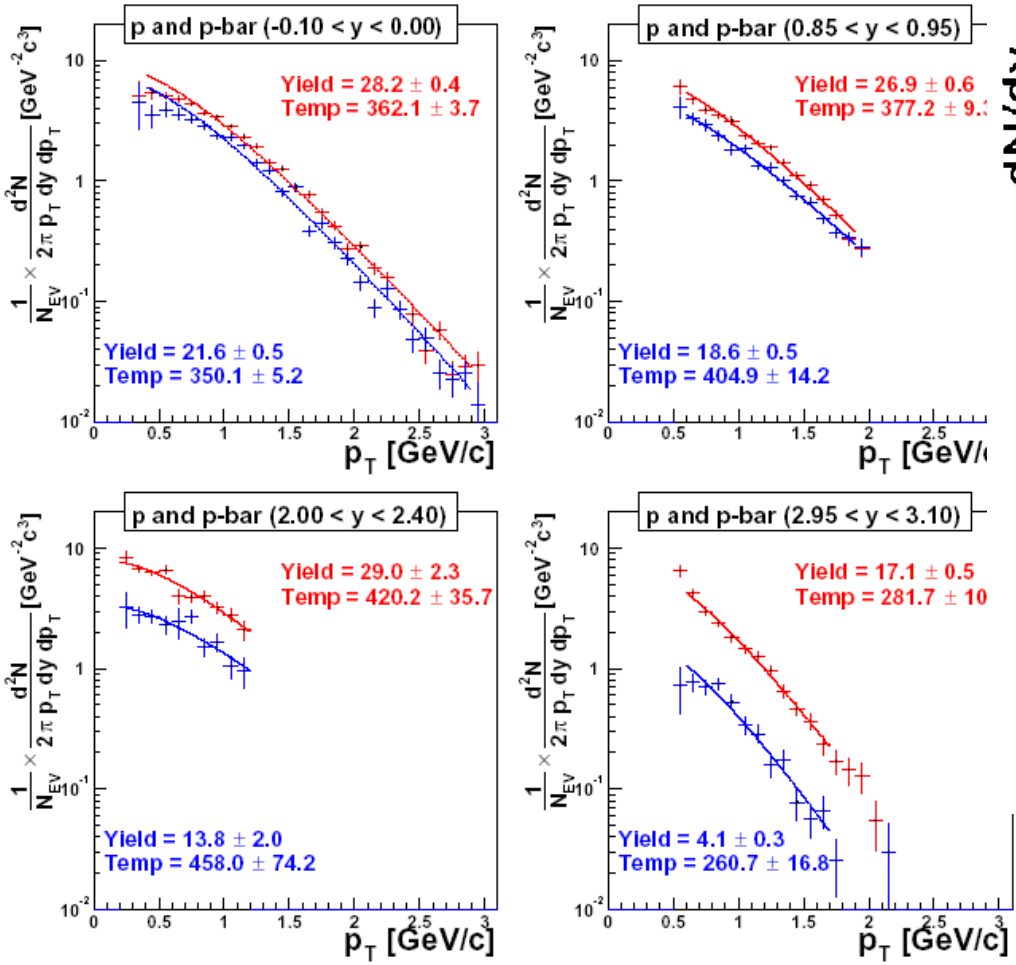
FIG. 4. Geometry of fluid expansion near the edge of the nuclei.

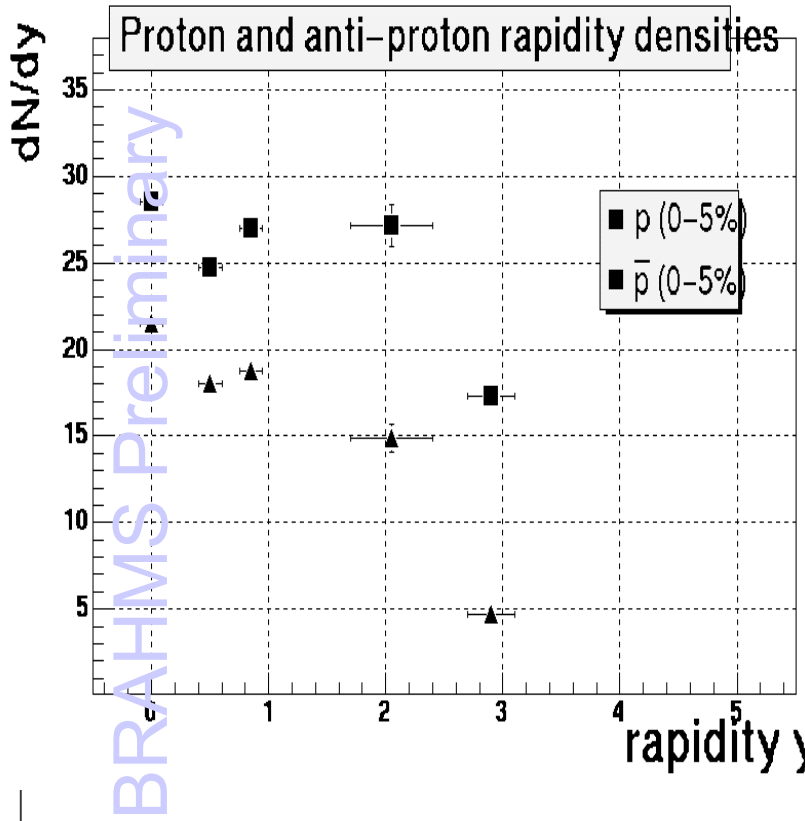
J.D.Bjorken,PRD 27,140 (1983)

Proton , and Net-Proton Distributions

- The net-baryon rapidity distributions are though to reflect the initial re distribution of baryonic matter in the very first moment of the collisions. Due to the large mass subsequent expansion and re-scattering will not result in a significant rapidity change.
- It is important to consider net-Protons i.e. N(B)-N(B-bar) since there is a significant ‘pair’ production at high energy.
- The net-p is used as a measure for the net-baryon which is only accessible via a measurement of the neutrons too. *I.e. this has to be discussed as well as how we account for Hyperons*

p,pbar Spectra at 0-5% Central at y=0 - 3





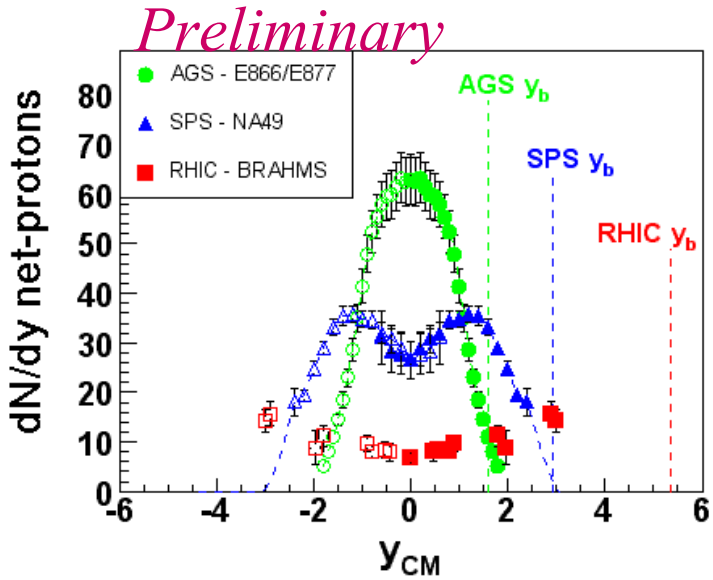
Have to address the issues of y~2 (T is up..)
And y~3; how sure on difference between p and p-bar

P. Christiansen (NBI) Thesis

Net-p energy systematic

The shape of the net-proton distribution measured at RHIC is different from what is observed at lower energies.

At RHIC the mid-rapidity region is almost net-proton free. Pair production dominates at RHIC.



- AGS->RHIC : Stopping -> Transparency
- Net proton peak > y ~ 2

We should get the real AGS data. They are actually kind of flat.

Estimate of amount of stopping

- Even though we do not have measurements in 3-5.4,we may extend another .4 units in future, how can we estimate rapidity loss right now.
- Interested in evaluating $\delta y = \int (yb-y)\, dN/dy \,/\, \int dN/dy$, as has been done for lower energy data.
- Baryon conservation tells us Net(p) ~ 68 for N_{part}~340 (0-10%) or ~85 in the case of full proton/neutron equilibration.
- Only small corrections are expected due contributions from Λ decays.

Energy systematic of Rapidity loss and Net-Proton

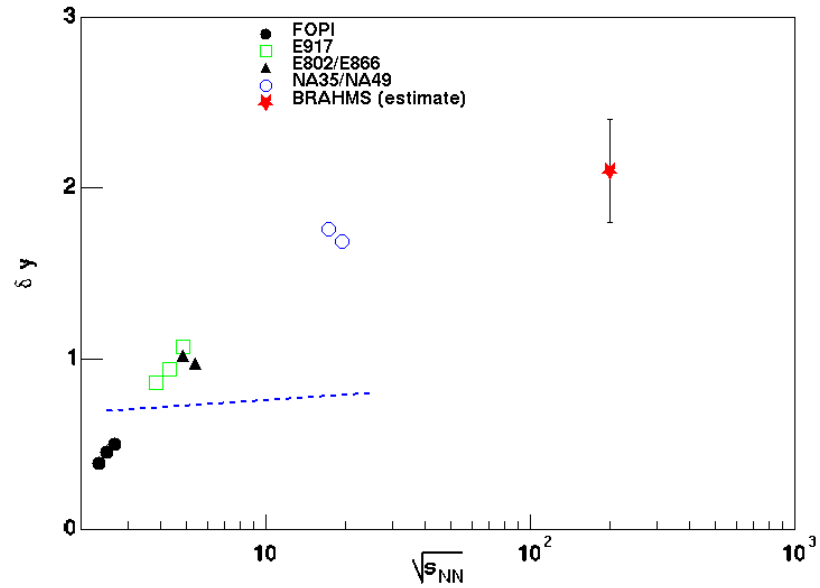
These data showing the ‘increase’ in δy for AA, while pp is approximately constant. *We do not want to wait for our pp but these are of interest.*

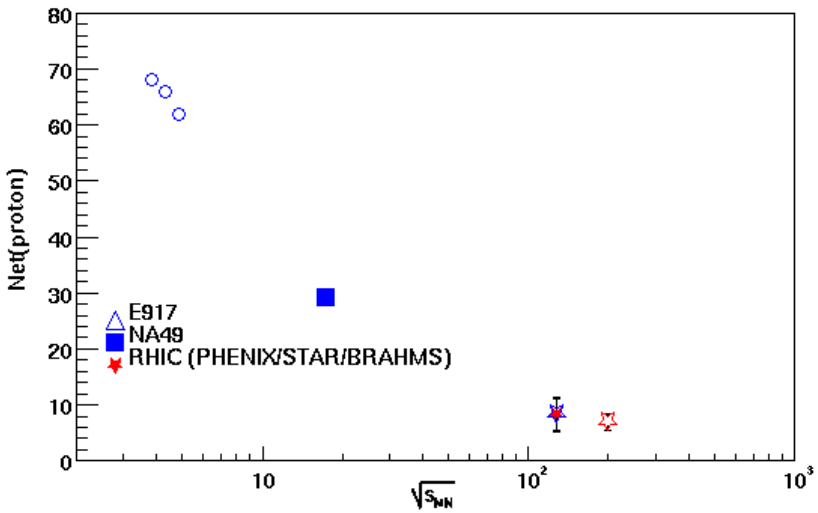
The estimated value at RHIC is consistent with a continuous increase of δy.

This implies that 84-90% of the initial energy is stopped and emerges as internal energy, produced particles and at end of reactions in longitudinal and transverse momentum distributions.

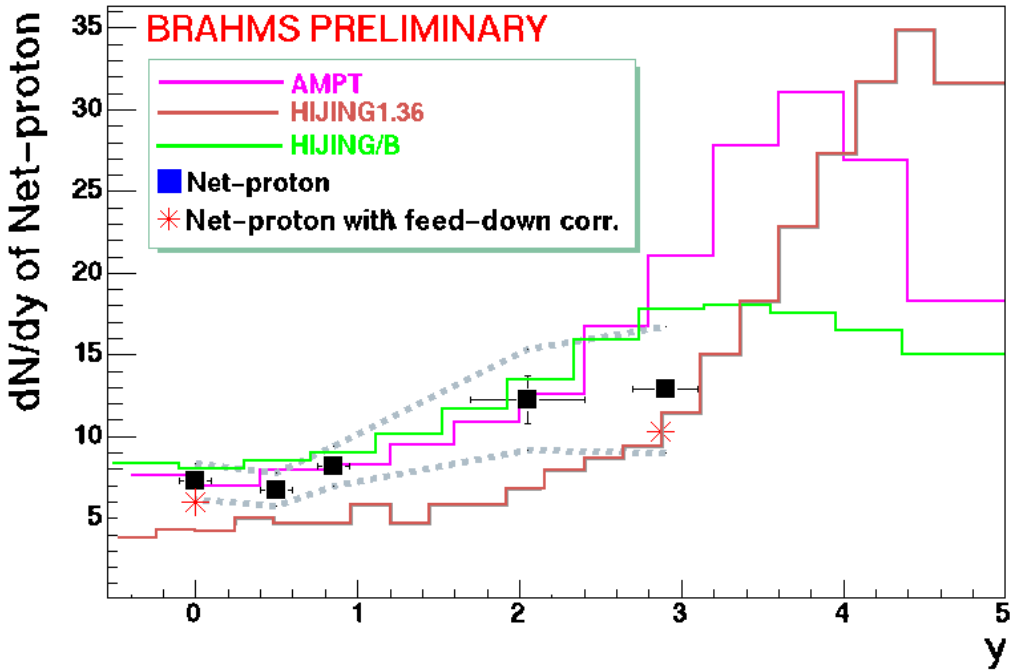
Net-protons at y~0 continuously decrease with energy.

AGS(E~.64) SPS(E~.83) RHIC(E~.89).





dN/dy of Net-proton and Models for 0-10% central



How do we want to address Models? Compare with dN/dy, or look at the estimated δy ?

"Plateau" at |y| < ± 1
the yields by 18, 20% at y=0,2.9

- **Net-baryon at y =0: ~16**
  (if N(proton)/N(neutron) ≈ 1
  N(net-L)=0.9N(net-proton))
- **Hyperon feed down correction decrease yields 16-20%**
- **A range of models is still allowed with these data.**