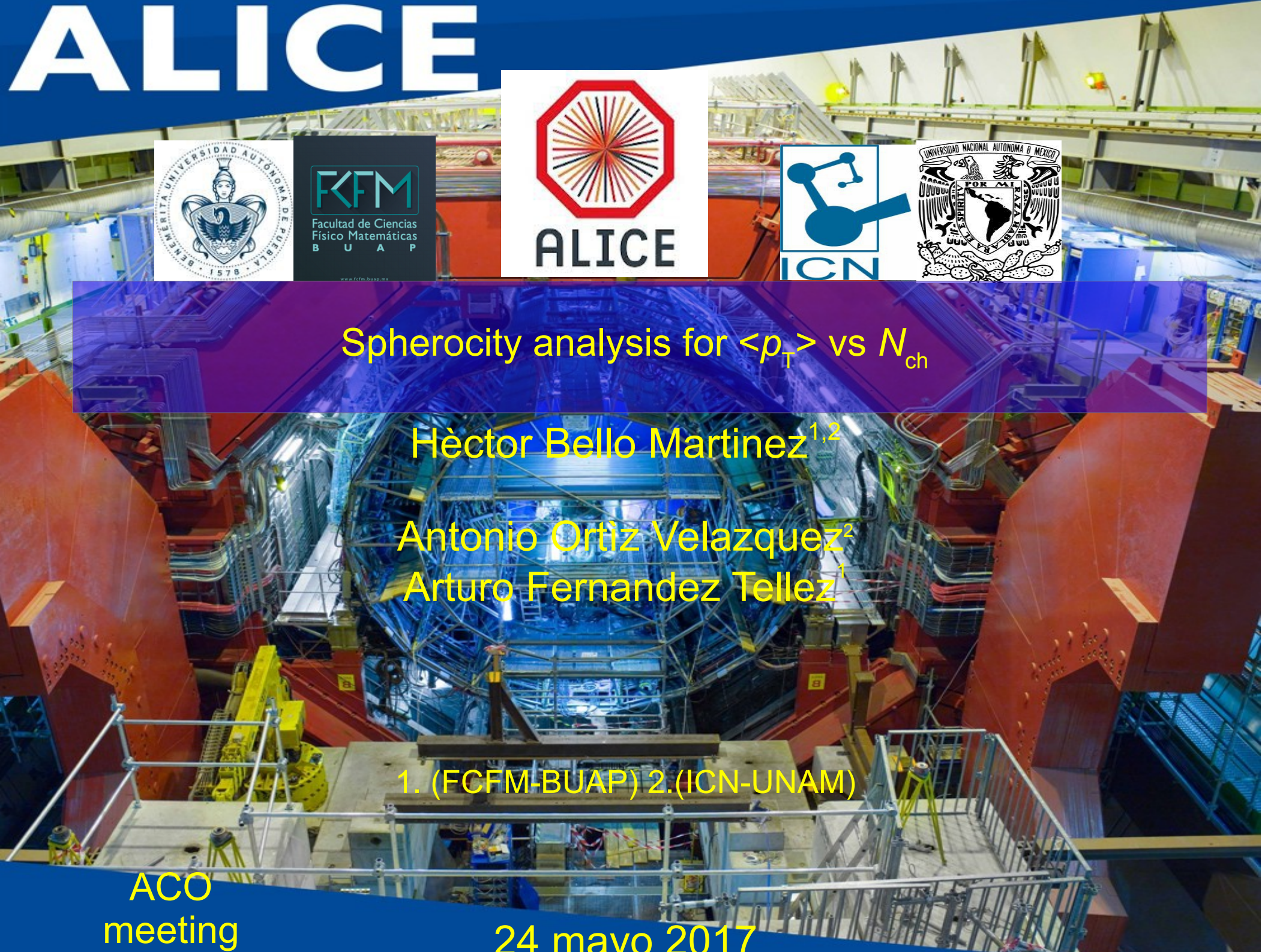

Spherocity analysis for $\langle p_T \rangle$ vs N_{ch}

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1. (FCFM-BUAP) 2.(ICN-UNAM)

ACO meeting

24 mayo 2017

Brief summary

- Analysis note has been summited, ARC questions have arrived
- DCAxy distributions for:

  Data

  MC prim & sec (material and weak decays)
- Efficiency by particle composition

  Conclusions

Analysis details

- **Datasets**

  Pythia Per2011 (LHC15g3c3) (36.1 M events after sel)

  EPOS-LHC (LHC16d3) (39.7 M events after sel)

  Data (LHC15f pass2) (27.2 M events after sel)

- **Event selection**

  AliVEvent::KINT7, AnalysisUtils::IsSPDClusterVsTrackletBG(), IsPileupFromSPDInMultBins(),IsIncompleteDAQ()

- **Vertex**

  For events with both SPD and reconstructed Track vertices, their separation along the z-axis was required to be smaller than 5 mm

- **Spherocity is reconstructed** using more than two tracks with transverse momentum greater than 0.15 GeV/c and within |eta|<0.8. Three set of cuts were tested:

  TPC: GetStandardTPCOnlyTrackCuts()+TPCrefit

  Hybrid: CreateTrackCutsPWGJE(10001008)+CreateTrackCutsPWGJE(10011008)

  Standard: GetStandardITSTPCTrackCuts2011(kTRUE,1)

- At the end we decided to use the TPC track cuts (global tracks wich satisfy GetStandardTPCOnlyTrackCuts()+TPCrefit). More details can be found in: https://aliceinfo.cern.ch/Notes/node/529

- In this presentation, results for the reference estimator are discussed

  GetReferenceMultiplicity(fESD,AliESDtrackCuts::kTrackletsITSTPC,0.8)

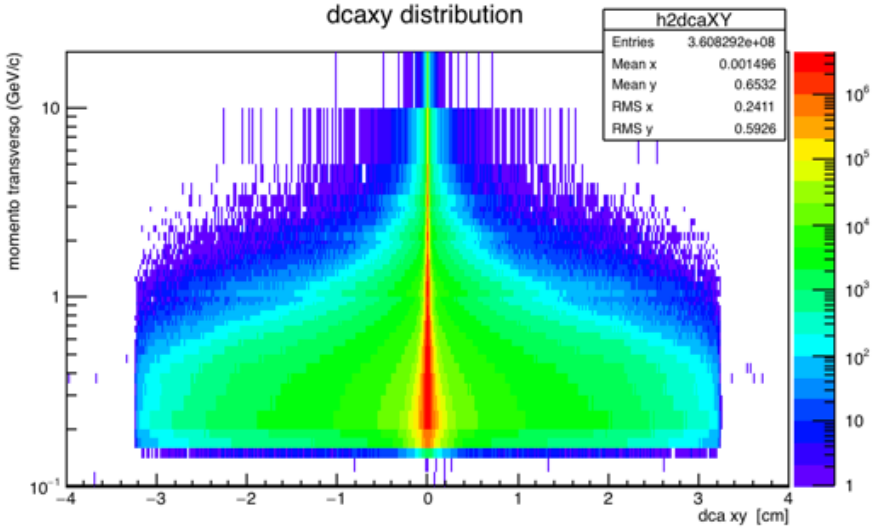
- We use the recommended vertex selection for 13 TeV pp analysis:

  https://twiki.cern.ch/twiki/bin/view/ALICE/PWGPBEvSelRun2pp

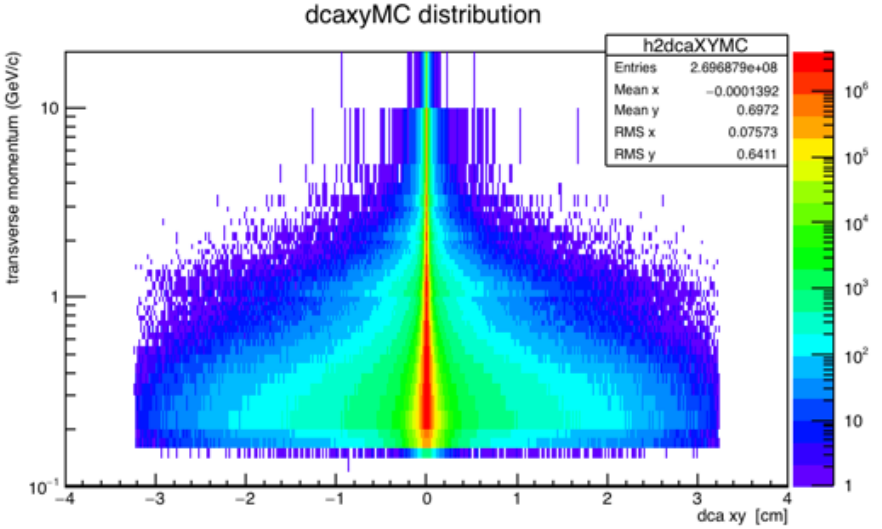
DCA xy distributions

- This was done with Data LHC15fpass2 & MC Pythia Per2011.

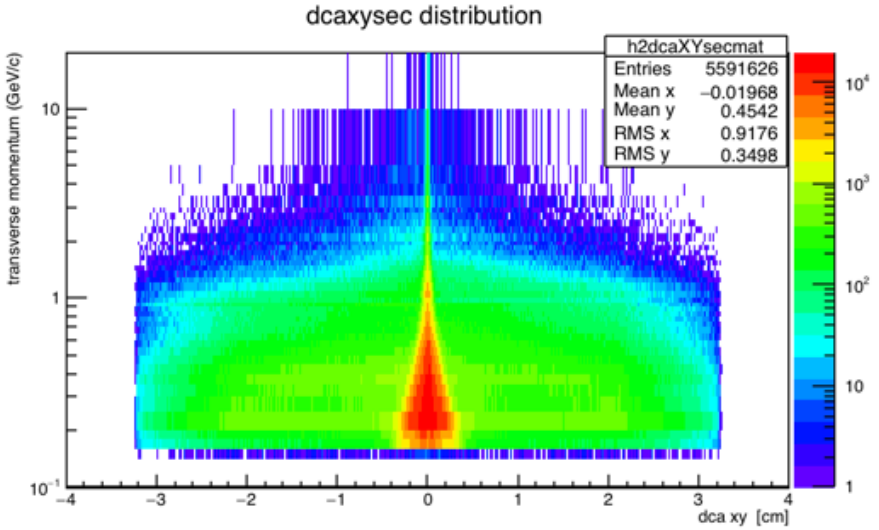
All data



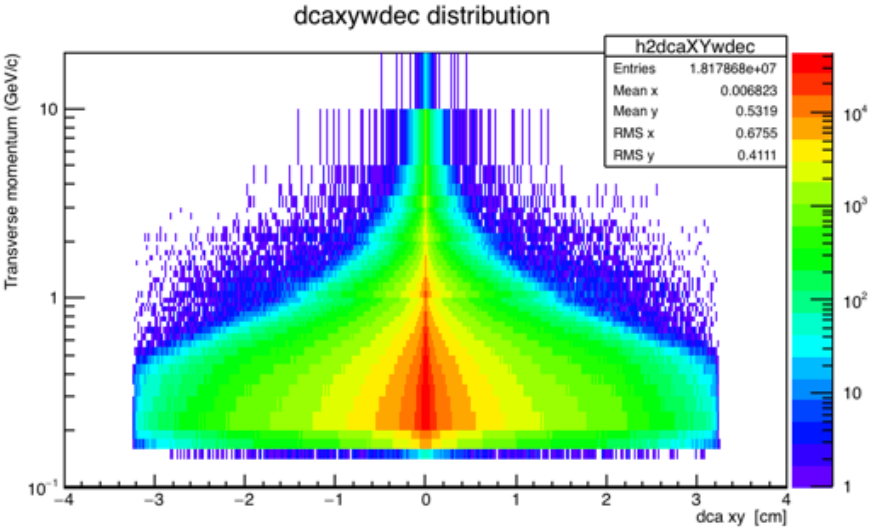
Primaries MC



- MC Sec material



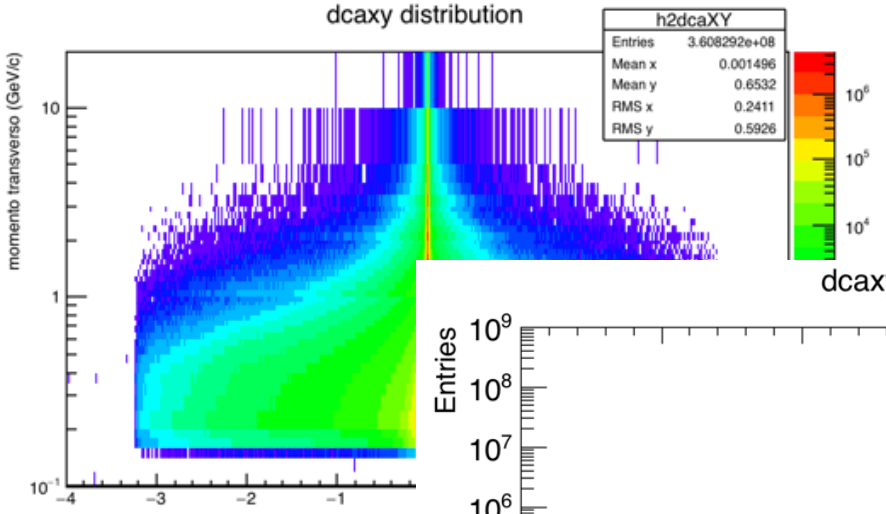
MC Weak decays



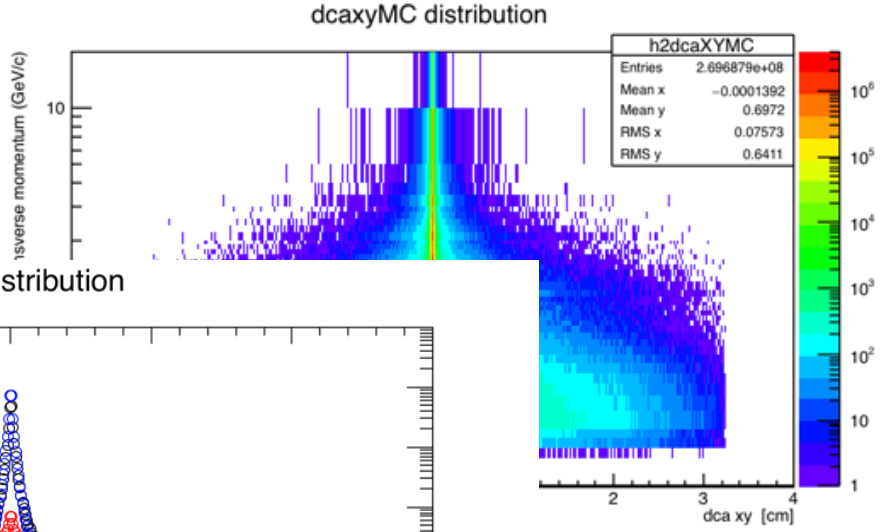
DCA xy distributions

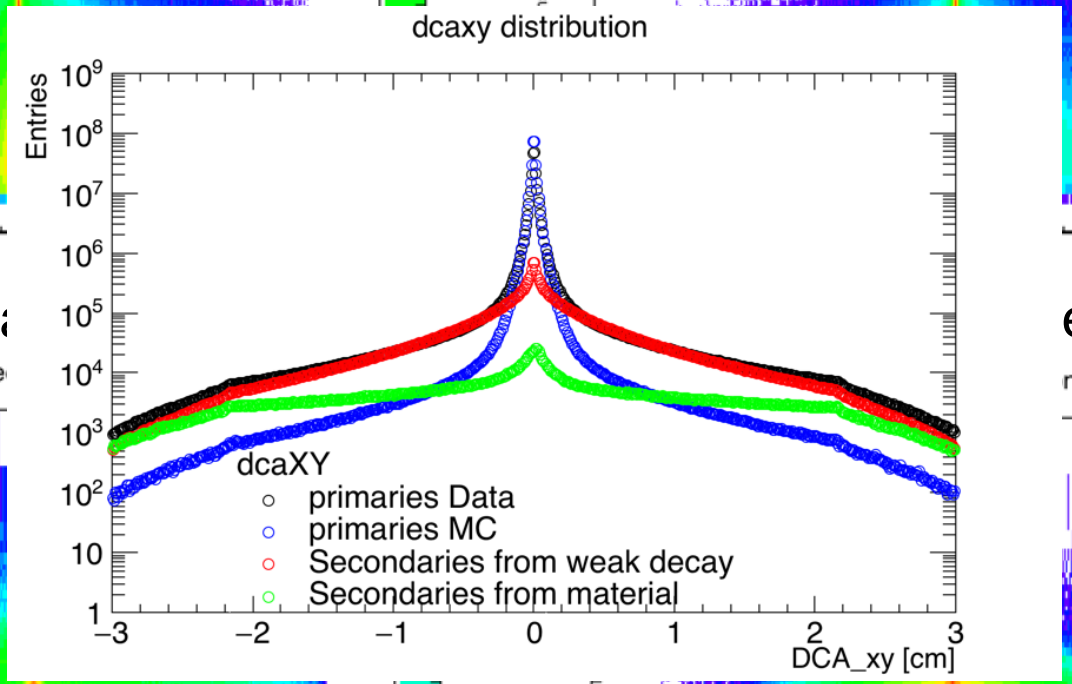
- This was done with Data LHC15fpass2 & MC Pythia Per2011.

All data

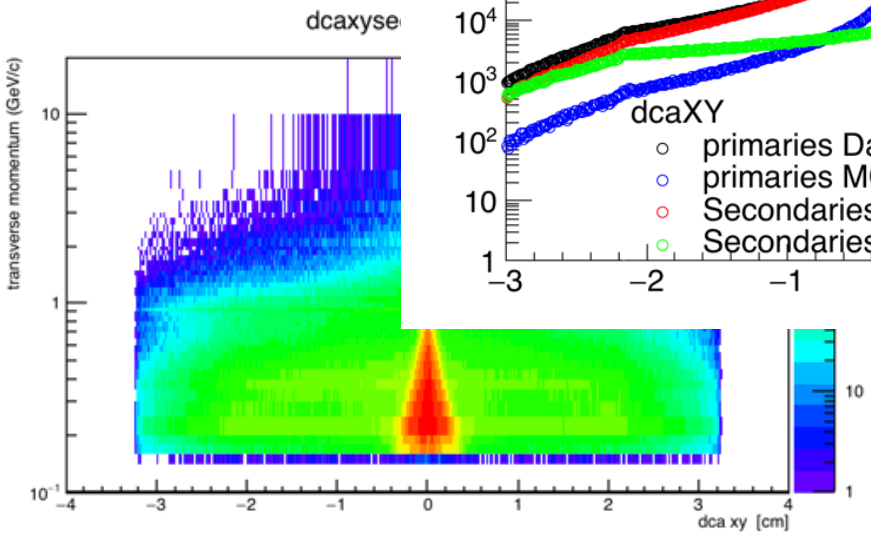


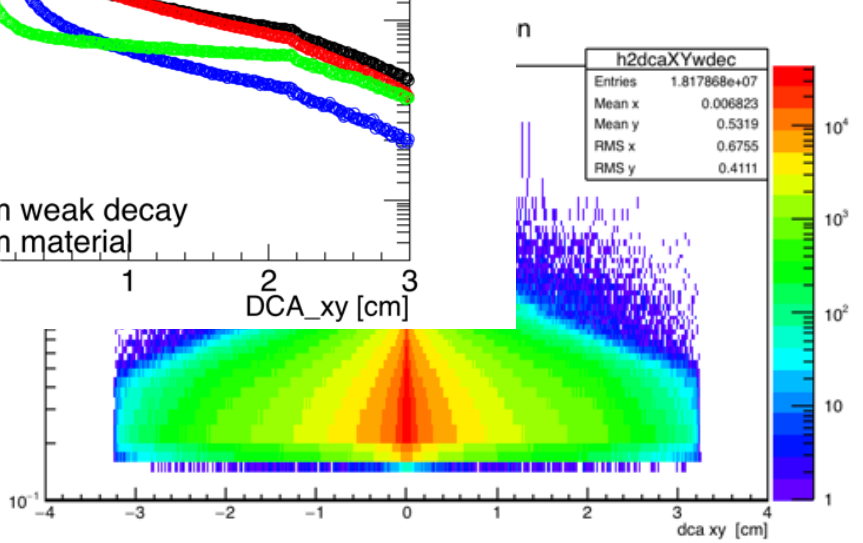
Primaries MC





- MC Sec ma ecays

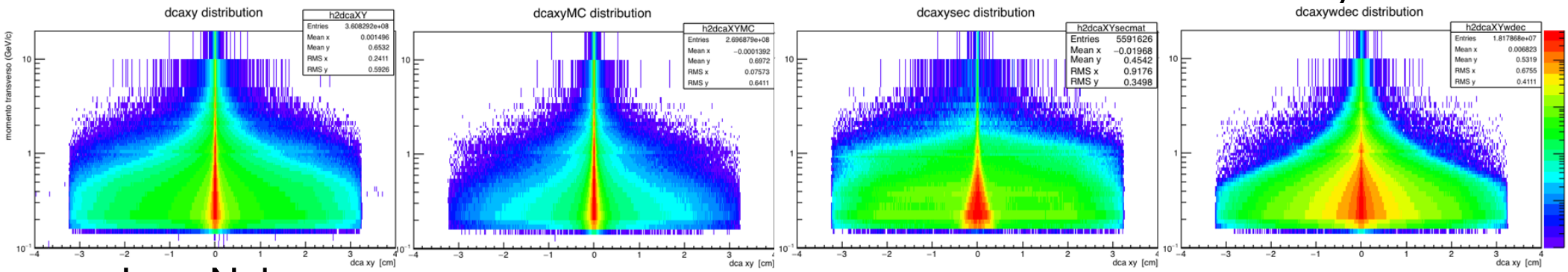




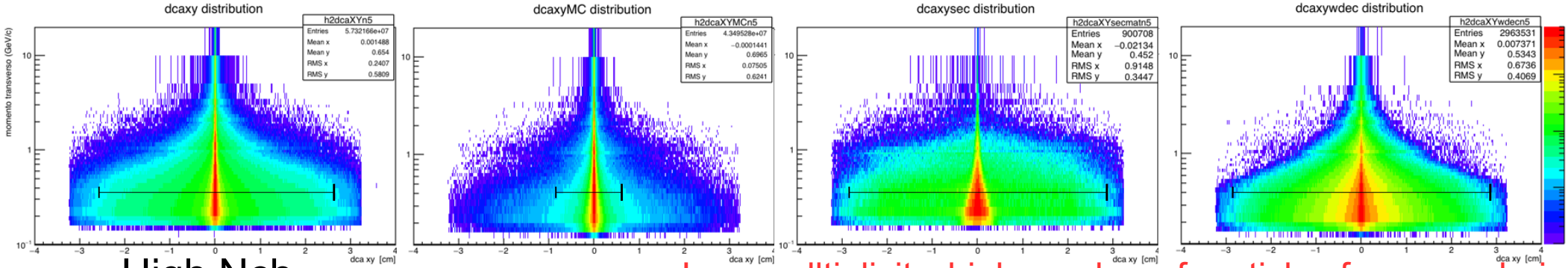
DCA xy distributions

- This was done with Data LHC15fpass2 & MC Pythia Per2011

All data | Primaries MC | Sec material MC | weak decays MC

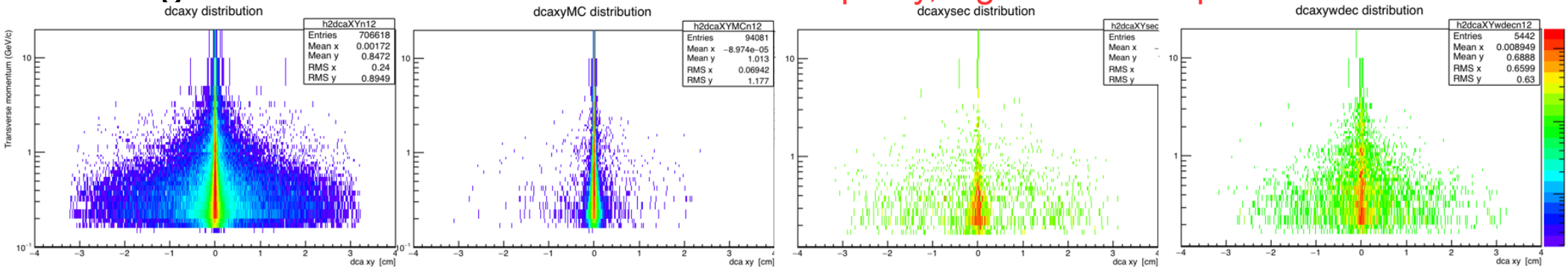


- Low Nch



- High Nch

Low mulltiplicity, high number of particles for secondaries



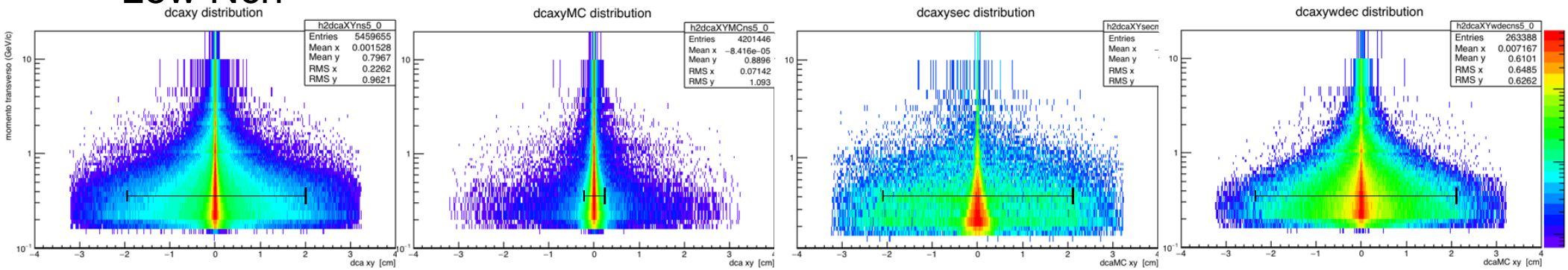
DCA xy distributions Jetty $0\%<So_{perc}<10\%$

- This was done with Data LHC15fpass2 & MC Pythia Per2011

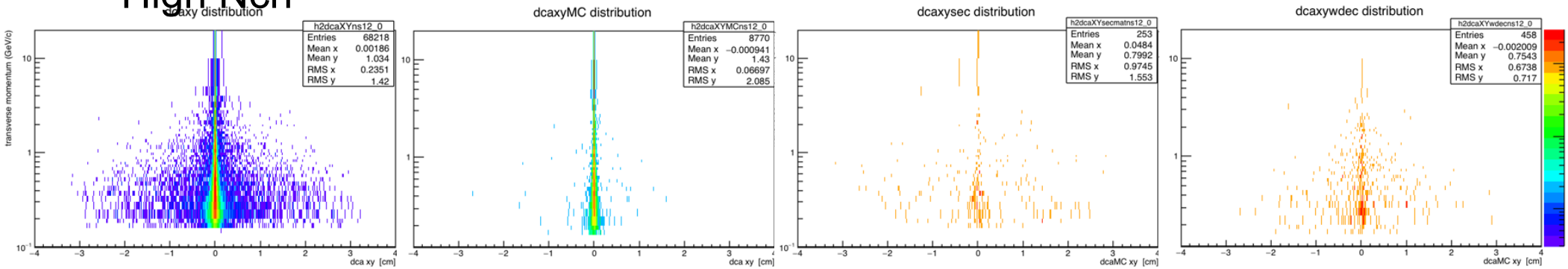
All data Primaries MC Sec material MC weak decays MC

DCAxy reduces for jetty compared with MB

- Low Nch



- High Nch



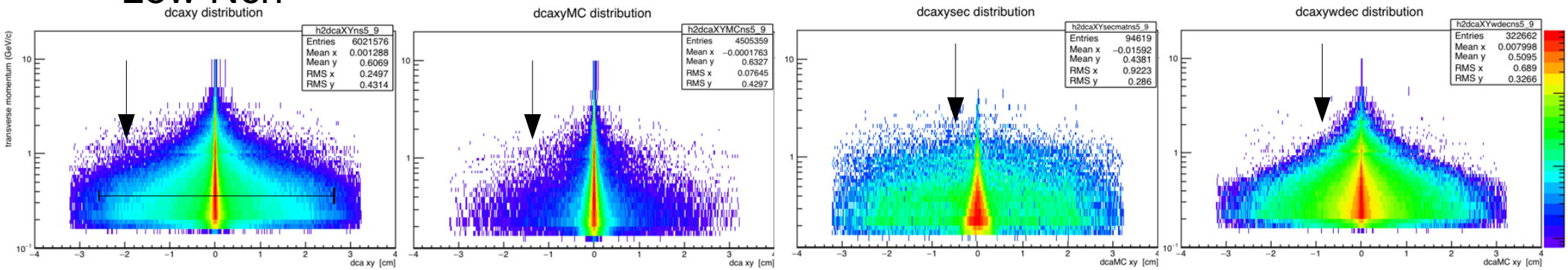
DCA xy distributions Isotropic $90\% < So_{perc} < 100\%$

- This was done with Data LHC15fpass2 & MC Pythia Per2011

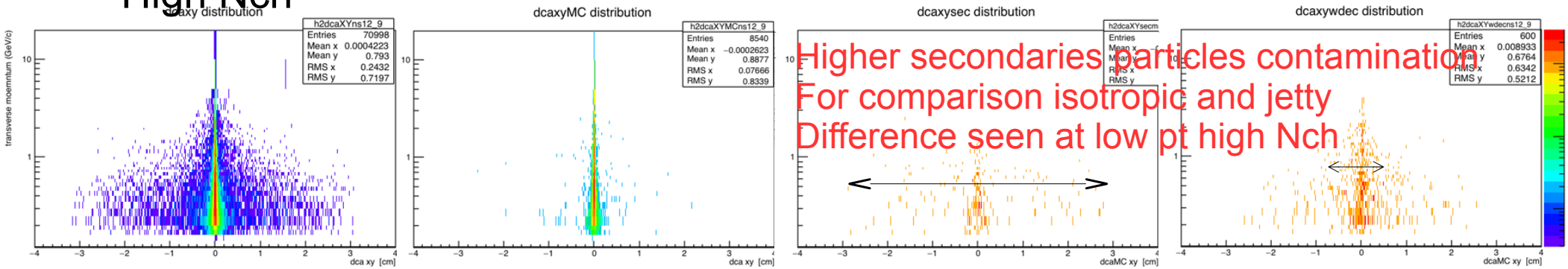
All data Primaries MC Sec material MC weak decays MC

Less high pt particles in range
DCAxy increases for isotropic compared to jetty

- Low Nch



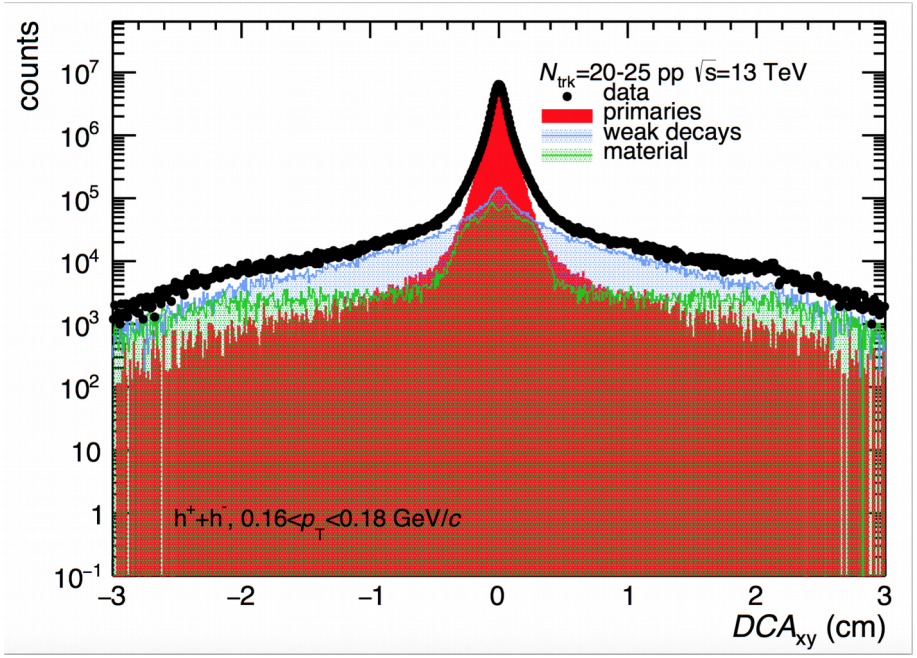
- High Nch

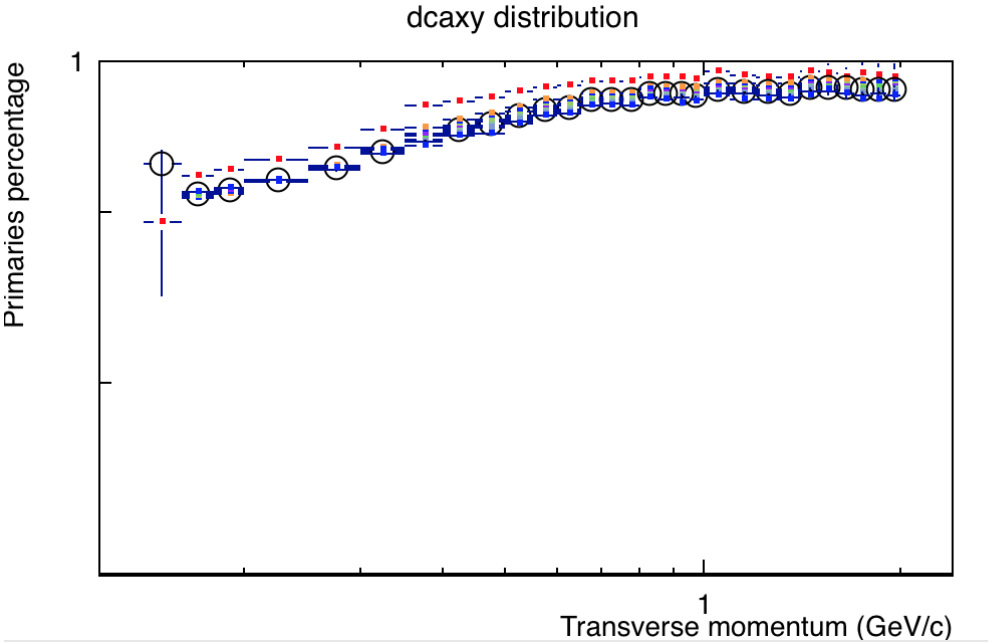


Higher secondaries particles contamination
For comparison isotropic and jetty
Difference seen at low pt high Nch

All entries at each column have the 10% of the events.

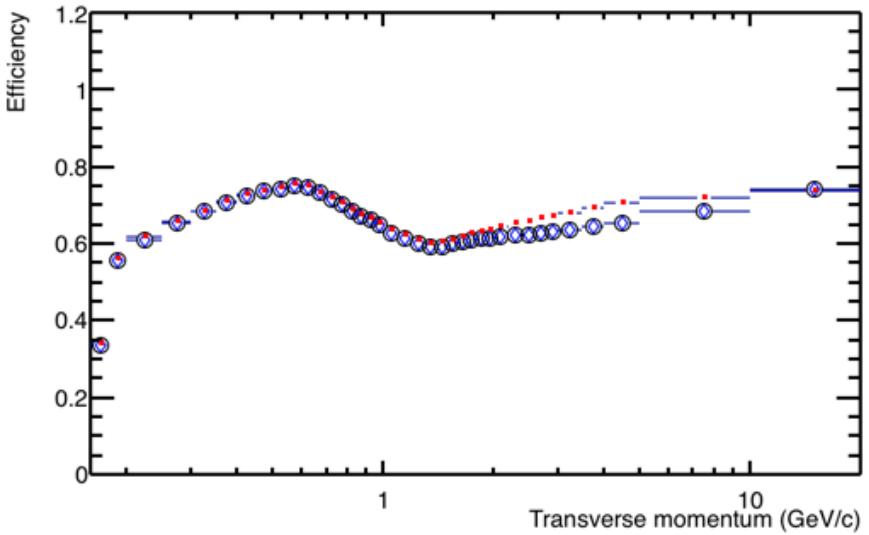
- DCA fit

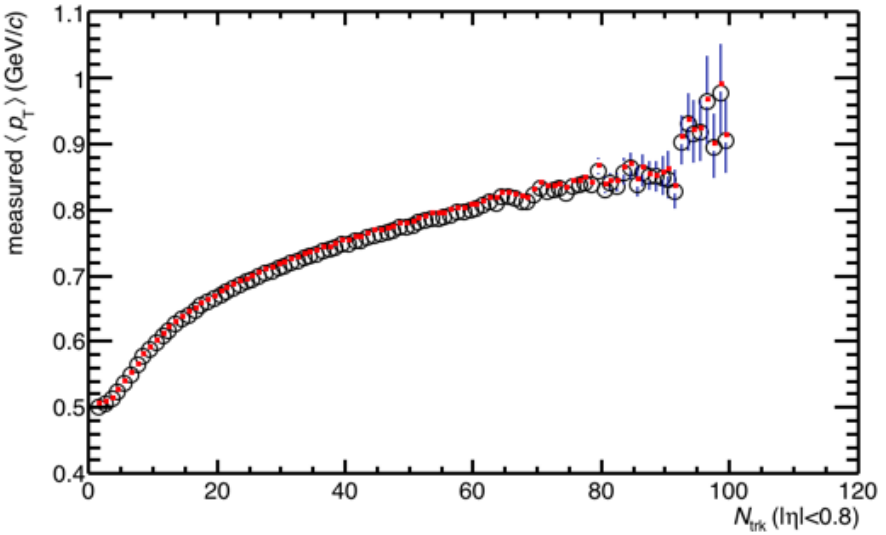


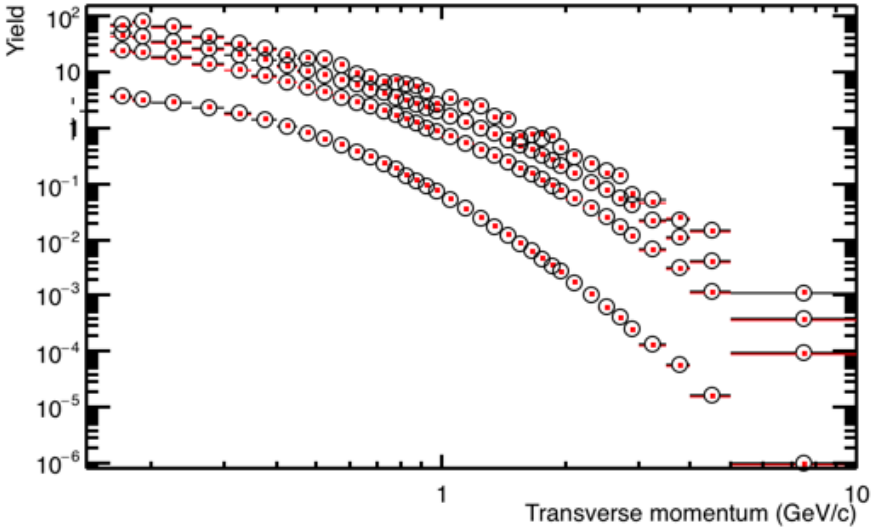


$$DCA_{\mathrm{XY}}^{\mathrm{Data}} = \alpha \cdot DCA_{\mathrm{XYsec-matl}}^{\mathrm{MC}} + \beta \cdot DCA_{\mathrm{XYsec-decays}}^{\mathrm{MC}} + \gamma \cdot DCA_{\mathrm{XYprim}}^{\mathrm{MC}}$$

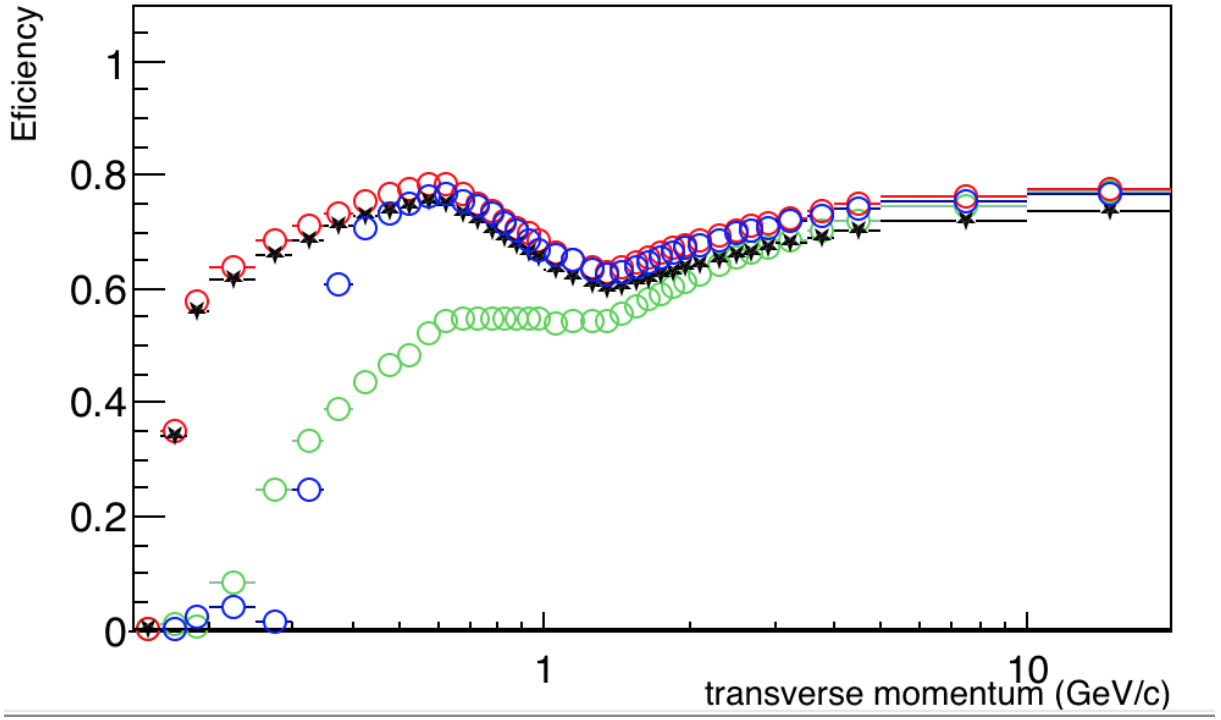
- Efficiency open& close DCA $SetMaxDCAToVertexXYPtDep("0.0182 + 0.0350/pt^{1.01}")$







- Efficiency by particle composition w closed DCA



$$\epsilon_{\text{PartComp}} = \frac{\sum_i \epsilon^i_{MC} \cdot (dN/dp_{\text{T}})^i + \epsilon^{RestMC}_{MC} \cdot (dN/dp_{\text{T}})^{RestMC}}{\sum_i (dN/dp_{\text{T}})^i + (dN/dp_{\text{T}})^{RestMC}}$$

Conclusions

- Secondaries contamination via dcaxy can be getted from plots obtained.
- Wider range for jetty events than for inclusive case
- Higher secondaries contamination espected to arrive

  from isotropic events at low p_T in high & low multiplicity

To do

- Answer questions from Oliver and Jacek to Analysis Note
- Apply secondaries contamination
- Get efficiency by particle composition
- Calculate systematics
- ...