R_{CP}, multiplicity, and R_{dAu}

- R_{CP}
- Centrality cuts
- dAu multiplicity
- Scaling?
- R_{dAu} and multiplicity
- Box method vs Full acceptance method
- Summary

R_{CP} in dAu

- R_{CP} = [yield(central)/N_{Coll}]/[yield(peripheral)/N_{Coll}]
- Acceptance and most of the systematics /inefficiencies cancel out
- centrality calibration with ~3-5% of resolution
- Trigger inefficiency for peripheral not corrected
- Data used: 90 (6A 6B), 40deg (3B 10B). 12deg (1/4 1/2A) 4deg (1A)
- MRS track ($\pm$15cm) , fFS track (-25 - +20)
- DST v6+v7
- more data available (need calibration)

Cronin Effect and High-p_T Suppression in pA Collisions

Dmitri Kharzeev[1], Yuri V. Kovchegov[2] and Kirill Tuchin[3]

We, therefore, conclude that if the effects of quantum evolution and anomalous dimension are observed in the forward rapidity region of dAu collisions at RHIC, they would manifest themselves by reducing R^{dA} at all k_T as shown in Fig. 8, eliminating the Cronin enhancement. R^{dA} will become a *decreasing* function of centrality. The pA program at LHC would observe an even stronger suppression of R^{pA}. However, it might be that the quantum evolution effects are still not important even in the forward region of dAu collisions at RHIC. Then reduction of R^{dA} going from mid-rapidity to deuteron fragmentation region should be rather mild and the Cronin peak would not disappear in the forward region.

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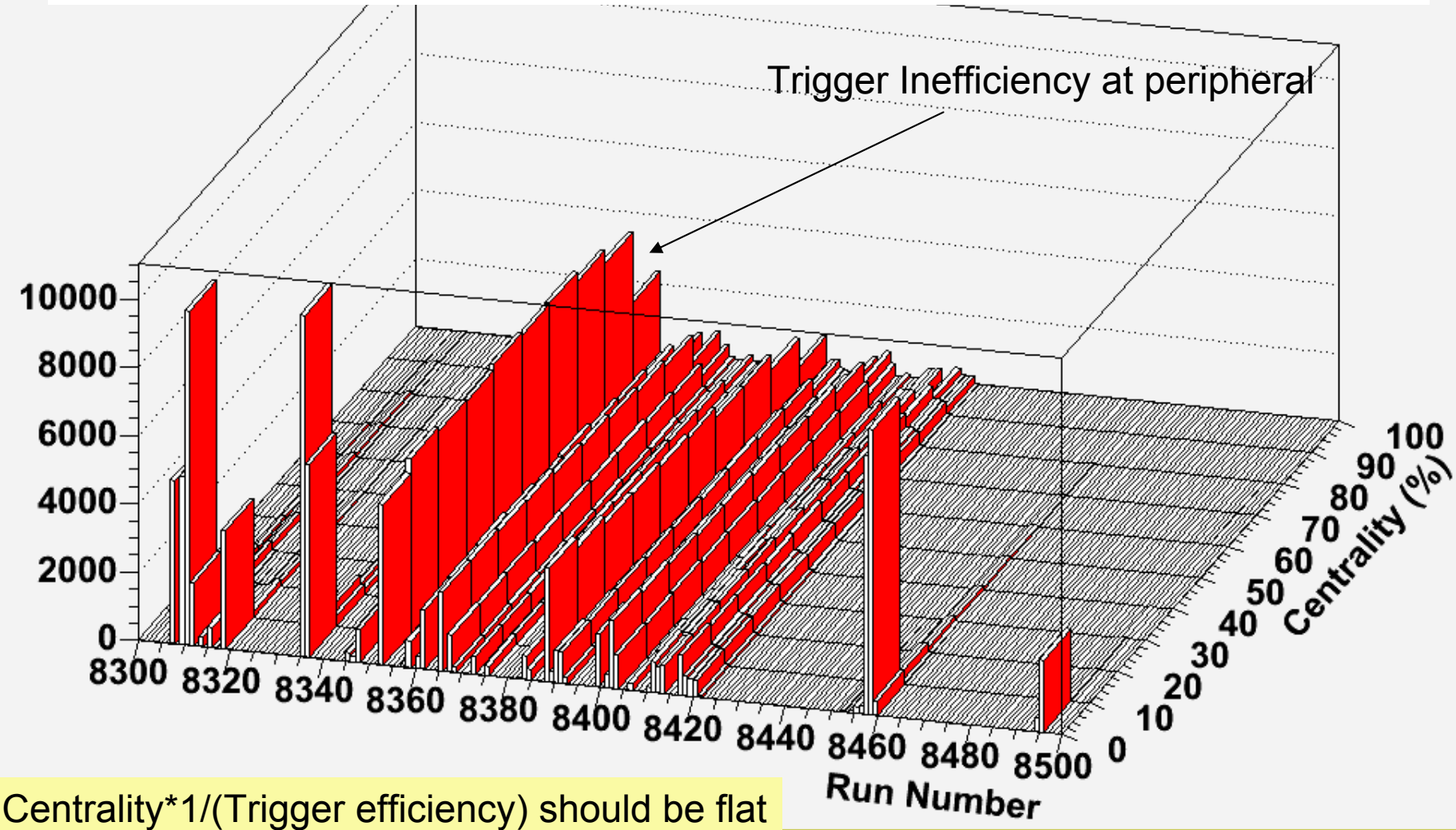
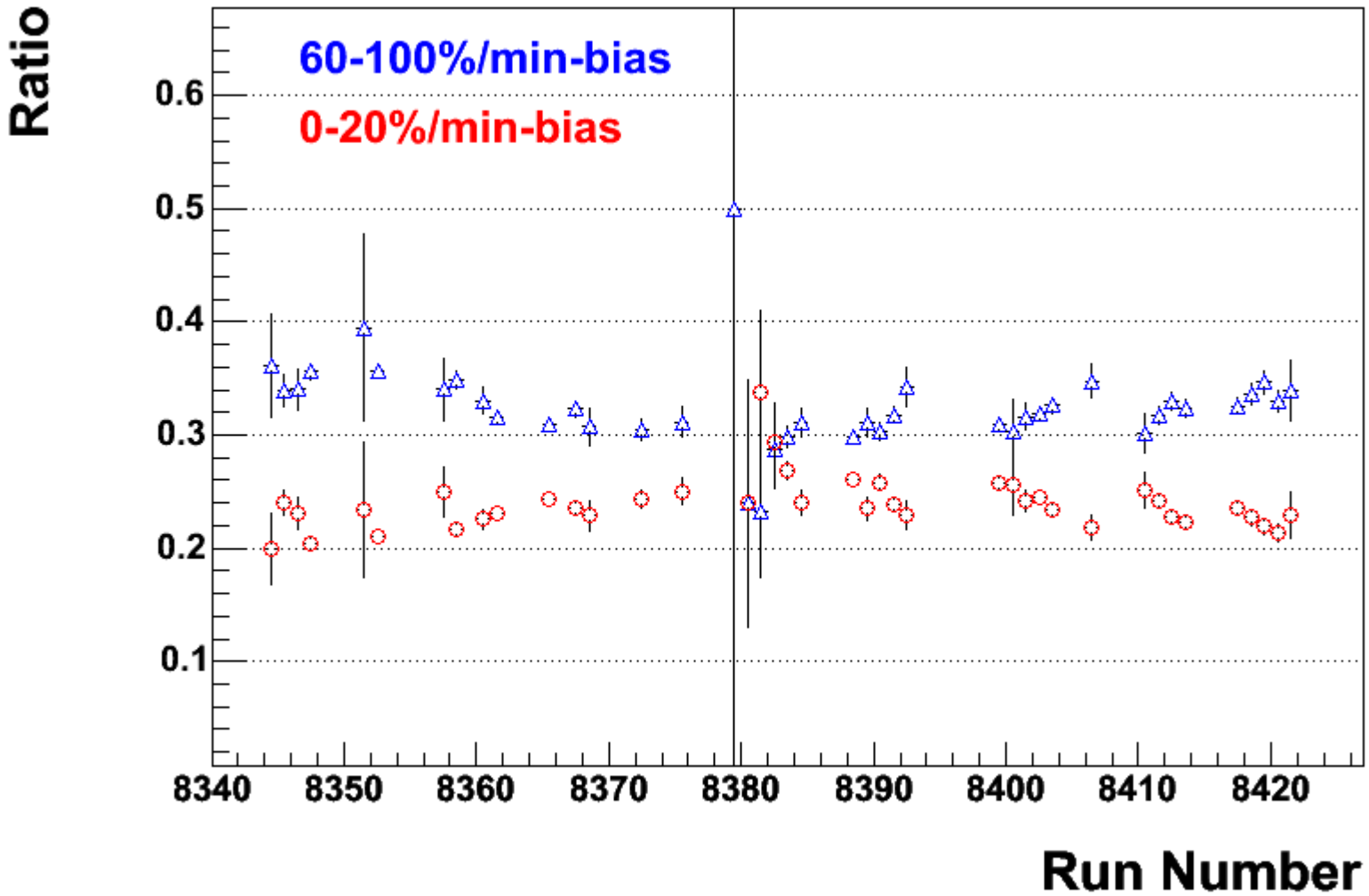
If the forthcoming data on R^{dA} in the forward rapidity region of dAu collisions would have no high-p_T suppression and would exhibit only a strong Cronin maximum which is an increasing function of centrality in agreement with predictions of multiple rescattering models described in Sect. III [48,49,51–54], then all of the observed high-p_T suppression in $Au-Au$ collisions would have to be attributed to the final state effects. However, if the future R^{dA} data in the forward rapidity region exhibits suppression either for all p_T or at high p_T with R^{dA} being a decreasing function of centrality as described in this paper (see also [8]), then a fraction of R^{AA} suppression in the forward rapidity region of $Au-Au$ collisions should be attributed to initial state quantum evolution effects. Indeed, there is some evidence [4] that the high k_T suppression in $Au-Au$ collisions increases between the pseudo–rapidities $\eta = 0$ and $\eta = 2.2$.

Centrality distributions for trigger5 events (-30<z<30cm) as a function of run number

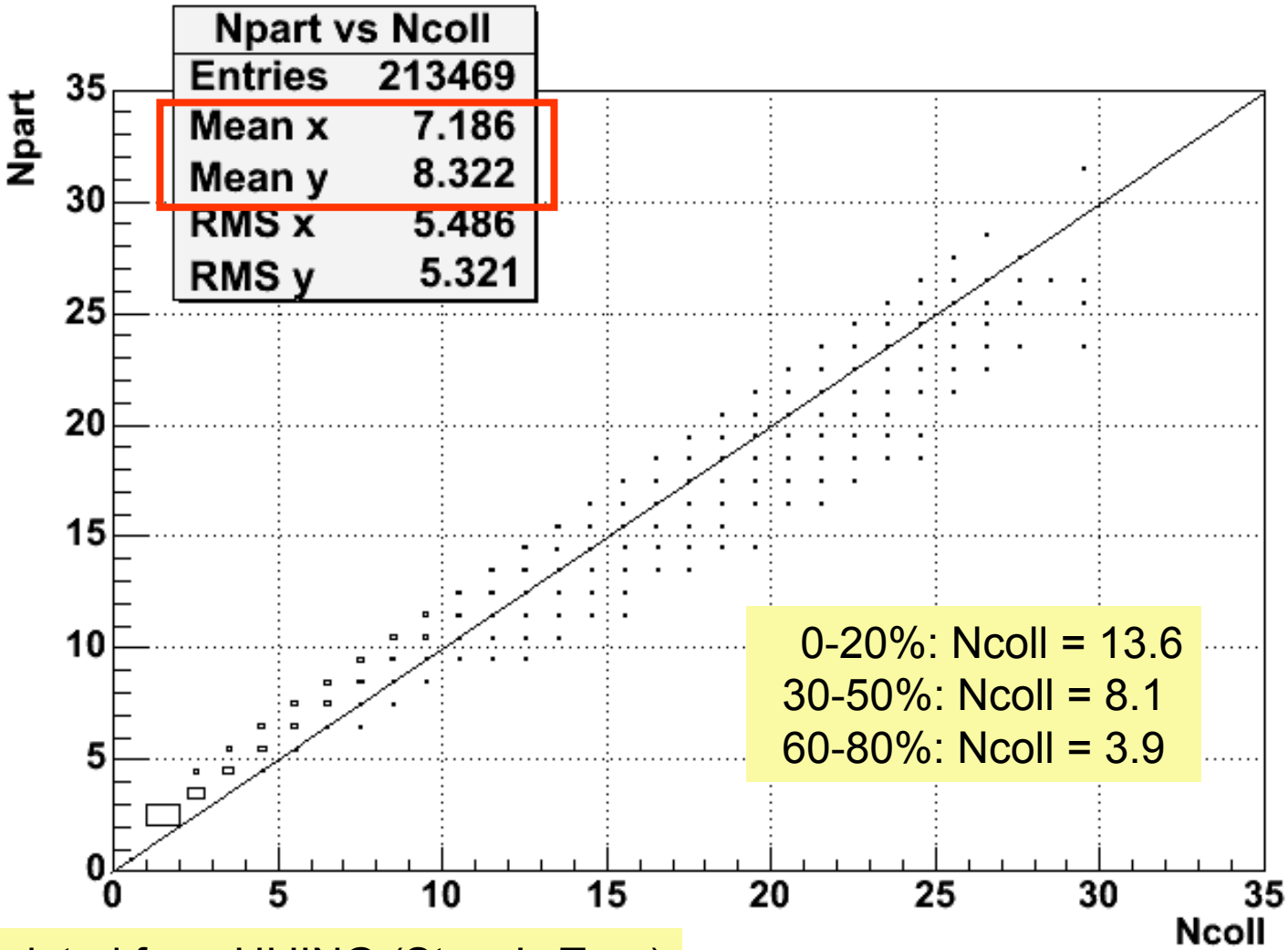


Centrality*1/(Trigger efficiency) should be flat

Resolution and Stability of Centrality Cuts

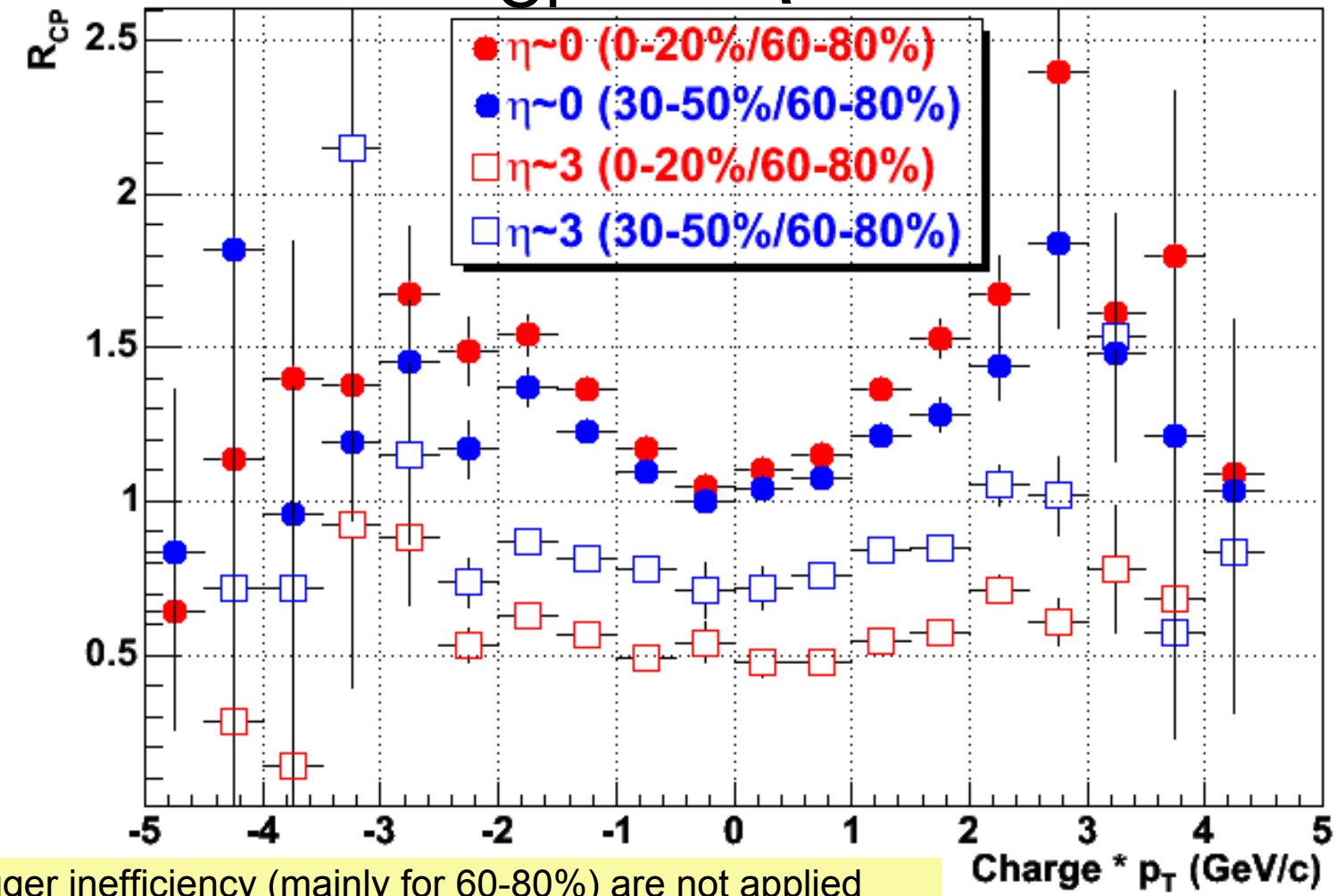


Ncoll and Npart



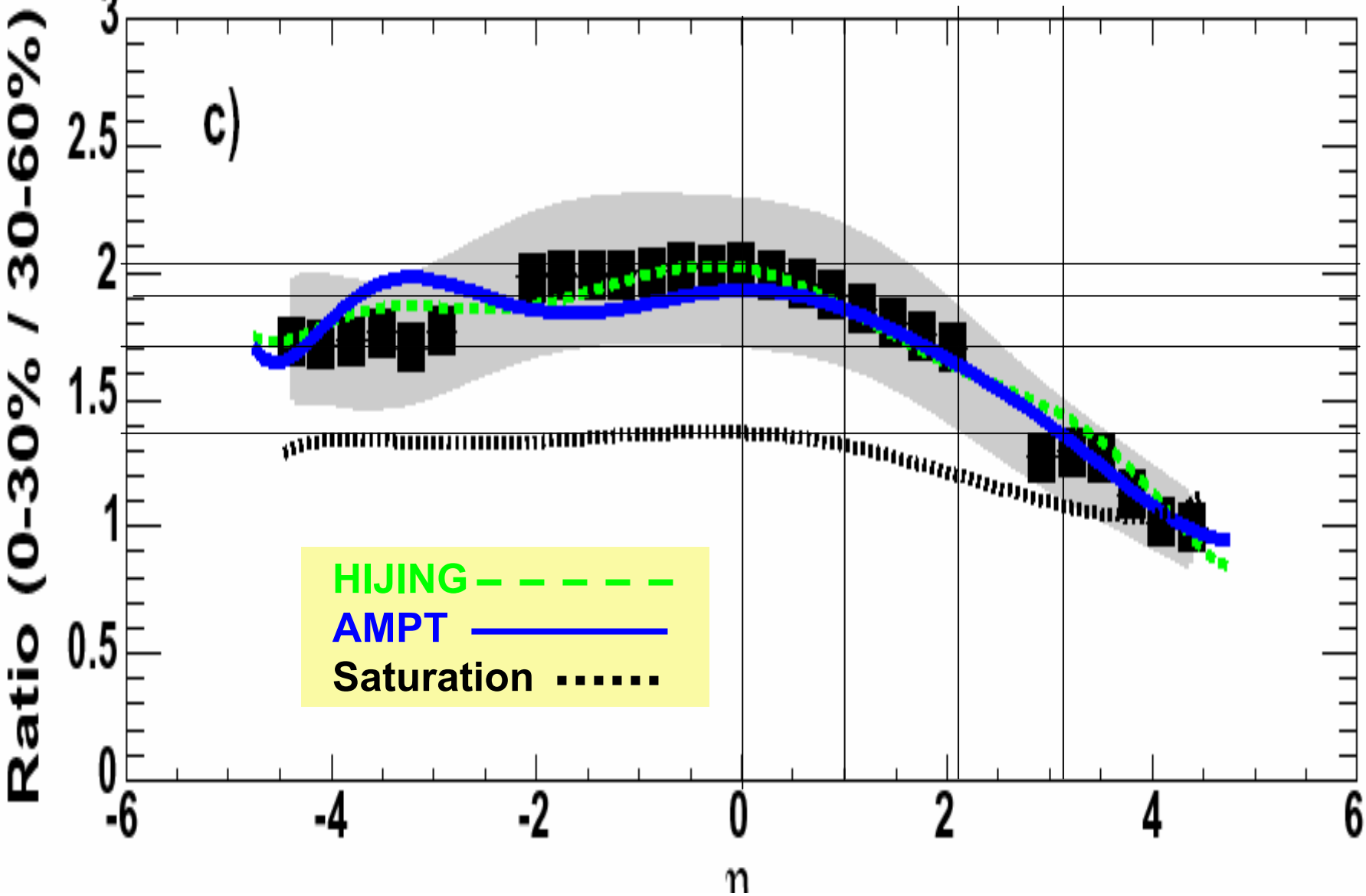
Calculated from HIJING (Steve's Tree)

R_{CP} at η=0,3

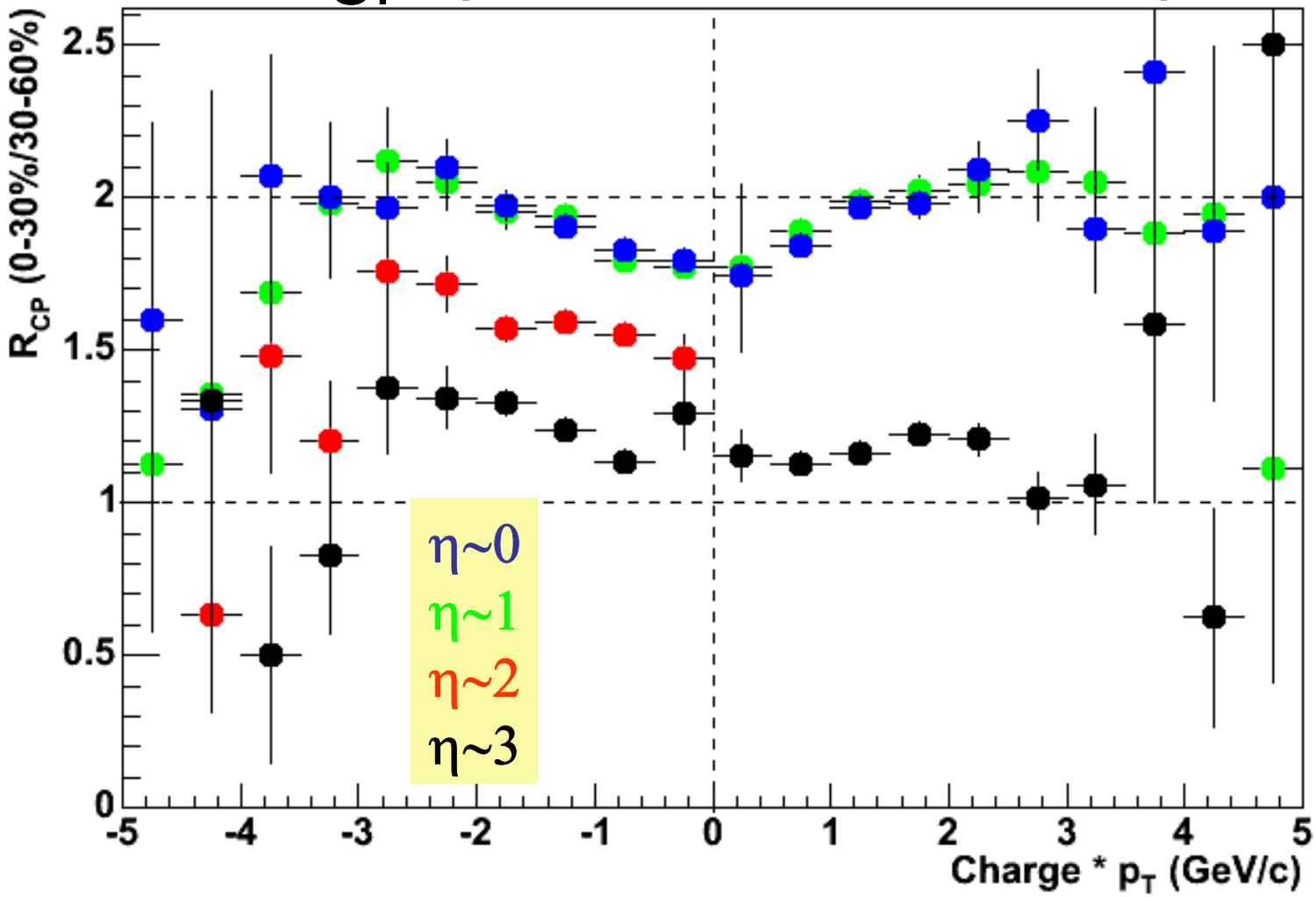


- Trigger inefficiency (mainly for 60-80%) are not applied
- Actual Rcp should be Lower(20-30%?) but the relative ratios are constant
- Rcp increasing function of Centrality at η~0
- Rcp decreasing function of Centrallity at η~3

From multiplicity paper draft

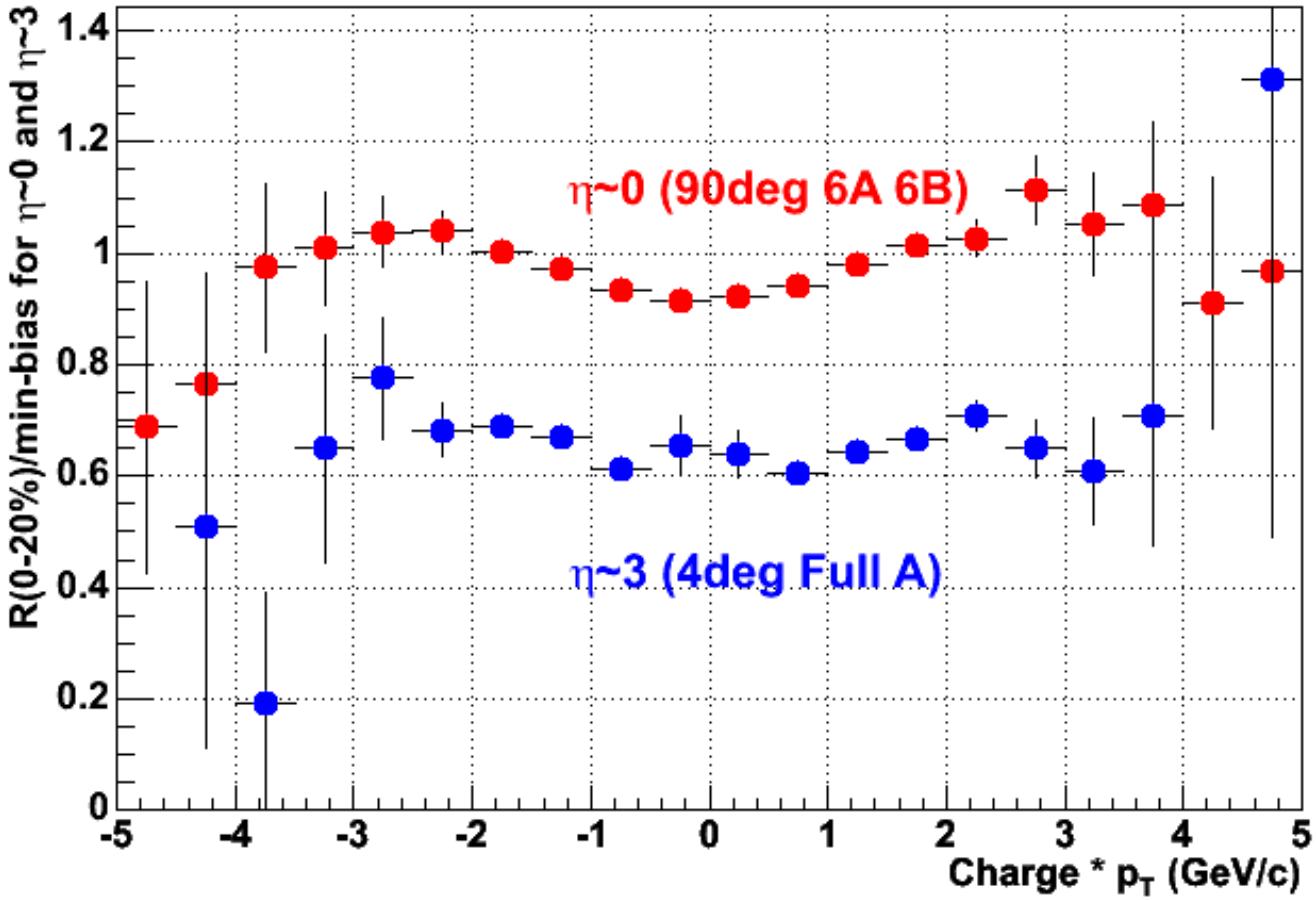


R_{CP} (0-30%/30-60%)

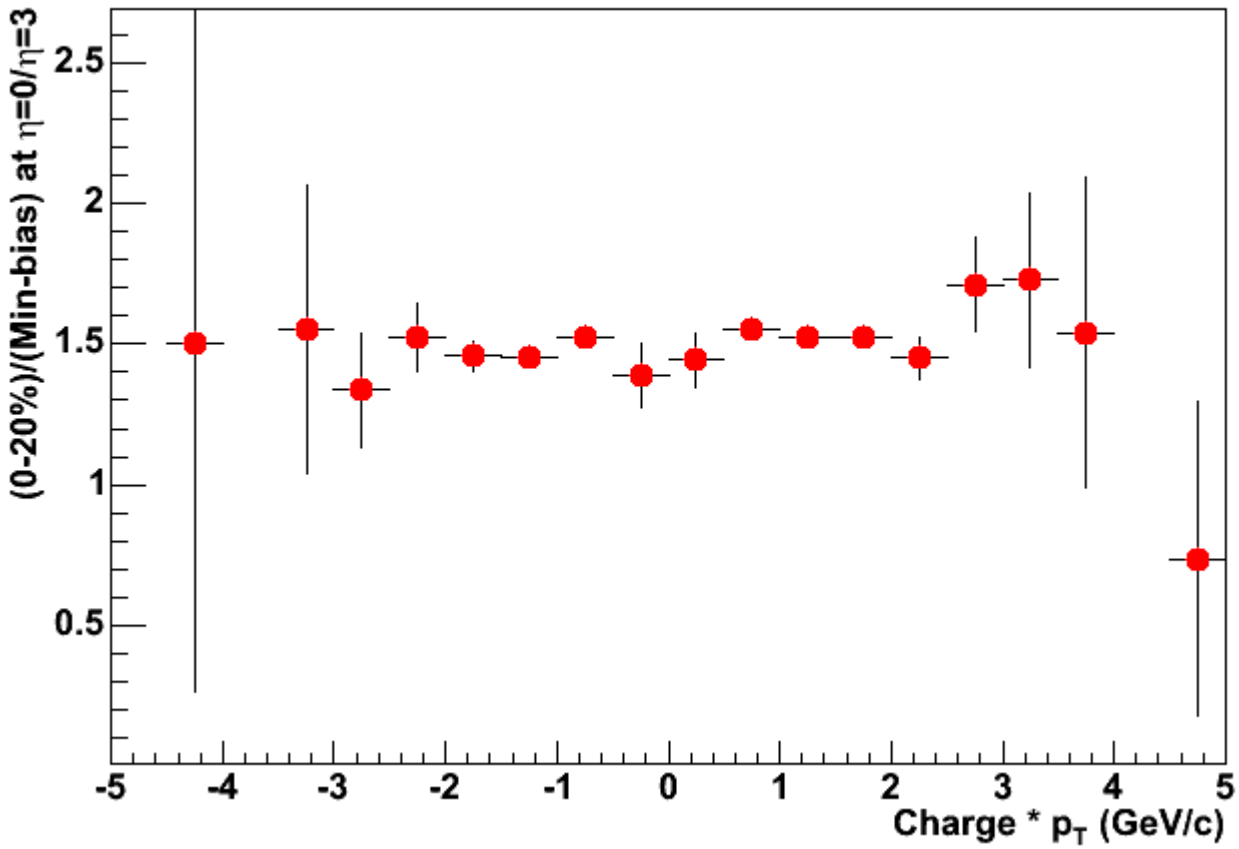


- Ratio: ~consistent with multiplicity ratios in pt<~3 GeV/c
- Pt>3GeV/c: Not enough statistics
- Zvertex using Inel. for 4 deg and track vtx for 12deg. (using track vtx for 4deg. yields similar results)

p_T dependence different for η~0 and η~3?

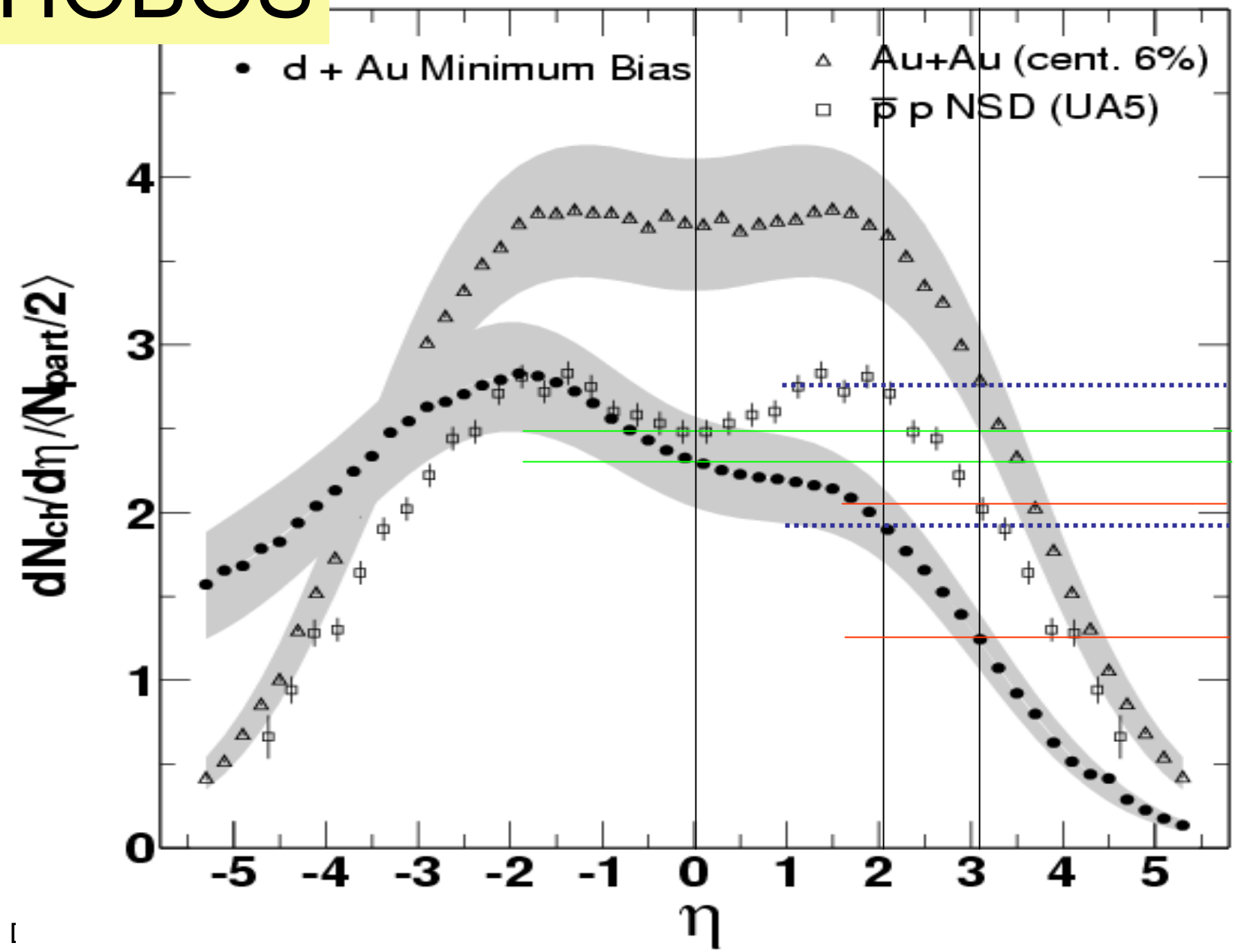


Ratio of the Ratios

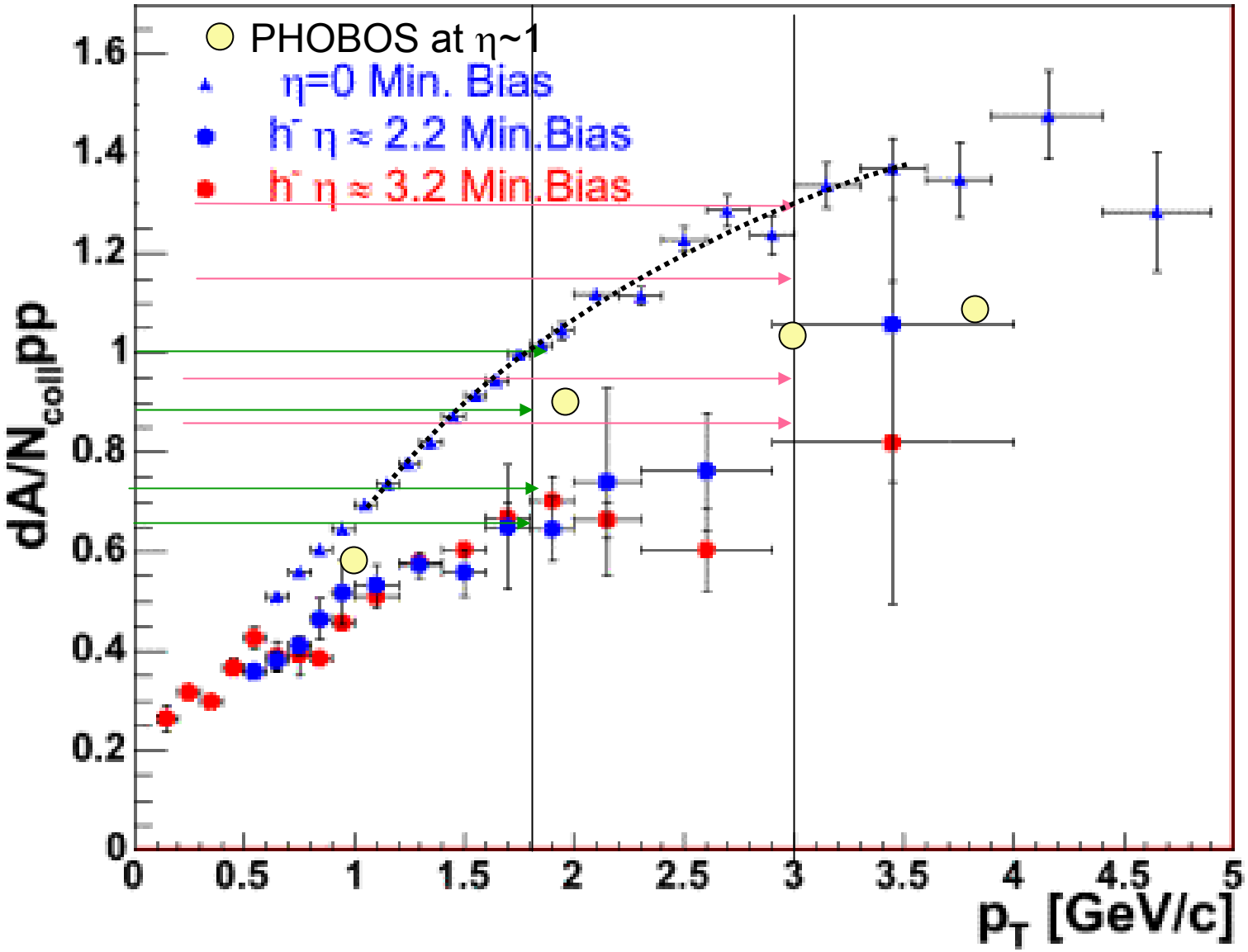


No significant pt dependence up to ~3GeV/c

PHOBOS

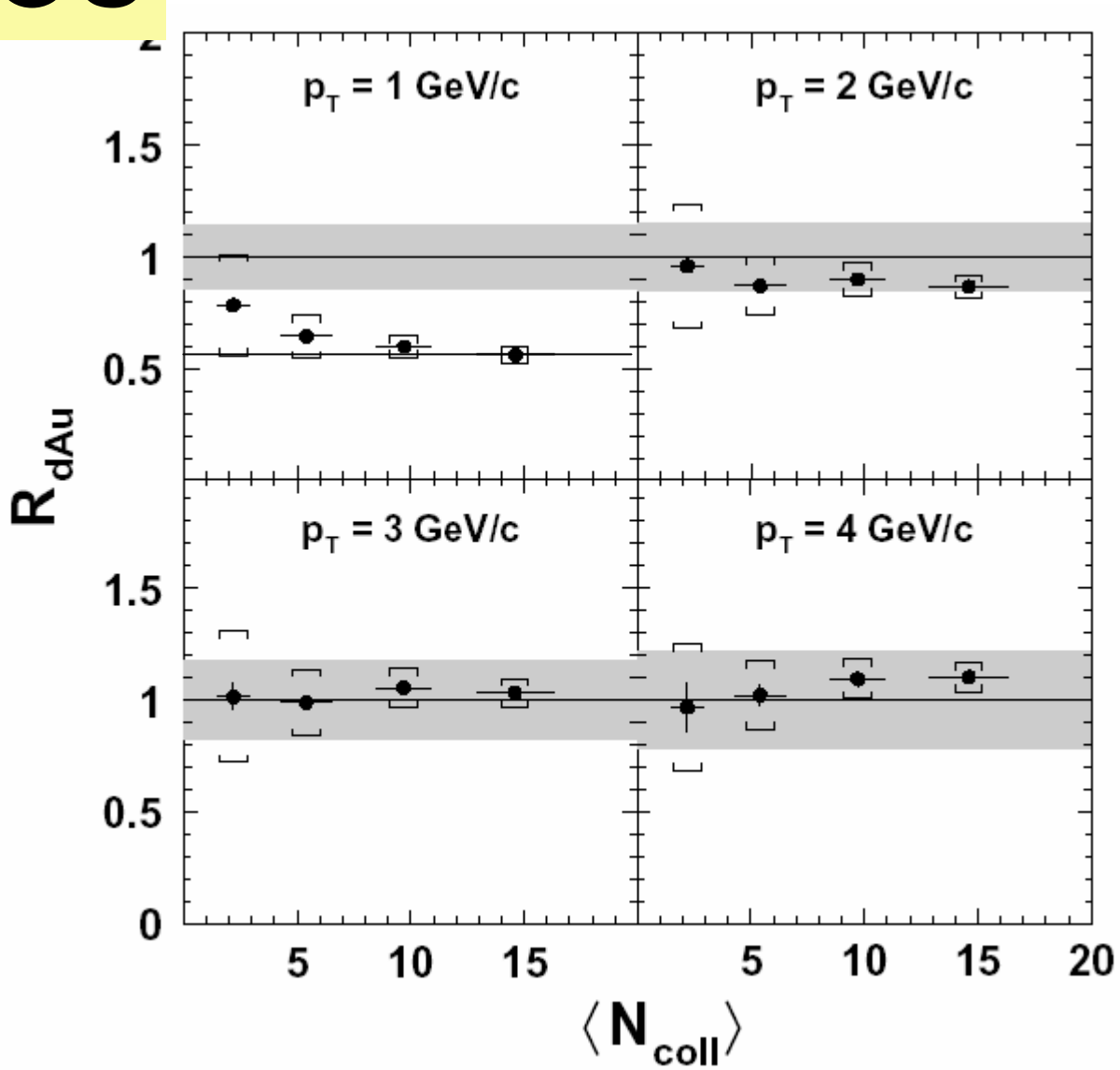

d + Au Minimum Bias
Au+Au (cent. 6%)
p̄ p NSD (UA5)
dN_ch/dη/⟨N_part/2⟩
η
0
1
2
3
4
-5
-4
-3
-2
-1
0
1
2
3
4
5

R_{dAu} and multiplicity scaling

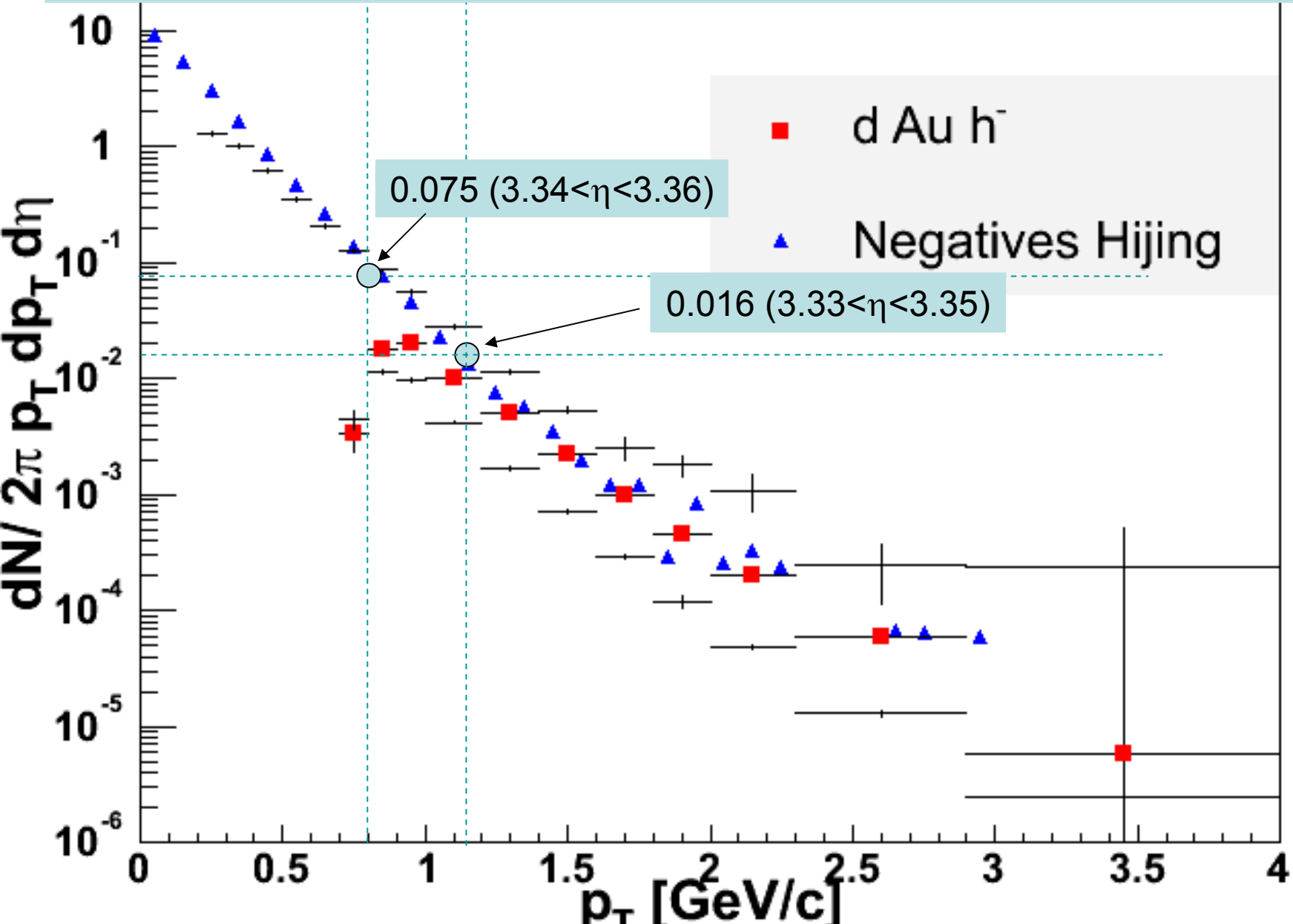


Dec.

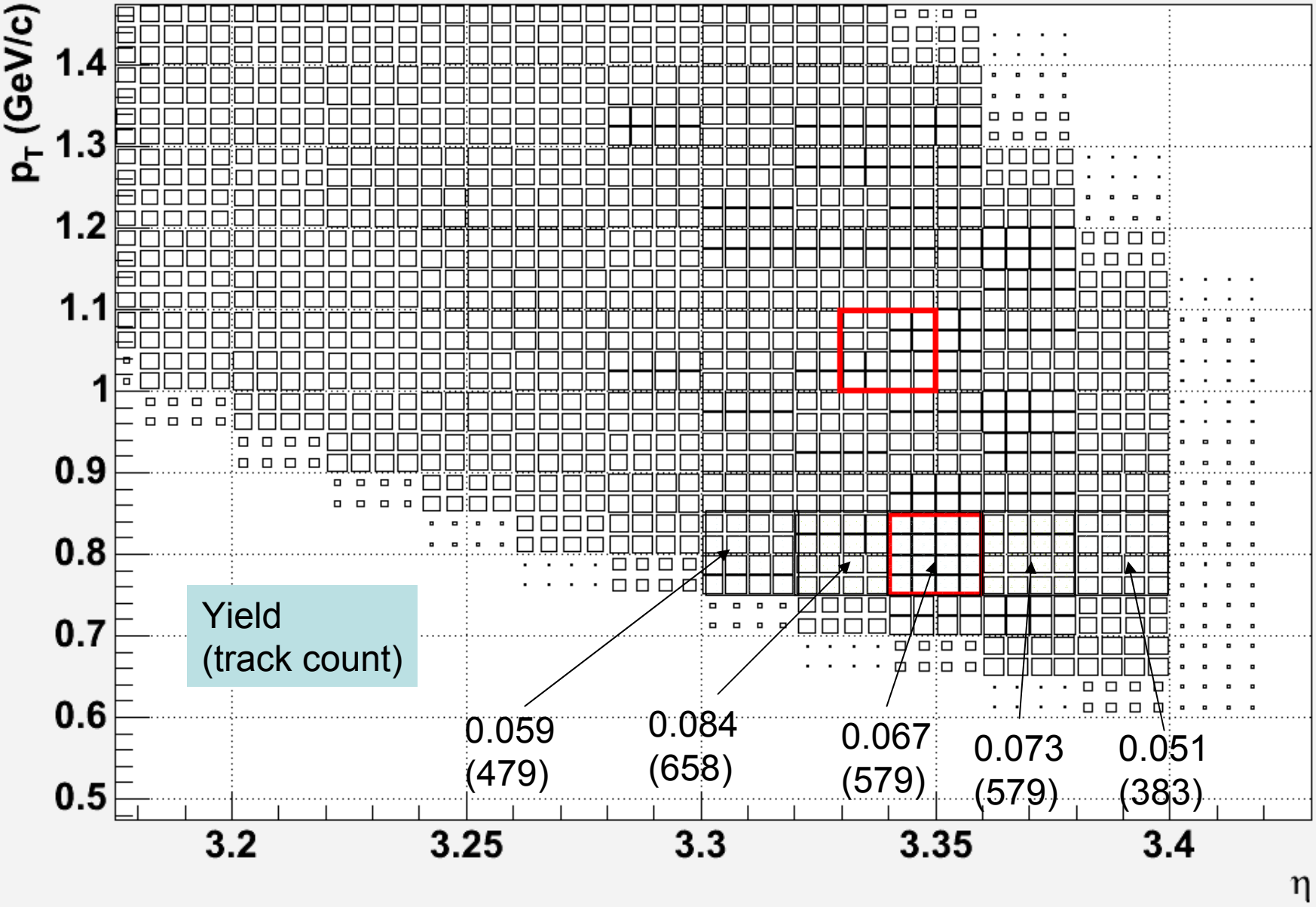
PHOBOS

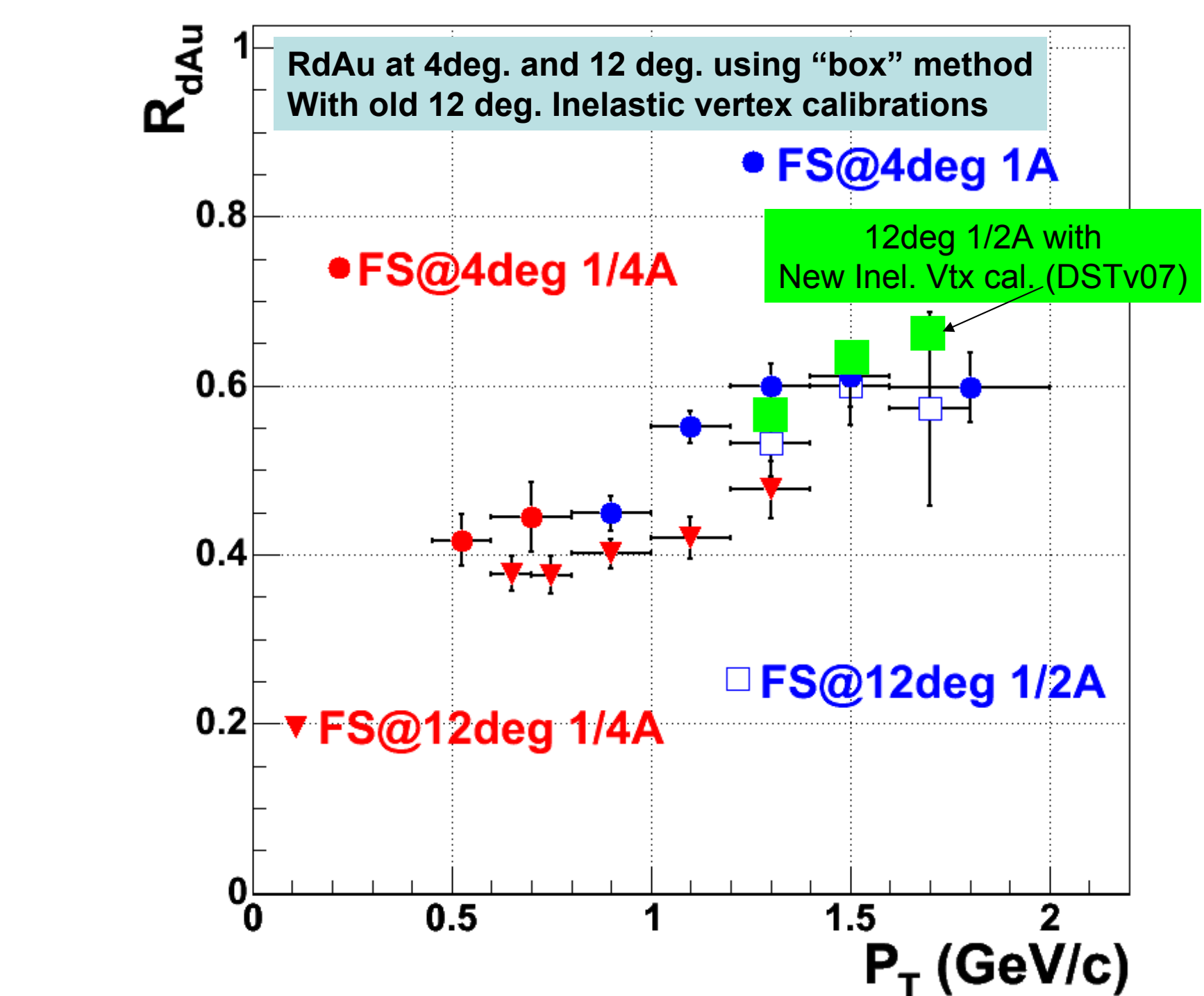

p_T = 1 GeV/c
p_T = 2 GeV/c
p_T = 3 GeV/c
p_T = 4 GeV/c
R_{dAu}
$\langle N_{coll} \rangle$
0
0.5
1
1.5
5
10
15
20

Comparison between Full acceptance Corrected and Box Method at FS@4deg
Red box: Full Acceptance method (from Ramiro's web page) 1A
Two blue circles with guided lines: from box method



Acceptance map for FS@4deg 1A
Red Boxes are areas used for the "box" method for the previous figure




RdAu at 4deg. and 12 deg. using "box" method
With old 12 deg. Inelastic vertex calibrations
FS@4deg 1A
FS@4deg 1/4A
12deg 1/2A with
New Inel. Vtx cal. (DSTv07)
FS@12deg 1/2A
FS@12deg 1/4A
R_{dAu}
P_T (GeV/c)
0
0.2
0.4
0.6
0.8
1
0.5
1.5
2

Summary

- Rcp should be in the paper?
- Rcp behaves as saturation models predict
  but can be also explained by “multiplicity scaling”
  up to pt~3GeV/c
- More data available for Rcp: Let’s have a “final”
  pass including all dAu runs with latest
  calibrations
- RdAu: “box method” gives consistent results with full acc. method