Dihadron Correlation with Identified Triggers

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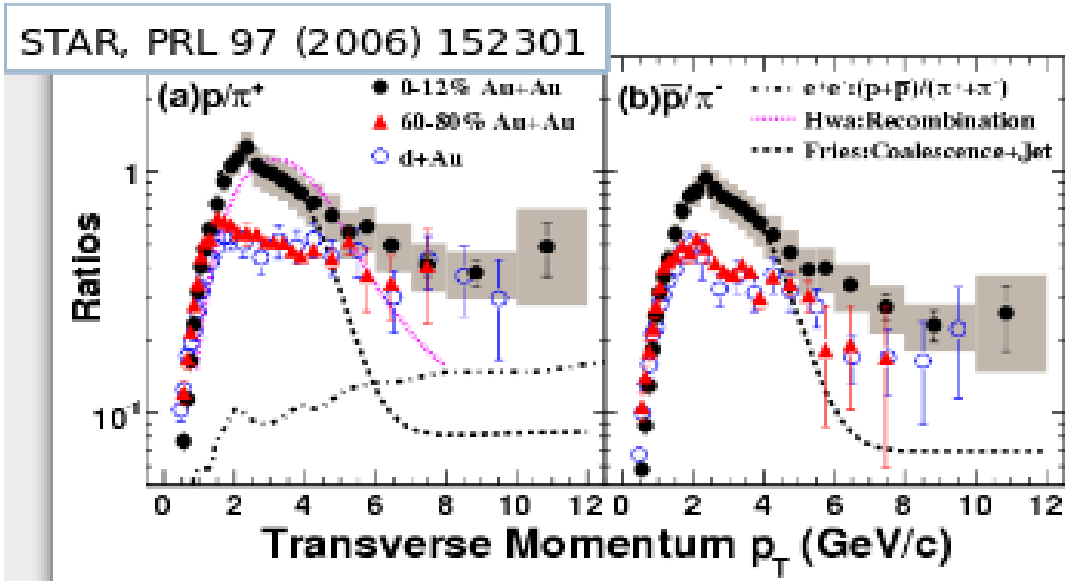
Motivation

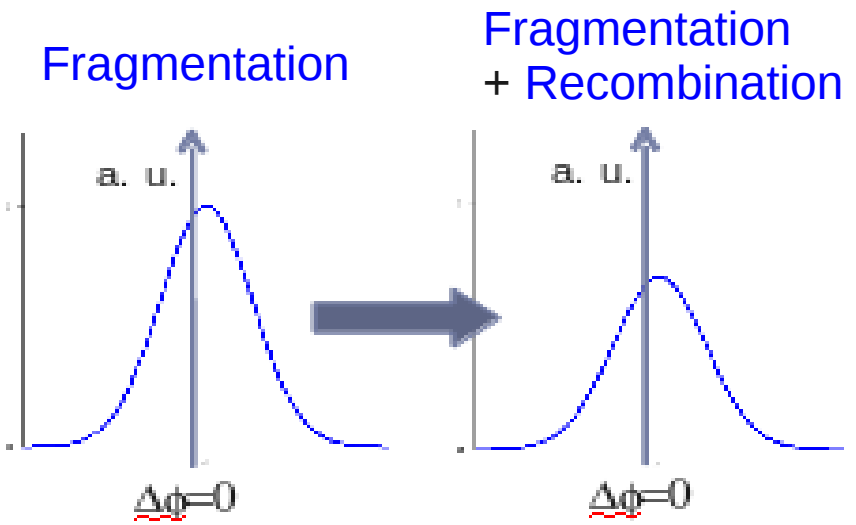
- Baryon/Meson enhancement has been observed in central collisions compared to peripheral collisions at RHIC
- Recombination Model predicts at intermediate P_T there will be more baryons compared to mesons



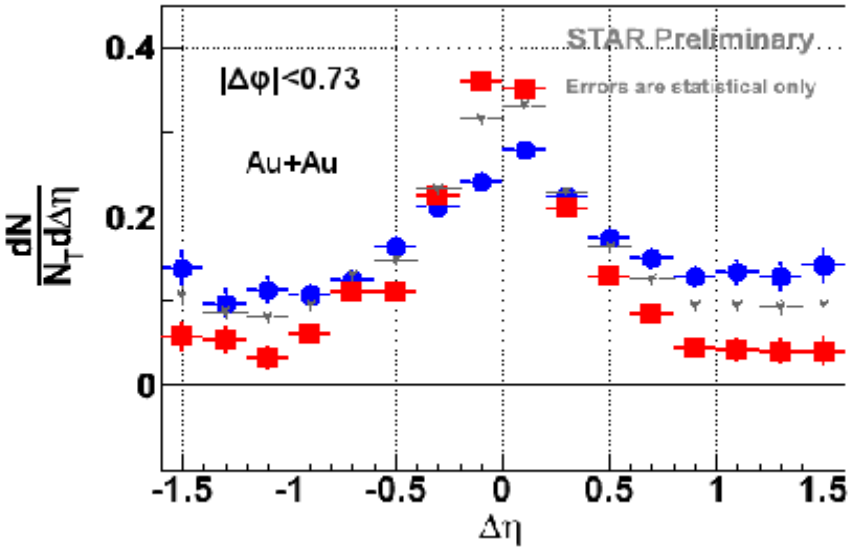
- Unidentified trigger yield has contribution from both baryon and meson triggers
- Baryon triggers are without associated hadrons due to jet production
- Results in “trigger dilution”....less near side yield

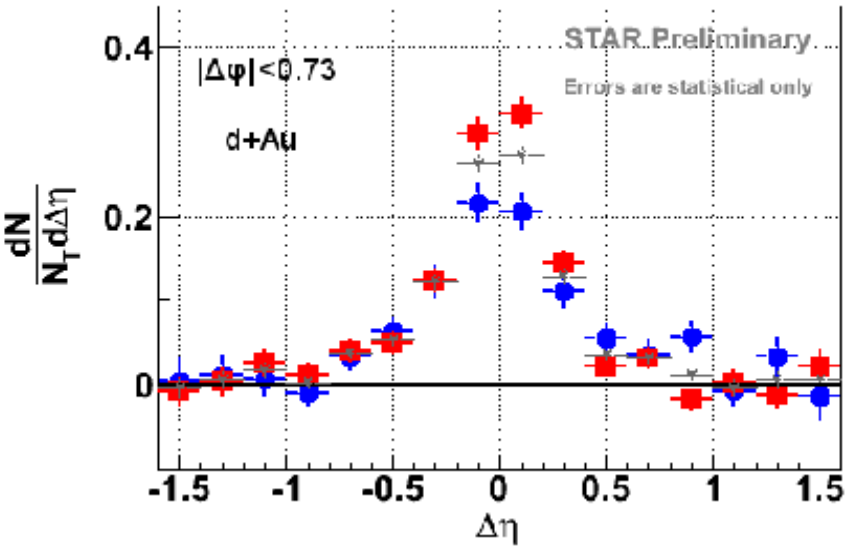
Simple recombination:

Stronger trigger dilution for baryons->**Lower associated Yield** per hadron trigger



STAR RESULTS(QM 2011)





Near side correlation structures are projected on Δη for pion triggered(red) and p +k triggered(blue) events in Au+Au(left) and d+Au(right)

Trigger PID	Au+Au	d+Au	Au+Au	d+Au	Au+Au
	Cone yield		Cone width		Ridge yield
π	0.22 ± 0.01	0.19 ± 0.01	0.34 ± 0.03	0.28 ± 0.03	0.057 ± 0.005
p+K	0.12 ± 0.01	0.14 ± 0.02	0.27 ± 0.01	0.22 ± 0.01	0.118 ± 0.007

Jet cone yield is not much different between d+Au and Au+Au.This contradicts with “trigger dilution” effect.

Assuming larger fraction of baryon triggers are from gluon jets and higher energy loss expected for gluons in medium could lead to larger yield which may diminish the effect.

For base line study we start with pp 7TeV ALICE data

Data ,Events and Tracks selection

DATA: pp 7TeV
LHC10e/pass2/

AOD099.Run Nos flagged as global quality 1

Events: Minimum Bias events with |Zvertex|<10 cm

Track Cuts:

1.Filter Mask 1<<7

2.Pt >0.2 GeV.

3.|η| < 0.8

4.DCAxy <2.4 and DCAz <3.2.

5. No of TPC Clusters>80.

6.ChiSq/ndf ≤4.0

Analysis Procedure

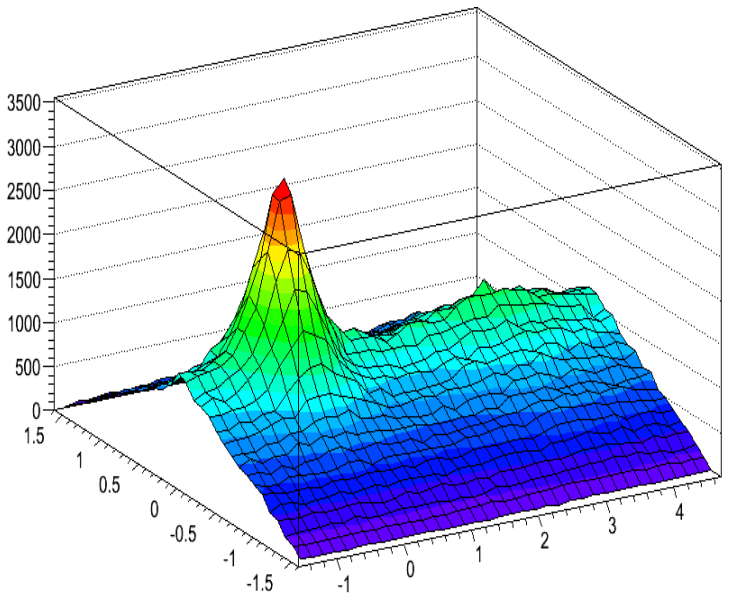
1.Two dimensional $\Delta\eta$ x$\Delta\varphi$ histogram is filled up taking trigger particle($4.0<P_T<8.0$) and associated particle < 4.0 GeV

2.Similar two dimensional histograms are filled up for mixed event taking trigger from one event and associated from other events with events in same Z vertex bin. Events to be mixed are grouped in 10 Z vertex bin of width 2 cm

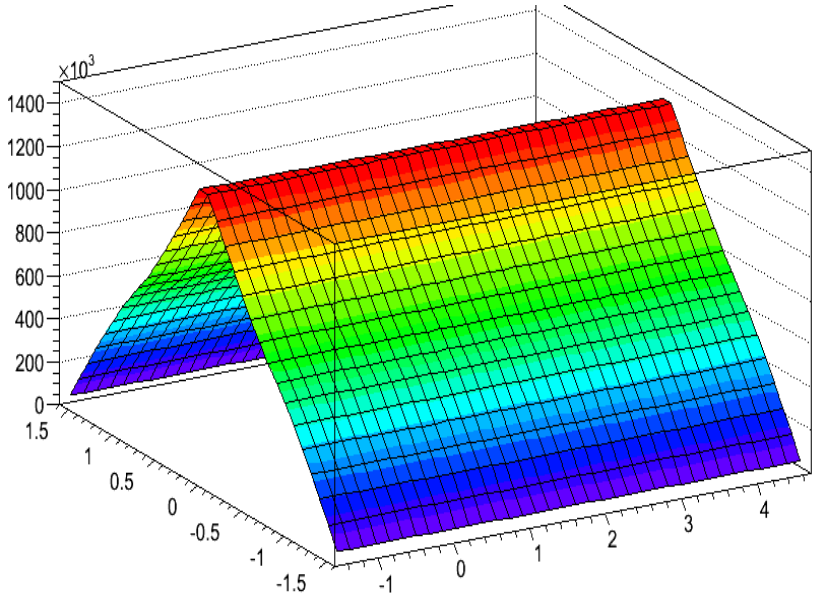
Analysis Procedure Contd....

3.Maximum of mixed event histograms are scaled to unity. Same event and mixed event histogram are divided to get correlation function

2D correlation for unidentified triggers pp 7TeV(DATA)

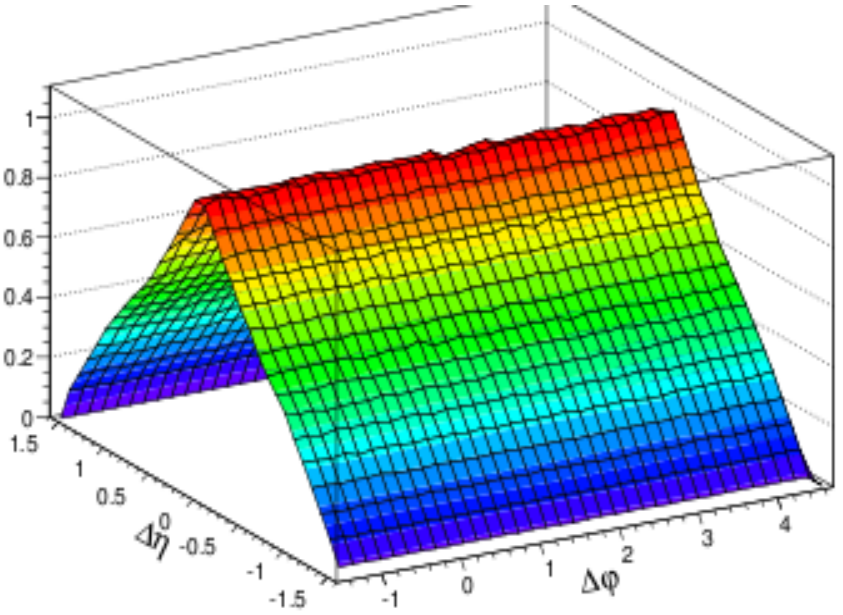


SAME EVENT

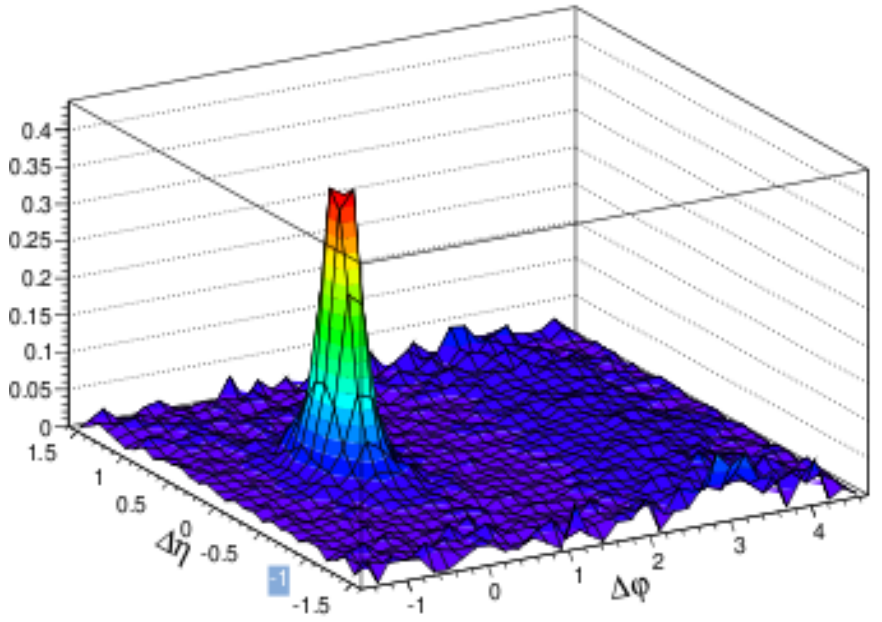


MIXED EVENT

Analysis Procedure Contd....



Mixed event maximum scaled to 1



Ratio of signal to mixed

Particle Selection

Triggers are identified as Pions or Kaons track by track depending on nσ cuts on both TPC and TOF.

Pions:

nσTPC <5.0 & nσTOF<2.0 .

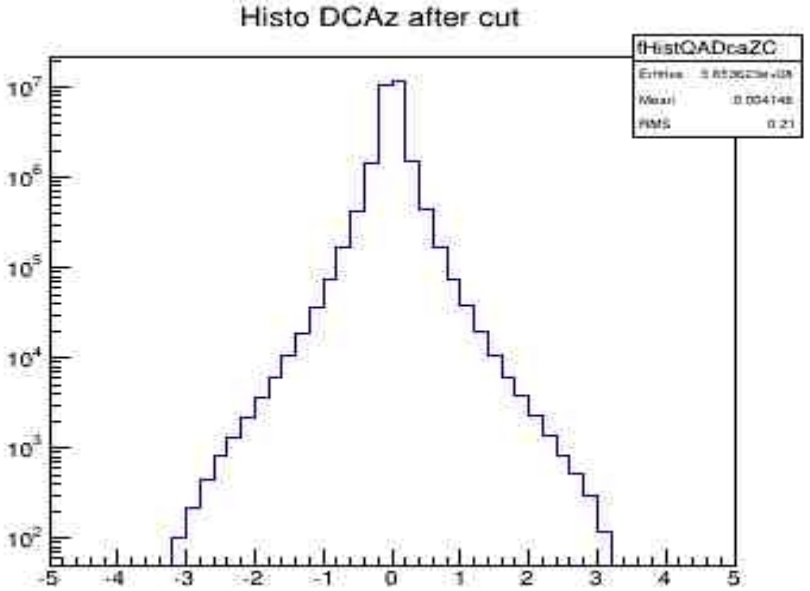
Kaons:

nσTPC <3.0 & nσTOF<3.0 .

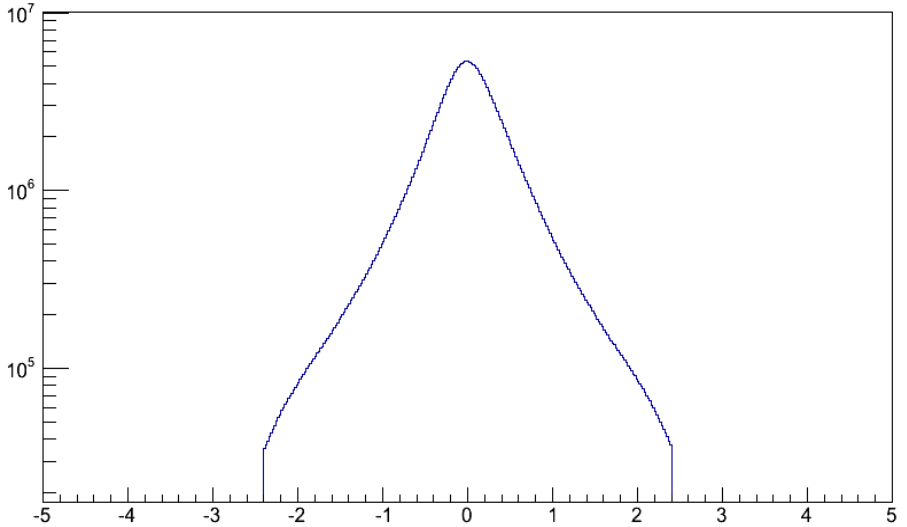
Tracks without TOF pid has been discarded

https://aliceinfo.cern.ch/Notes/node/111

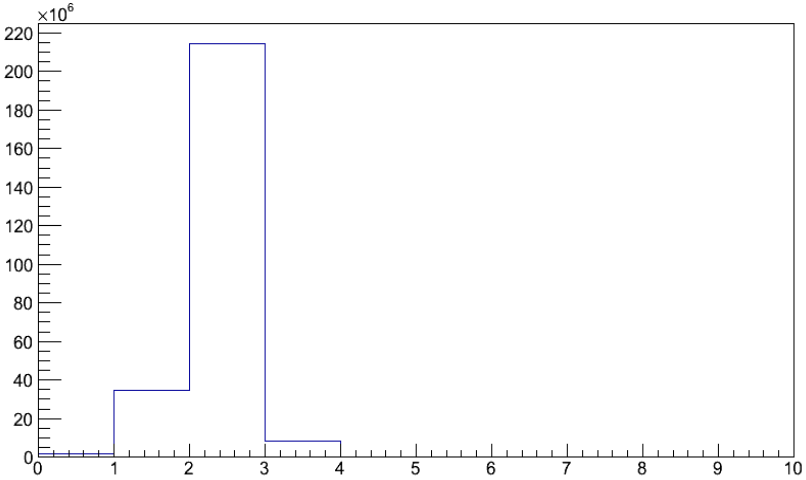
Basic QA plots



DCAz<3.2



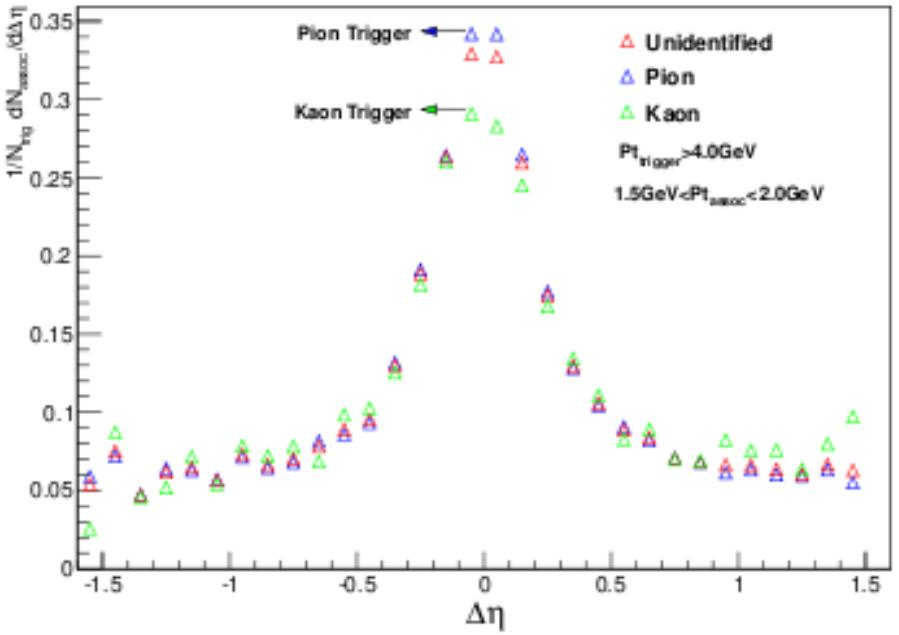
DCAxy<2.4

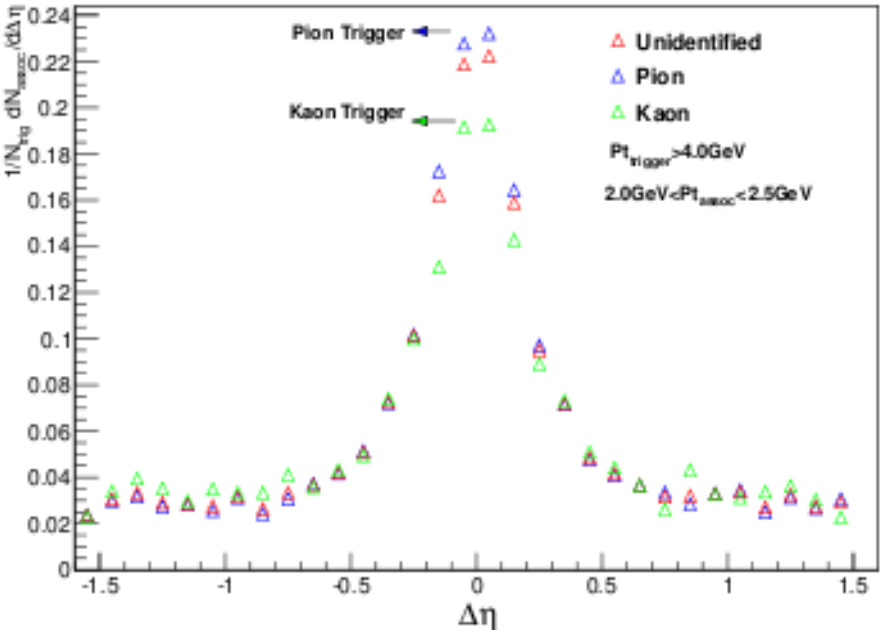


ChiSq/ndf<=4

Preliminary Results

Associated yield per trigger particle

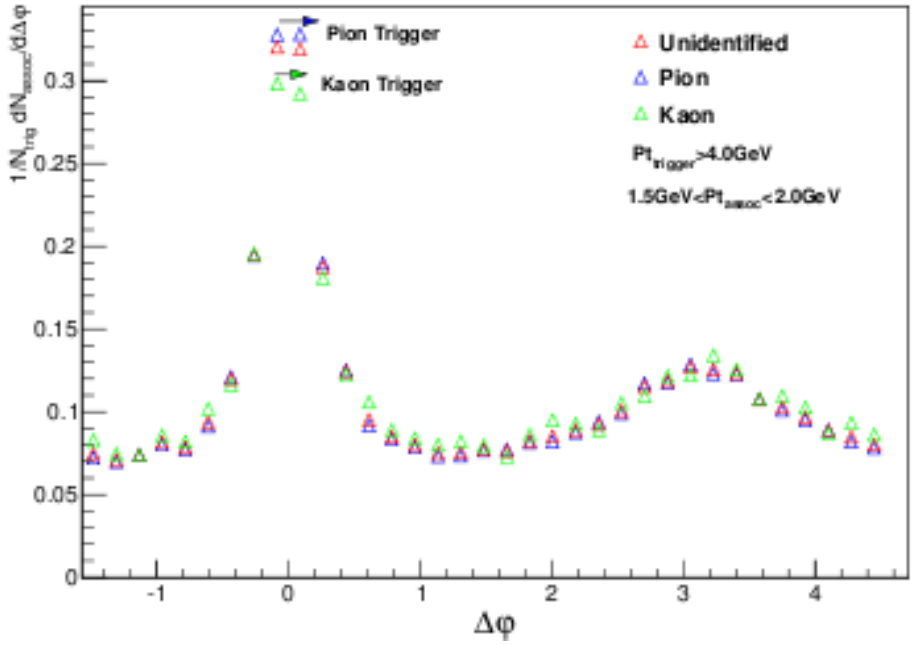


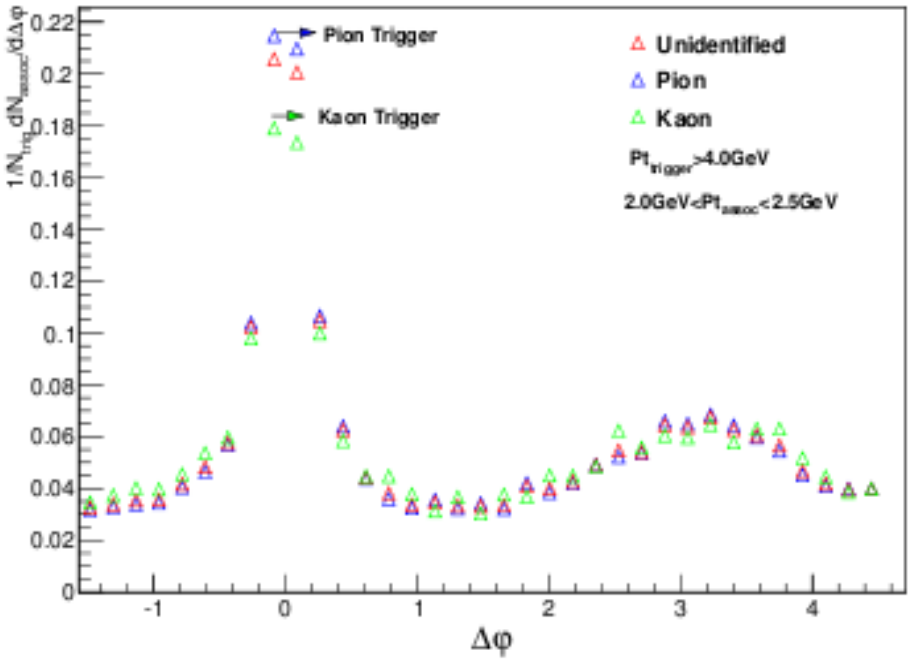


Raw correlation projected onto Δη axis

Observation:Difference in yield for pion triggers compared to kaon triggers

Associated yield per trigger particle

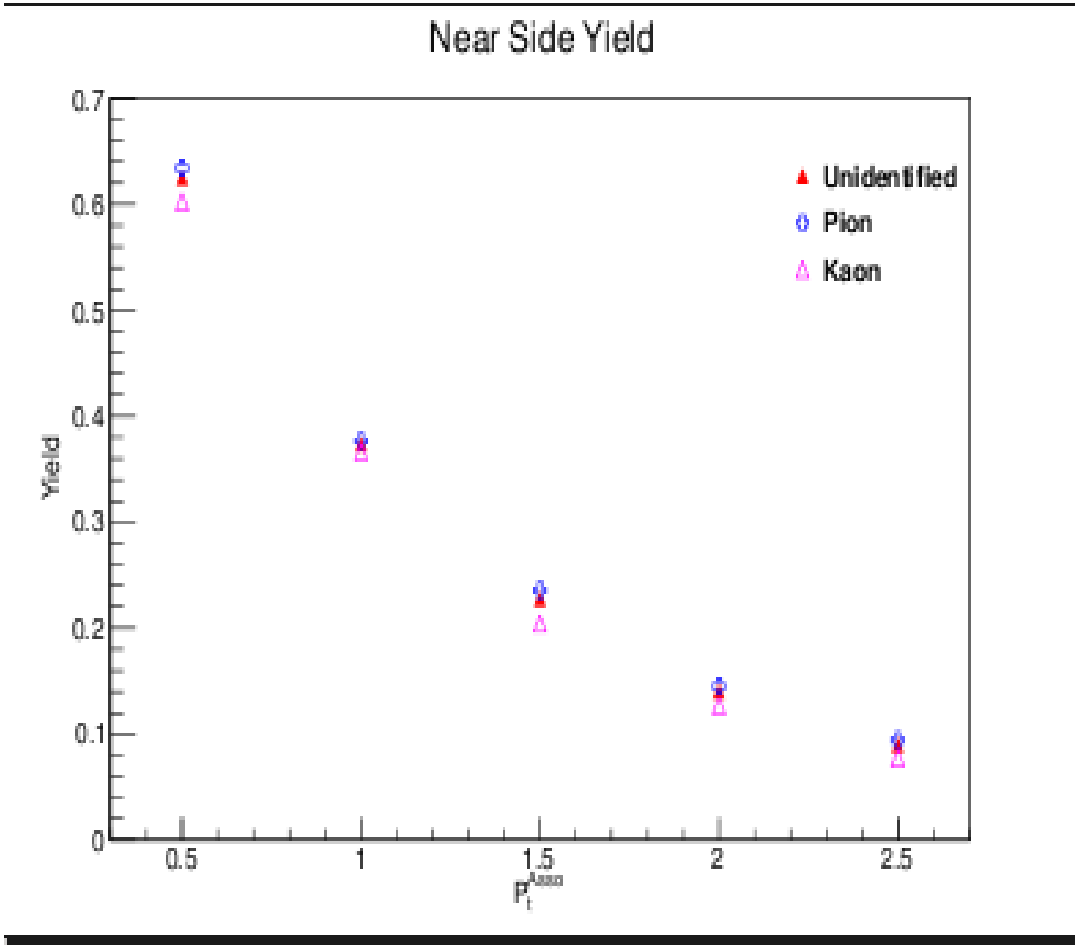


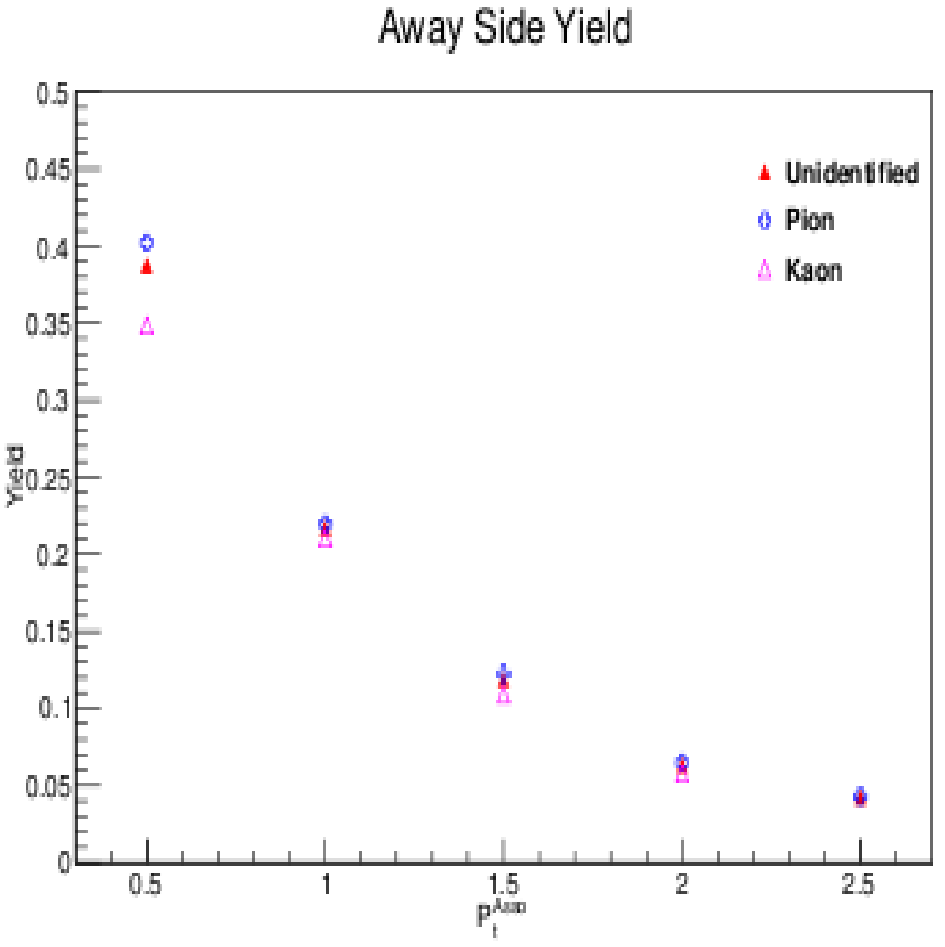


Raw correlation projected onto Δφ axis

Observation:Difference in yield for pion triggers compared to kaon triggers

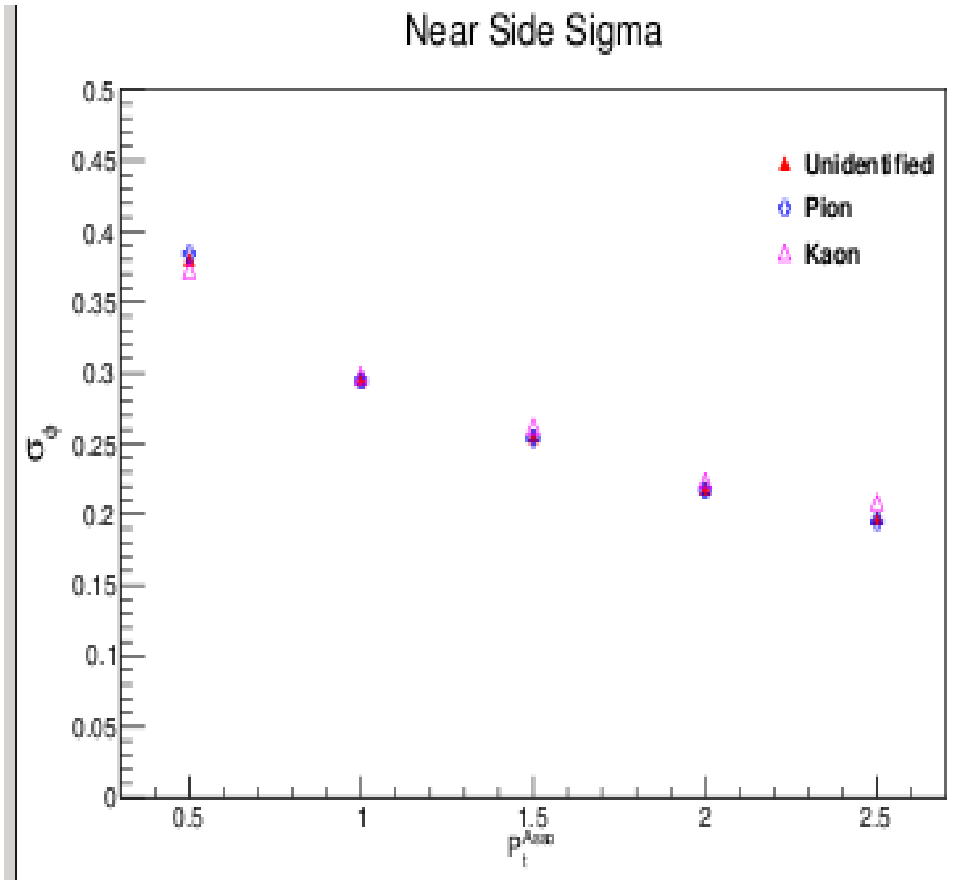
Yield/Trigger

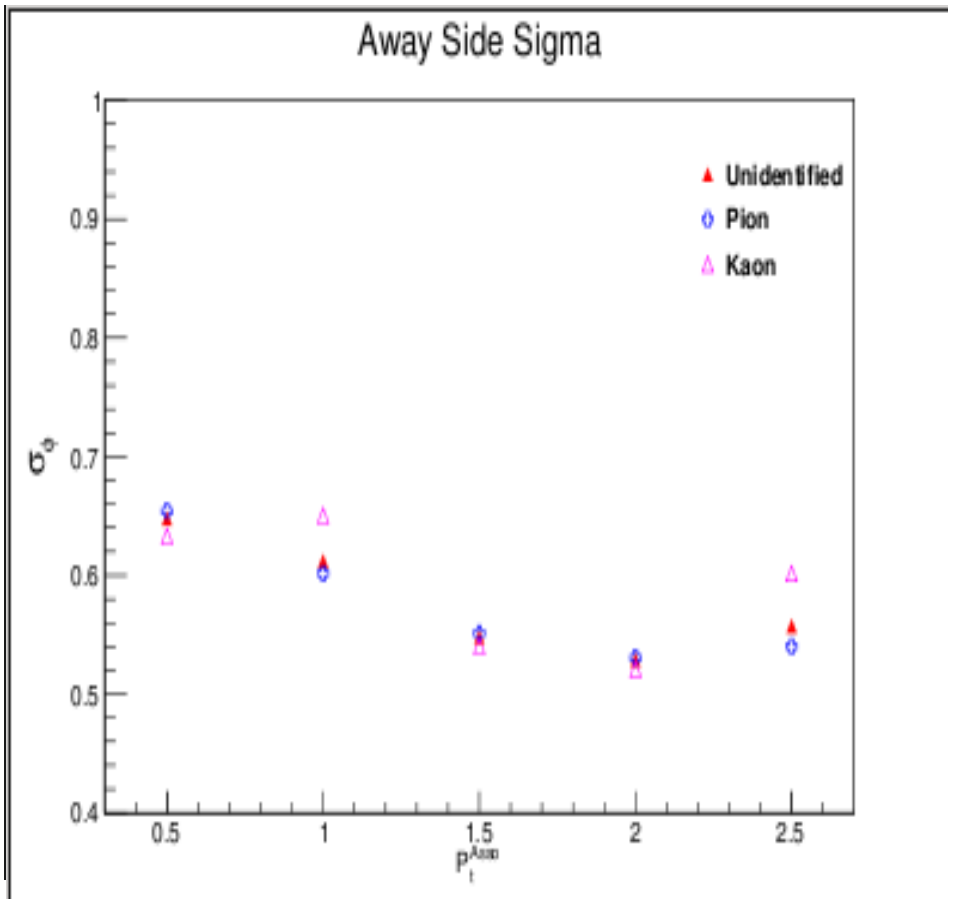




Observation: Per trigger yield is seen to have PID dependence

Peak Broadening





Observation:Both near and away side width is seen to be independent of choice of trigger PID

Conclusion & To Do List

We observe small difference in pion and kaon trigger yield. It need to be checked rigorously.

Need to check purity of the trigger sample and also to repeat the study with proton triggers.

Do the same for pp2.76TeV and PbPb2.76TeV