Particle correlations in ALICE

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CERN, ALICE

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ALICE (**A** **L**arge **I**on **C**ollider **E**xperiment)

- Focusing on Pb-Pb collisions
- Looking for properties of quark-gluon plasma
- Searching for modifications by the medium

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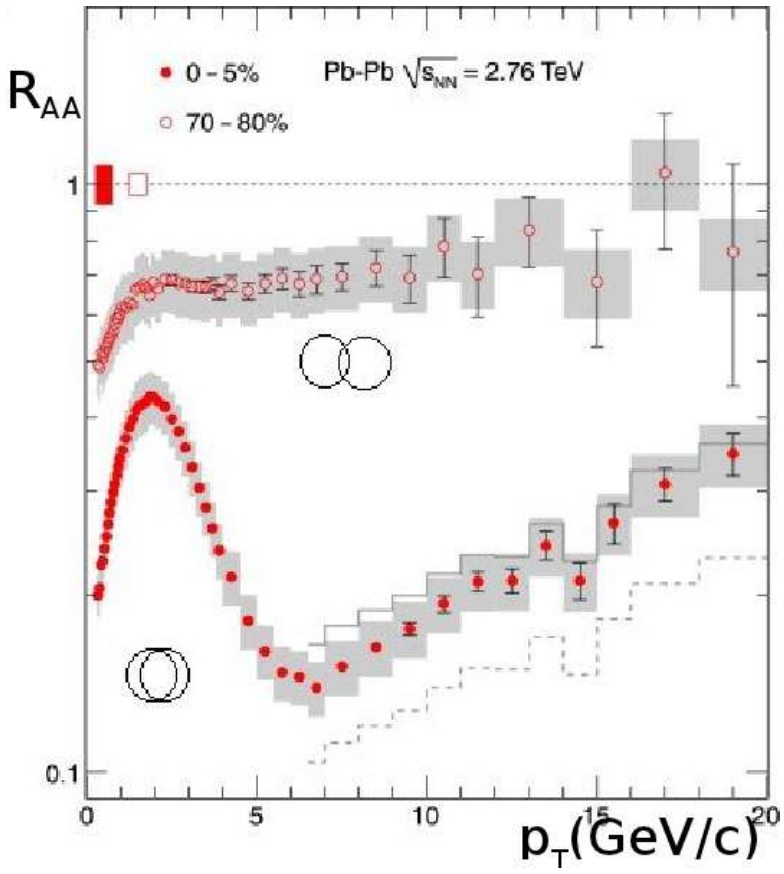
- $R_{AA} = \frac{d^2 N_{ch}^{AA}/d\eta dp_T}{\langle N_{coll}\rangle d^2 N_{ch}^{PP}/d\eta dp_T}$



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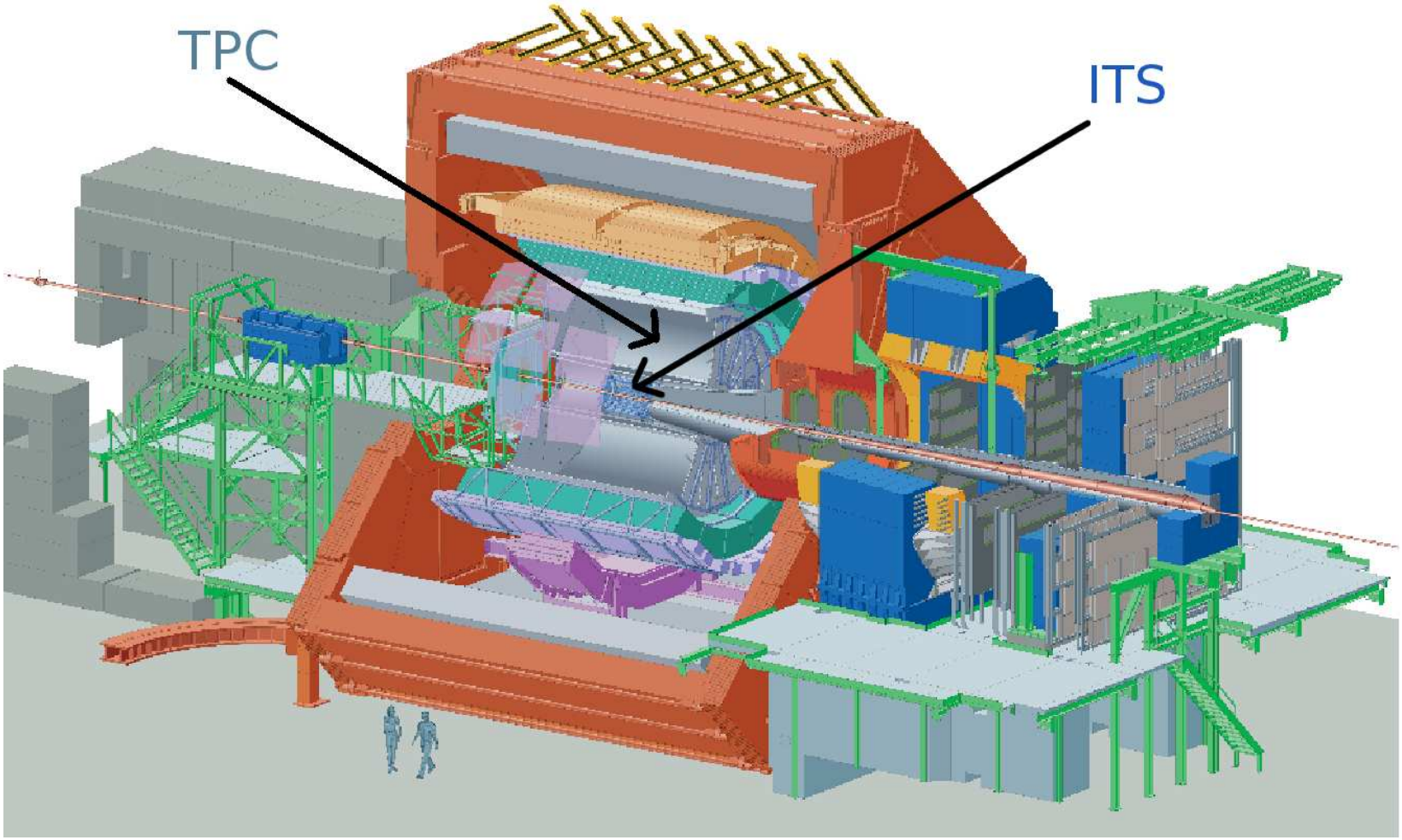
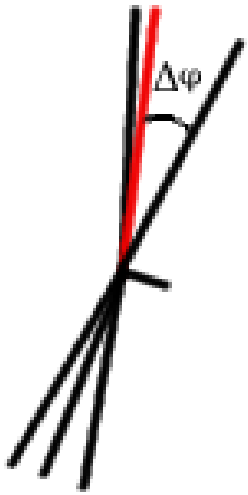


Particle correlations

- Looking for modification of jets compared to pp collisions
- $\Delta\varphi = \varphi_1 - \varphi_2$, $\Delta\eta = \eta_1 - \eta_2$



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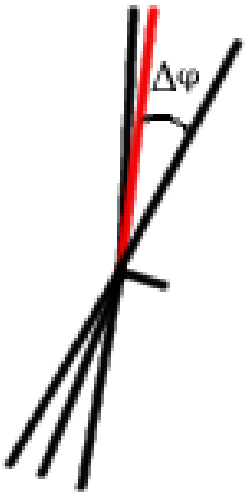

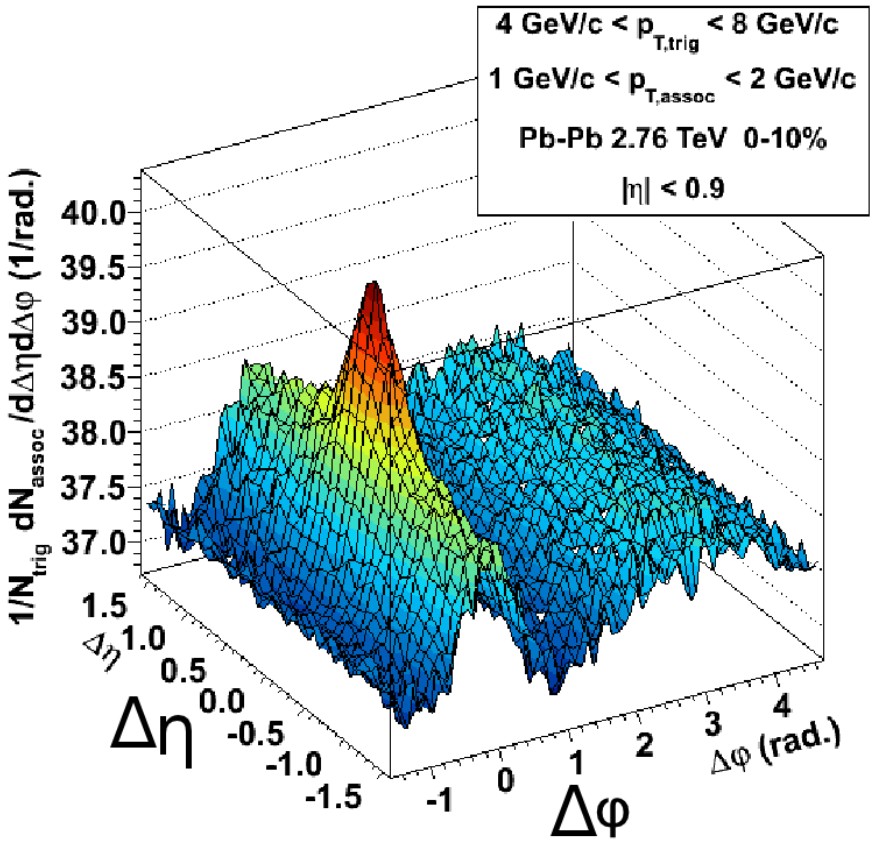

Corrections

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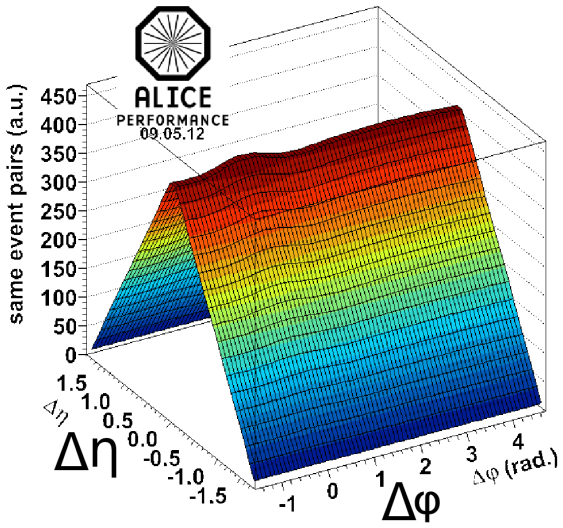
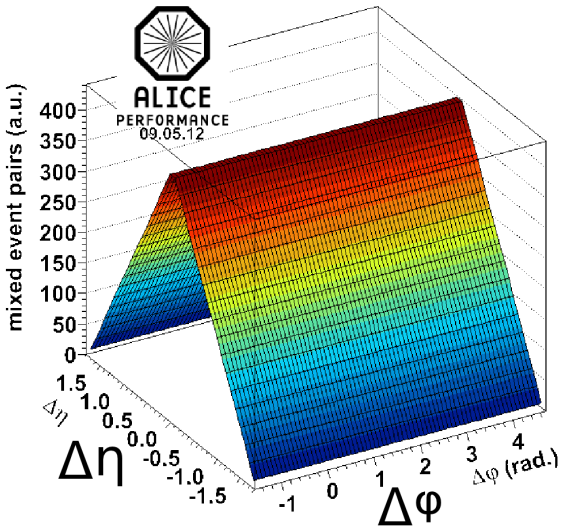
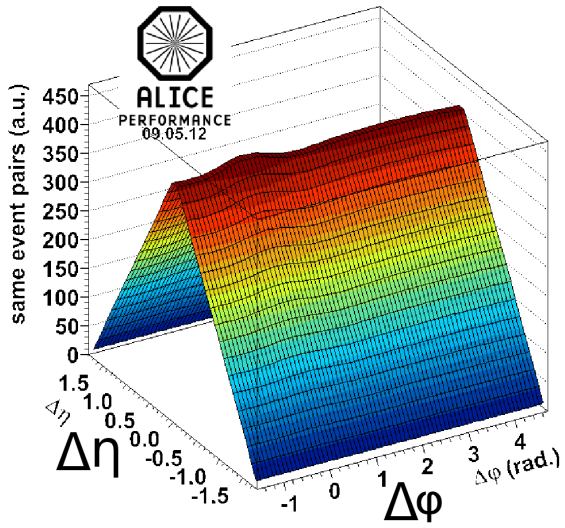
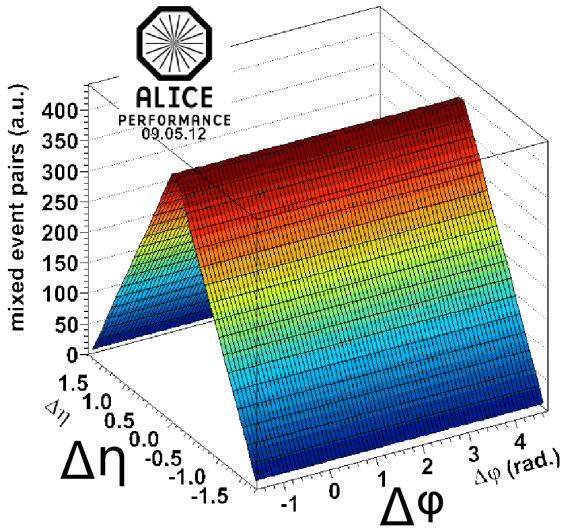


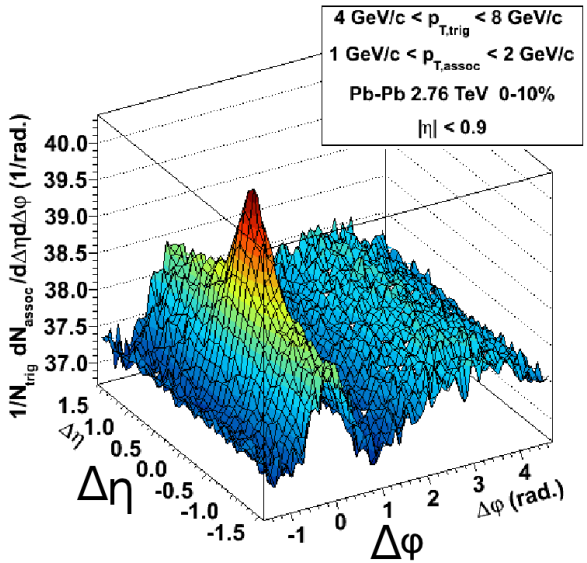


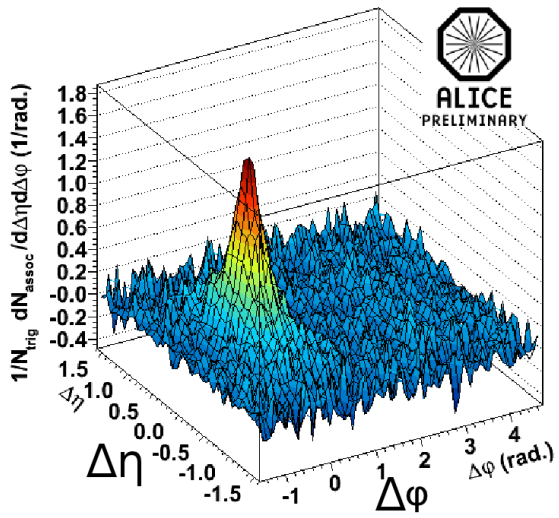
Corrections

- Tracking correction
- Mixed event
- Background subtraction (η gap subtraction)



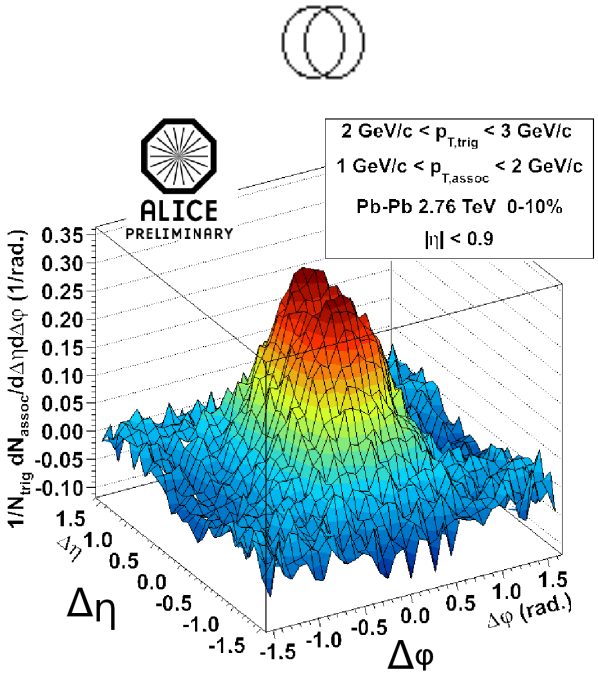






Peak shape

$0 - 10\%$



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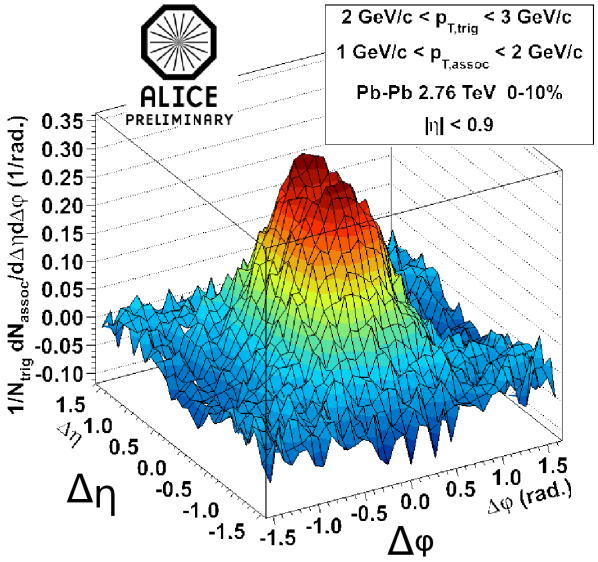
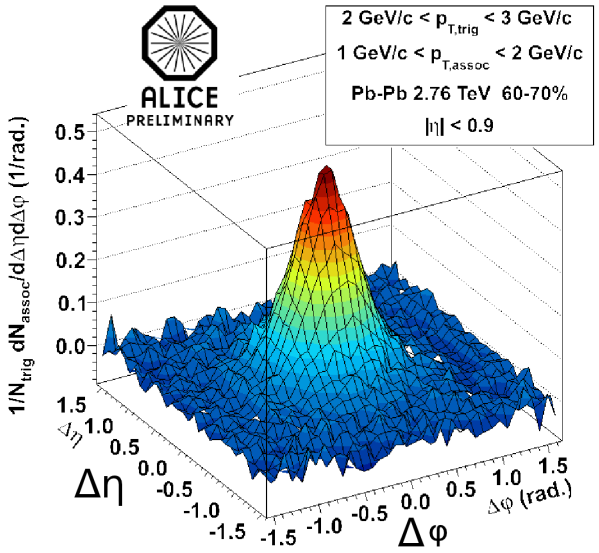


60 – 70%



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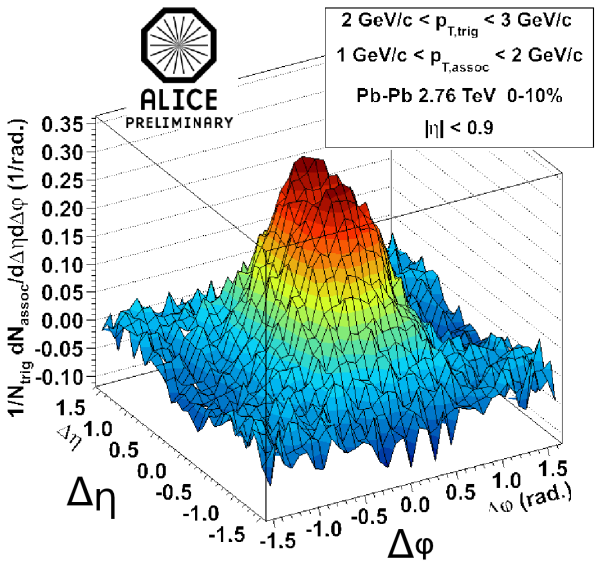

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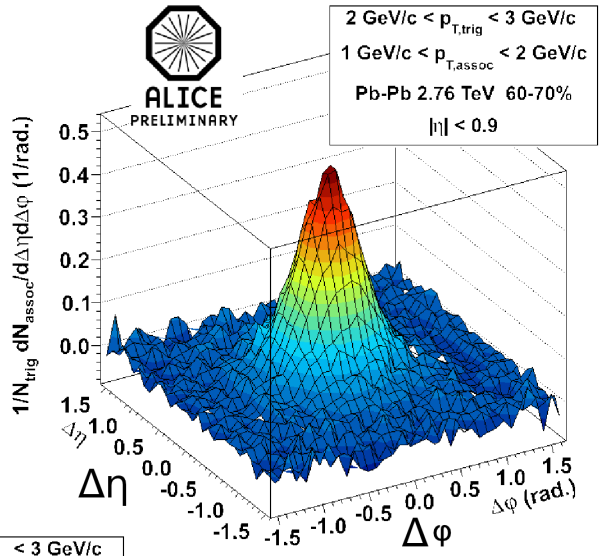
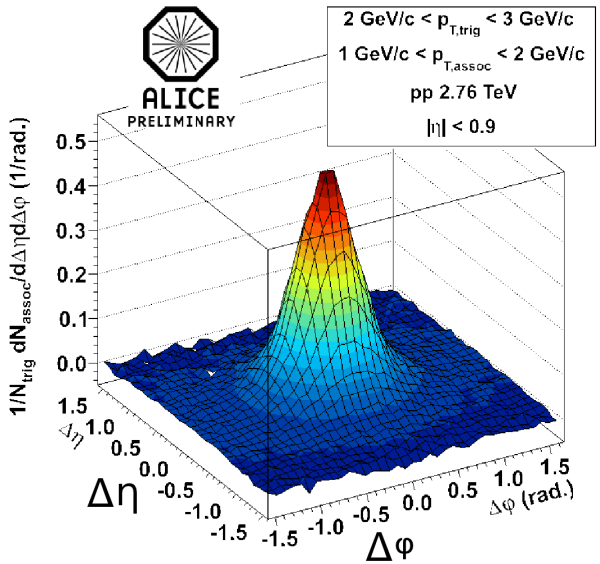
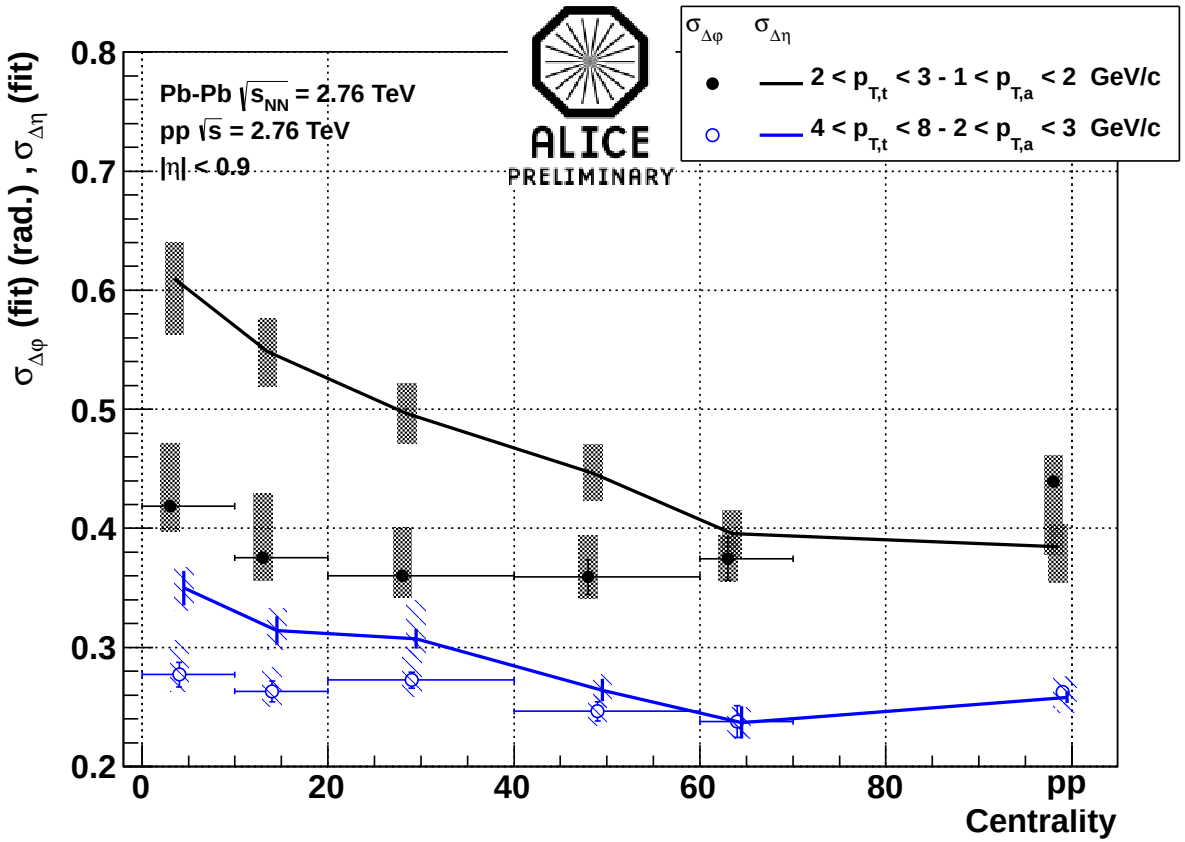


pp



Peak characterisation

- Fit with different functions
- Best: sum of two Gaussian functions
- Width (σ) extracted from the fit



- Add more high p_T bins
- Hard to fit

2010 and 2011 data

- Energy: $\sqrt{(s_{NN})} = 2.76$ TeV
- 2010: $\sim$ 15 M events
- 2011: centrality trigger $\Longrightarrow$ 10 times more in central bins
- Goal: have higher statistics $\Longrightarrow$ unite 2010 and 2011 data $\Longrightarrow$ cross checks $\Longrightarrow$ Mixed event, efficiency should be similar
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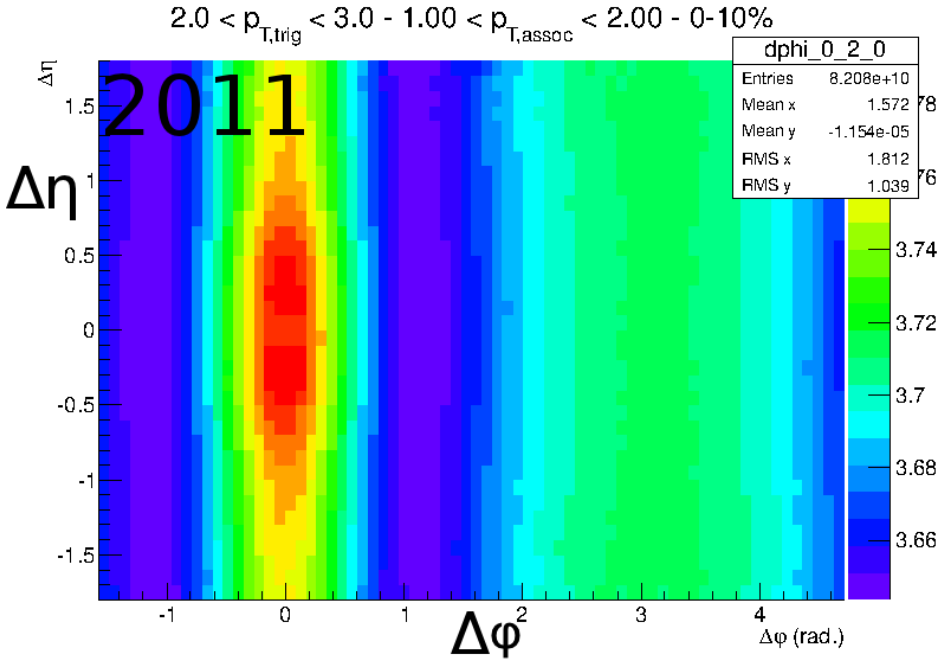
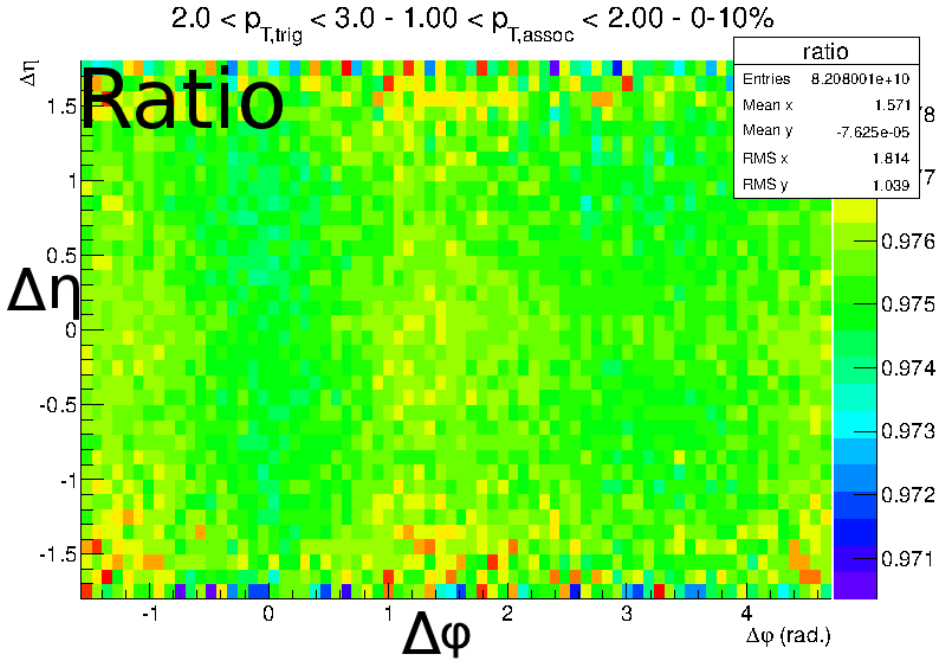
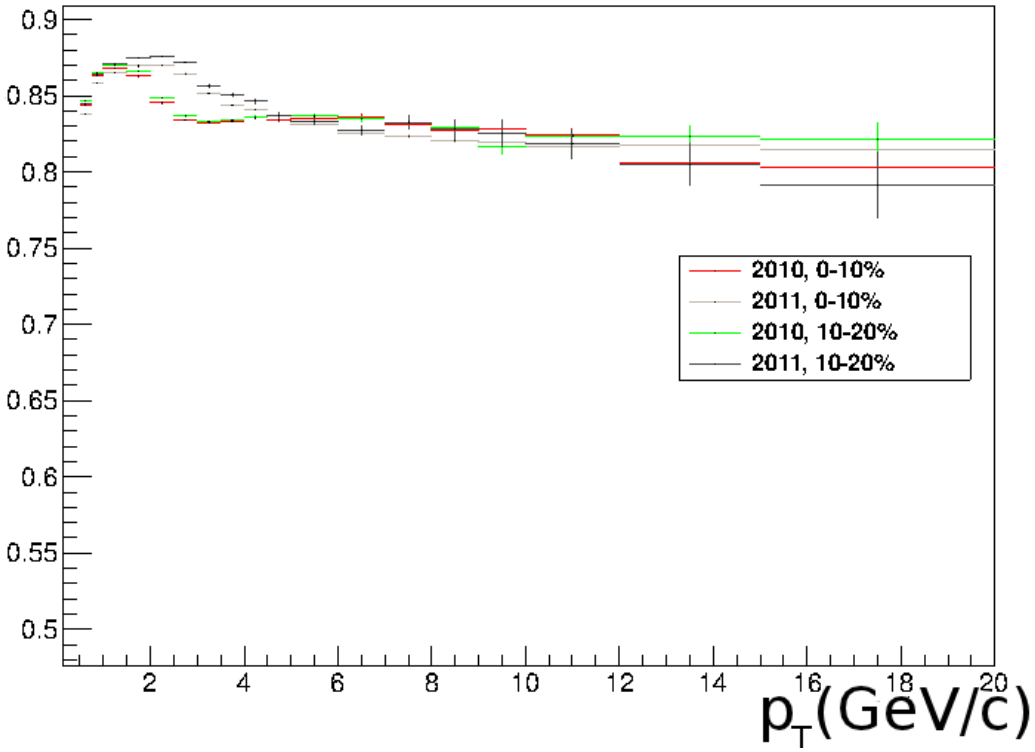




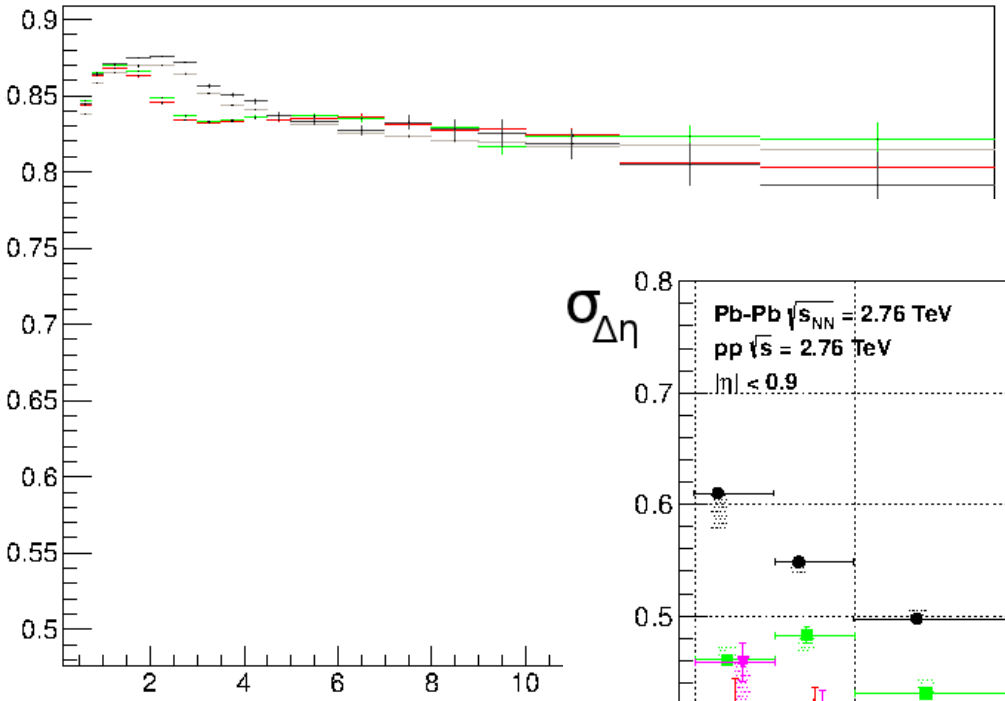
- Similar, but $\sim$ 3% difference $\Longrightarrow$ have to understand

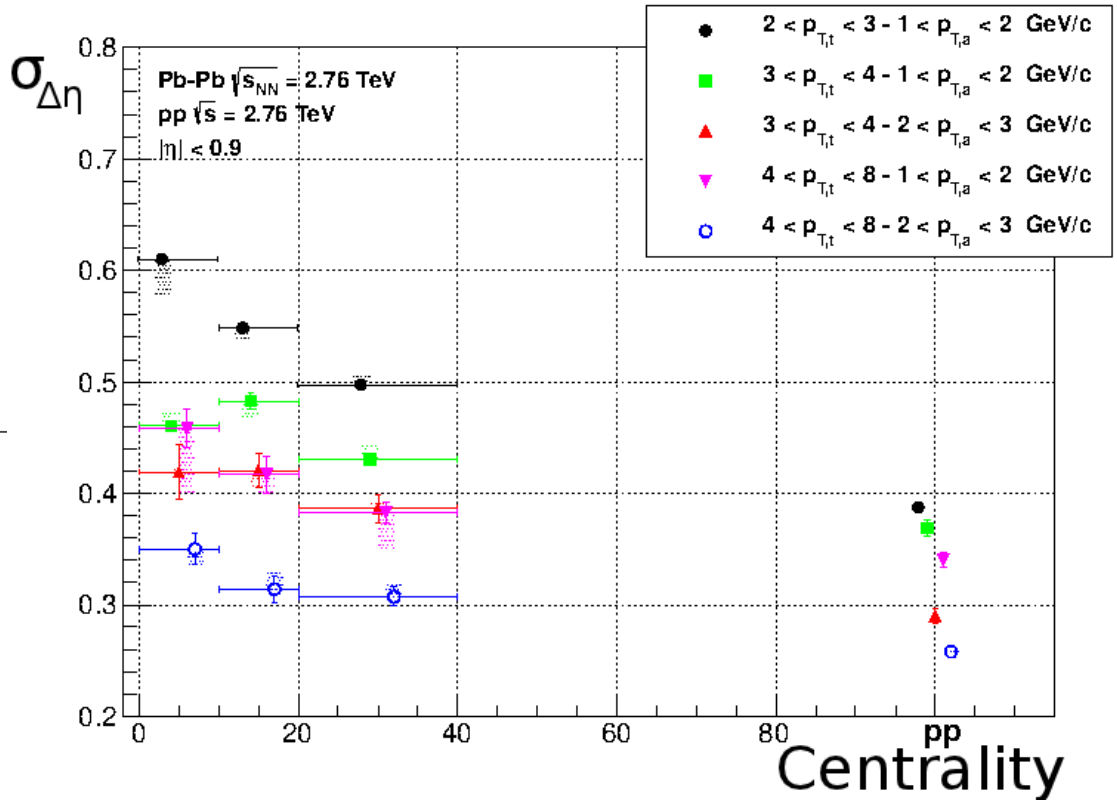
ALICE

Efficiency



Efficiency


0.9
0.85
0.8
0.75
0.7
0.65
0.6
0.55
0.5
2
4
6
8
10


$\sigma_{\Delta\eta}$
Pb-Pb $\sqrt{s_{NN}}$ = 2.76 TeV
pp $\sqrt{s}$ = 2.76 TeV
|η| < 0.9
2 < $p_{T,t}$ < 3 - 1 < $p_{T,a}$ < 2 GeV/c
3 < $p_{T,t}$ < 4 - 1 < $p_{T,a}$ < 2 GeV/c
3 < $p_{T,t}$ < 4 - 2 < $p_{T,a}$ < 3 GeV/c
4 < $p_{T,t}$ < 8 - 1 < $p_{T,a}$ < 2 GeV/c
4 < $p_{T,t}$ < 8 - 2 < $p_{T,a}$ < 3 GeV/c
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0
20
40
60
80
pp
Centrality

Summary and plans

Summary

- Working mostly on 2010 data
- Started comparison of 2010 and 2011 data

Plans

- Unite all 2011 data
- Unite 2010 and 2011 data
- Include higher p_T bins
- Comparison to AMPT model (**A** Multi**P**hase **T**ransport)
- Comparison to STAR experiment

Thank you for your attention!