

Report

BiBi collisions at 9.2 GeV

I. Maldonado

Outline

- **MC productions**
- **Centrality type of analysis**
- **PT distributions**
- **Summary**

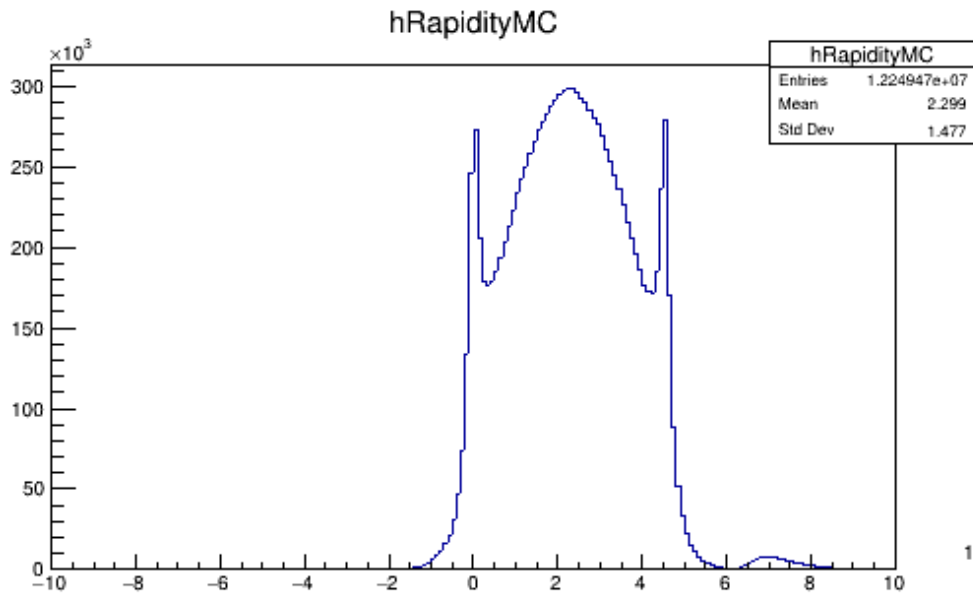
Analysis done with UrQMD

- **1 M of events -99500 events**
- **Bi Bi collisions at 9.2 GeV**
- **Geant4**
- **Location of files**
 - /eos/nica/mpd/sim/data/exp/dst-BiBi-09.2GeV-mp06-21-500ev/BiBi/09.2GeV-mb/UrQMD/BiBi-09.2GeV-mp06-21-500ev/urqmd-BiBi-09.2GeV-mb-eos0-500-15.reco.root

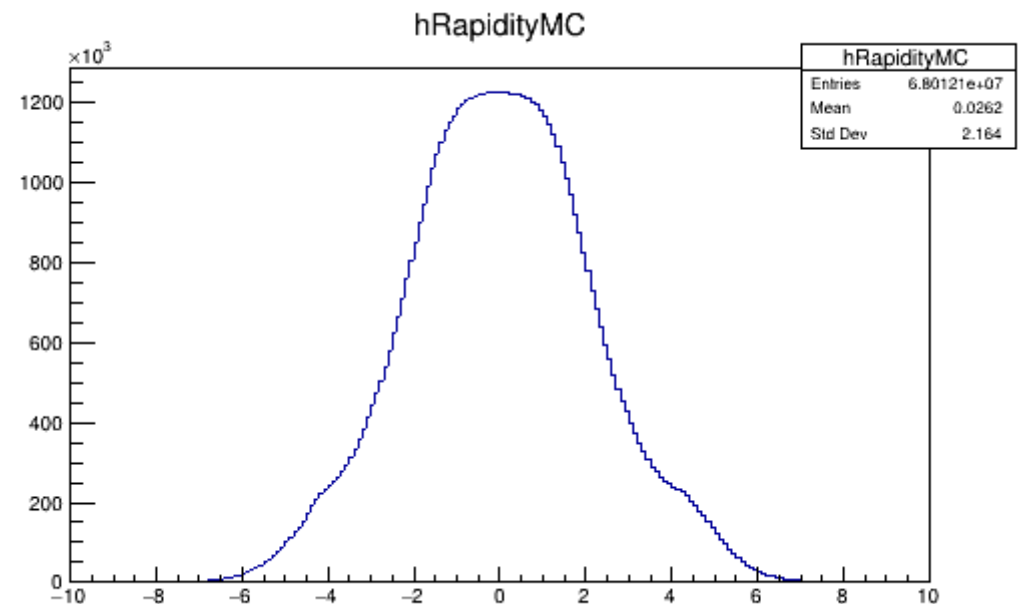
Analysis done with DCM-SMM

- **1M of events - 100000 events**
- **Bi Bi collisions at 9.2 GeV**
- **Location of files**
 - /eos/nica/mpd/sim/data/exp/dst-BiBi-09.2GeV-mp07-21-2kev/BiBi/09.2GeV-mb/DCMSMM/BiBi-09.2GeV-mp07-21-2kev/dcmsmm-BiBi-09.2GeV-mb-eos0-2k-20-.reco.root
- **Can we use it?**

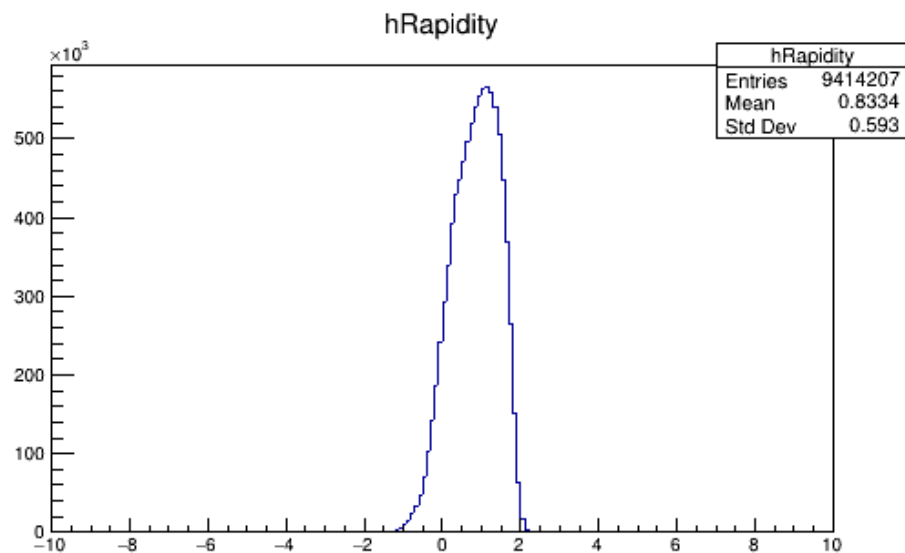
Rapidity in MC Tracks



With the proper Lorentz Transformation in p_z , we can shift the rapidity or pseudorapidity

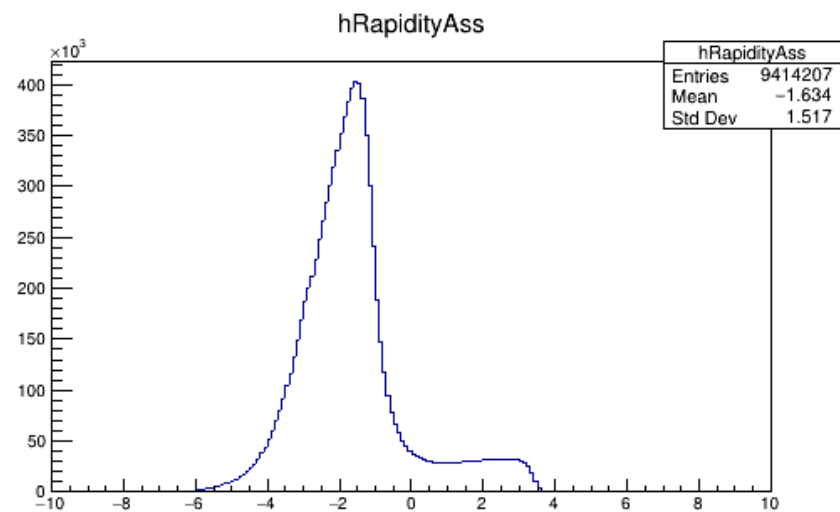


Rapidity in Reconstructed Tracks

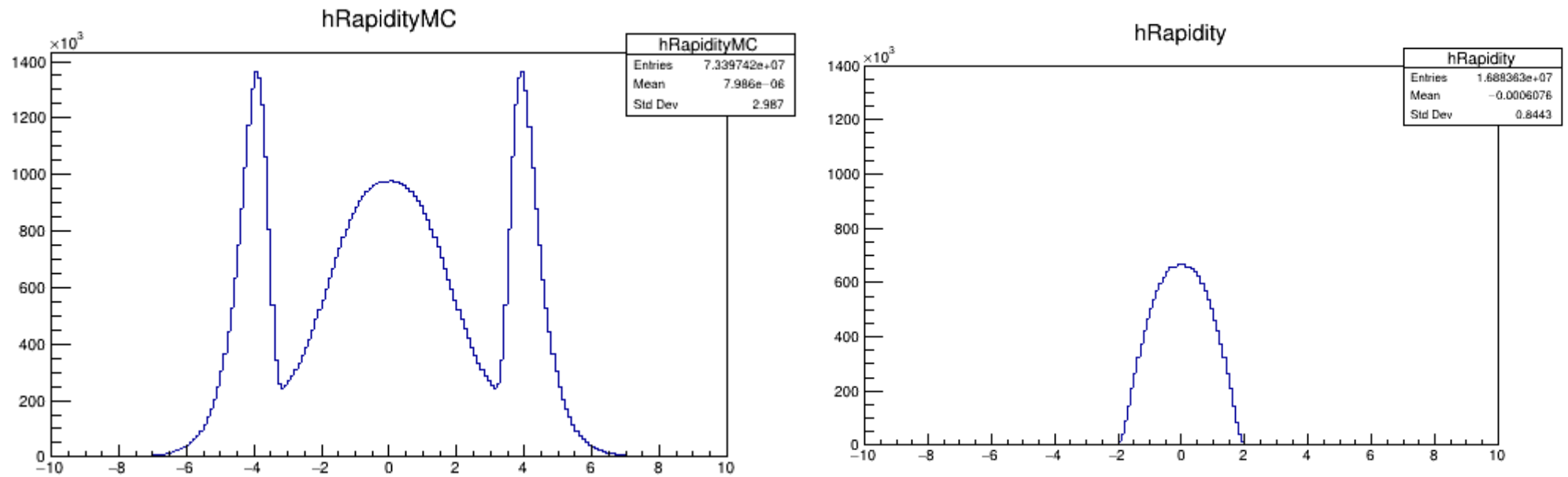


The distribution change its shape and It affects the cuts to estimate the multiplicity

With the proper Lorentz Transformation in p_z , we can shift the rapidity or pseudorapidity

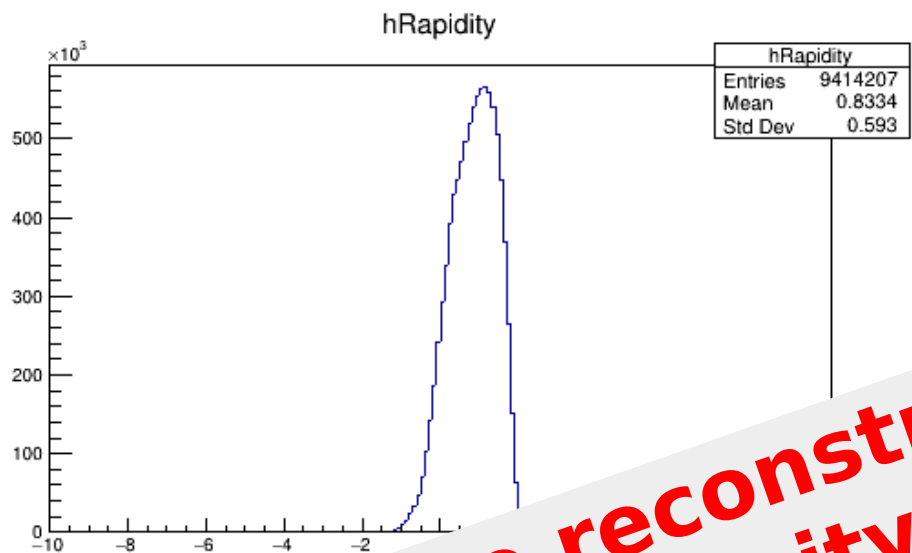


Rapidity Reconstructed tracks with UrQMD



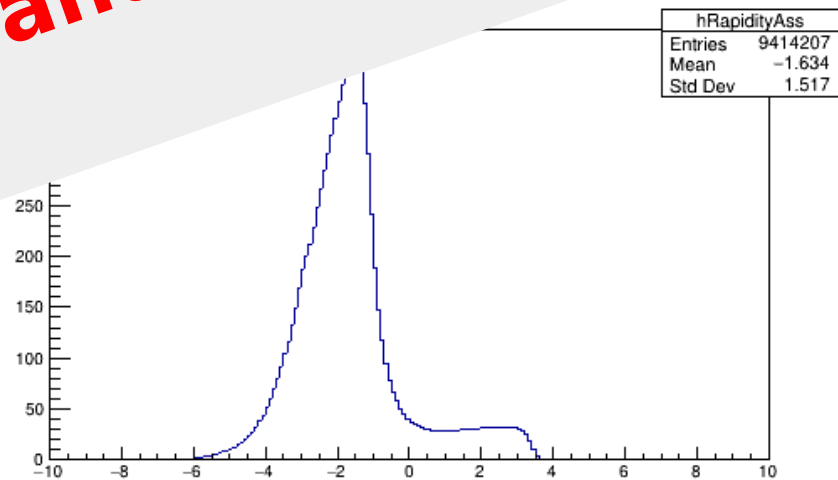
Decreases the number of particles but the shape at mid-rapidity is similar

Rapidity in Reconstructed Tracks with DCM-SMM



With the proper Lorentz Transformation in the longitudinal direction, we can shift the rapidity distribution to pseudorapidity.

- **Cuts in the reconstructed tracks affects multiplicity and ...**



Estimation of Centrality

Which are the differences? Which is the approach we are going to use?

- **Flow folder with functions**

- restore_dca
- get_dca
- get_centrality
- https://git.jinr.ru/nica/mpdroot/-/tree/pro/macro/physical_analysis/Flow

- **Centrality Framework**

- Glauber Monte Carlo
- <https://github.com/FlowNICA/CentralityFramework>

Estimation of Centrality

Which are the differences? Which is the approach we are going to use?

- **Flow folder with functions**

- restore_dca

- get_dca

- get_centrality

- [https://github.com/FlowNICA/CentralityFramework](#)

- [https://github.com/FlowNICA/CentralityFramework/tree/pro/macro/physic](#)

Which is the best option?

Which are going to use?

- **FlowNICA Framework**

- Monte Carlo

- <https://github.com/FlowNICA/CentralityFramework>

Transverse p_T distributions

- **Track selection → same for centrality**

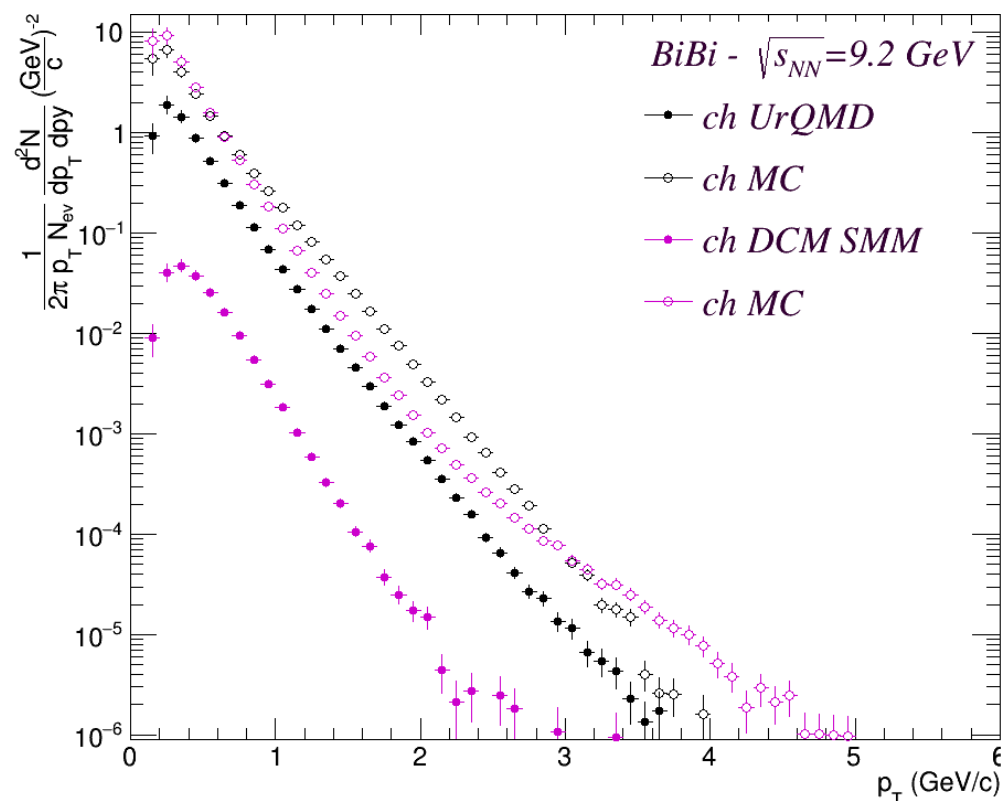
- $P_T > 0.15$ GeV/c
- $|\eta| < 0.5$
- Only charged particles (pi, K, p)
- $N_{\text{hits}} > 16$
- $\text{DCA} < 0.5$ cm
- MC → only primary

-

Transverse p_T distributions - ch

- **Generated vs Reconstructed (Associated)**

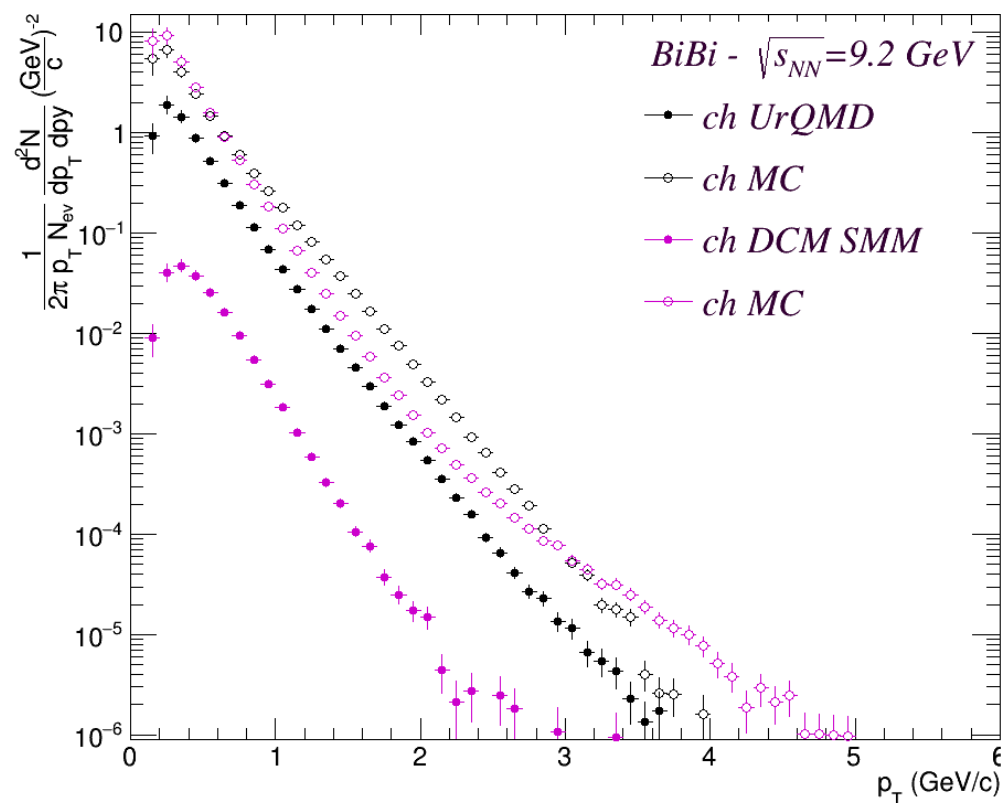
Differences in reconstructed with DCM-SMM are due the cuts in pseudorapidity



Transverse p_T distributions - ch

- **Generated vs Reconstructed (Associated)**

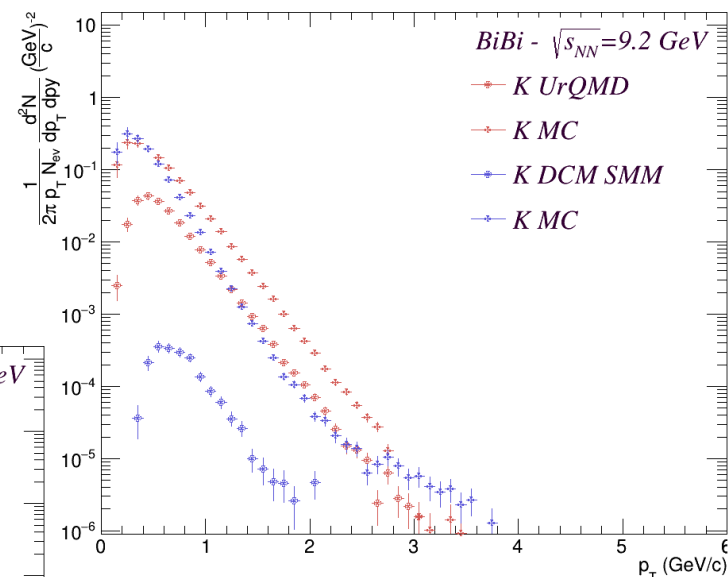
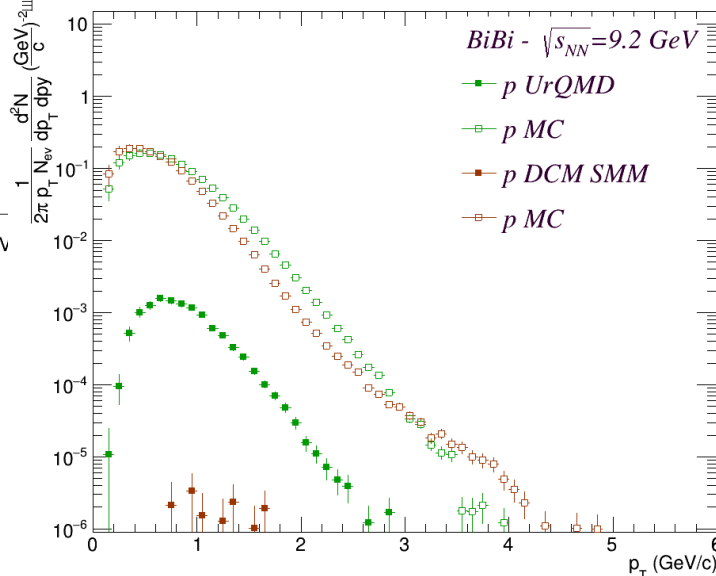
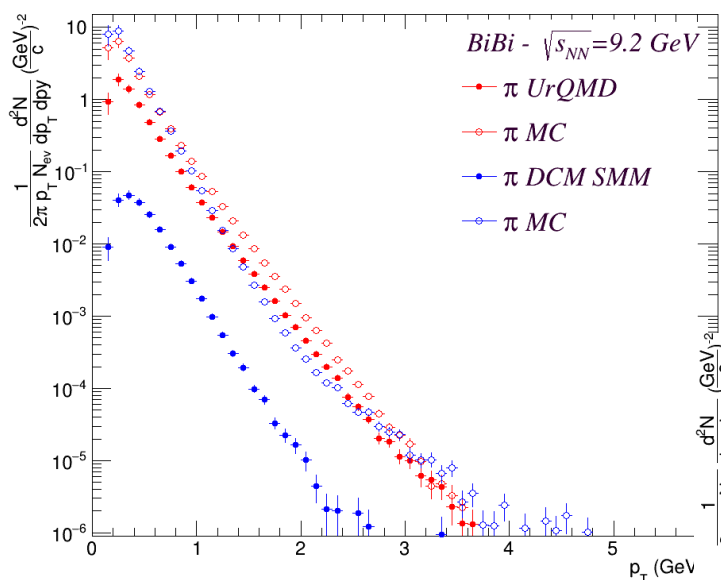
Differences in reconstructed with DCM-SMM are due the cuts in pseudorapidity



Transverse p_T distributions - π , K , p

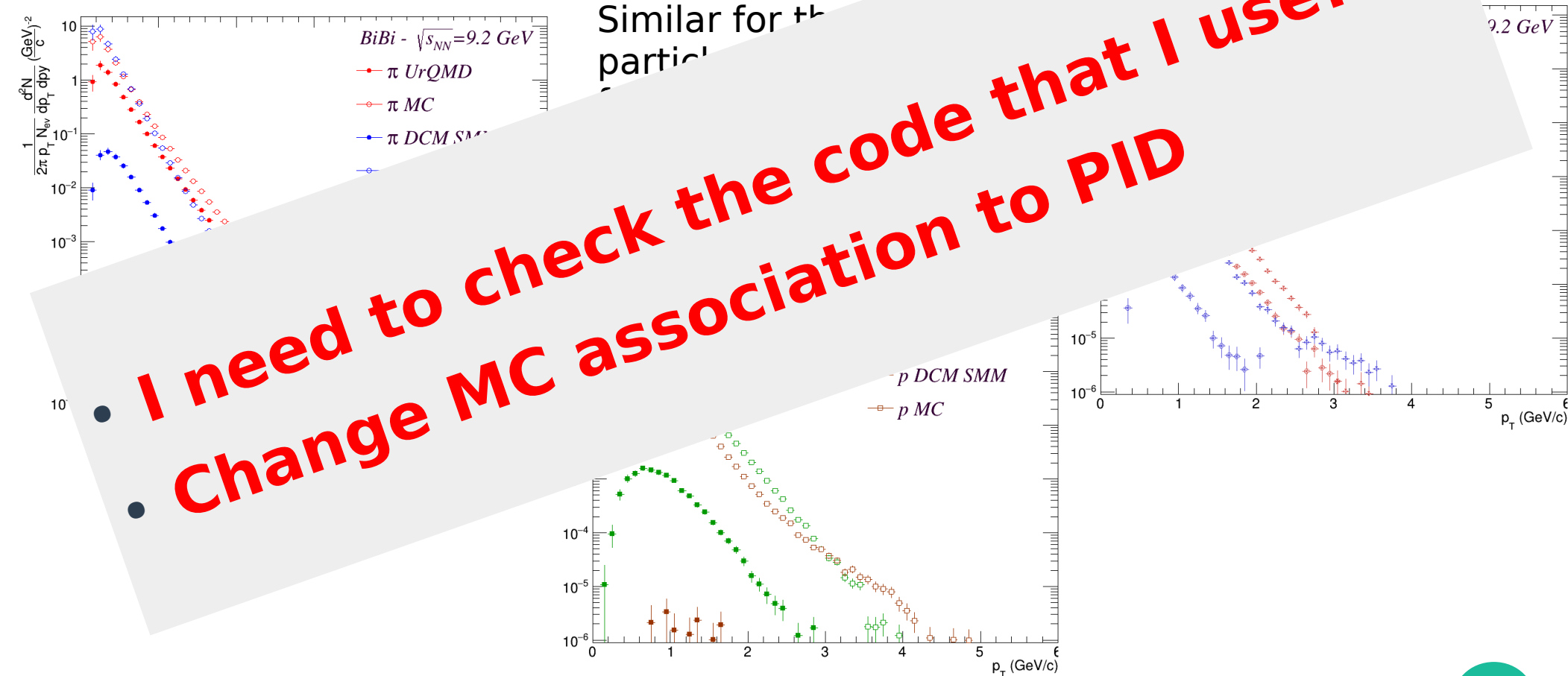
• Generated vs Reconstructed (Associated)

Similar for the other particles but for reconstructed **only we have K^- ?**



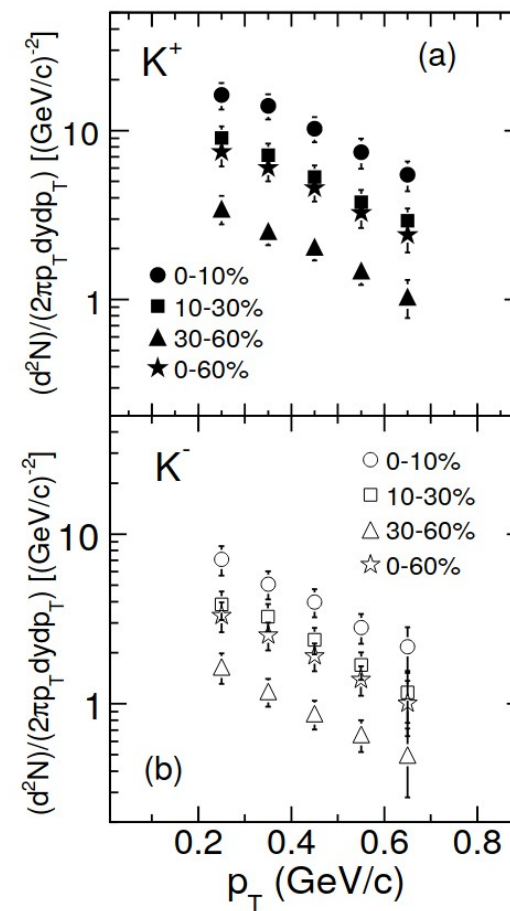
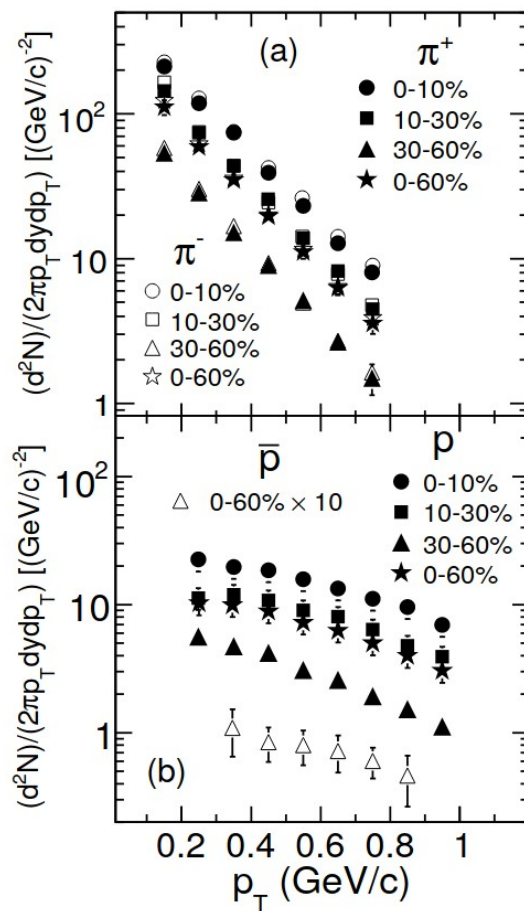
Transverse p_T distributions - π , K , p

- Generated vs Reconstructed (Associated)



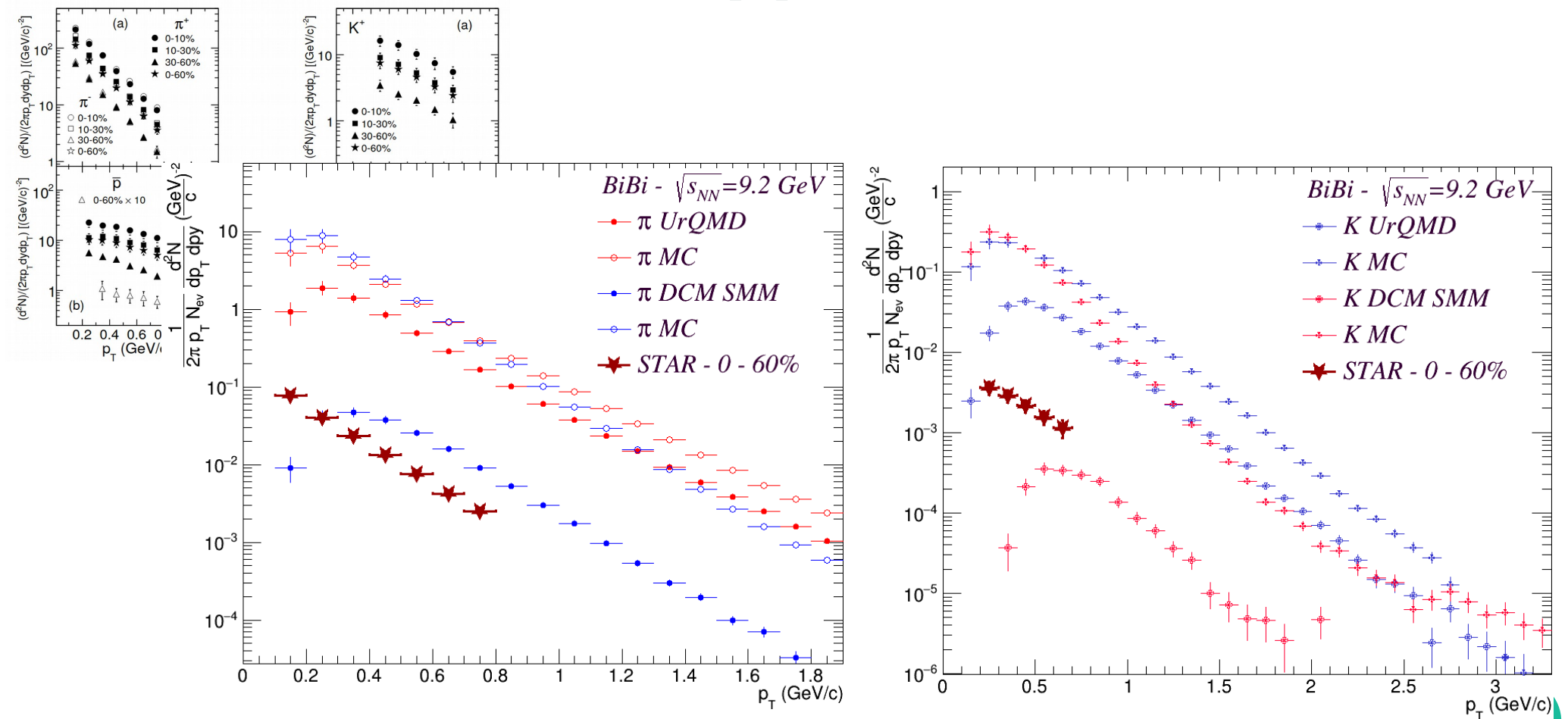
Comparison with STAR - p_T distributions

- Au+Au at 9.2 GeV Phys.Rev.C 81 (2010) 024911 approx (3000 events)



Comparison with STAR - p_T distributions

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Summary

- **We check the DCM-SMM production it can be used for generated data, not for Reconstructed**
- **This affects the centrality determination, required to compare with data from STAR**
- **Generated pT distributions to compare with data - we require to develop this work**



Comments