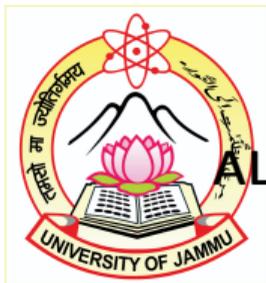


Lambda(1520) production in PbPb collisions at 5.36TeV

Nasir Mehdi Malik

University of Jammu
Supervisor- Prof. Sanjeev Singh Sambyal



ALICE-STAR India Collaboration Meeting

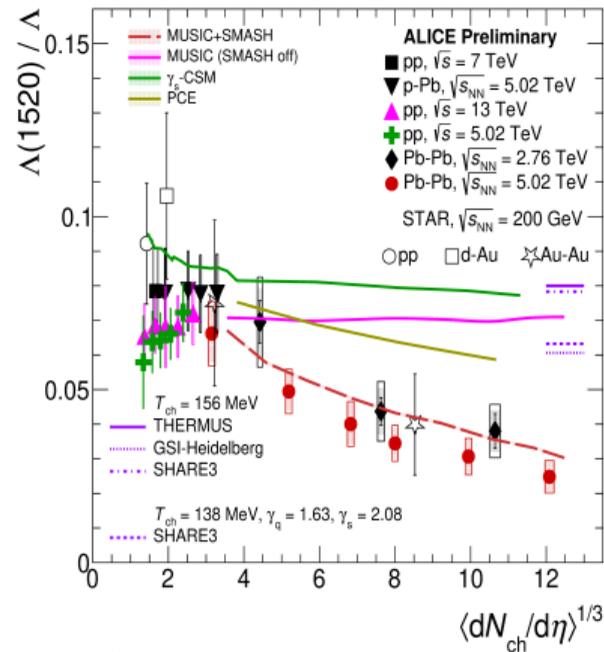


June 25, 2024

- * Motivation
- * Data Set
- * Event and Track Selection
- * QA
- * Analysis Details
- * Invariant mass after background subtraction
- * Raw Yield
- * SUMMARY & OUTLOOK

Motivation and Introduction

- Study of hadronic resonance production tell about re-scattering and regeneration effects during the evolution of hadronic phase.
- $\Lambda(1520)$ Lifetime is between K^* and ϕ , It makes $\Lambda(1520)$ good candiadate to better understand hadronic phase.
- Studying in run3 will hep us to further refining centerlity class. So that we get deeper insight into its behavior,



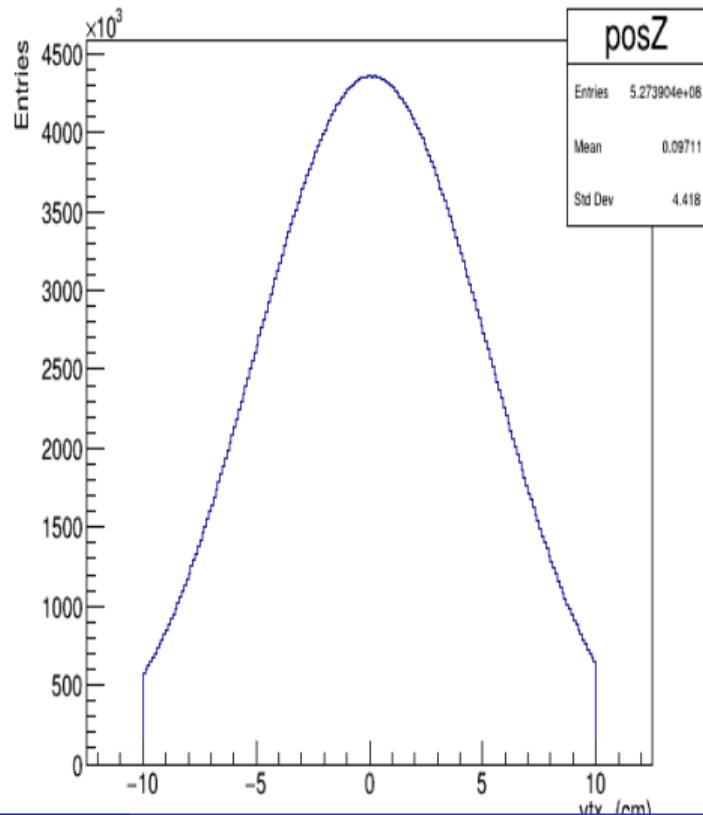
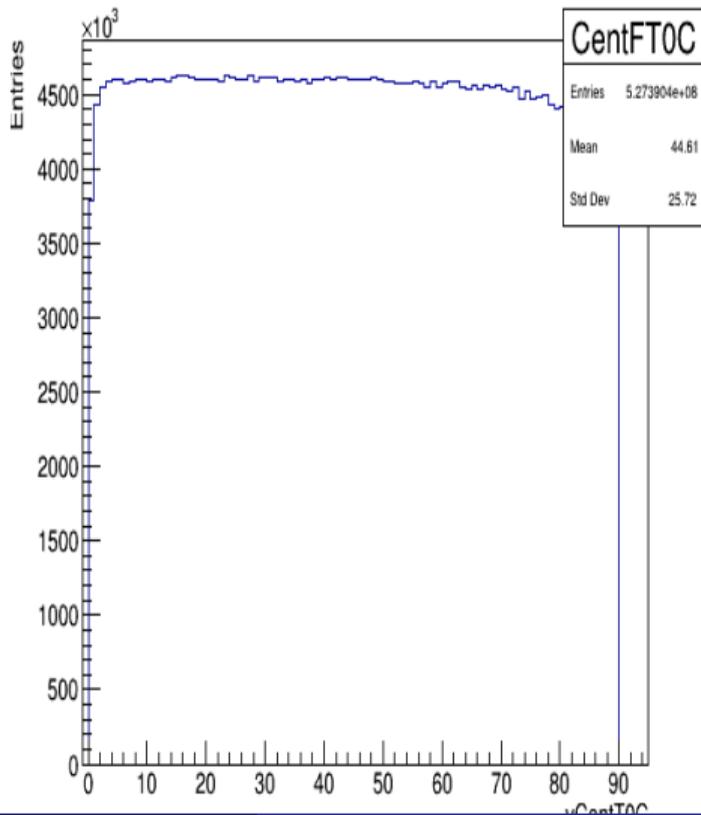
ALI-PREL-516662

Period	AOD	\sqrt{s}	Events
LHC23zzh,zzf,zzg	pass2	(PbPb)5.36 TeV	343 million.

Table: Data production table

Event Selection

- $|V_z| < 10\text{cm}$
- sel8
- multiplicity estimator:- FT0C



Resonance

$\Lambda(1520) \rightarrow pK^-$
Branching Ratio 22.5

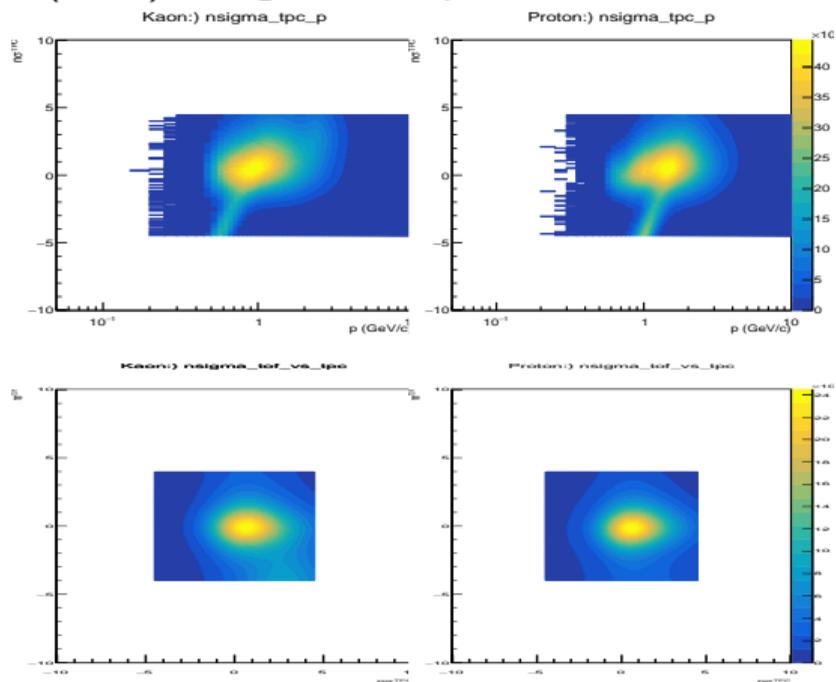
Width 15.7 MeV/c²
Mean life time 12.6 fm/c

- IsGlobalTrack
- IsPrimaryTrack
- $p_T > 0.15 \text{ GeV}/c$
- $|DCA_{xy}| < 0.1 \text{ cm}$
- $|DCA_z| < 1 \text{ cm}$
- $|\eta| < 0.8$
- $|y| < 0.5$
- hasTOF()

PID Selection

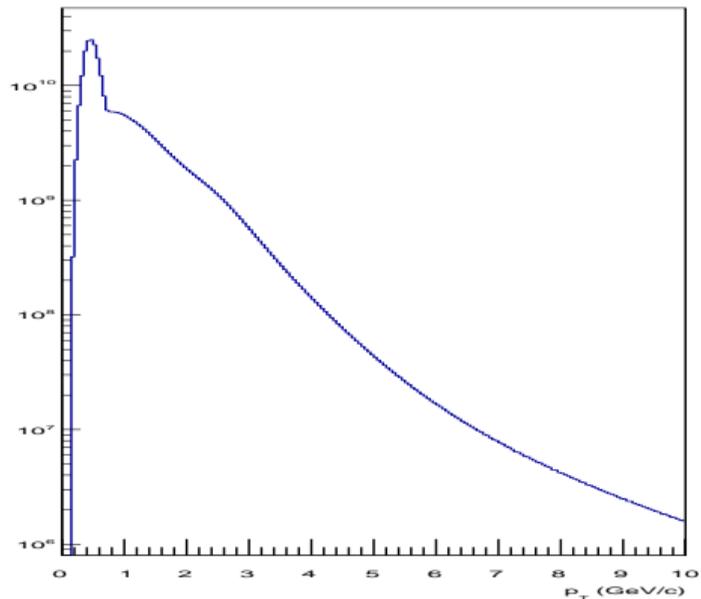
Track present in TOF,
Proton ($N\sigma$) TOF = 4.5
with ($N\sigma$) TPC = 4 as
veto

Kaon ($N\sigma$) TOF = 4 with
($N\sigma$) TPC = 4.5 as veto

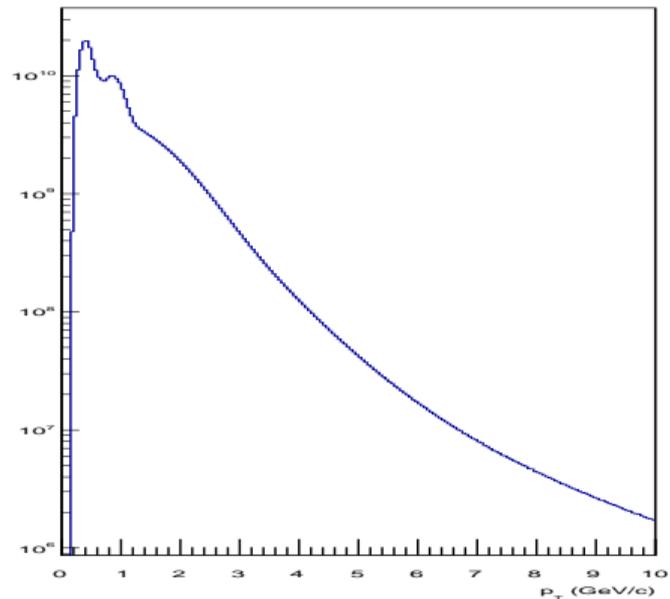
$\Lambda(1520)$ daughter $n\sigma$ plots

QA daughter particles (Kaon & proton)

Kaon:) pt



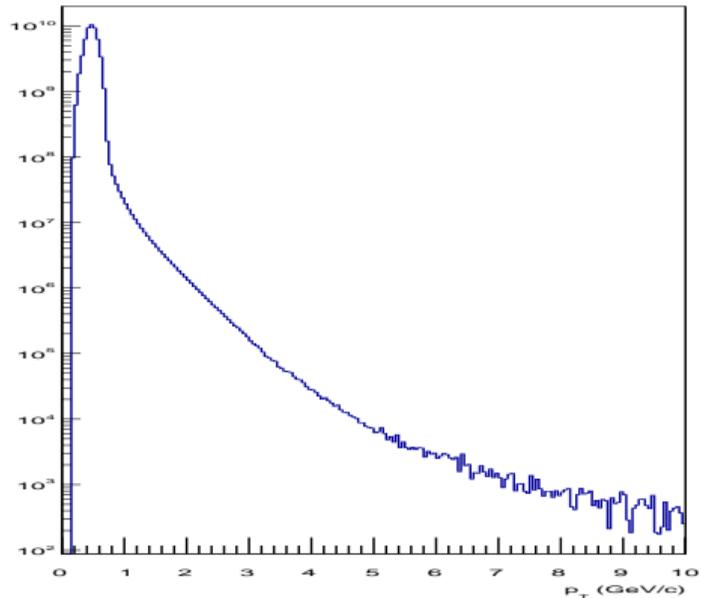
Proton:) pt



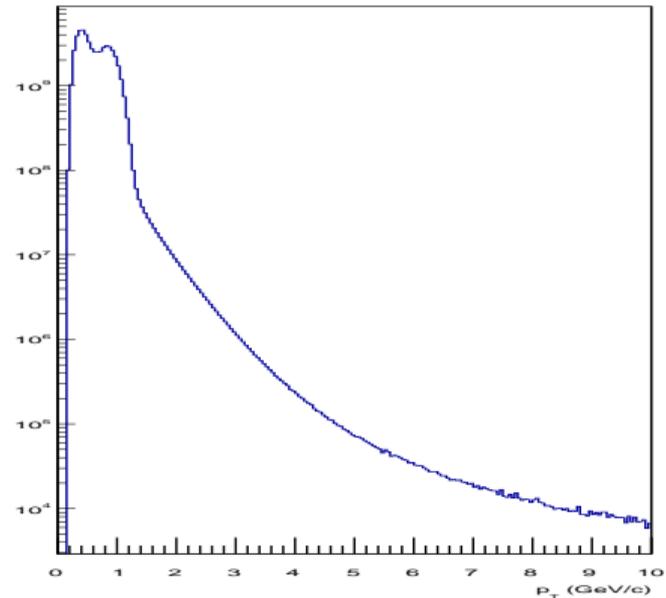
Sharp peak at low p_T in kaon and double peak for proton is observed.

QA daughter particles(only TPC tracks)

Kaon:) pt



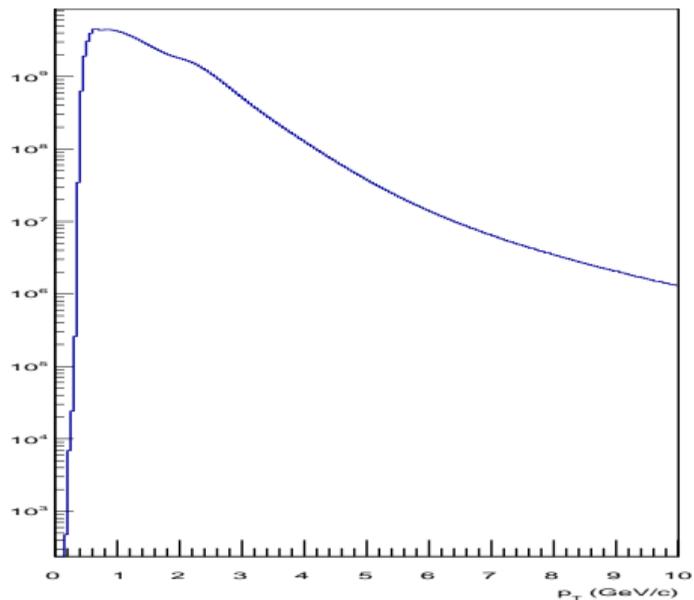
Proton:) pt



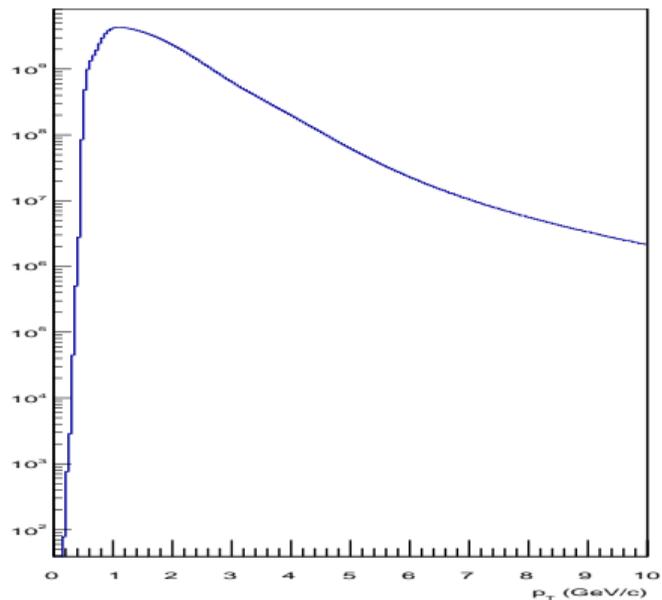
Sharp peak at low p_T in kaon and double peak for proton is observed only in TPC tracks.

QA nsigma(has TOF)

Kaon:) pt



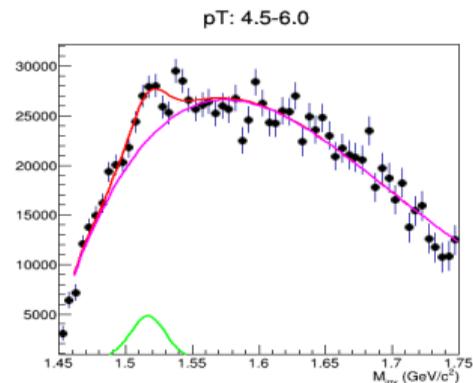
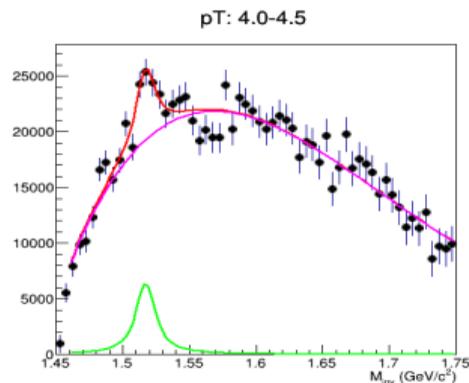
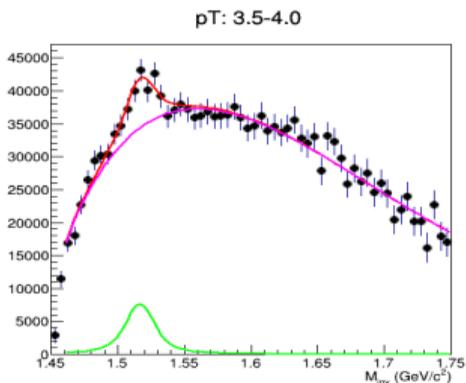
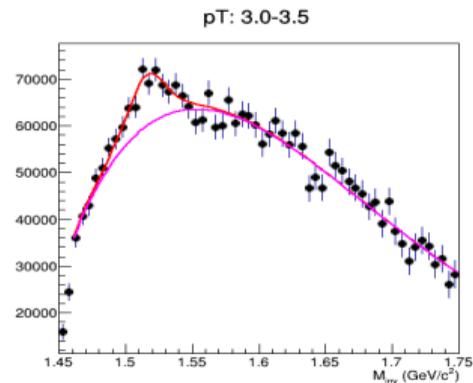
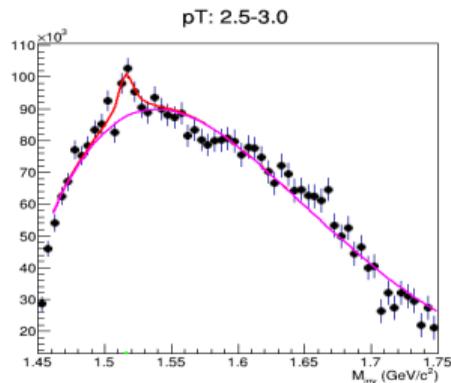
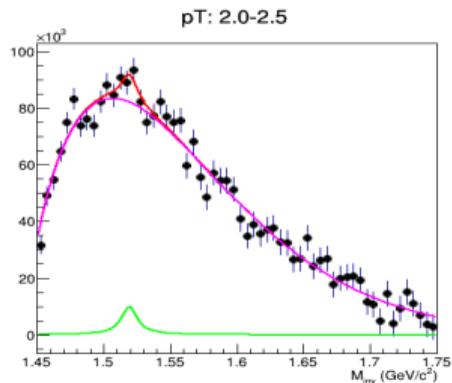
Proton:) pt



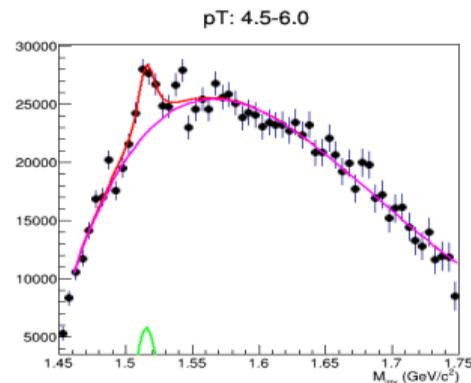
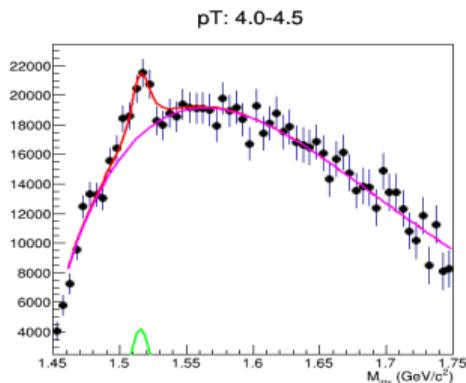
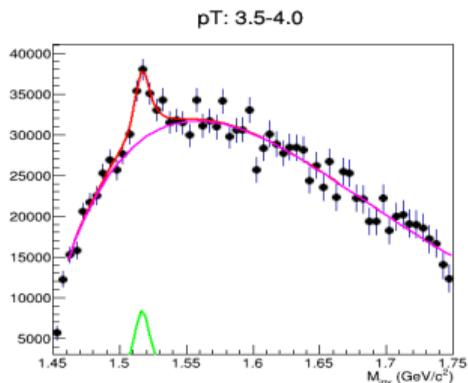
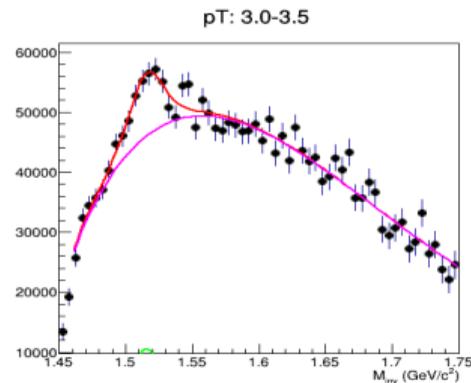
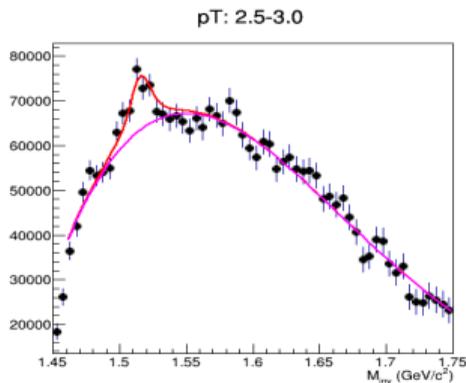
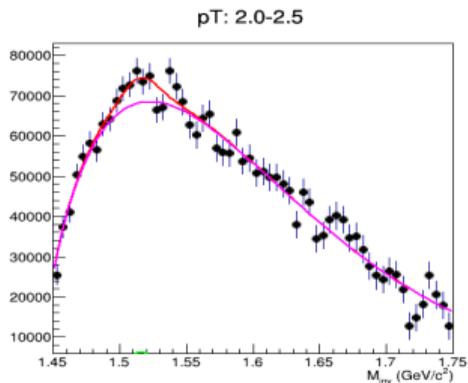
Not observed with tracks hasTOF.
Double peaks are in TPC only tracks.

- Invariant mass distribution from $p + K$ unlike-sign pairs.
- Background:
 - Mixed-event
 - Number of Event mixing = 10, Difference in $|Vz| < 1$ cm
 - multiplicity binning (FT0C and VZ)
 - Normalisation range : 1.70 -2.0 GeV/c^2
- FT0C intervals:
 - 0-10%, 10-20%, 20-30%,30-40%, 40-50%,50-60%,60-70%, 70-90%, 0-90%
- p_T intervals:
 - [2.0, 2.5, 3.0, 3.5, 4.0, 4.5, 5.0, 6.0]
- Fit:
 - $\Lambda(1520)$: Voigtian + Maxwell-Boltzmann distribution function
 - mass: (1.516,1.525)
 - width: (.014,.0162)
 - sigma: (.001,.006)

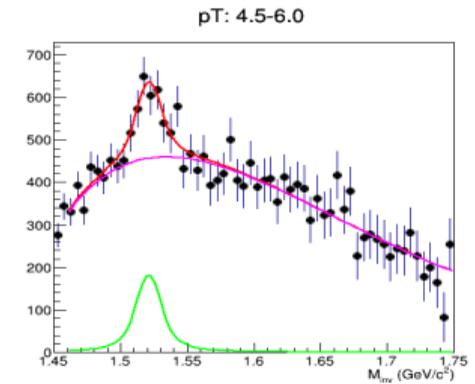
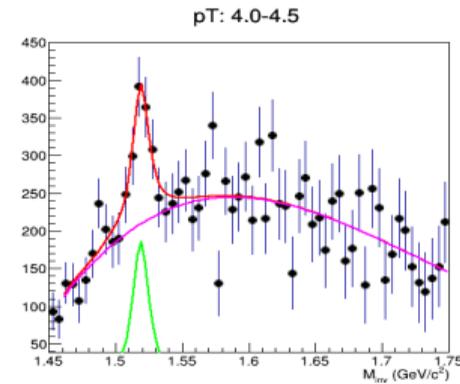
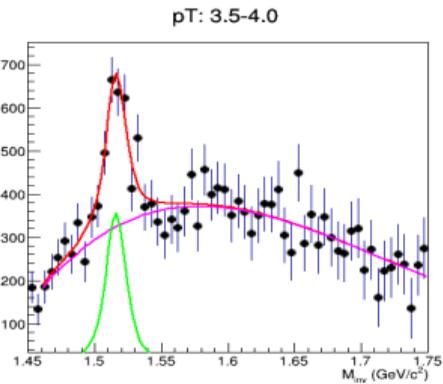
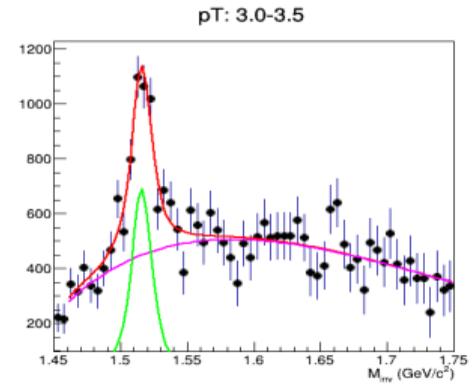
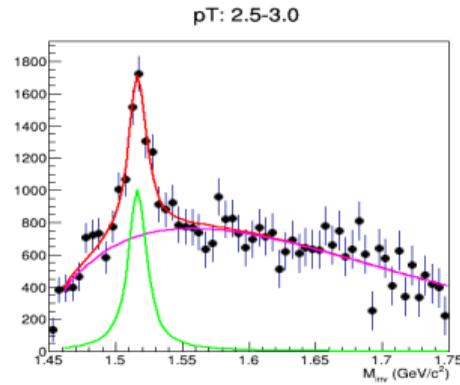
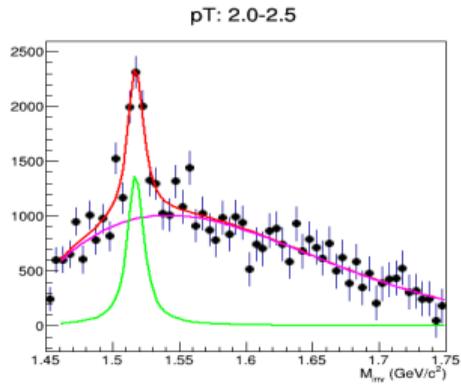
For Centrality(0-10)



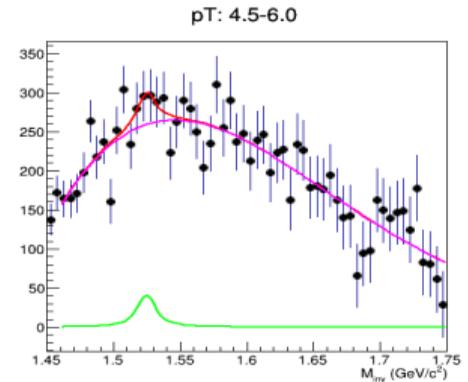
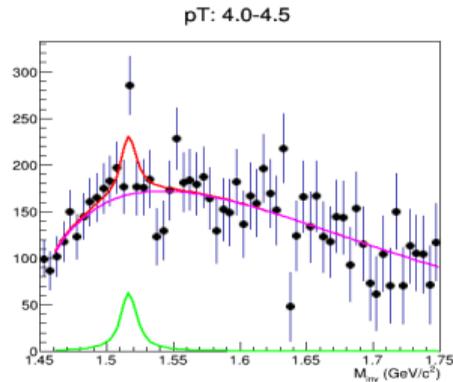
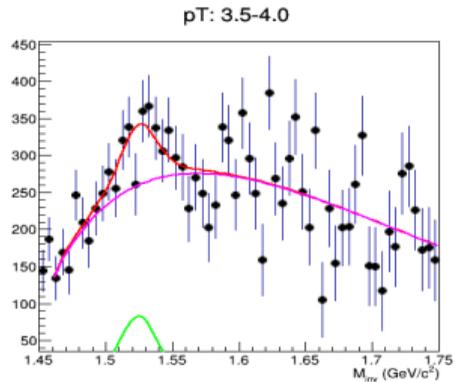
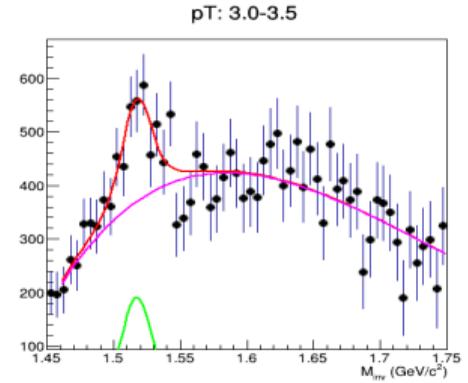
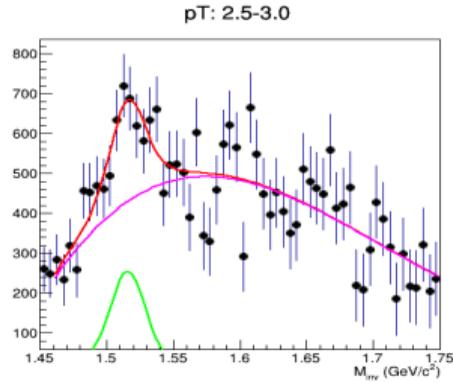
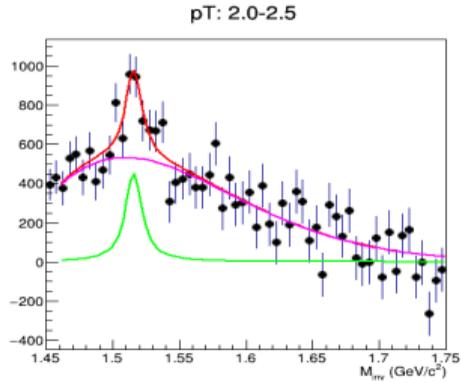
For Centrality(10-20)



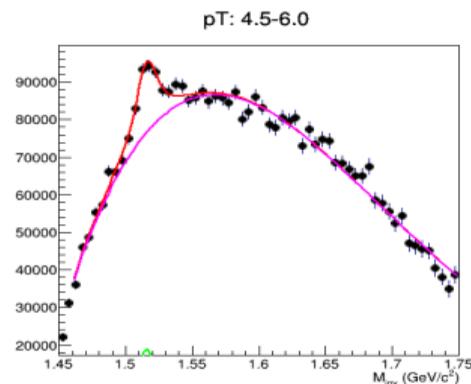
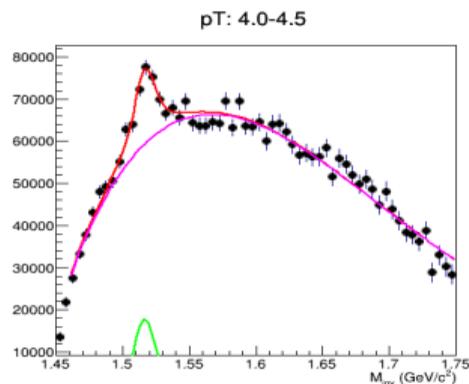
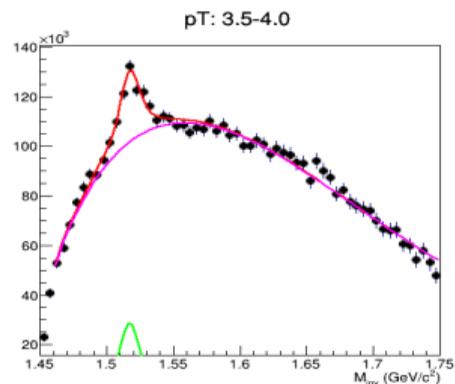
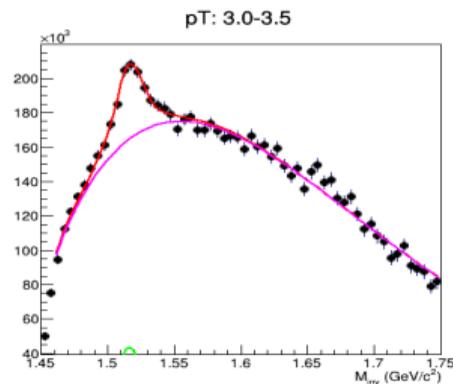
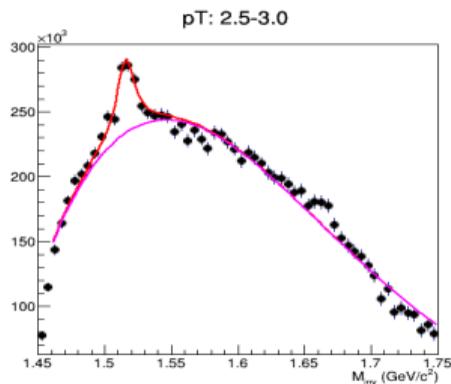
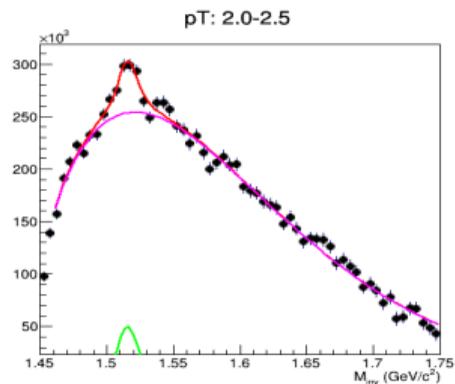
For Centrality(70-80)

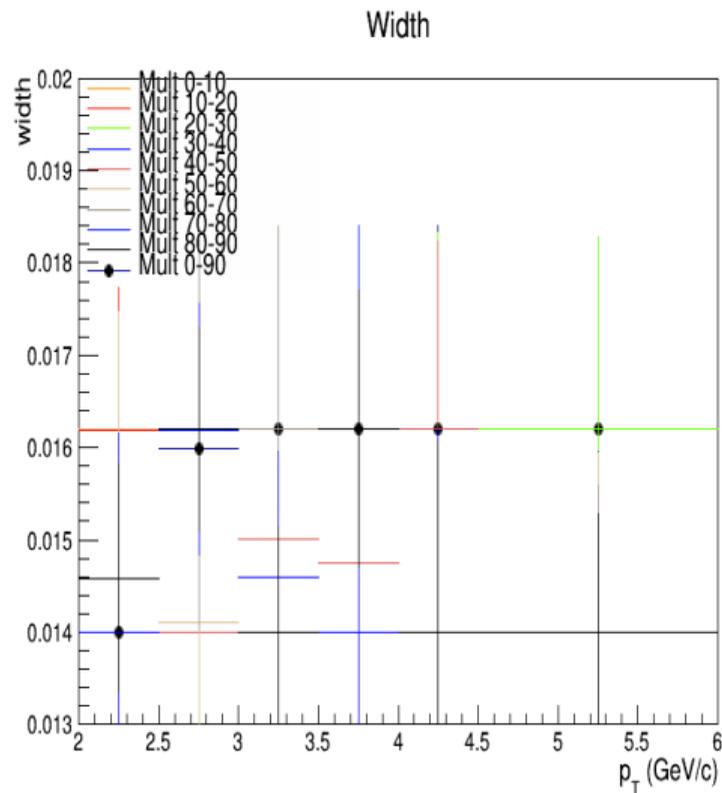
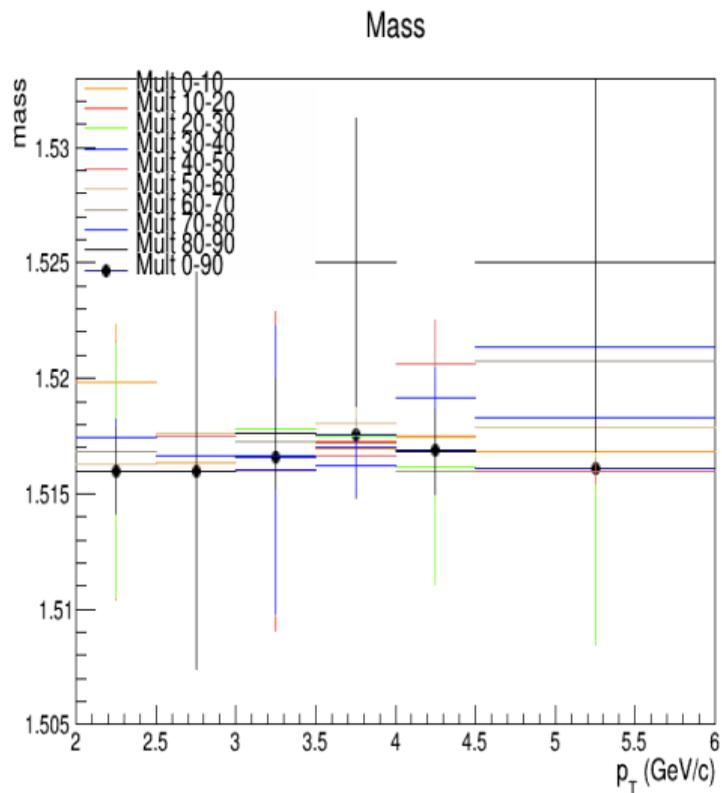


For Centrality(80-90)



For Centrality(0-90)





SUMMARY

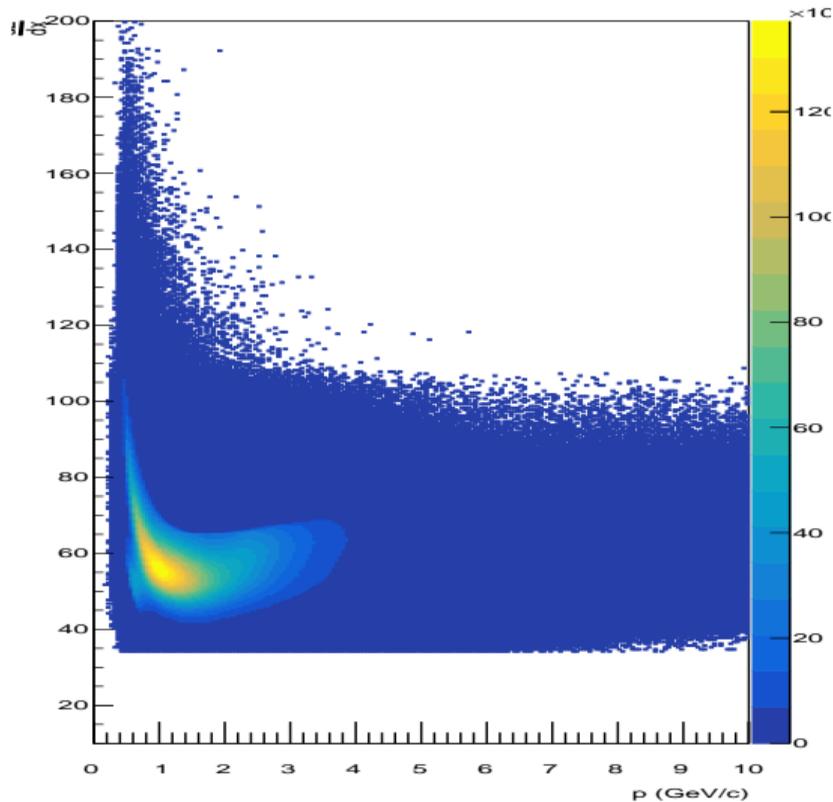
- Observation of double peak in proton spectra at low pt in TPC only tracks.
- Invariant mass of $\Lambda(1520)$ is presented in various centrality class for PbPb 5.36TeV.
- Raw Yield is presented.

OUTLOOK

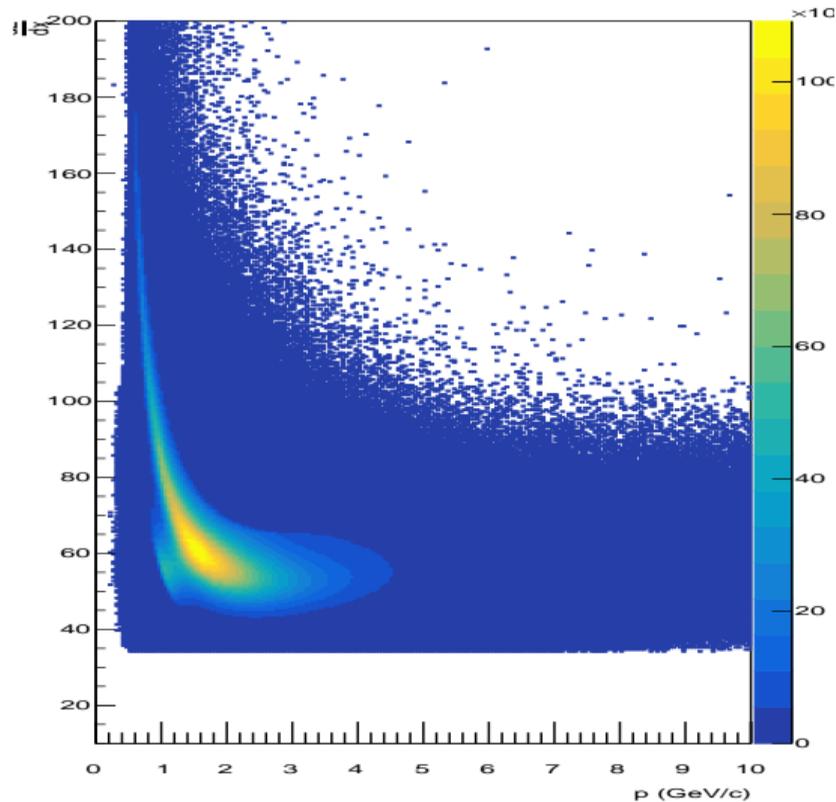
- efficiency calculation

Thank You

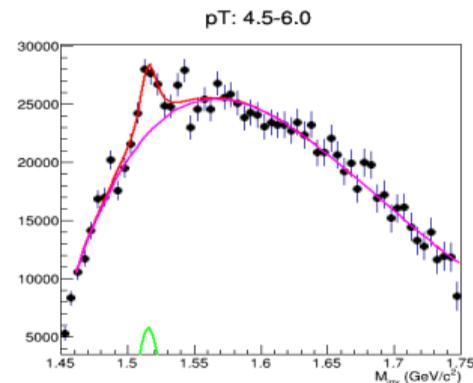
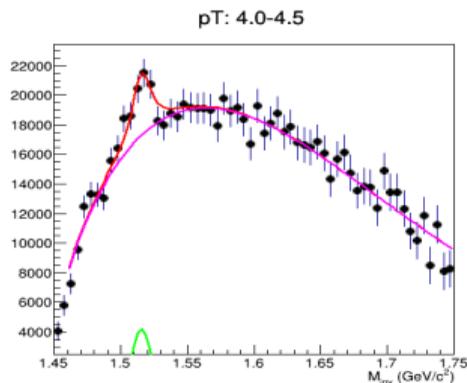
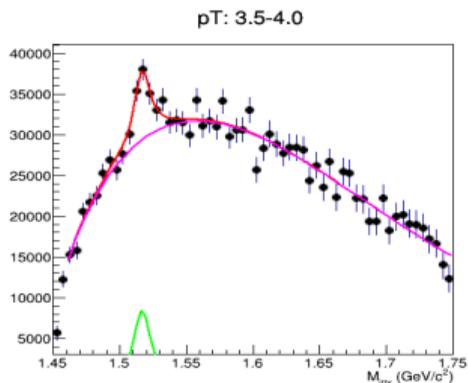
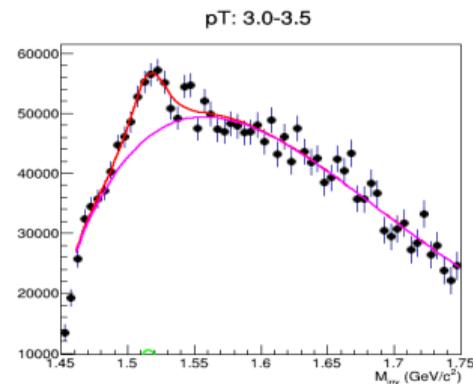
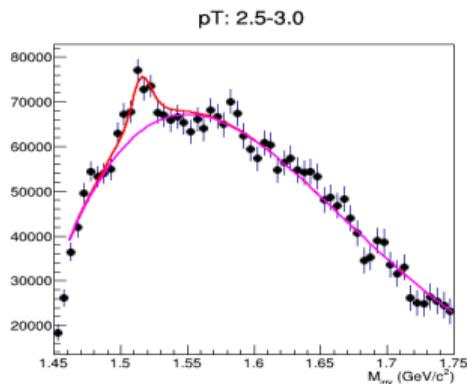
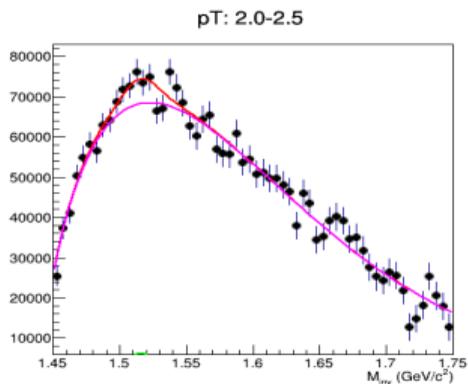
Kaon:) dEdx_p



Proton:) dEdx_p

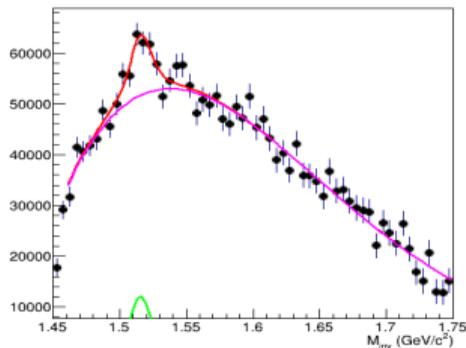


For Centrality(10-20)

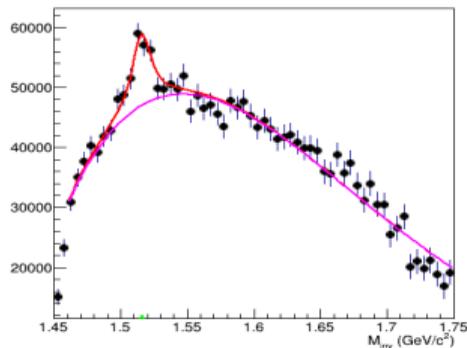


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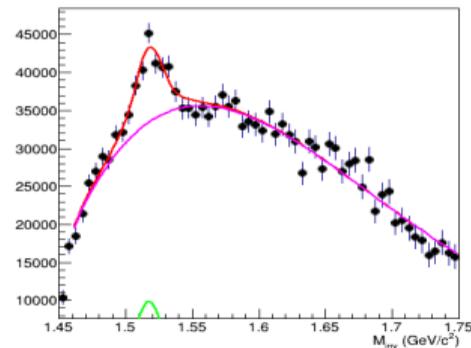
pT: 2.0-2.5



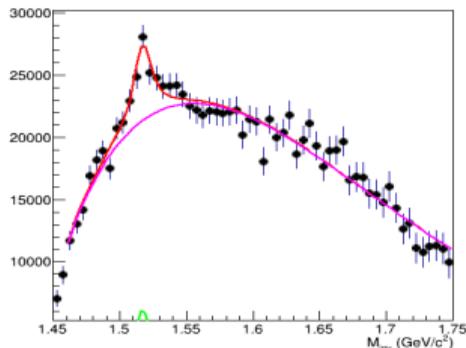
pT: 2.5-3.0



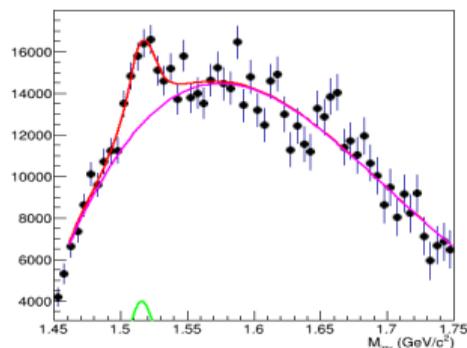
pT: 3.0-3.5



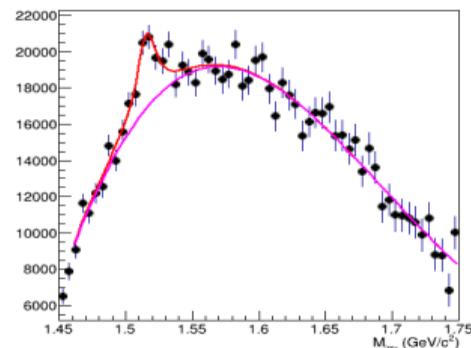
pT: 3.5-4.0



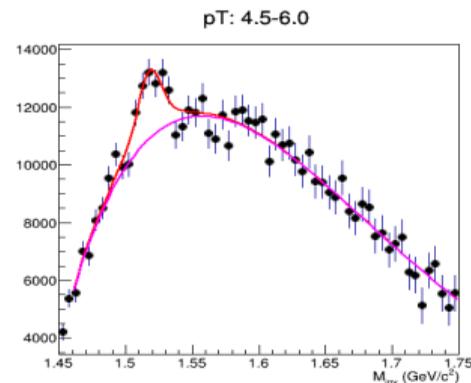
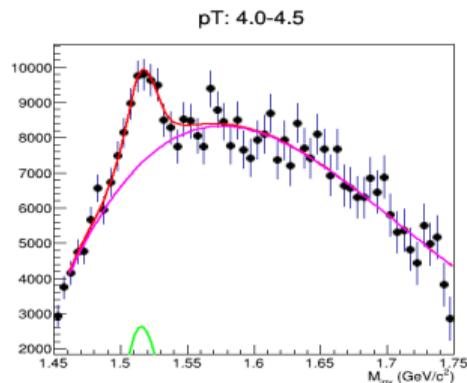
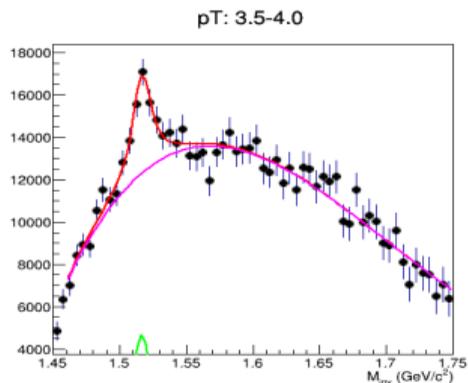
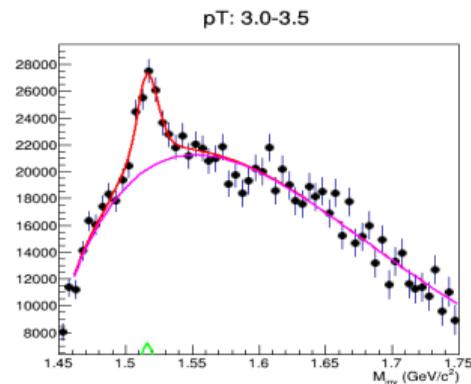
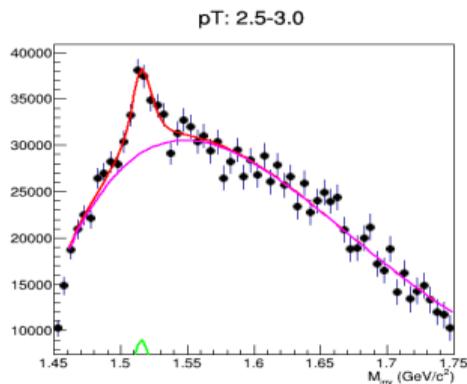
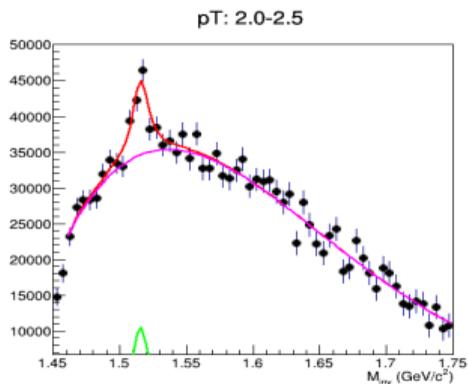
pT: 4.0-4.5



pT: 4.5-6.0

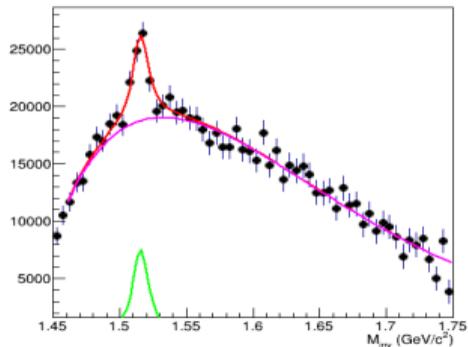


For Centrality(30-40)

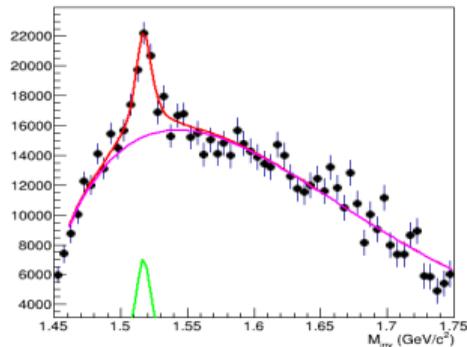


For Centrality(40-50)

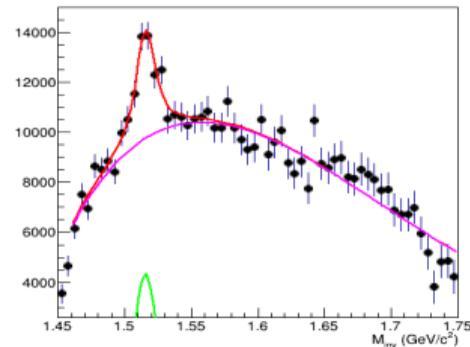
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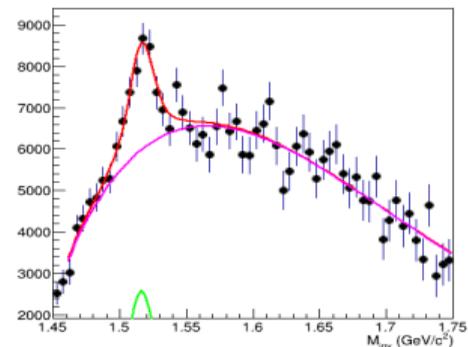
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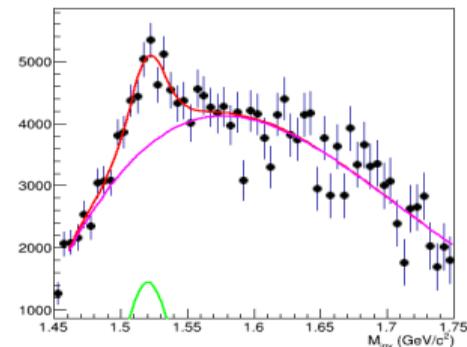
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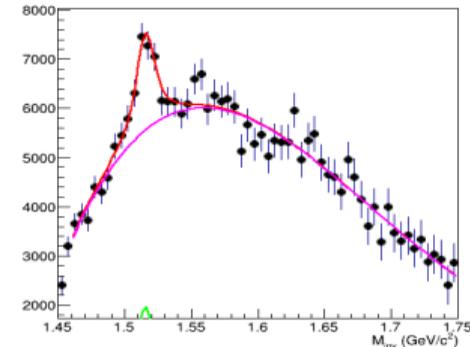
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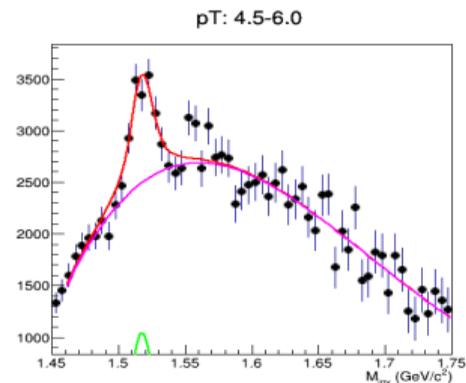
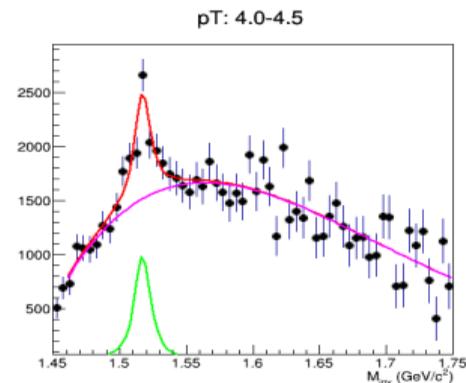
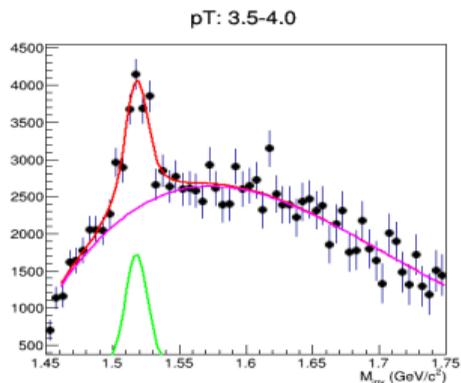
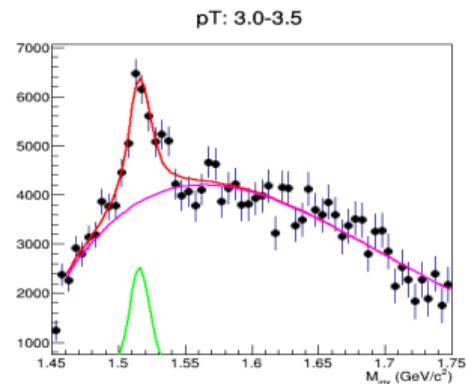
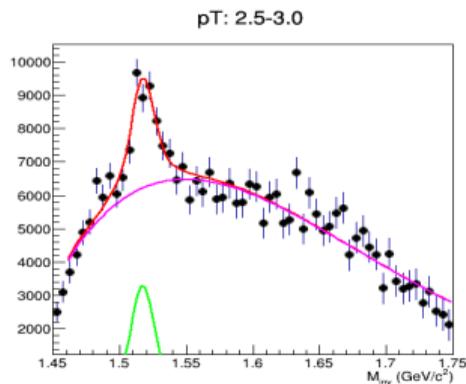
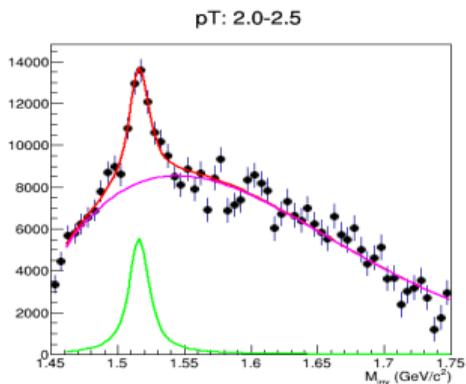
pT: 4.0-4.5



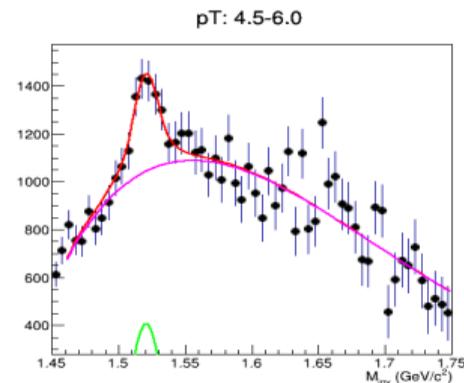
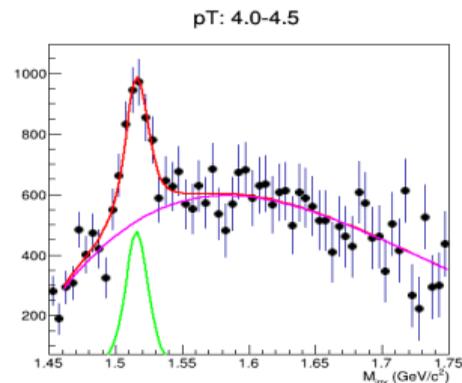
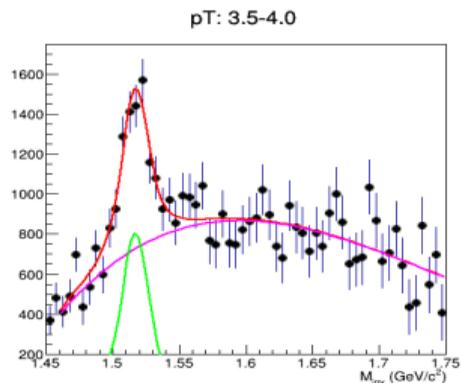
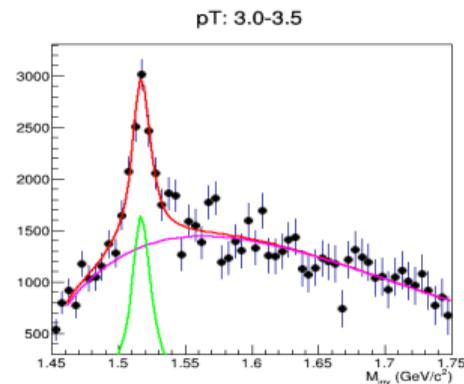
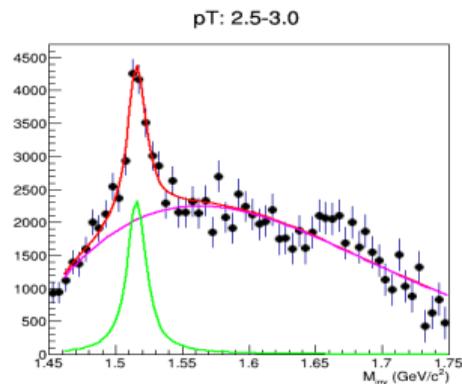
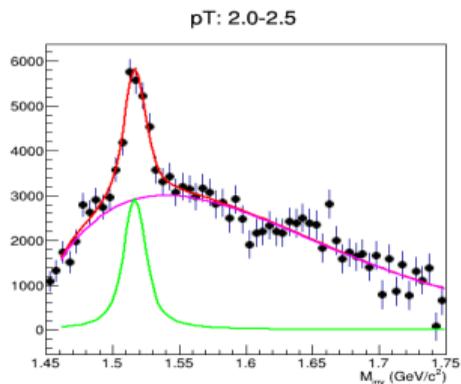
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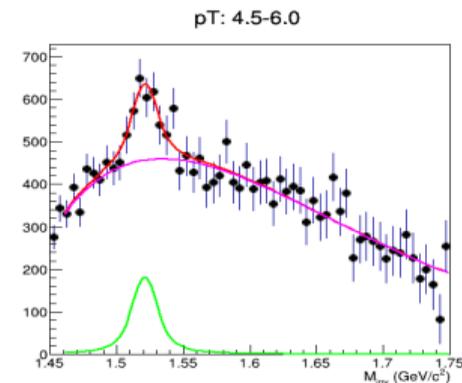
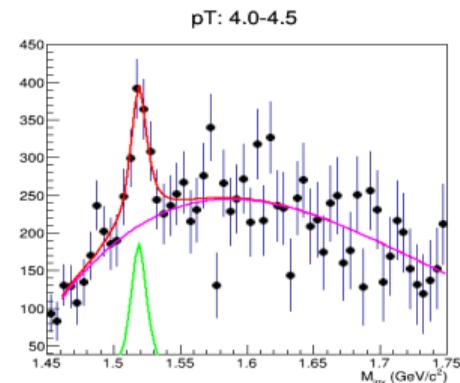
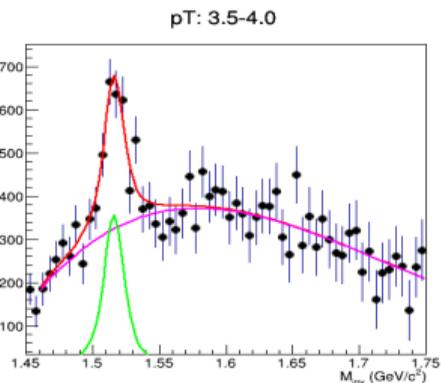
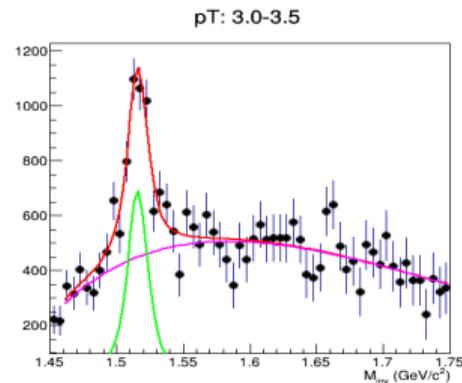
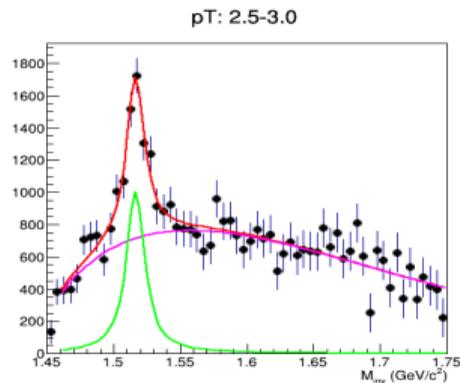
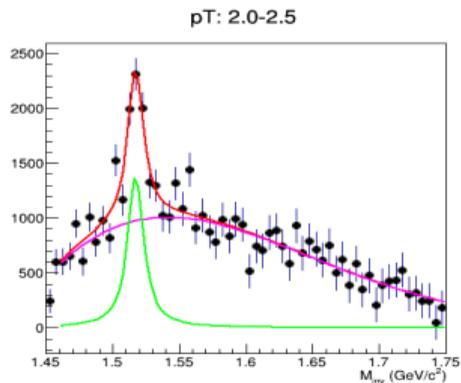
For Centrality(50-60)



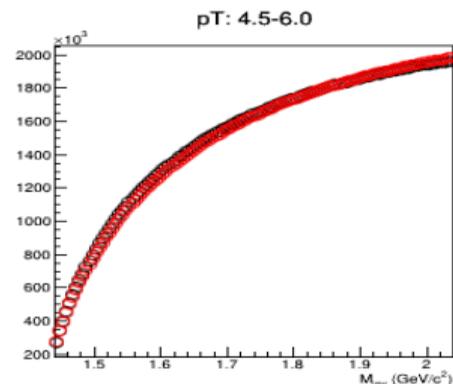
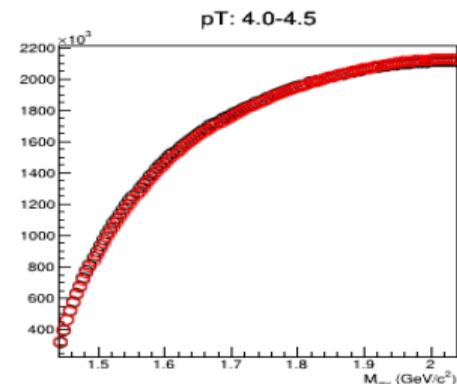
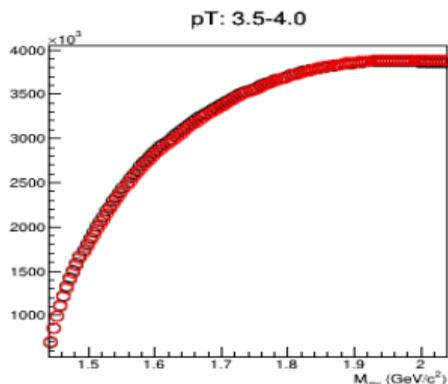
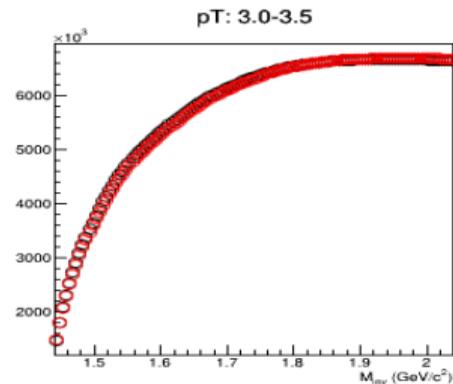
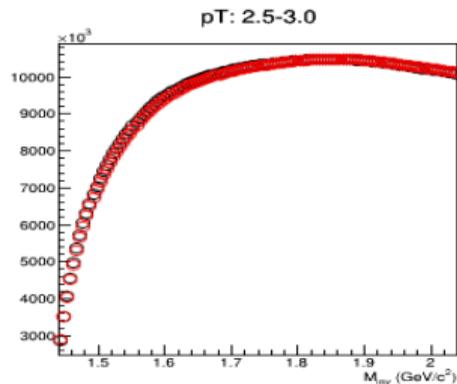
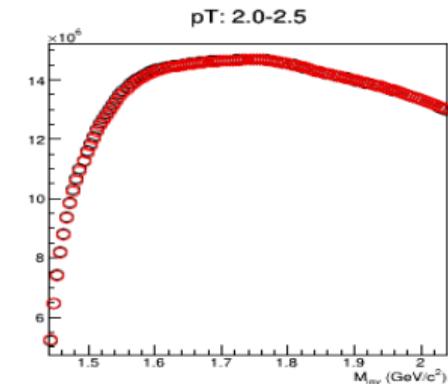
For Centrality(60-70)



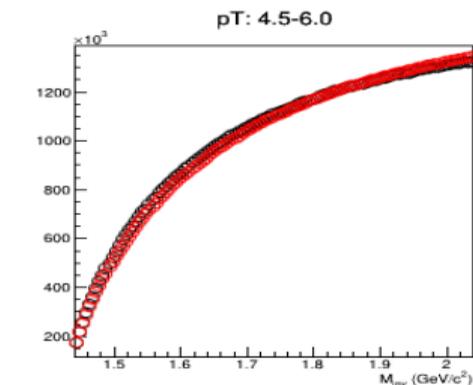
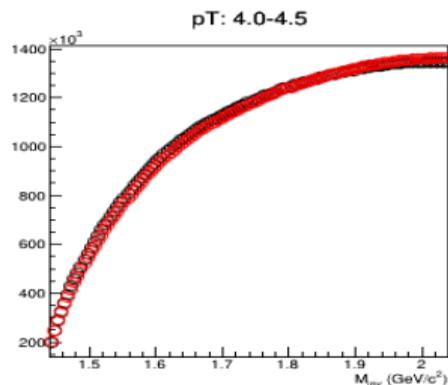
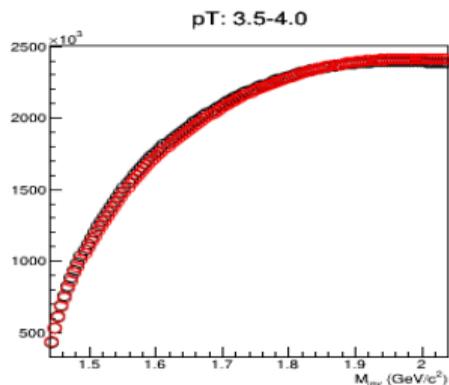
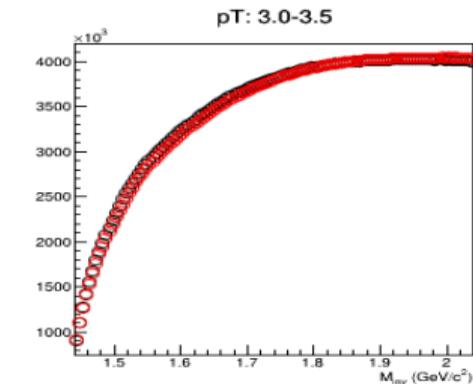
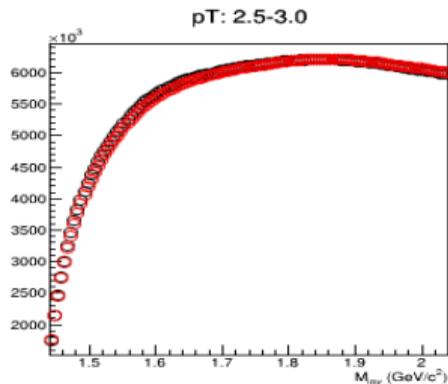
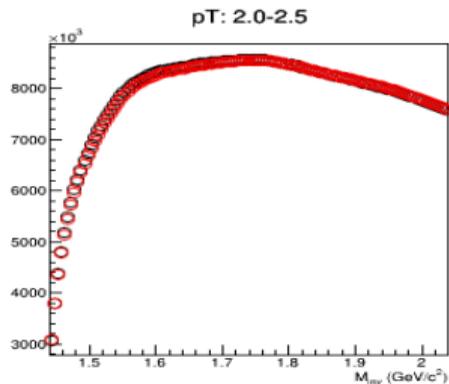
For Centrality(70-80)



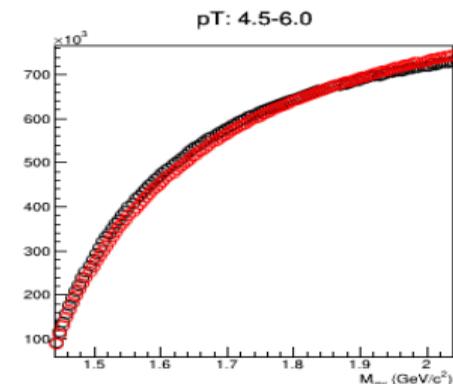
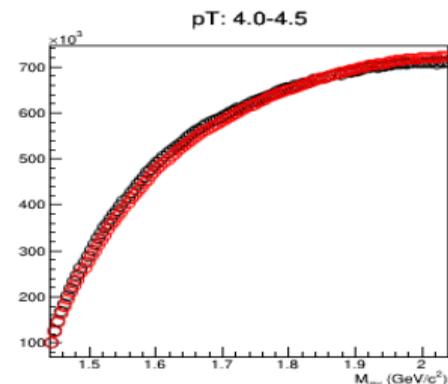
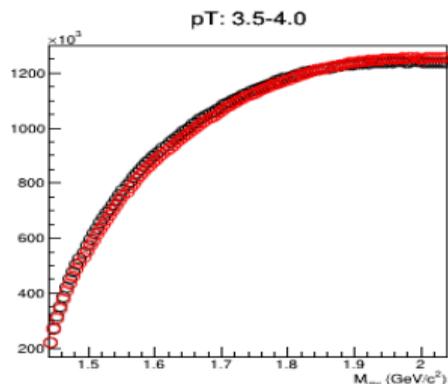
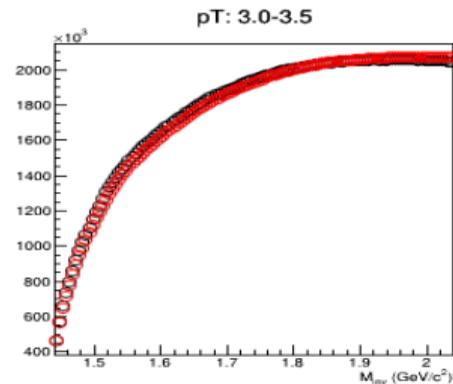
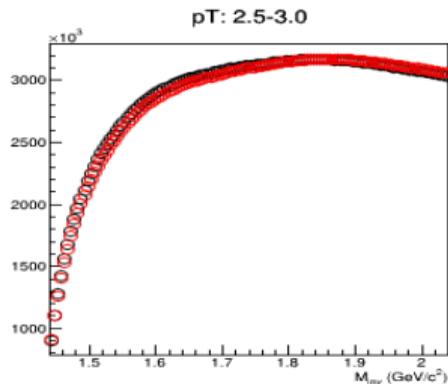
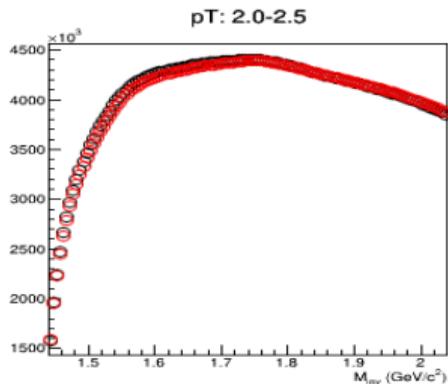
For Centrality(0-10)



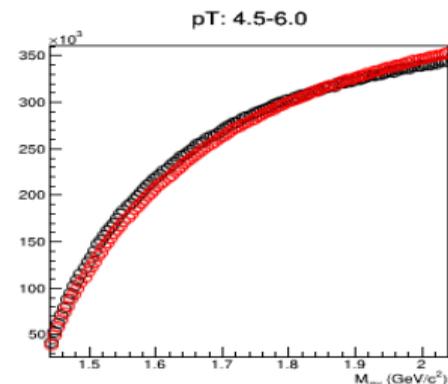
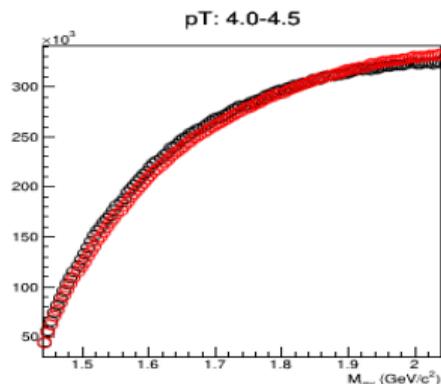
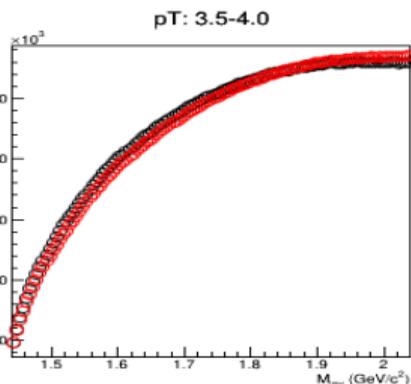
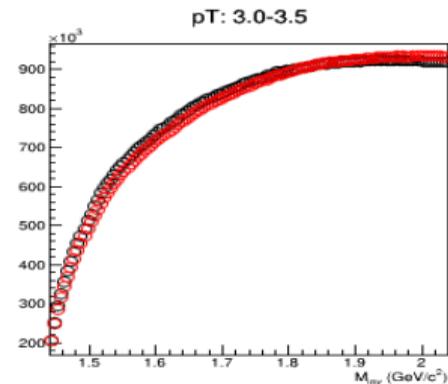
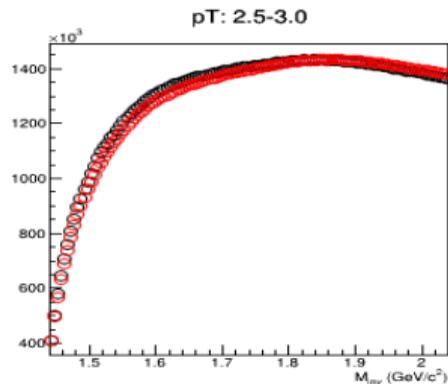
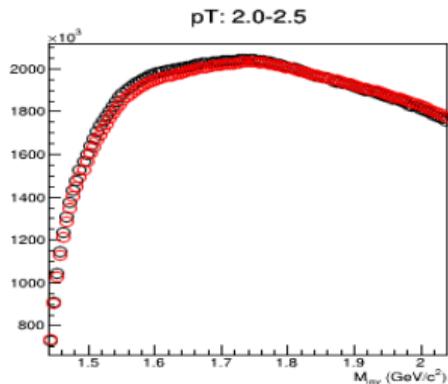
For Centrality(10-20)



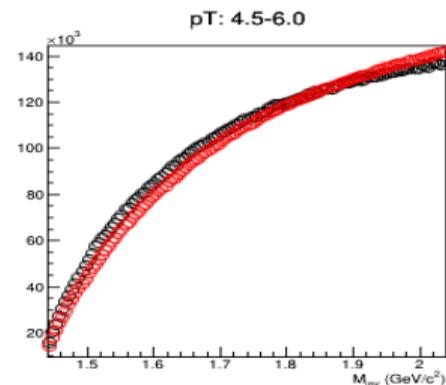
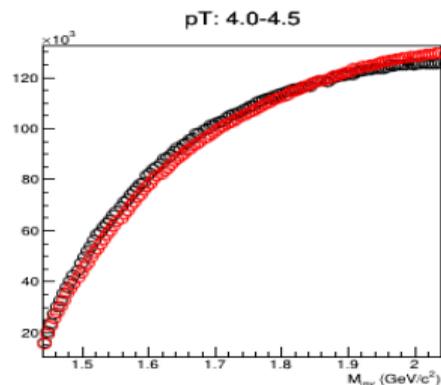
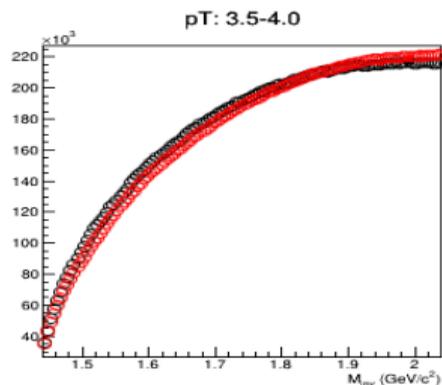
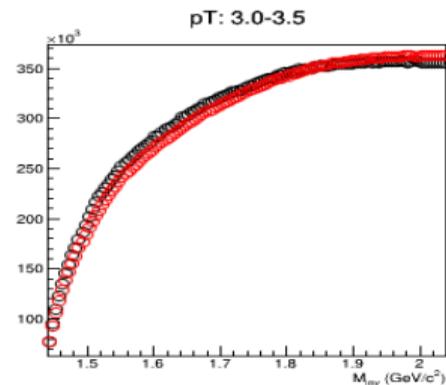
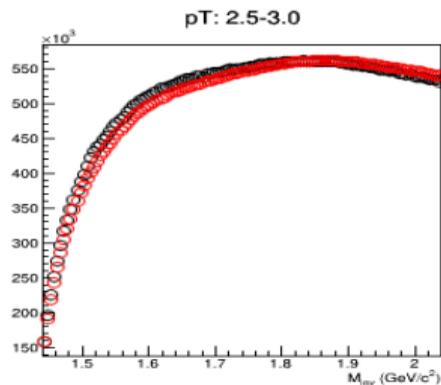
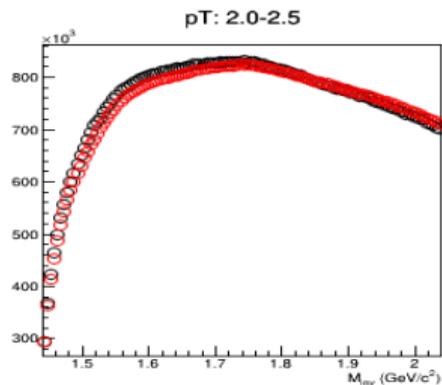
For Centrality(20-30)



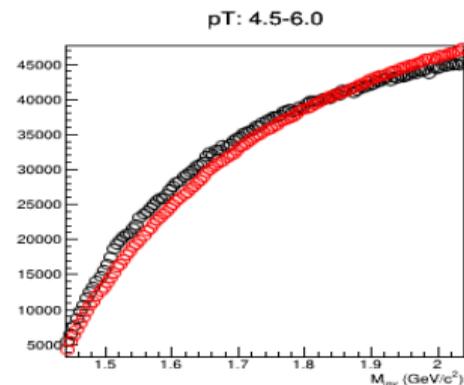
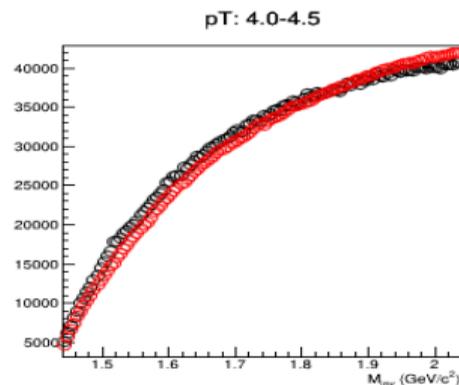
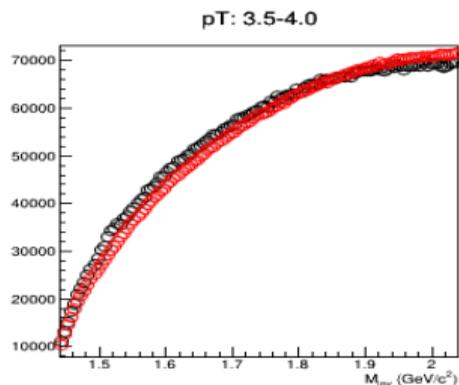
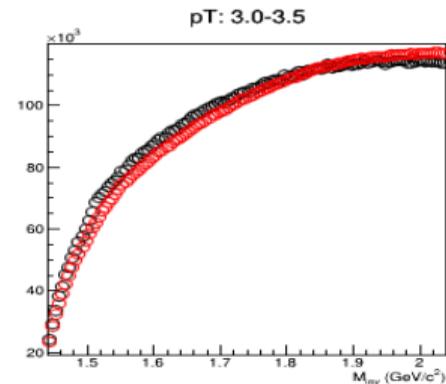
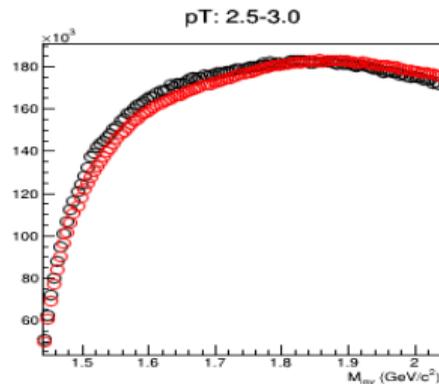
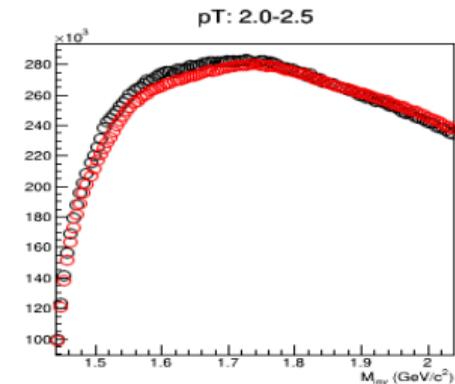
For Centrality(30-40)



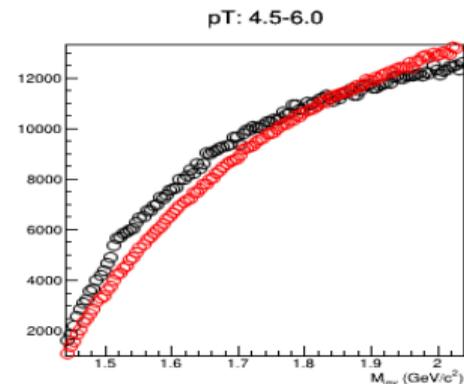
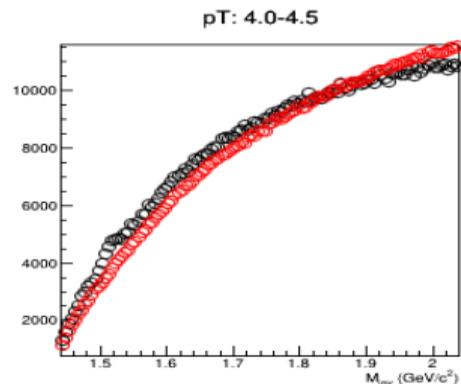
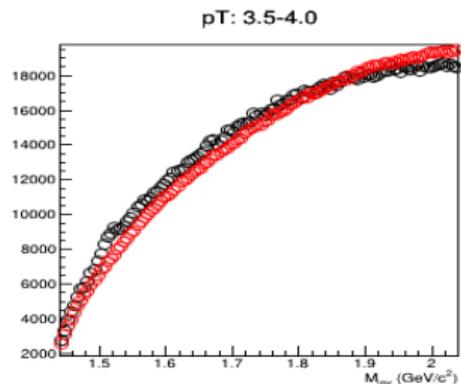
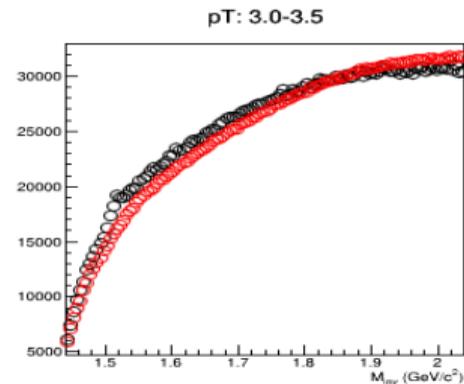
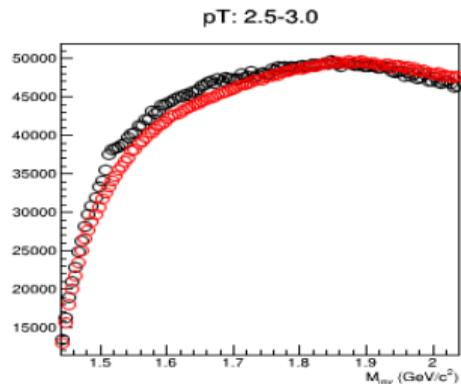
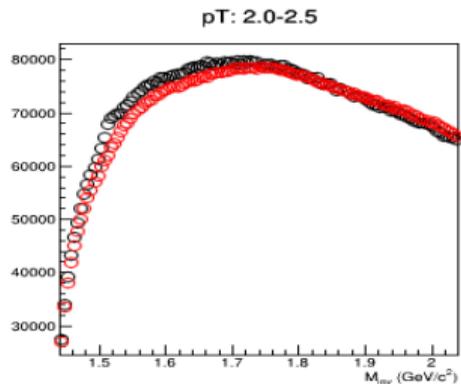
For Centrality(40-50)



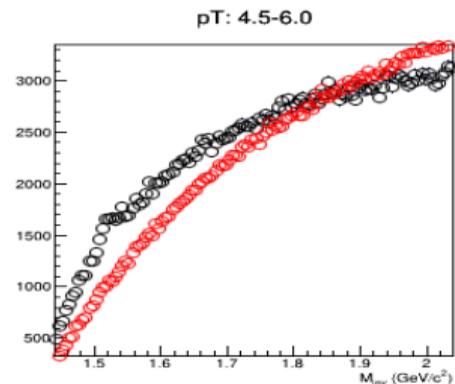
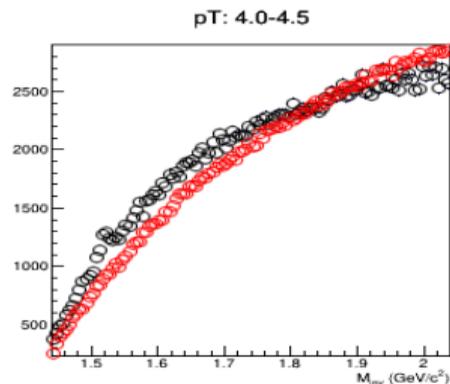
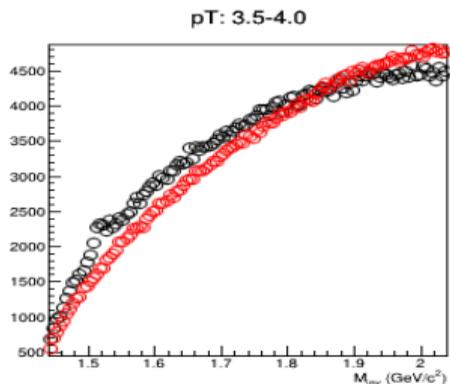
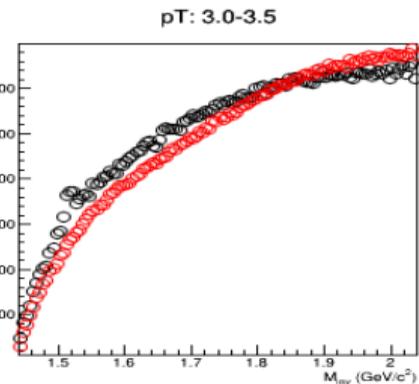
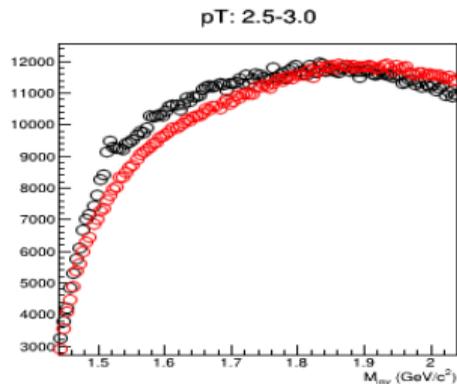
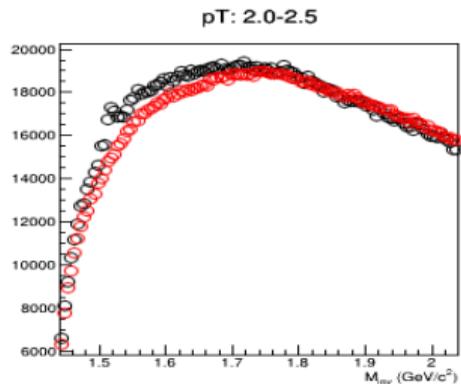
For Centrality(50-60)



For Centrality(60-70)

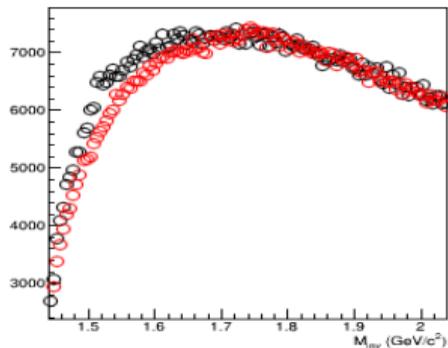


For Centrality(70-80)

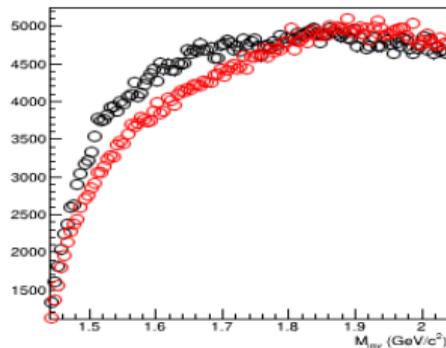


For Centrality(80-90)

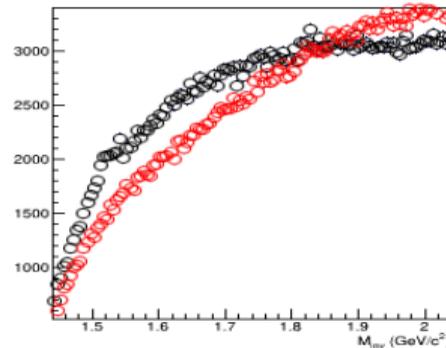
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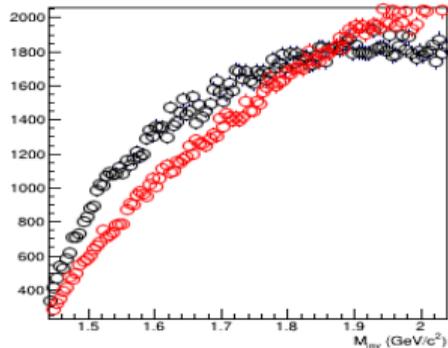
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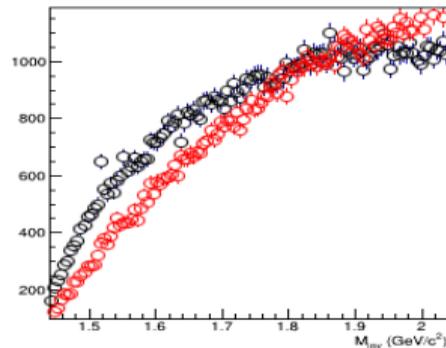
pT: 3.0-3.5



pT: 3.5-4.0



pT: 4.0-4.5



pT: 4.5-6.0

