Sphero(i)city technicalities

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Outline

- The replies to EPJC was sent and the revision version of the paper was resumited.
- Some efficiency comparison multiplicity bins vs MB case for spherocity/sphericity in three different binnings for the cuts and the percentage selection of the event shape.
- Transverse momentum spectra was obtained for data and with the corresponding efficiency and secondaries correction.

- Software
  - AliRoot: v5-08-13a-1 AliPhysics: vAN-20160716-1 ROOT: v5-34-30-alice5-alice-1
- Datasets
  - Good runs (according with RCT) LHC15f pass2
  - LHC15g3a3 (Pythia 8 - Monash 2013) anchored to LHC15f pass2
- Event selection
  - AliVEvent::kINT7, AnalysisUtils::IsSPDClusterVsTrackletBG(), IsPileupFromSPDInMultBins(), IsIncompleteDAQ()
- Vertex
  - For events with both SPD and Track vertices reconstructed, their separation along the *z*-coordinate was required to be smaller than 5 mm

- Sphero(i)city is reconstructed using more than two tracks with transverse momentum greater than 0.15 GeV/c and within $|\eta| < 0.8$. Three sets 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 which satisfy GetStandardTPCOnlyTrackCuts()+TPCrefit). More details can be found here:

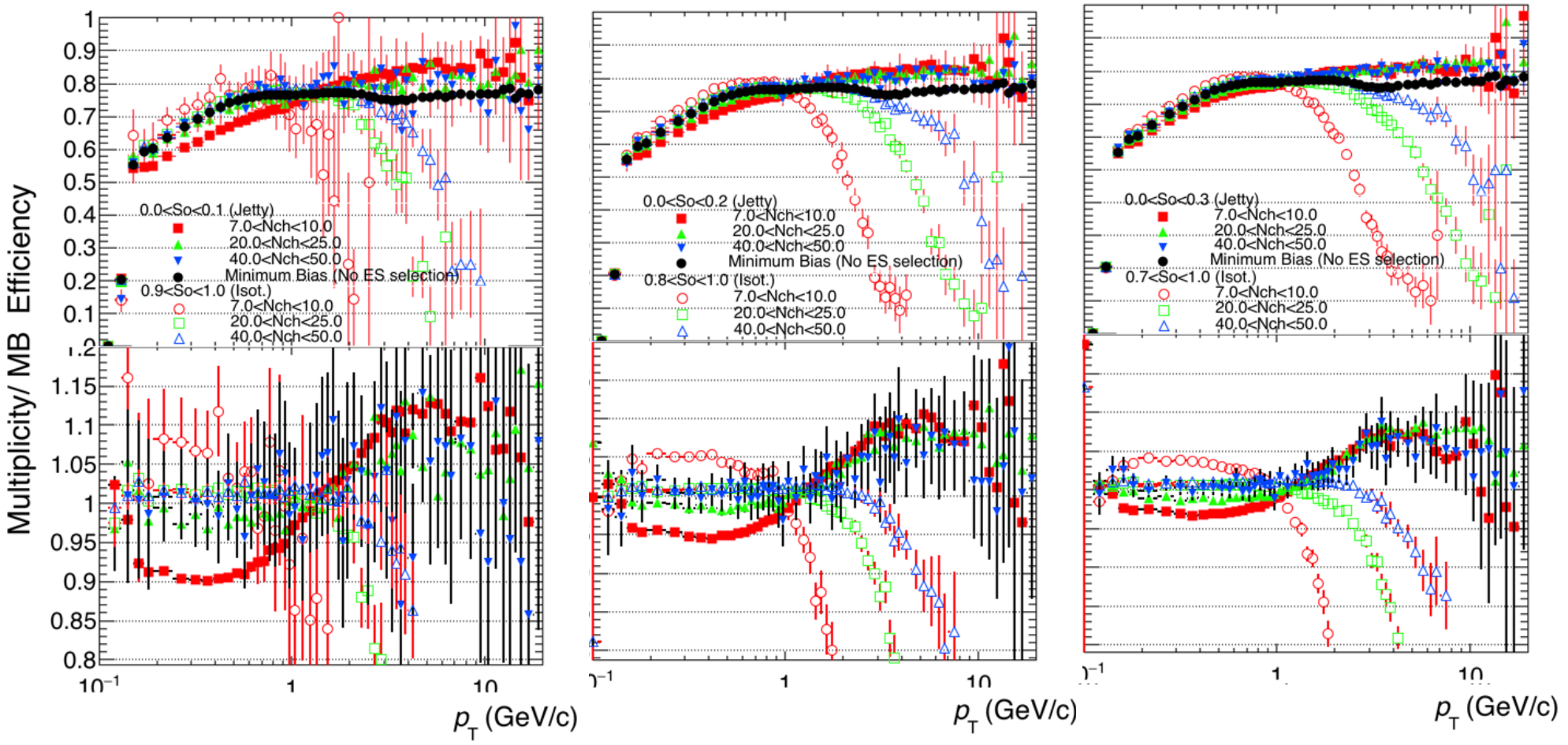
  https://aliceinfo.cern.ch/Notes/node/529
- In this presentation, results for the reference estimator are discussed
  - **GetReferenceMultiplicity(fESD, AliESDtrackCuts::kTrackletsITSTPC, 0.8)**

For three different Event Shape binnings and percentiles

- BinA= {0.0,0.1,0.4,0.9,1.0}; BinApc= {0.0,10.0,40.0,90.0,100.0};
- BinB= {0.0,0.2,0.4,0.8,1.0}; BinBpc= {0.0,10.0,40.0,90.0,100.0};
- BinC= {0.0,0.3,0.4,0.7,1.0}; BinCpc= {0.0,10.0,40.0,90.0,100.0};

For three different SPHEROCITY binnings

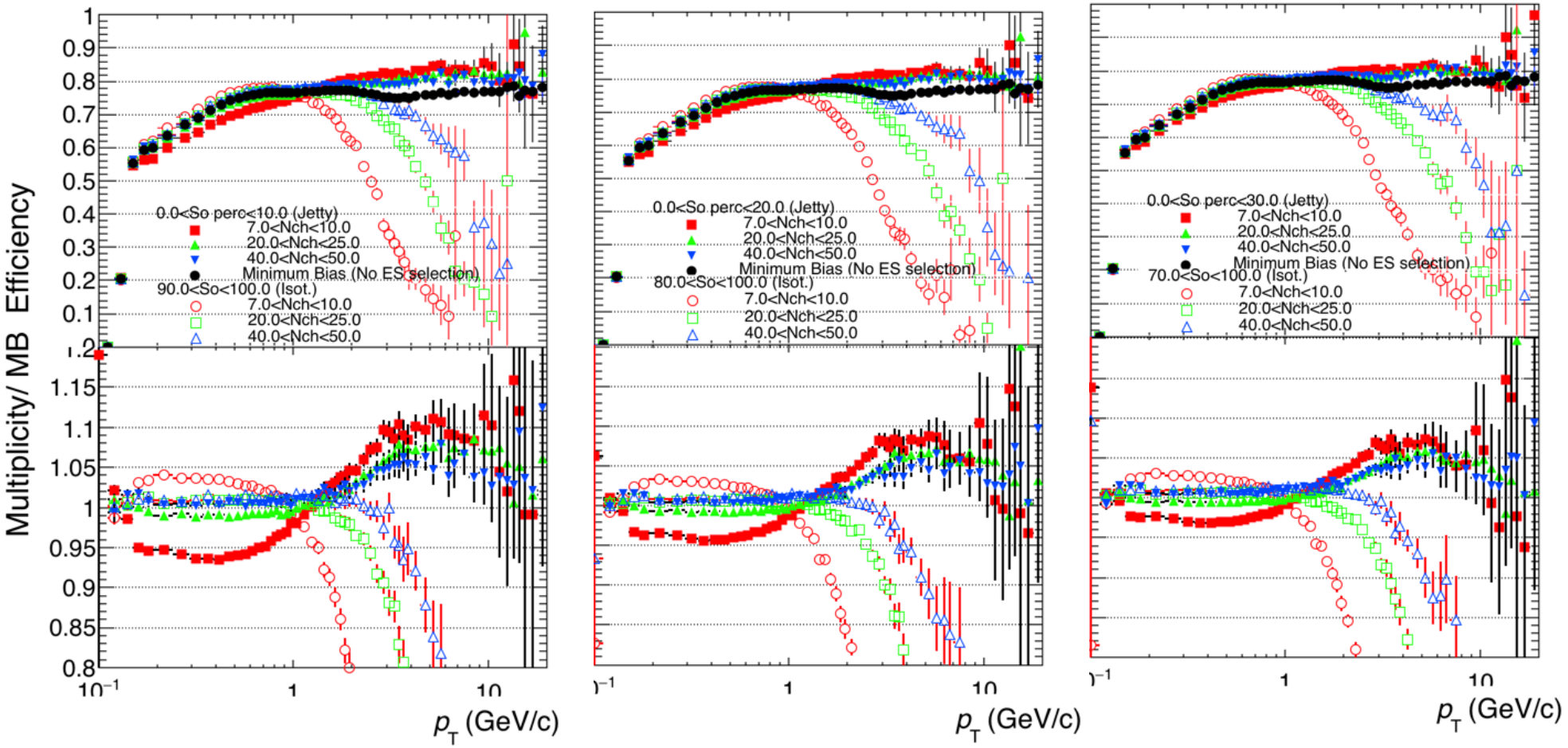
- BinA= {0.0,0.1,0.4,0.9,1.0};
- BinB= {0.0,0.2,0.4,0.8,1.0};
- BinC= {0.0,0.3,0.4,0.7,1.0};



For three different SPHEROCITY percentiles

- BinA= {0.0,10.0,40.0,90.0,100.0};
- BinB= {0.0,20.0,40.0,80.0,100.0};
- BinC= {0.0,30.0,40.0,70.0,100.0};

Better statistics for percentiles



For three different SPHERICITY binnings

- BinA= {0.0,0.1,0.4,0.9,1.0};
- BinB= {0.0,0.2,0.4,0.8,1.0};
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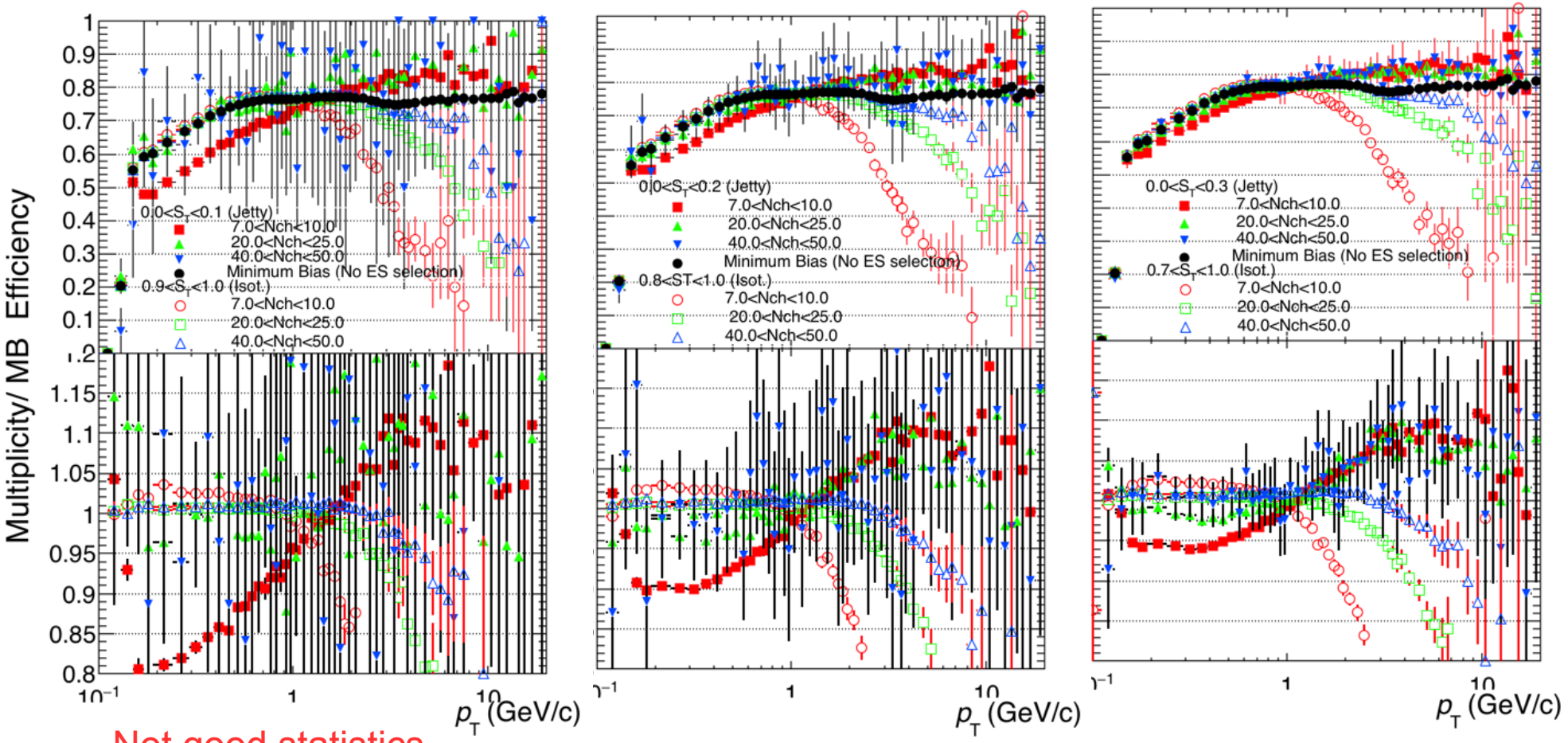
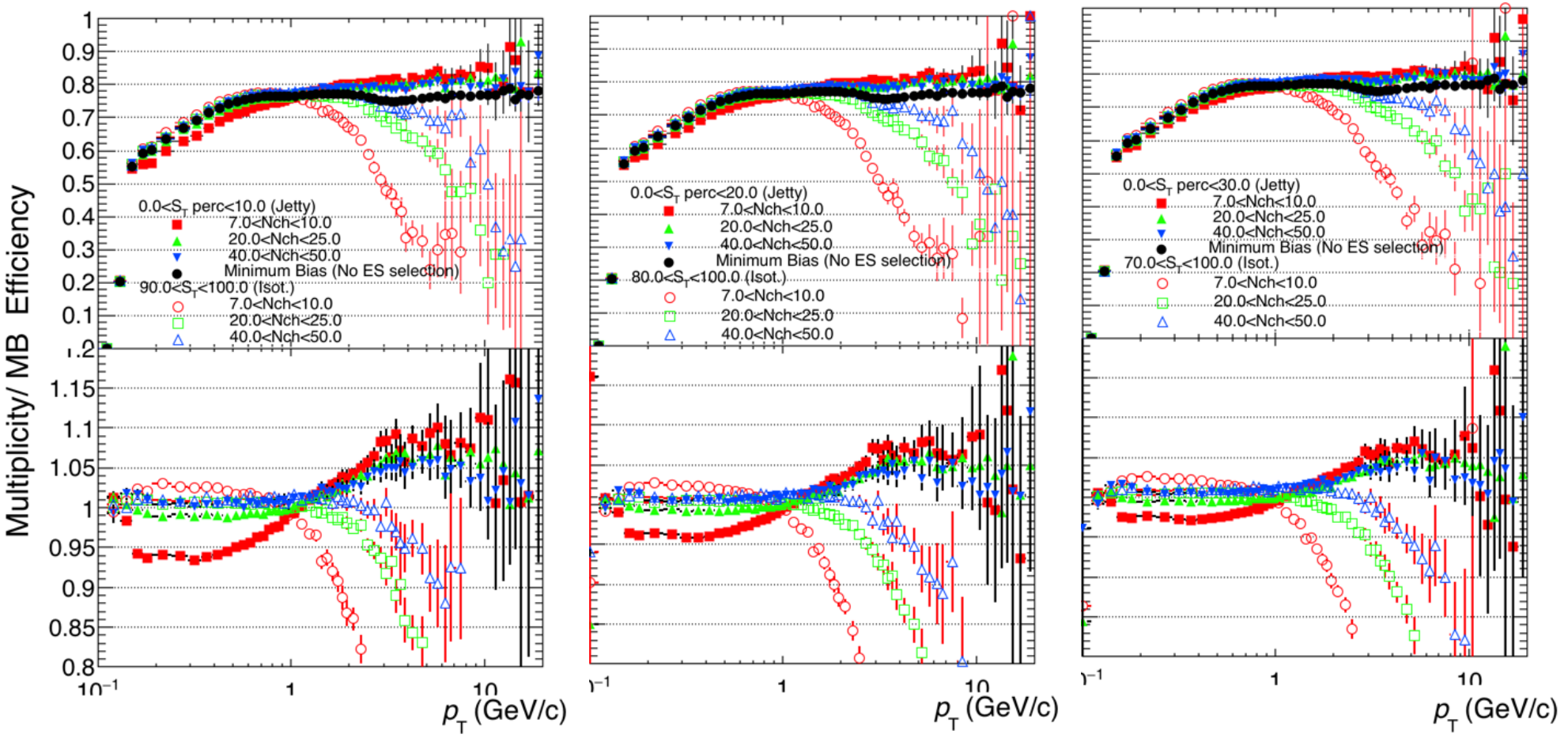


Not good statistics
for small binning

For three different SPHERICITY percentiles

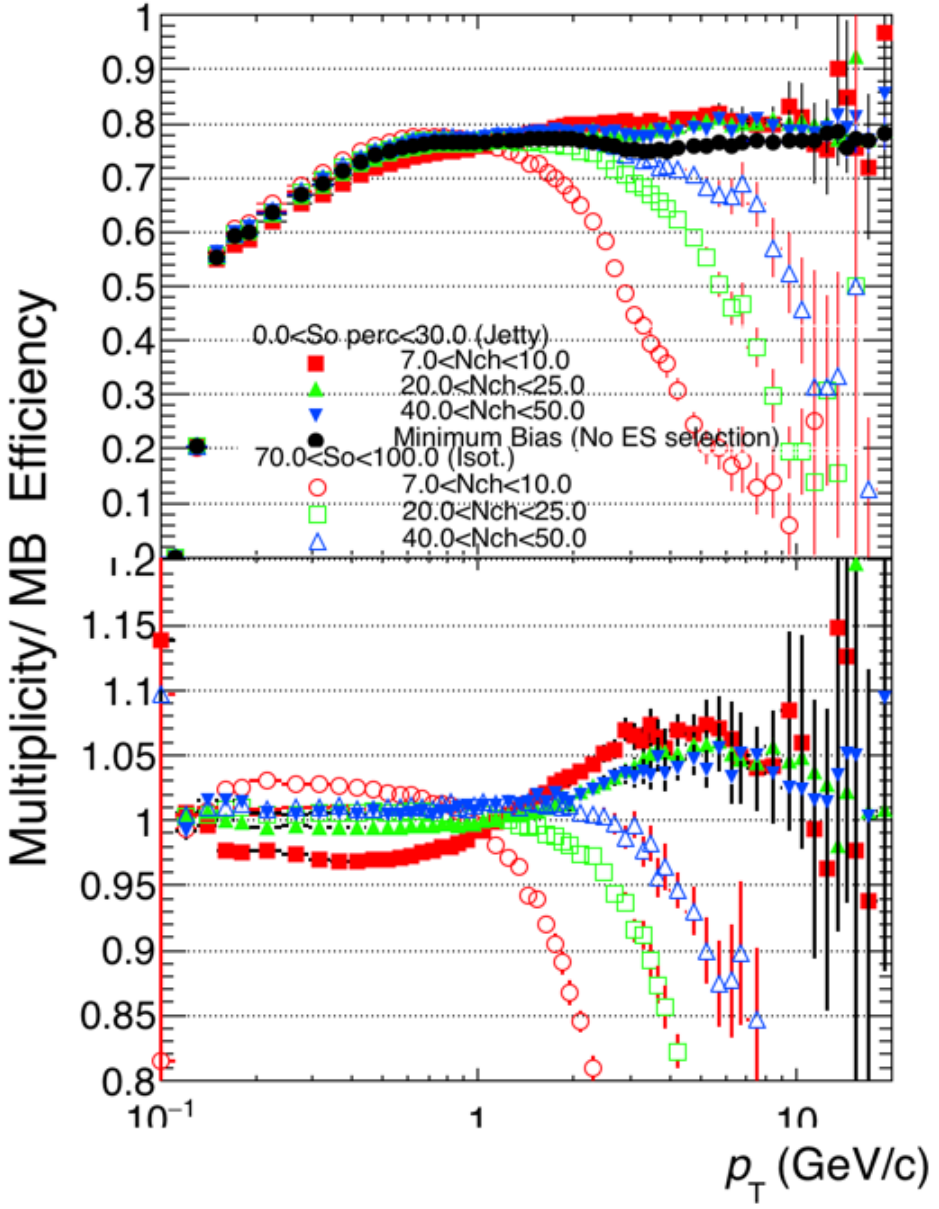
- BinA= {0.0,10.0,40.0,90.0,100.0};
- BinB= {0.0,20.0,40.0,80.0,100.0};
- BinC= {0.0,30.0,40.0,70.0,100.0};

Better statistics for percentiles

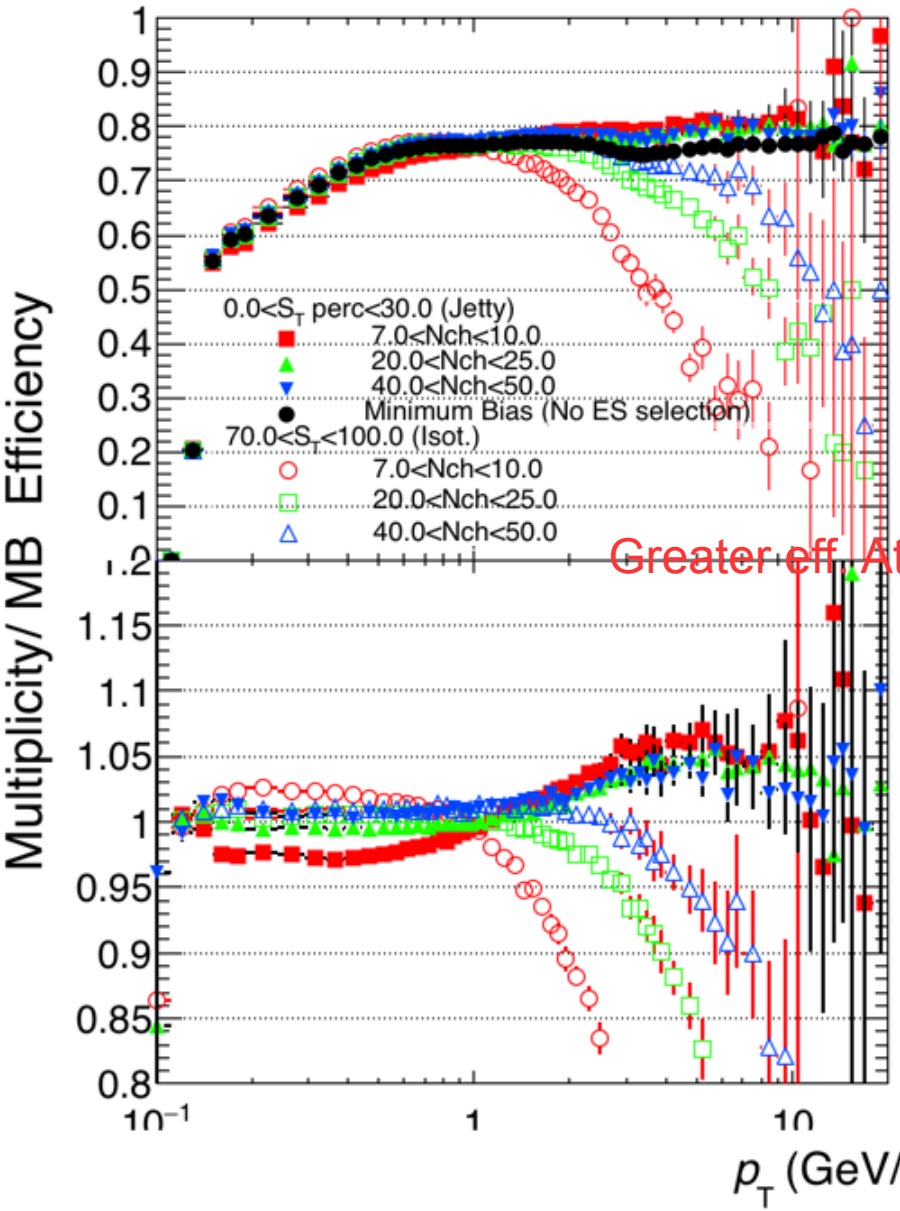


Comparison for percentile bins with best statistics.

SPHEROCITY

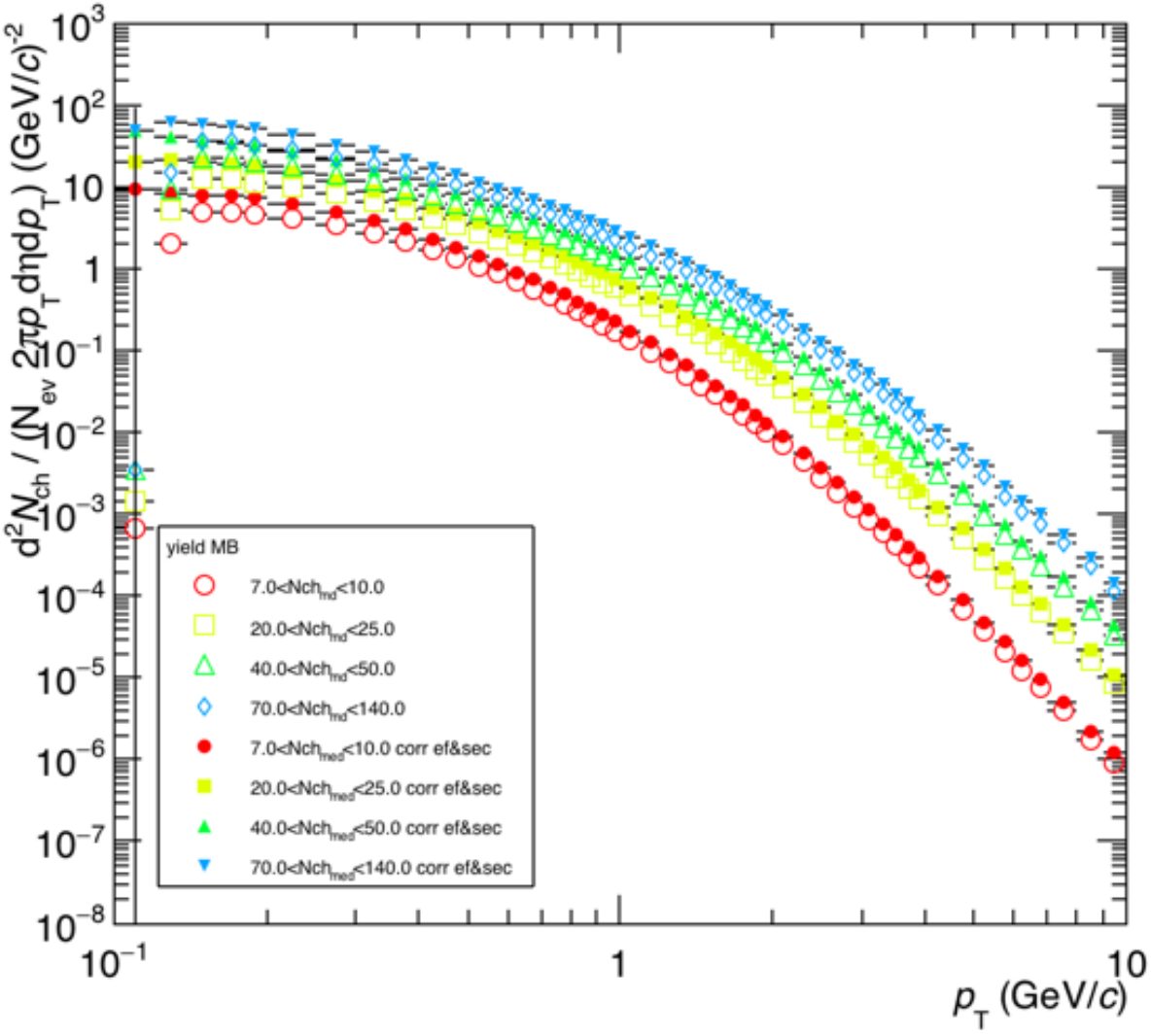


SPHERICITY



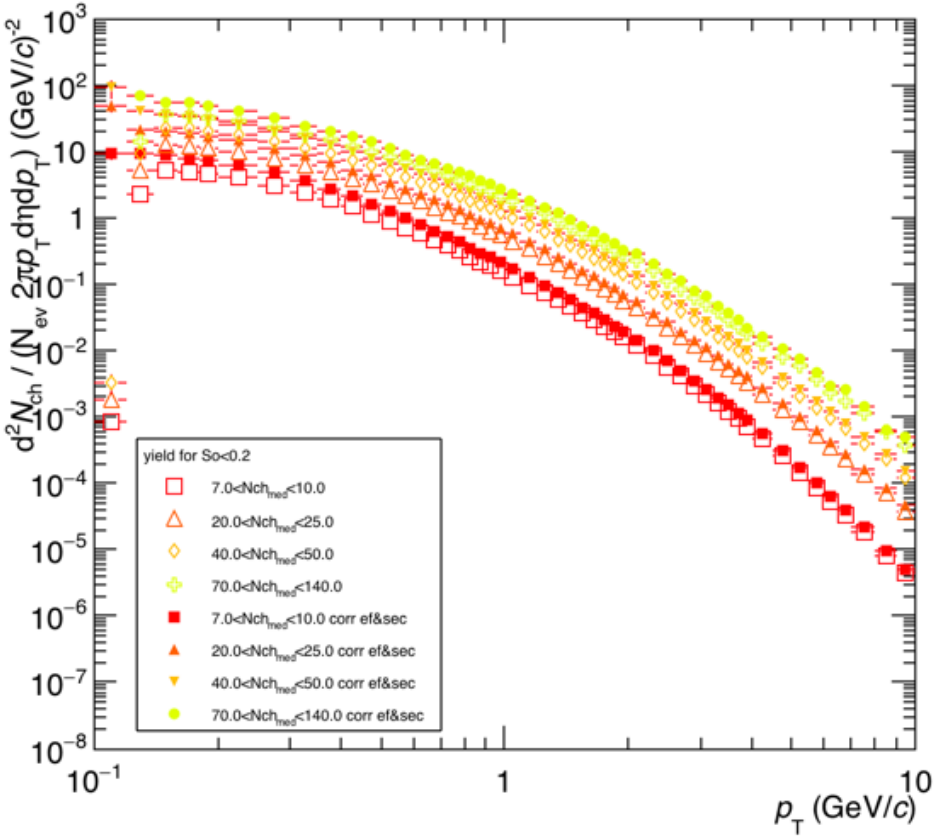
Greater eff. At high p_T

The spectra for the charge particles raw and corrected by efficiency and secondaries for MB.

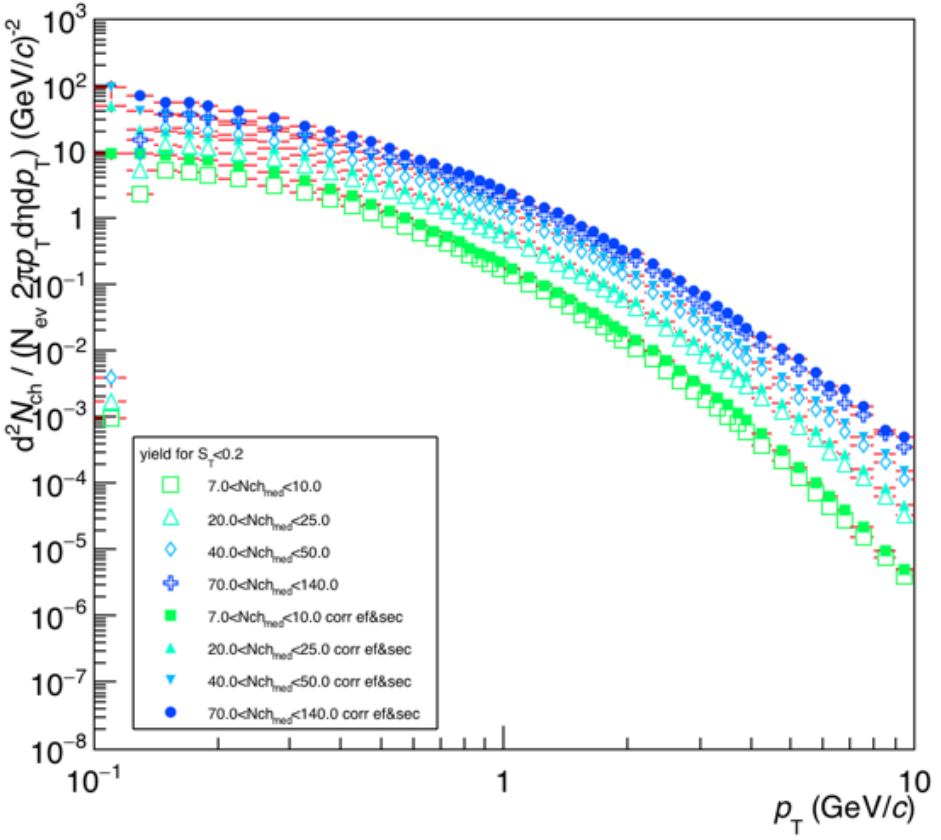


The spectra for jetty charge particles raw and corrected by secondaries and efficiency (jetty efficiency).

- Selected with SPHEROCITY

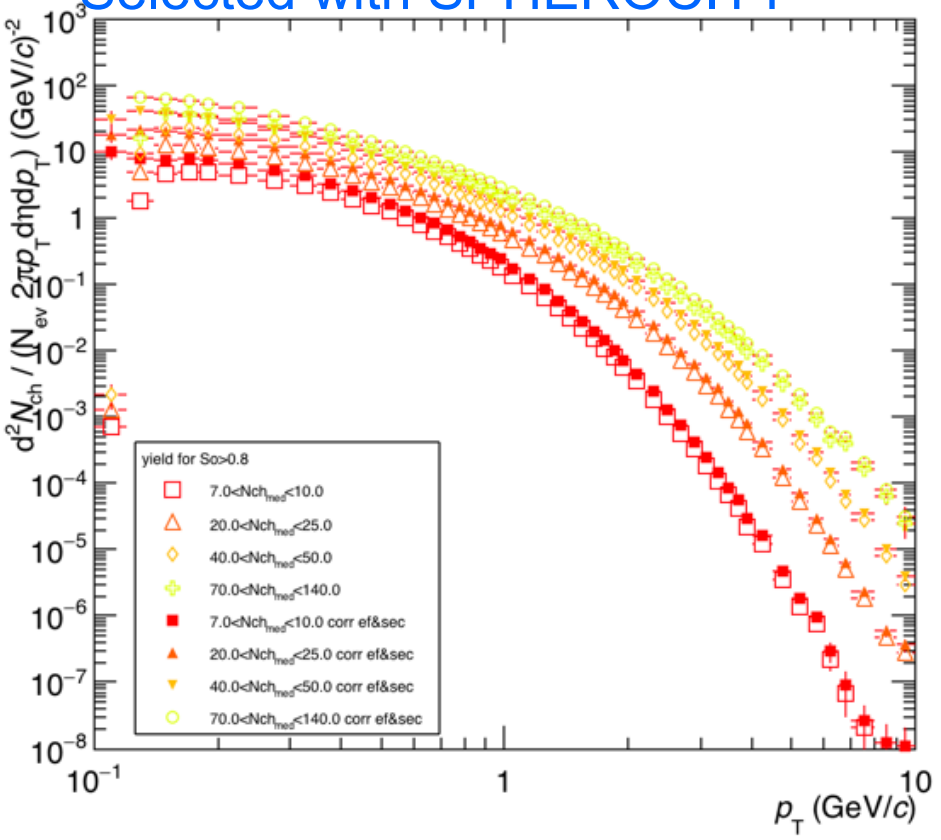


Selected with SPHERICITY

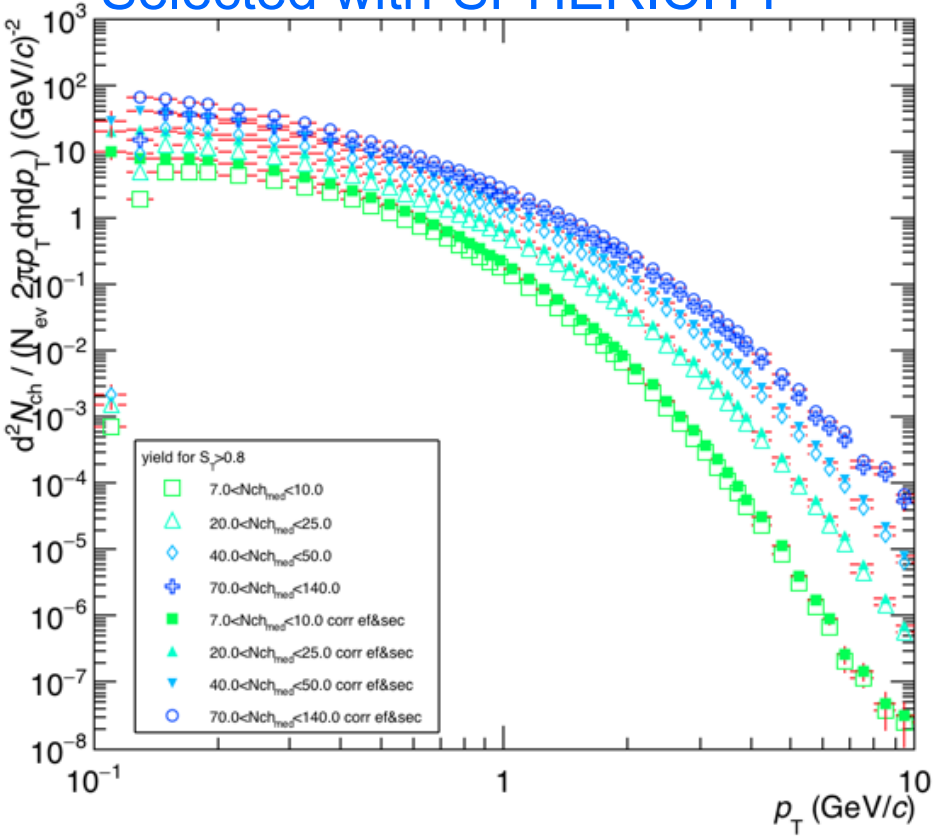


The spectra for isotropic charge particles raw and corrected by secondaries and efficiency.

- Selected with SPHEROCITY



Selected with SPHERICITY



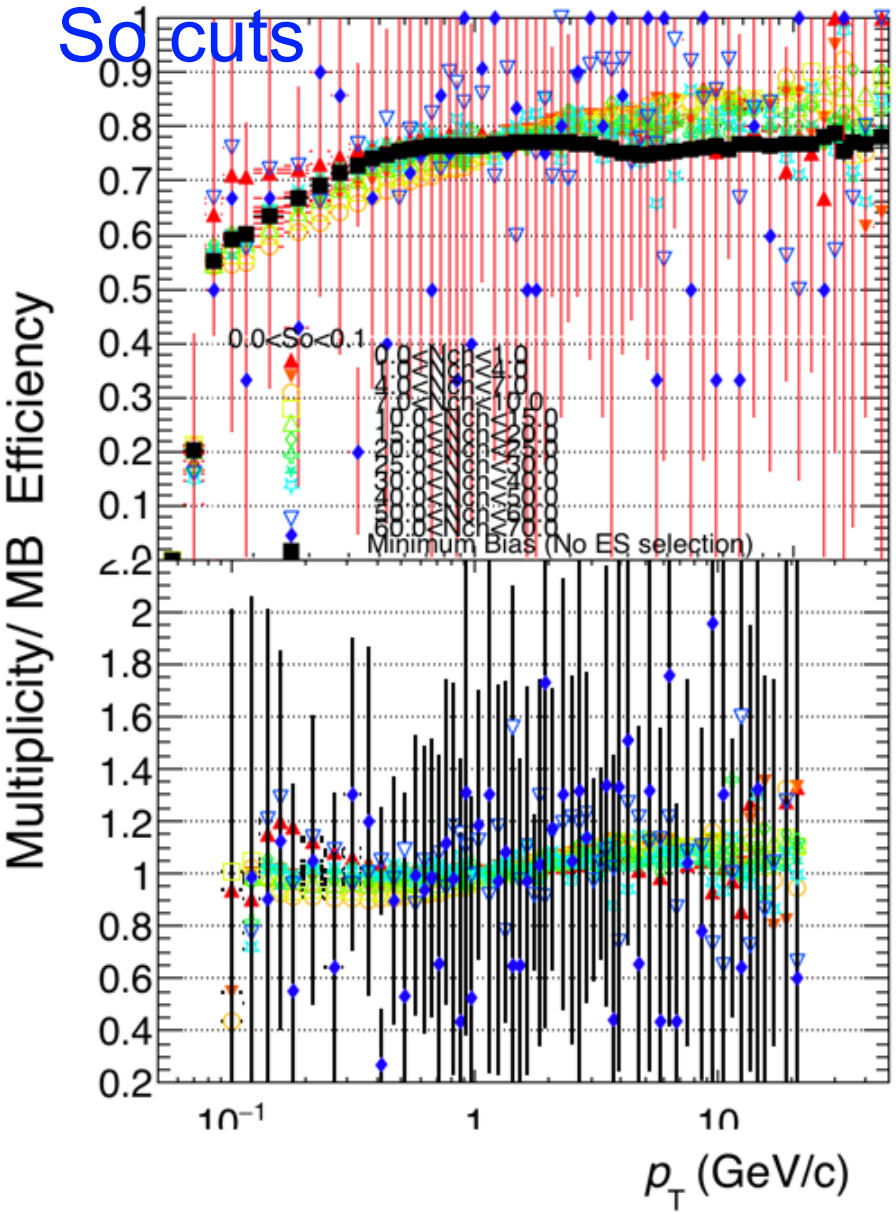
Conclusions

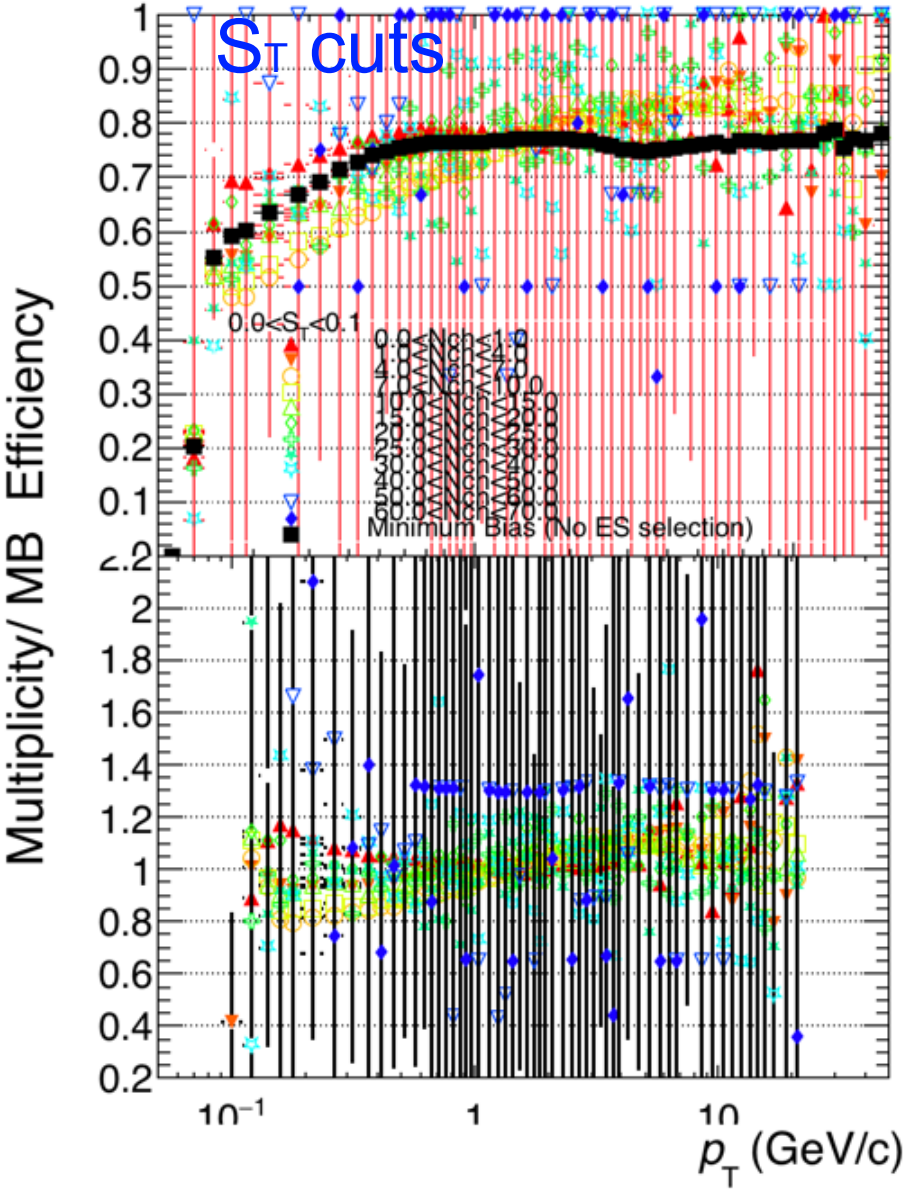
- Efficiency for jetty events is better than for isotropic ones.
- Jetty events efficiency different than MB sample, but no mult dependence.
- For Isotropic and dN/deta >31 and pt<3 GeVs there' s no multiplicity dependence.
- selecting in percentage is less noisy by statistics.
- binning C has better statistics.

Thank you!

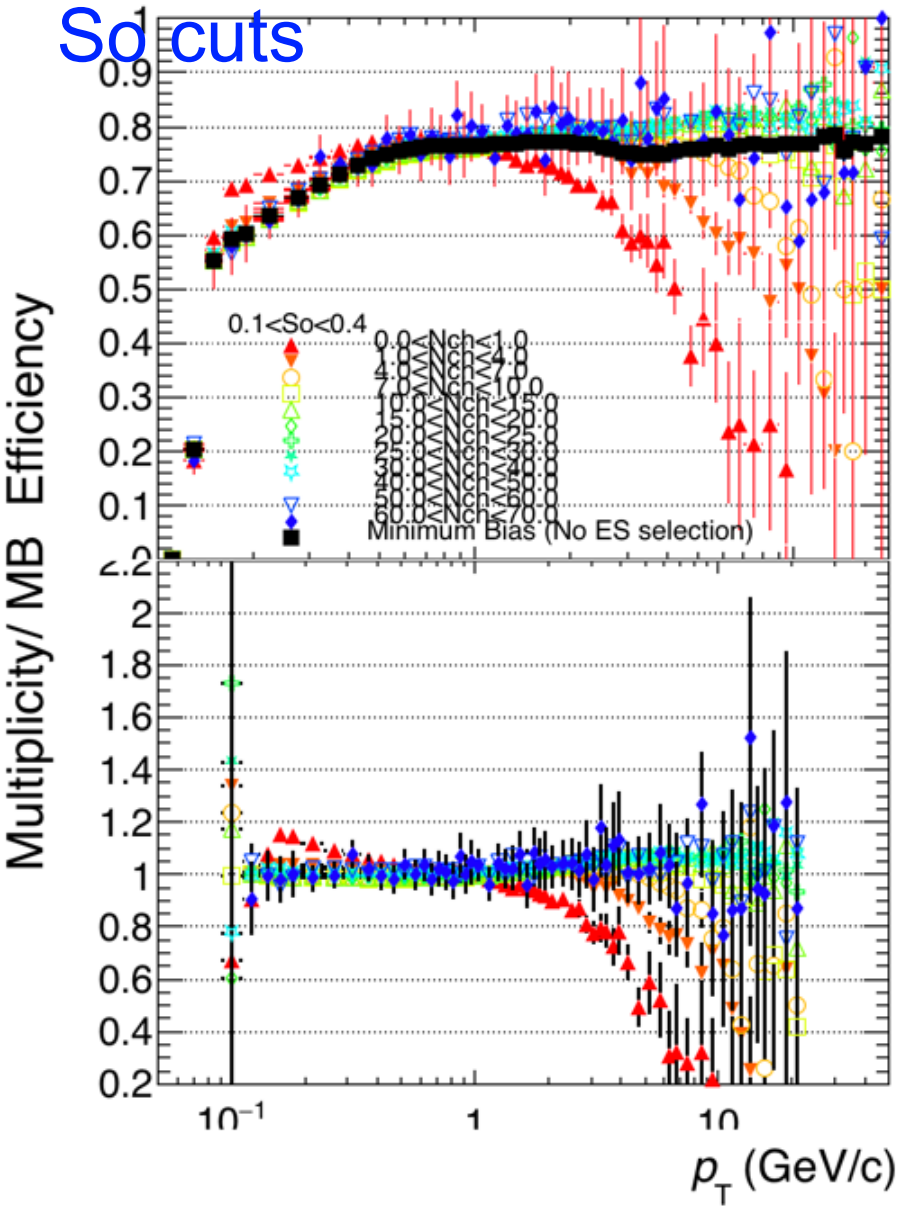
Backup

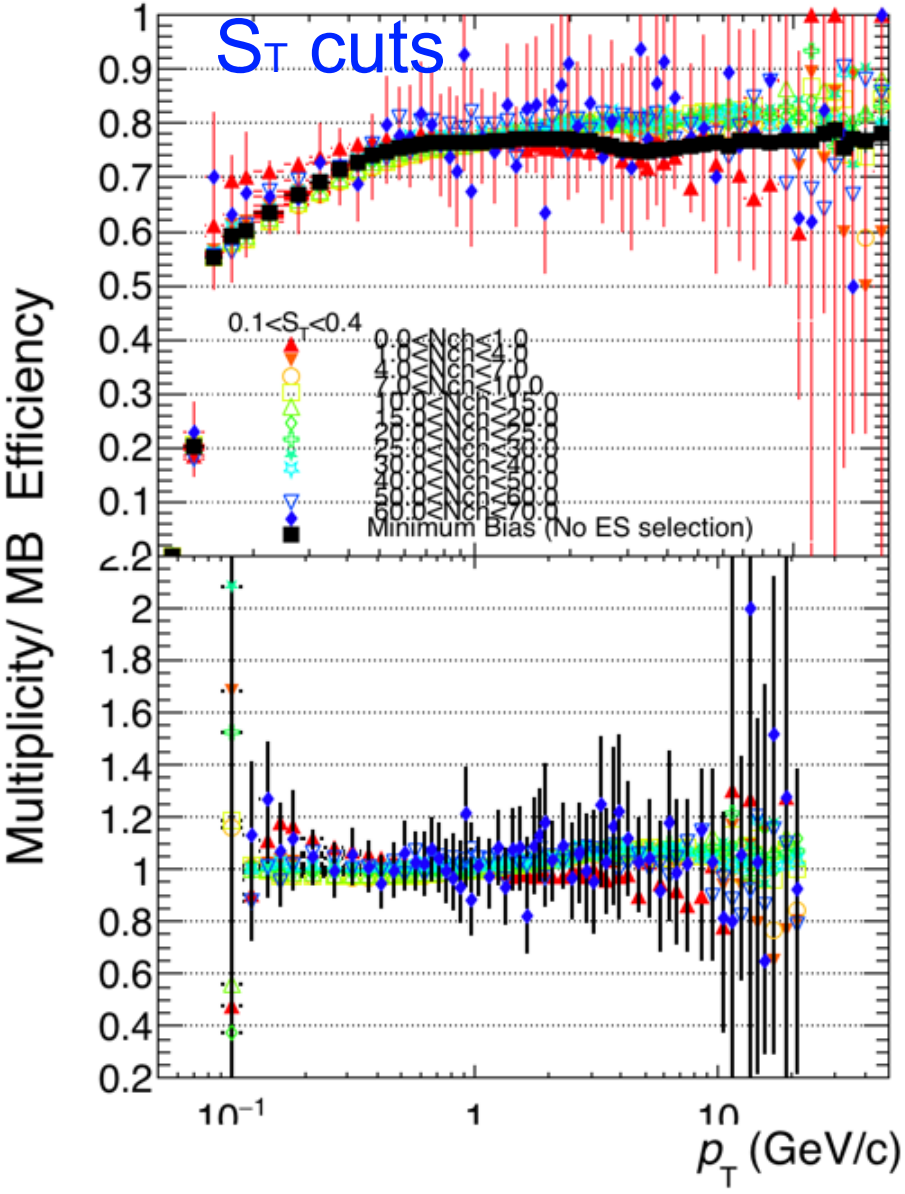
Spherocity Bin A Sphericity



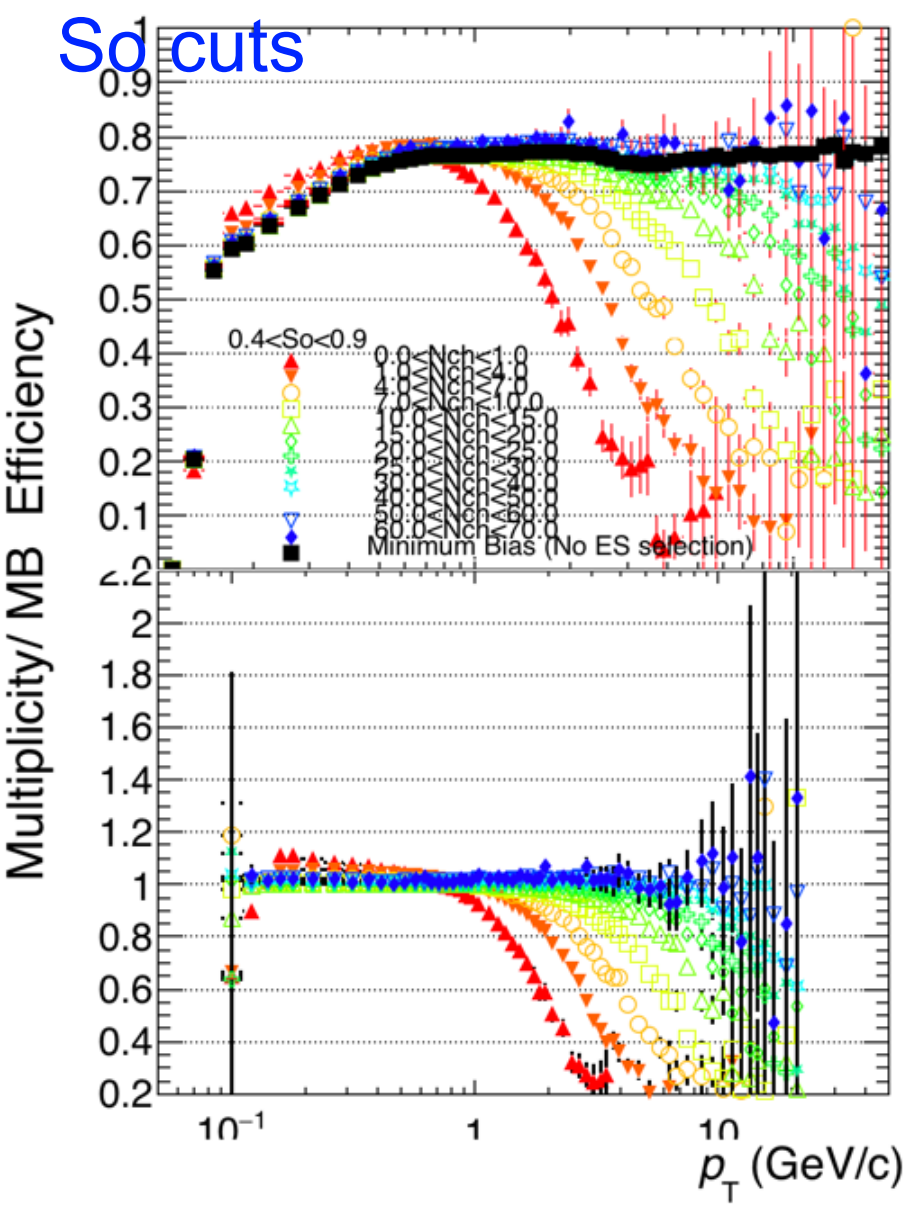


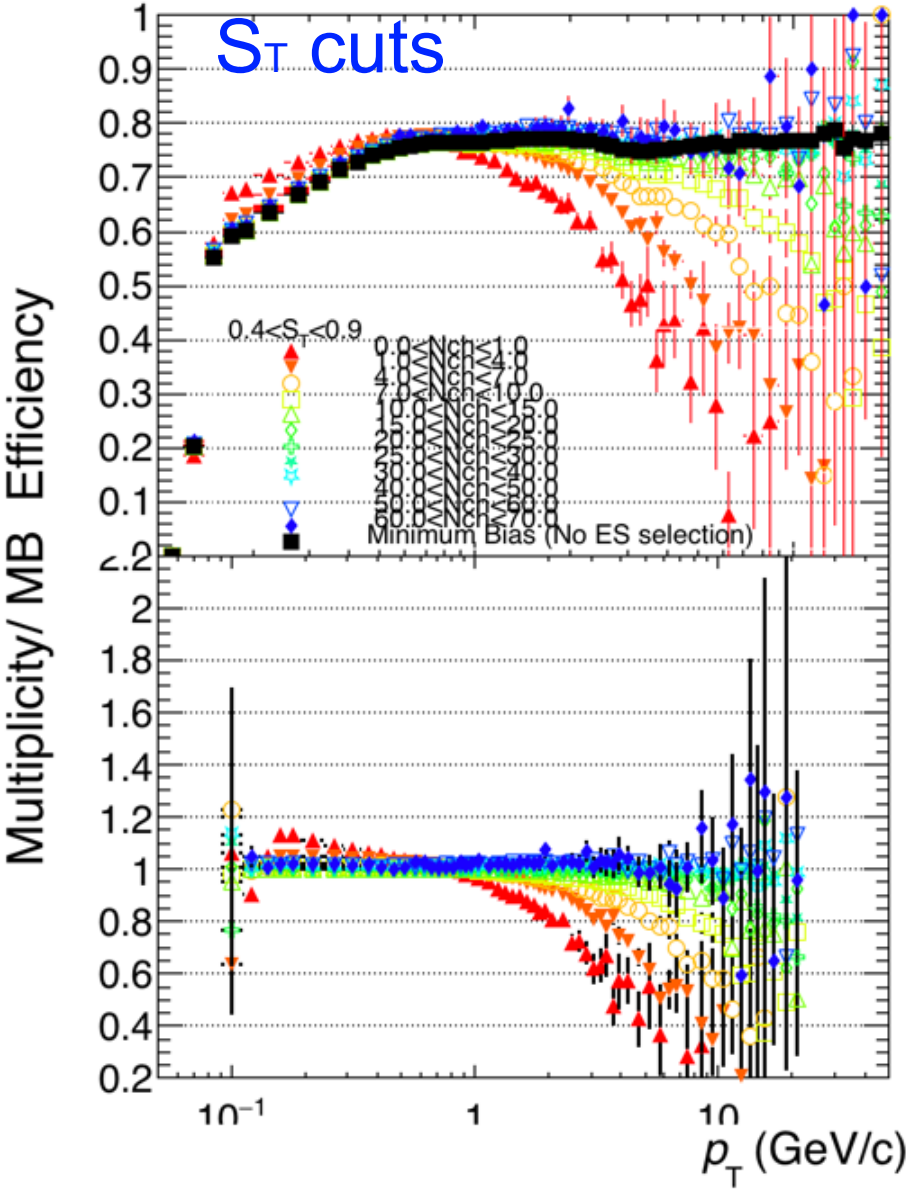
Spherocity Bin A Sphericity



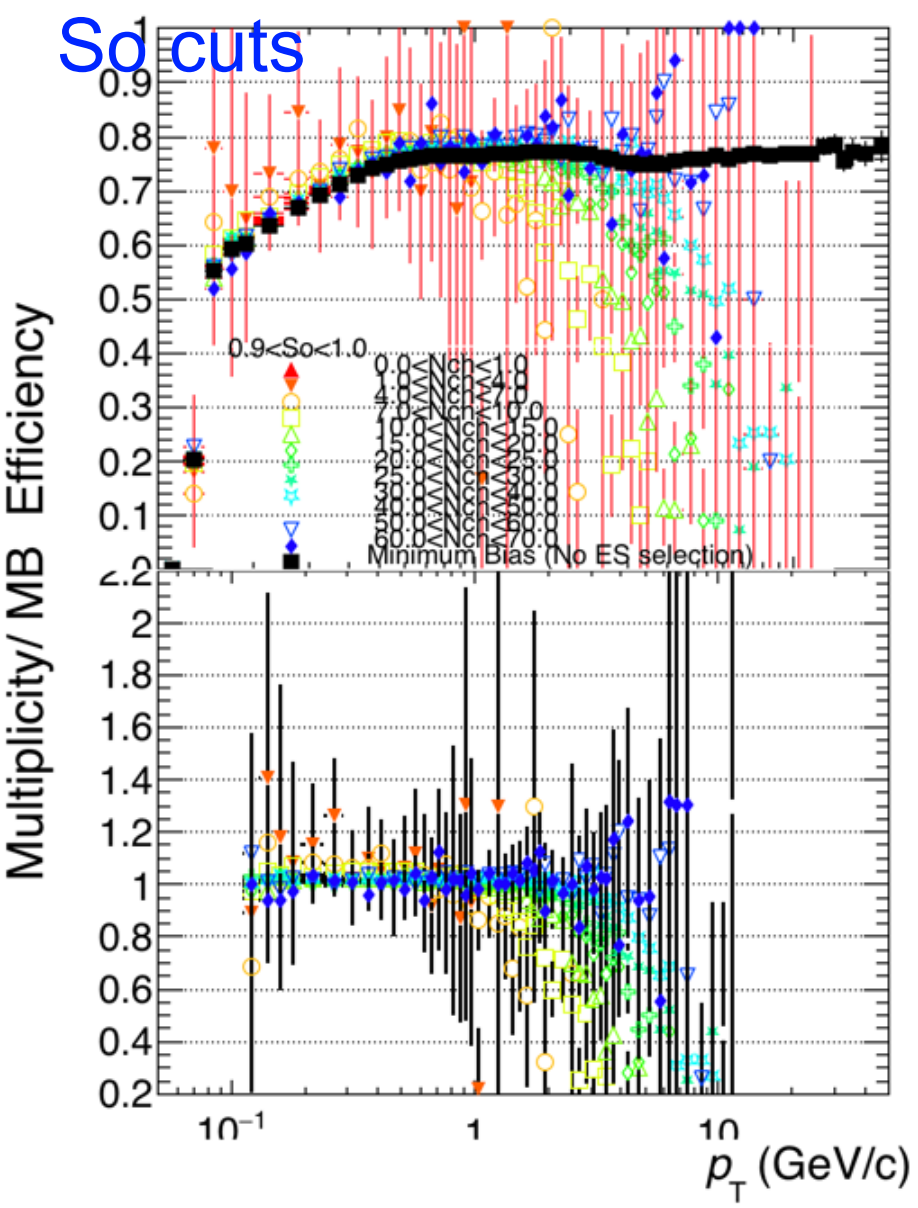


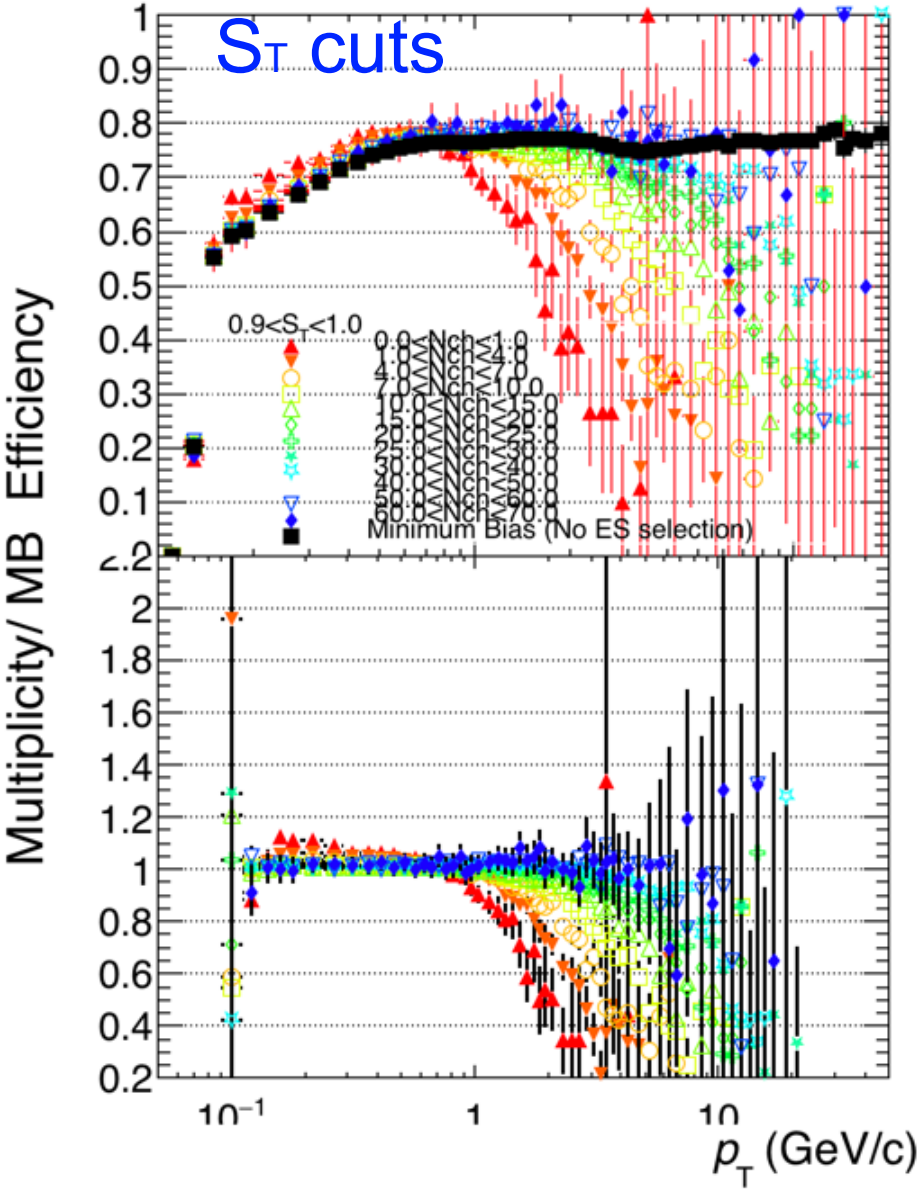
Spherocity Bin A Sphericity



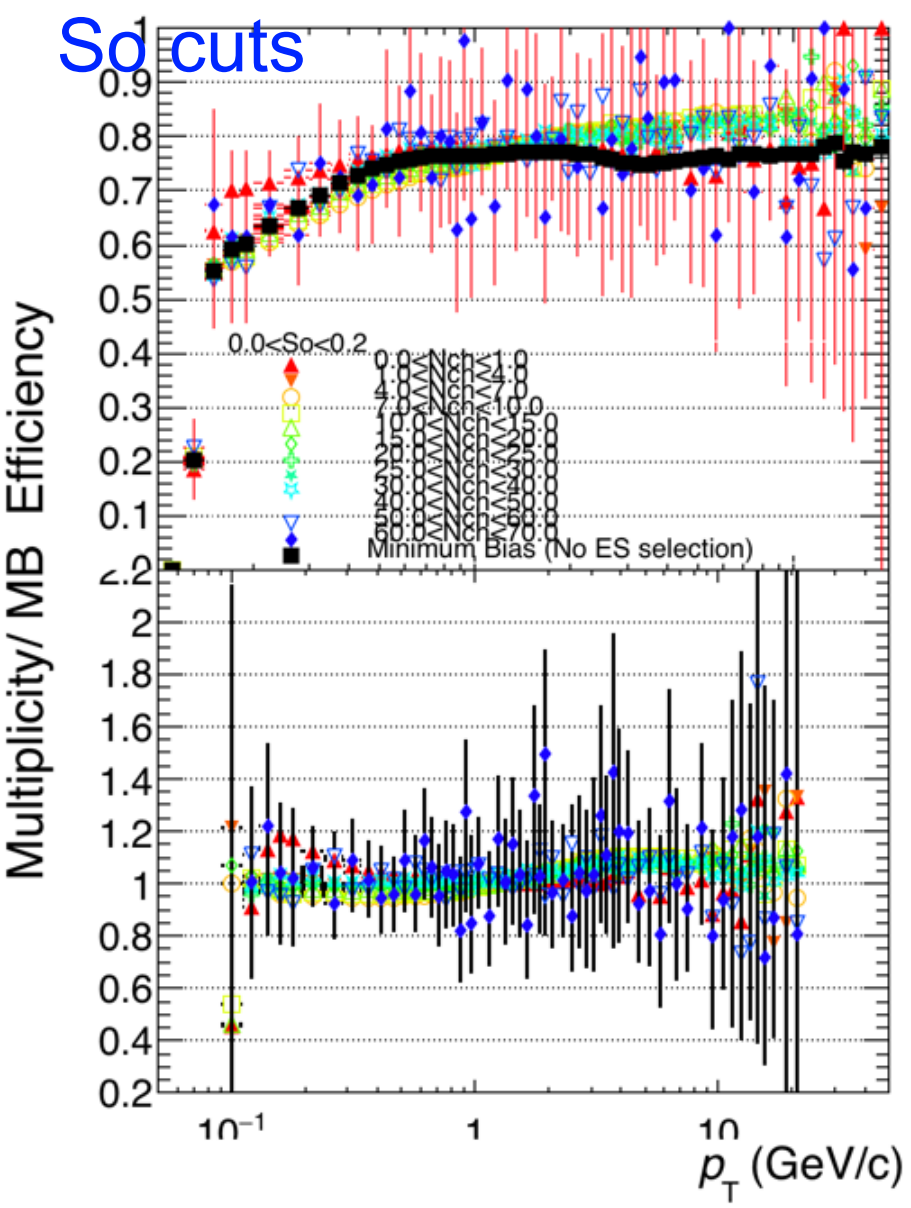


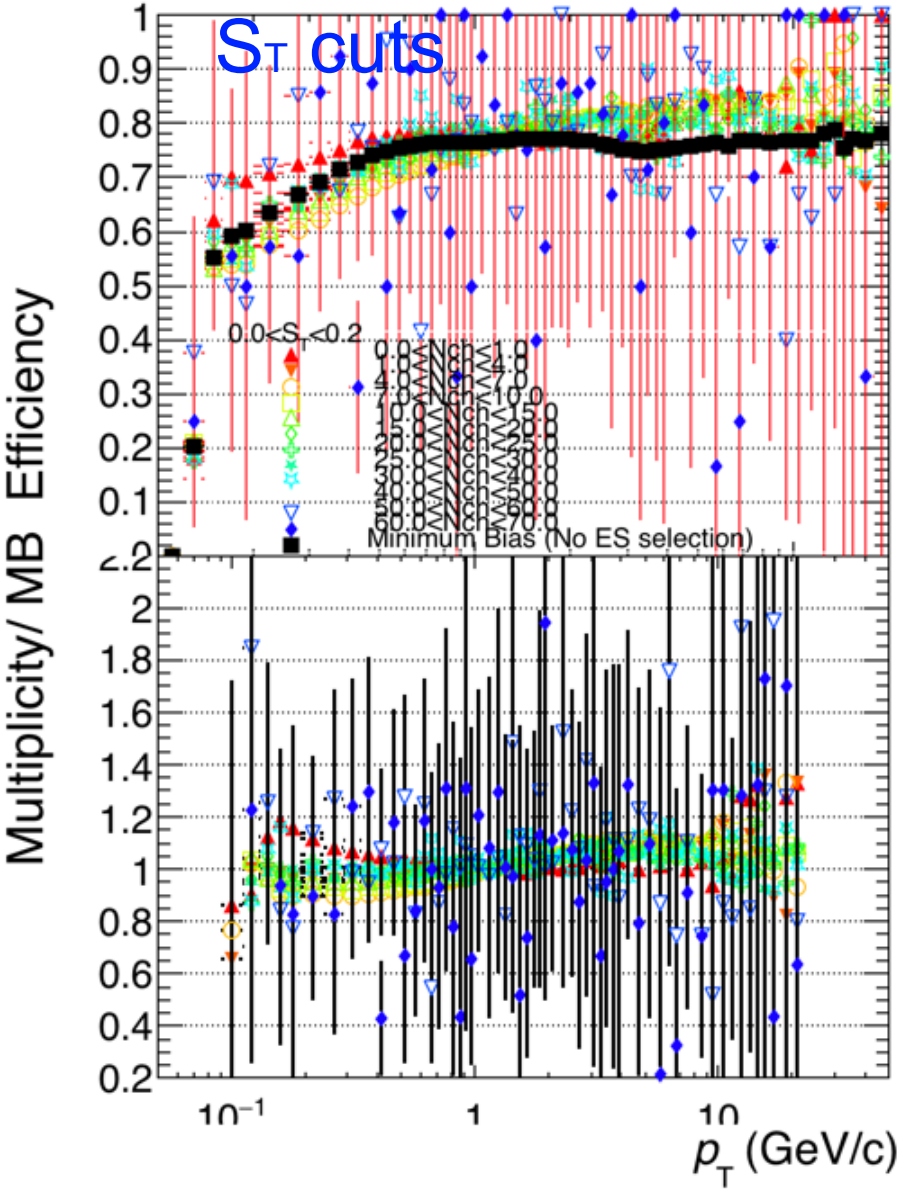
Spherocity Bin A Sphericity





Spherocity Bin B Sphericity





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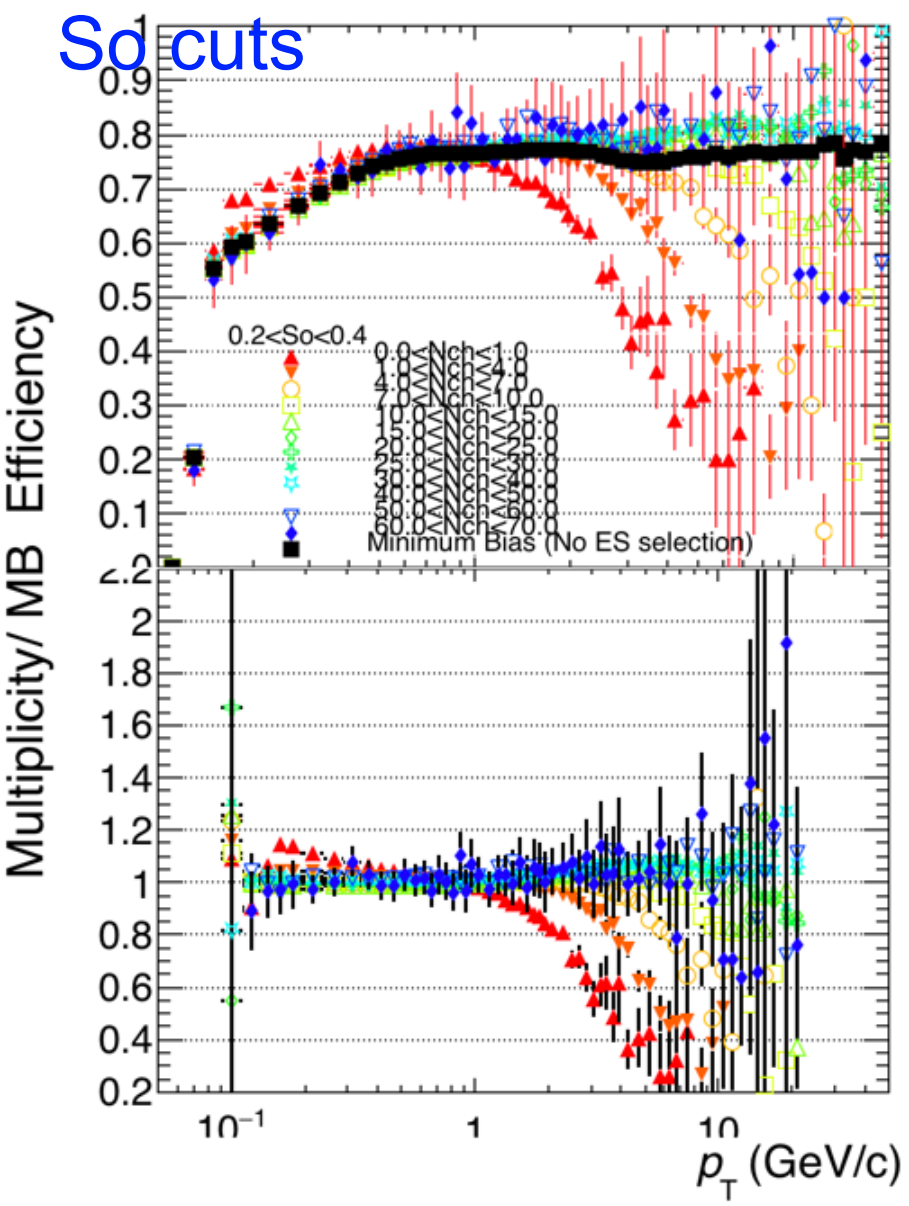

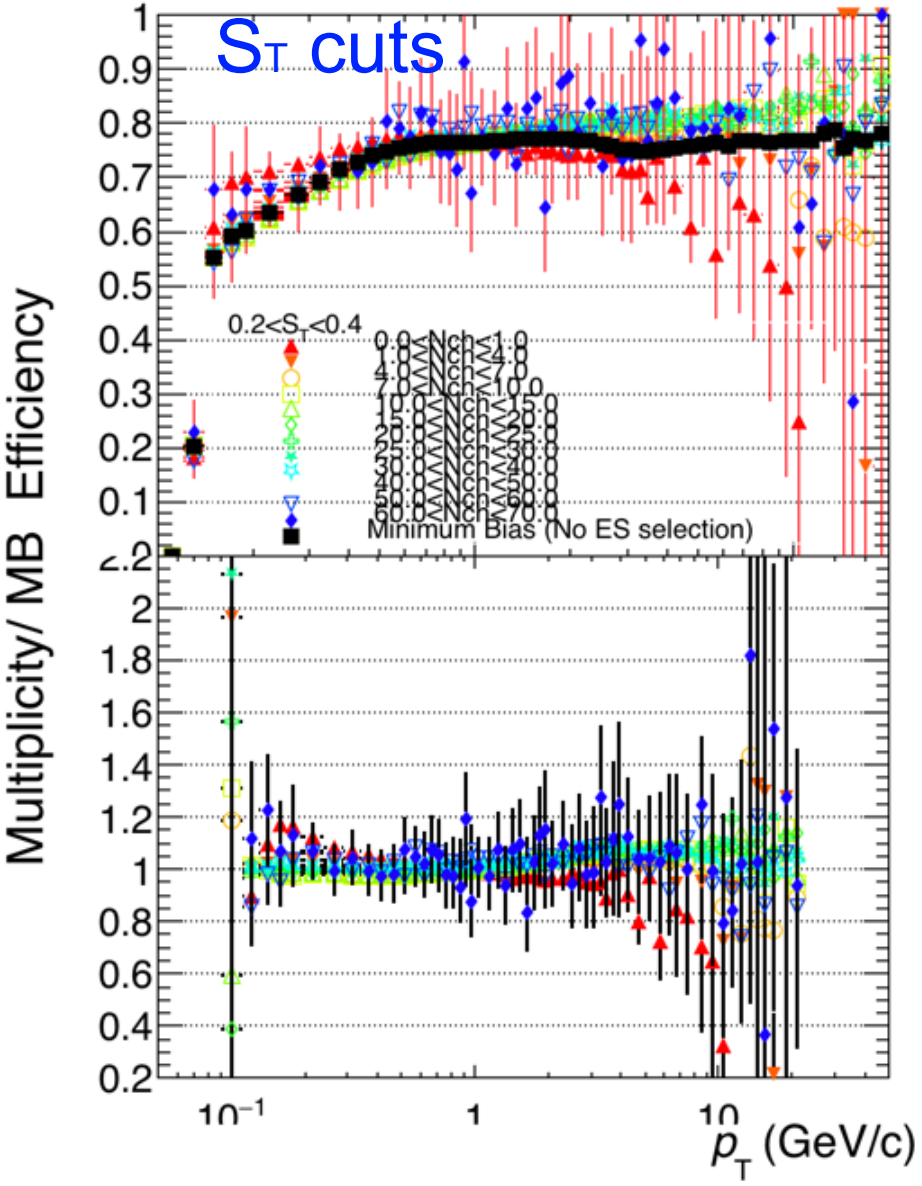

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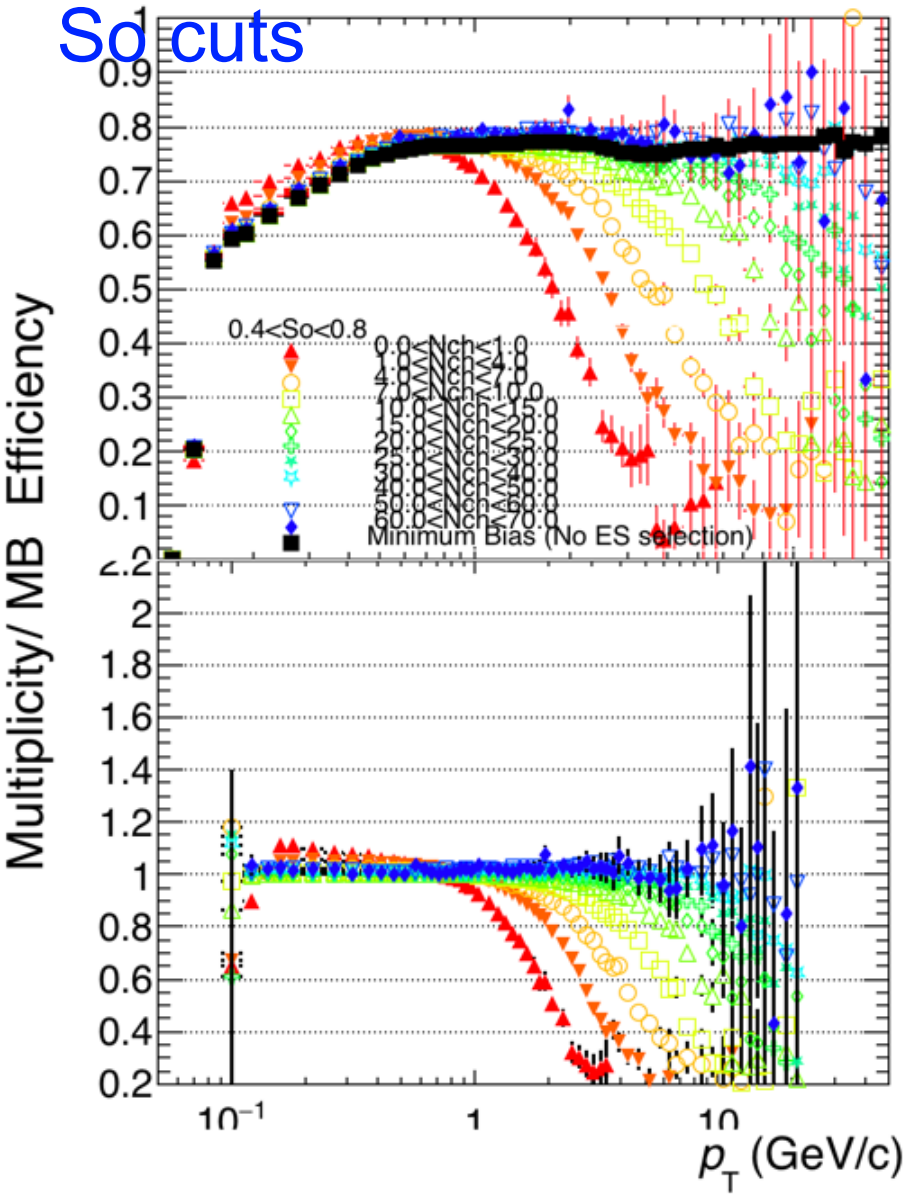

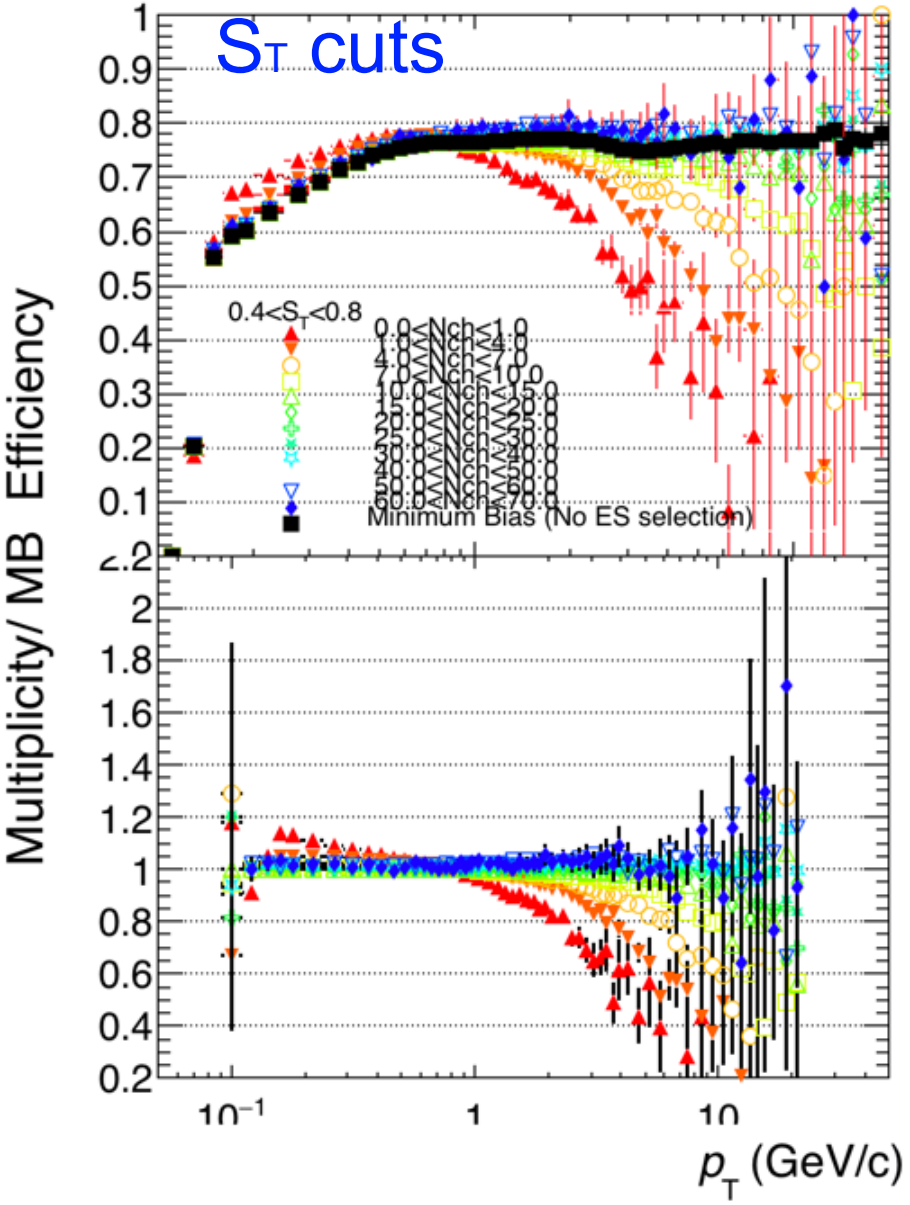

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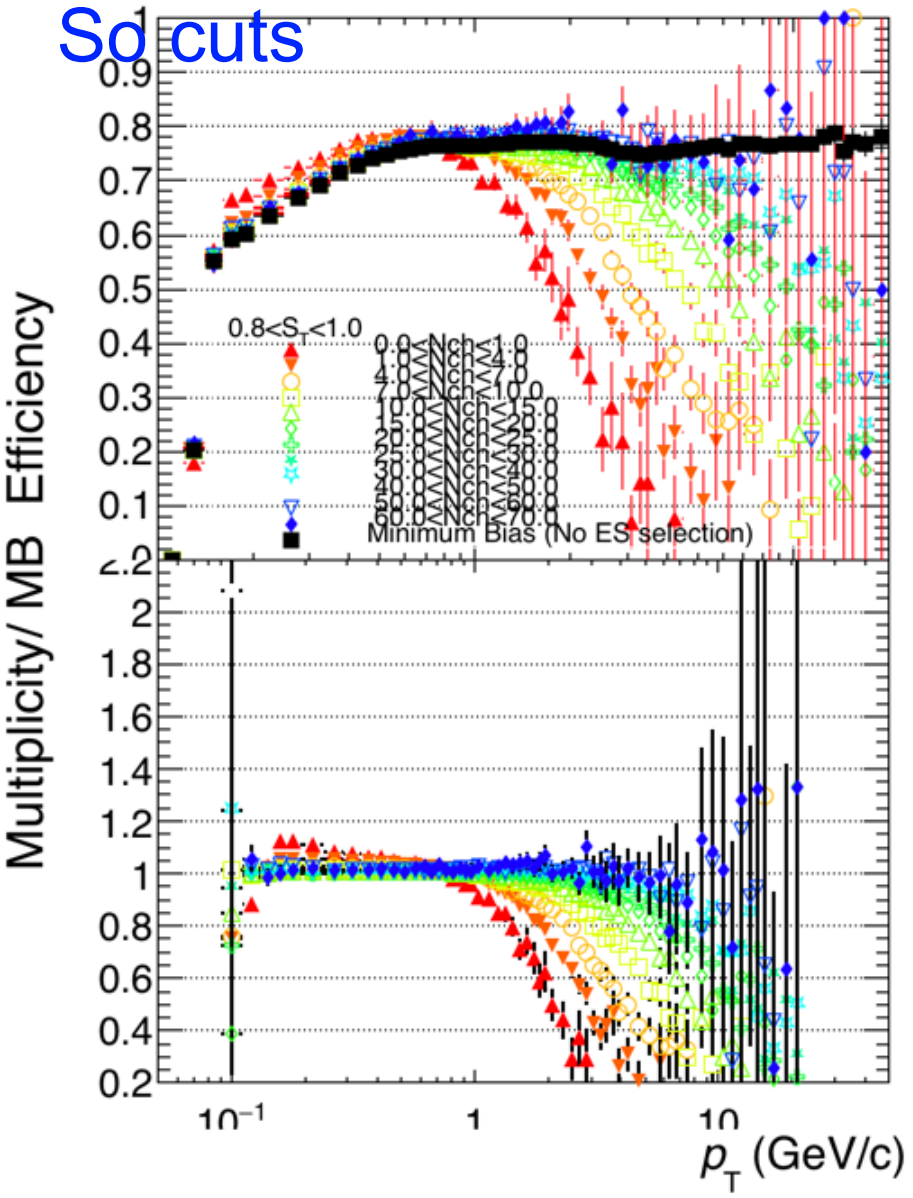
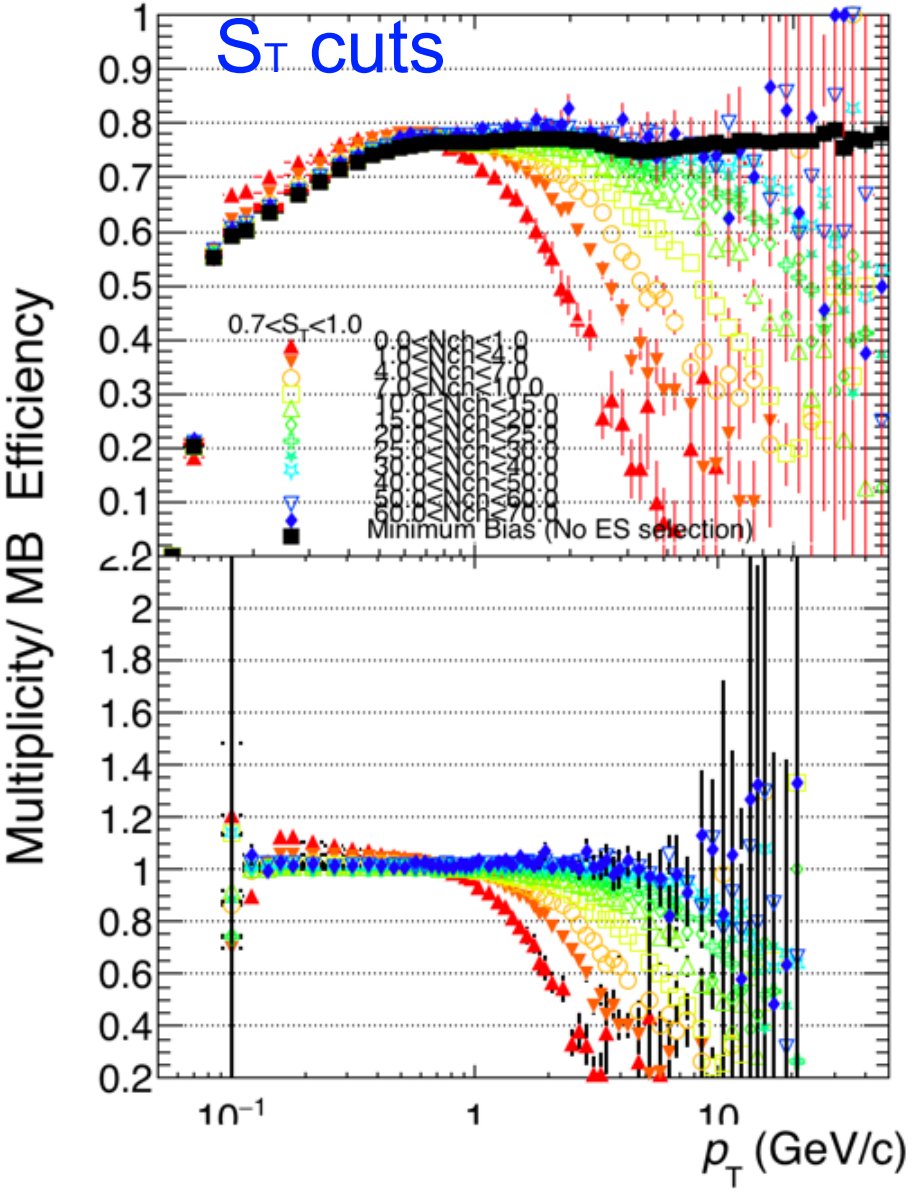
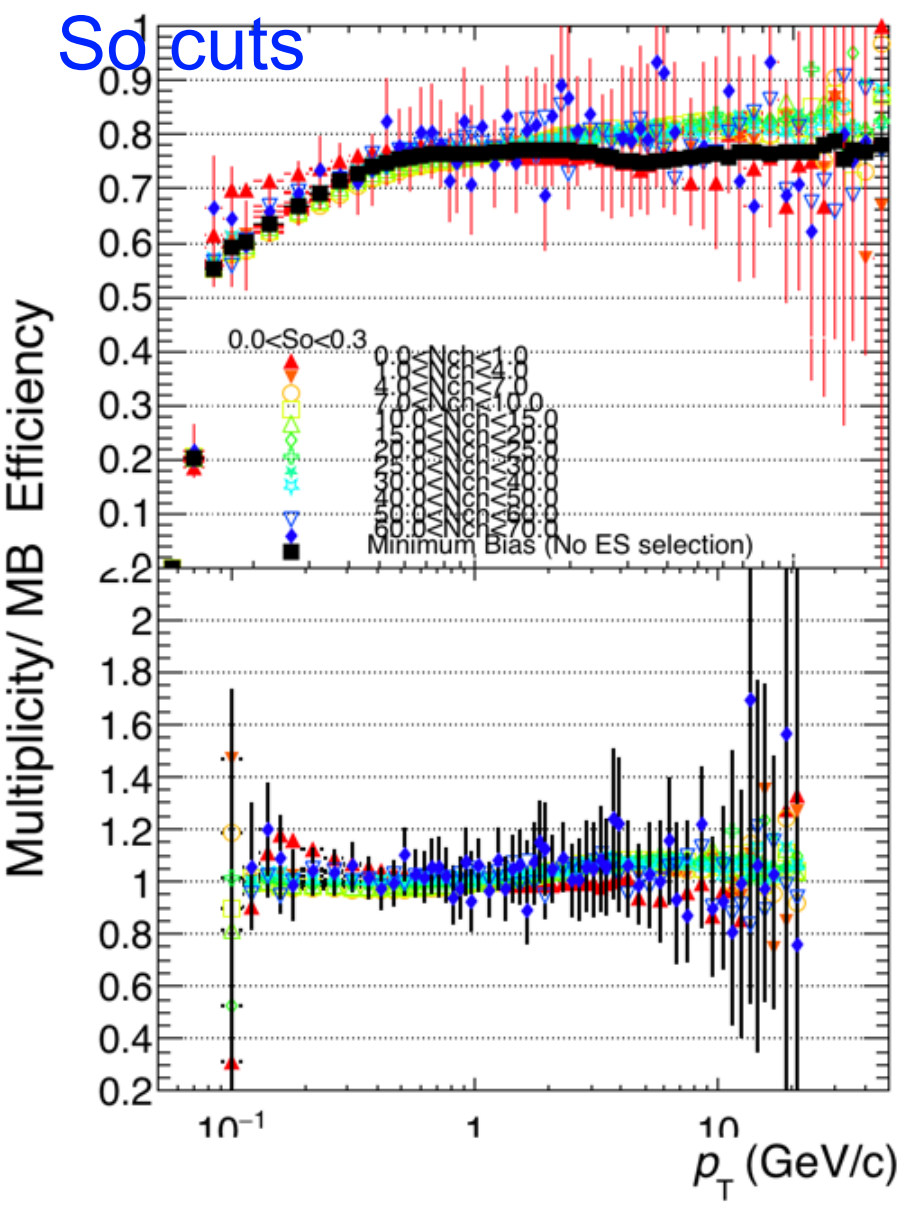
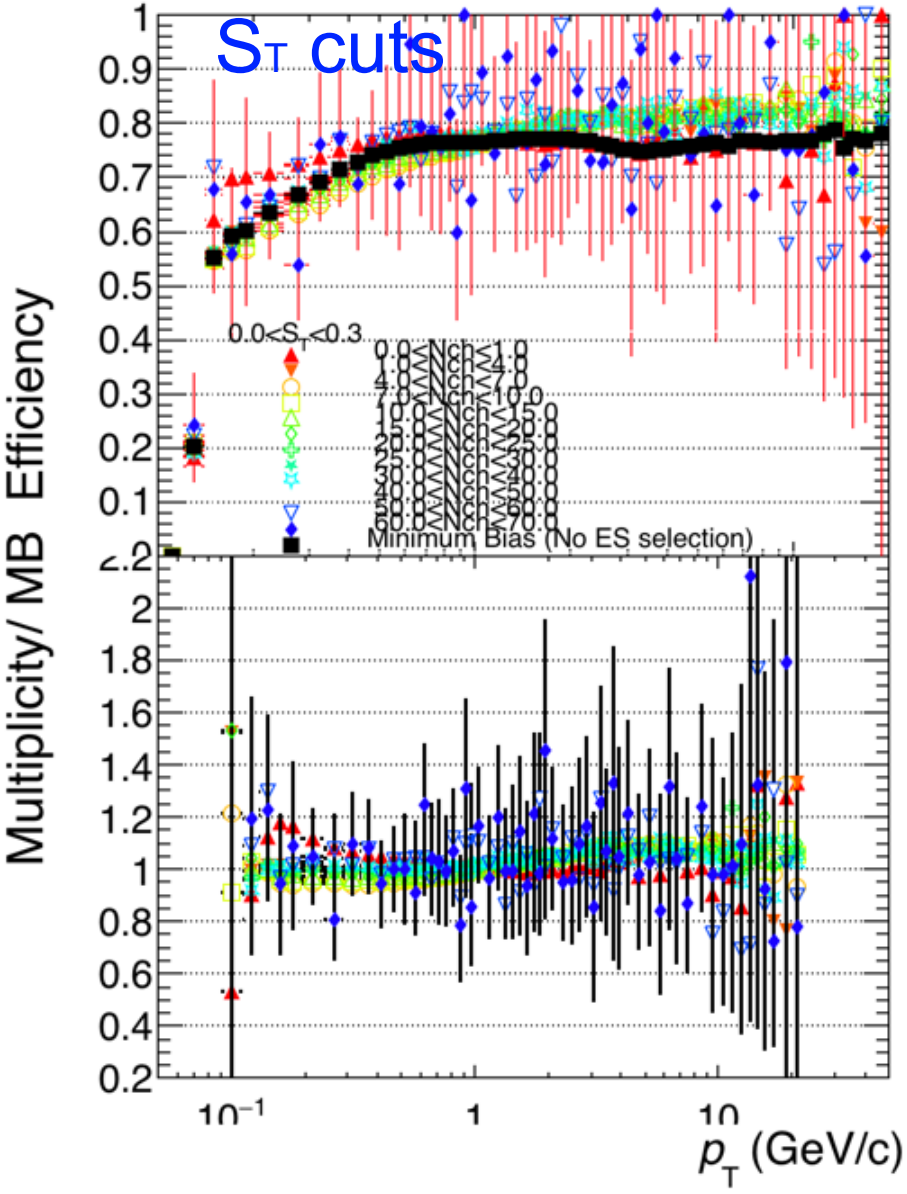


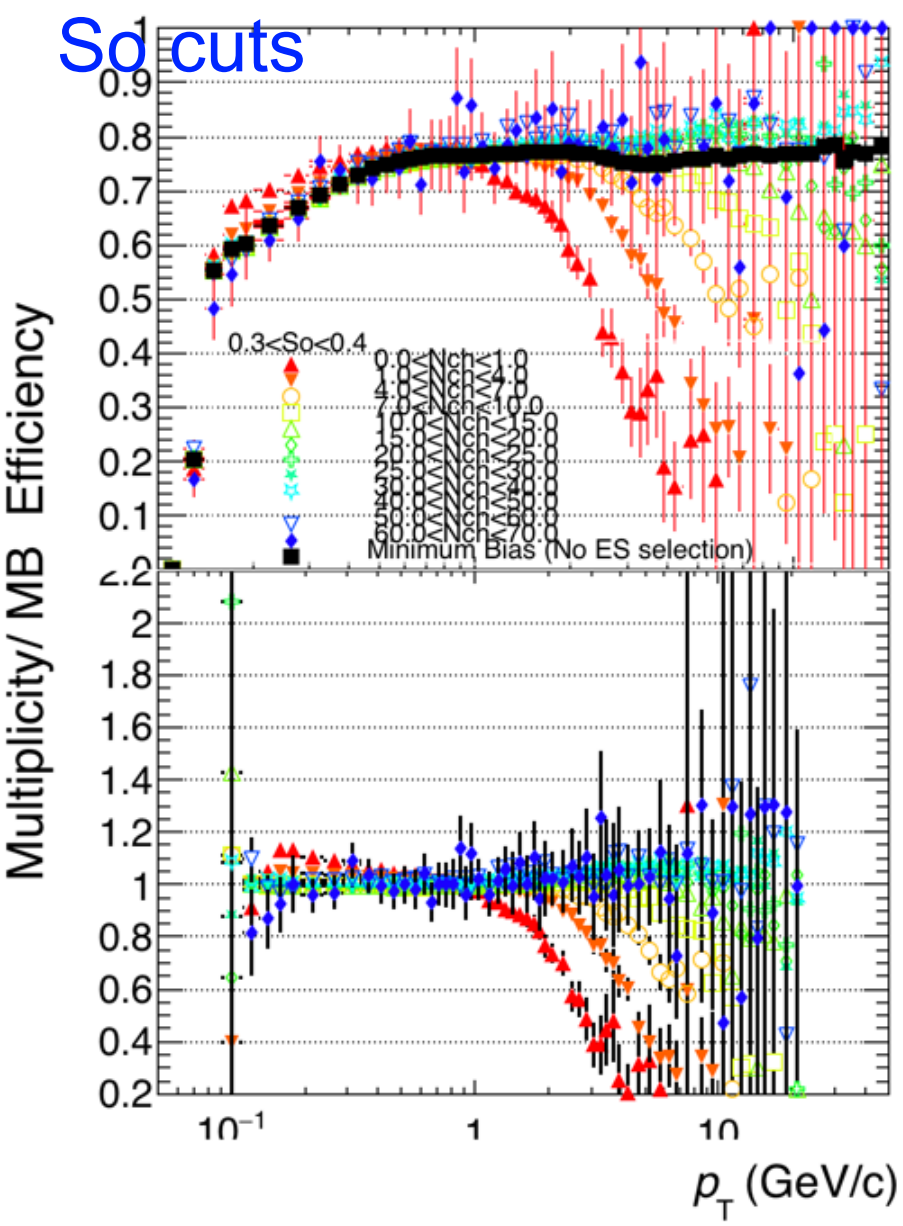


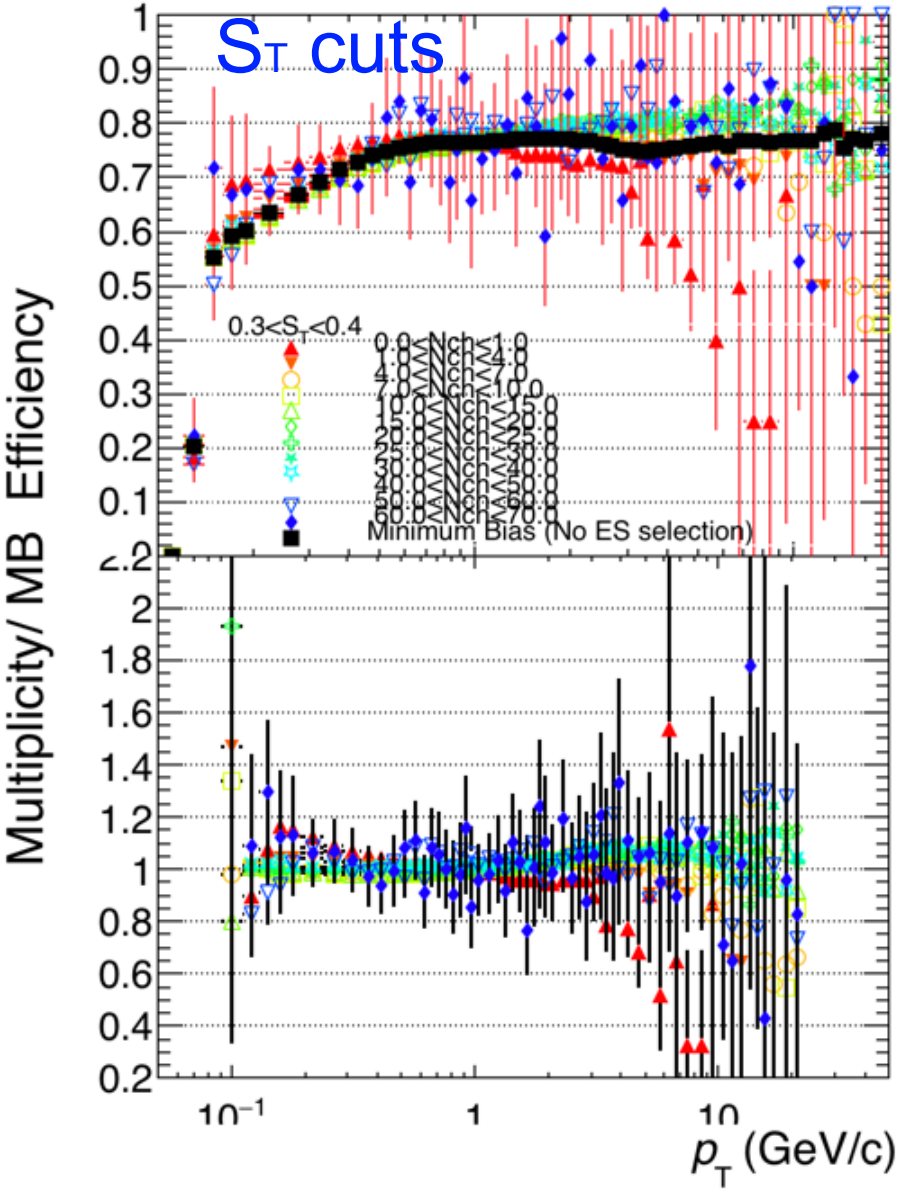
Spherocity Bin C Sphericity



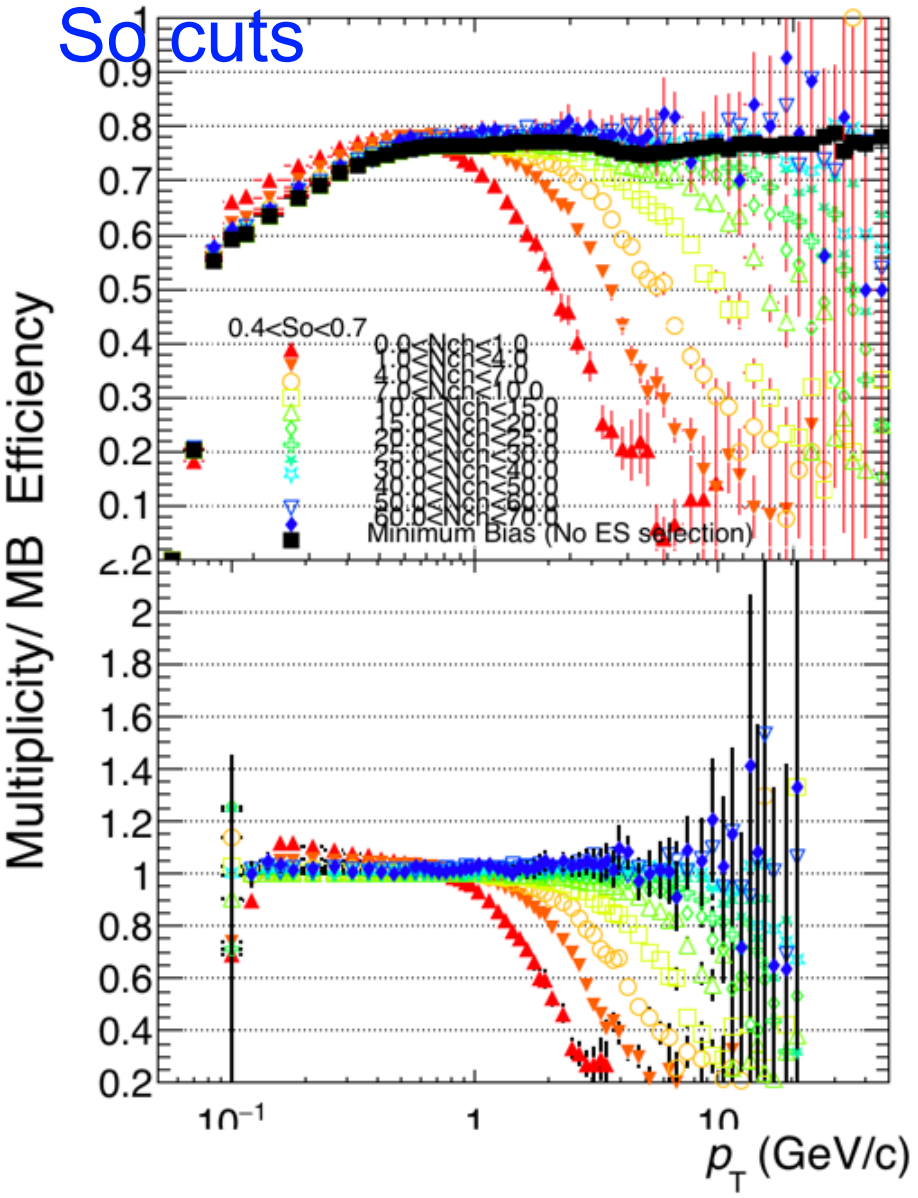


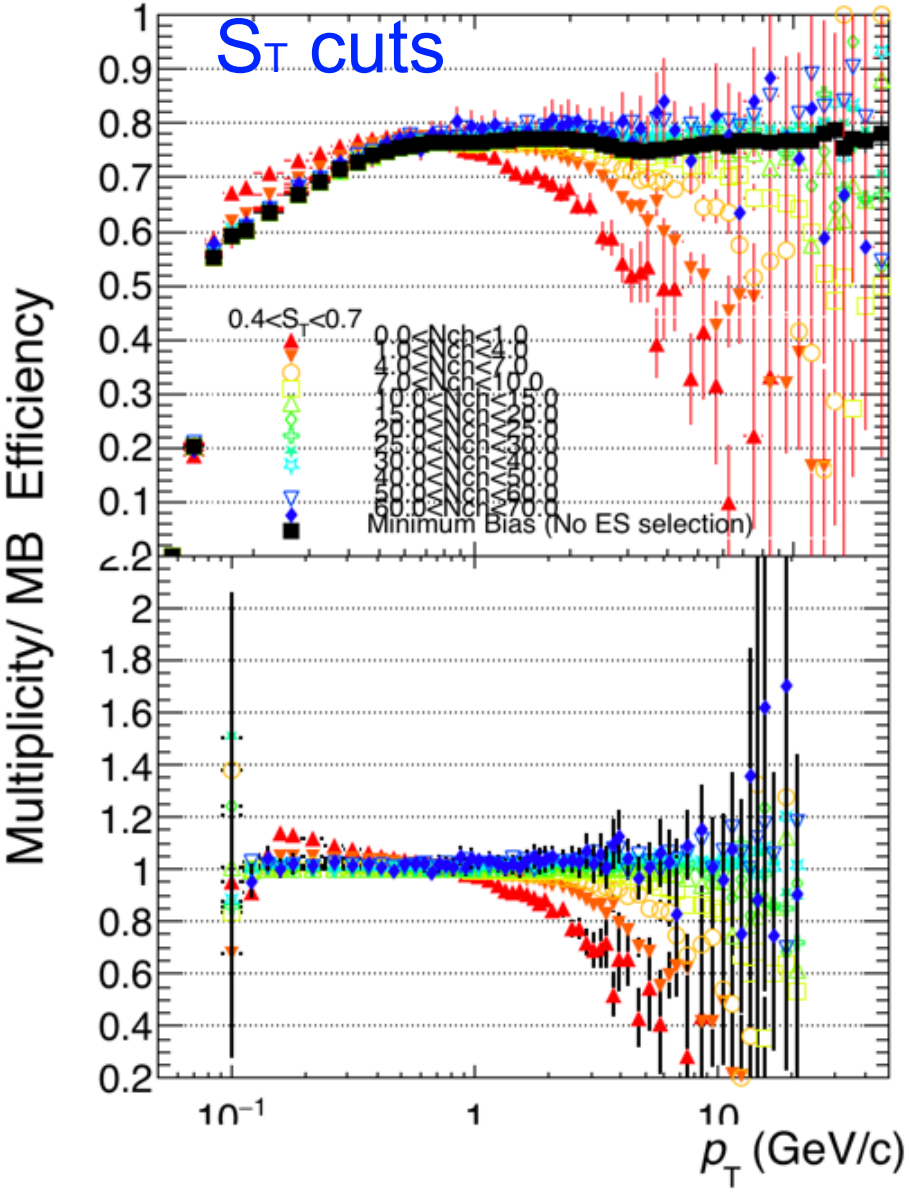
Spherocity Bin C Sphericity





Spherocity Bin C Sphericity





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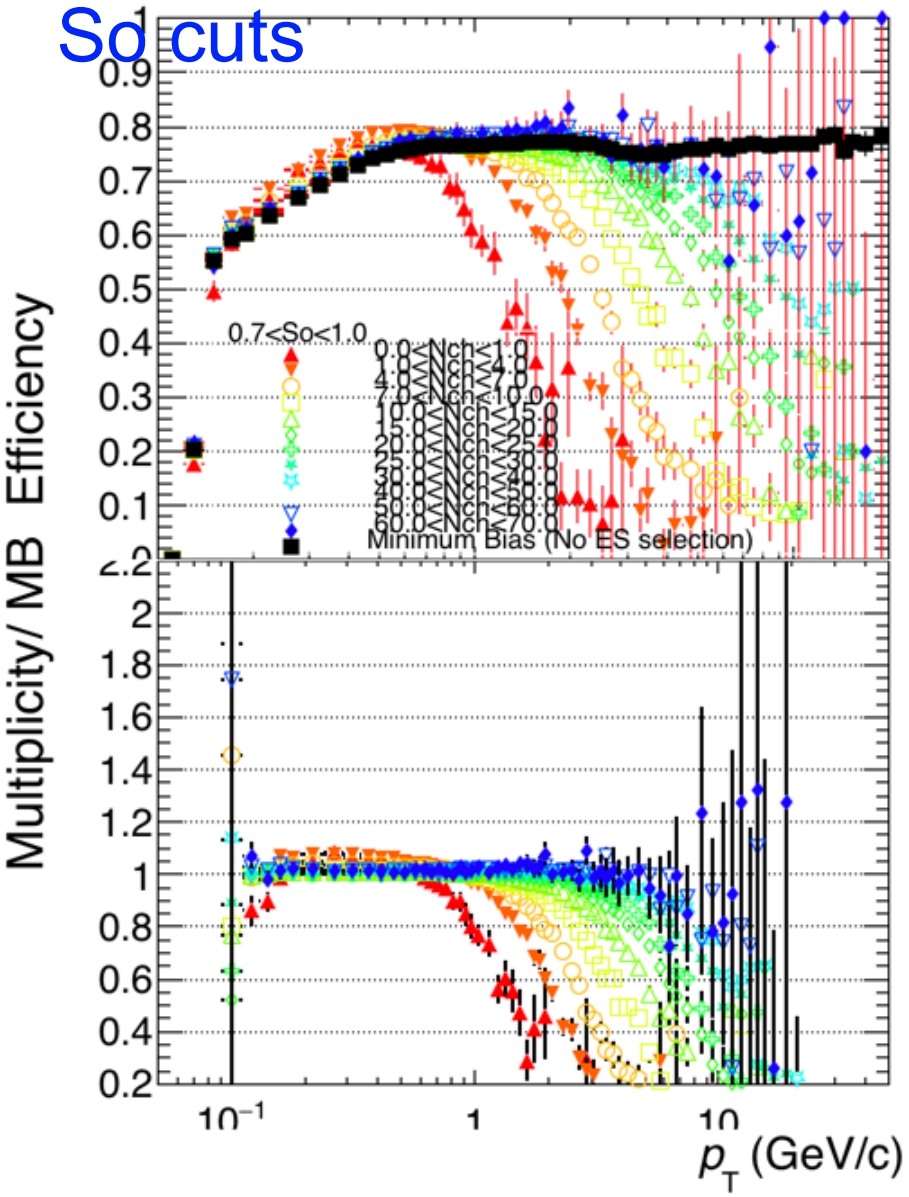
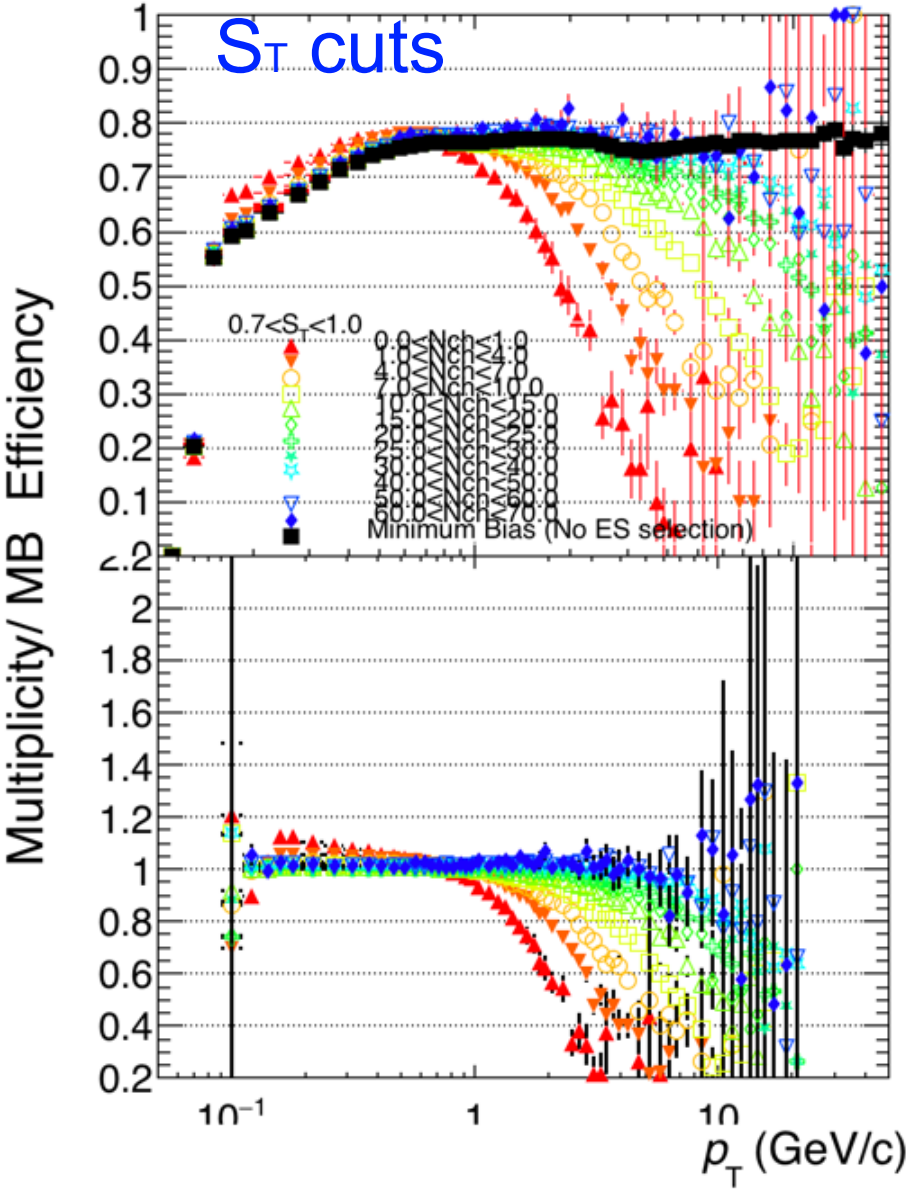
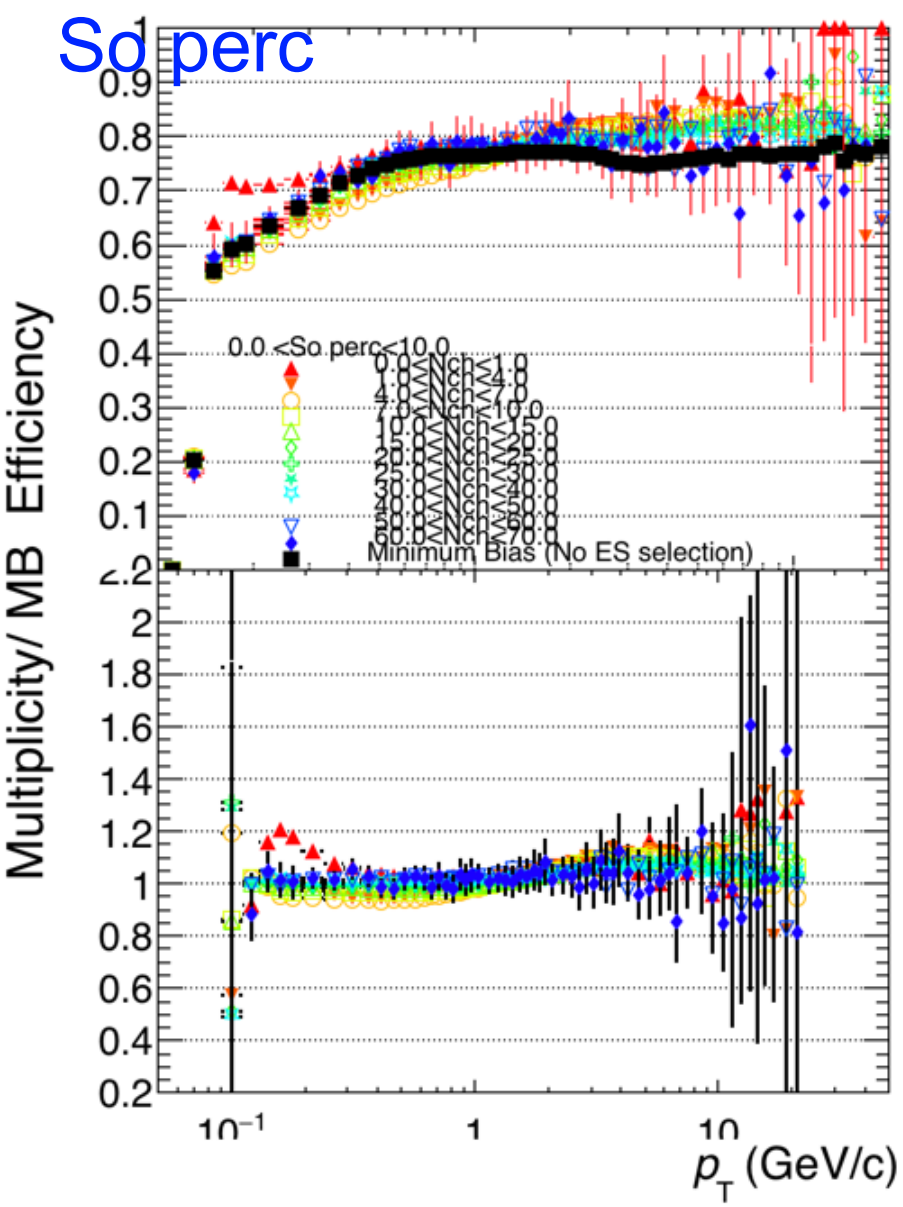
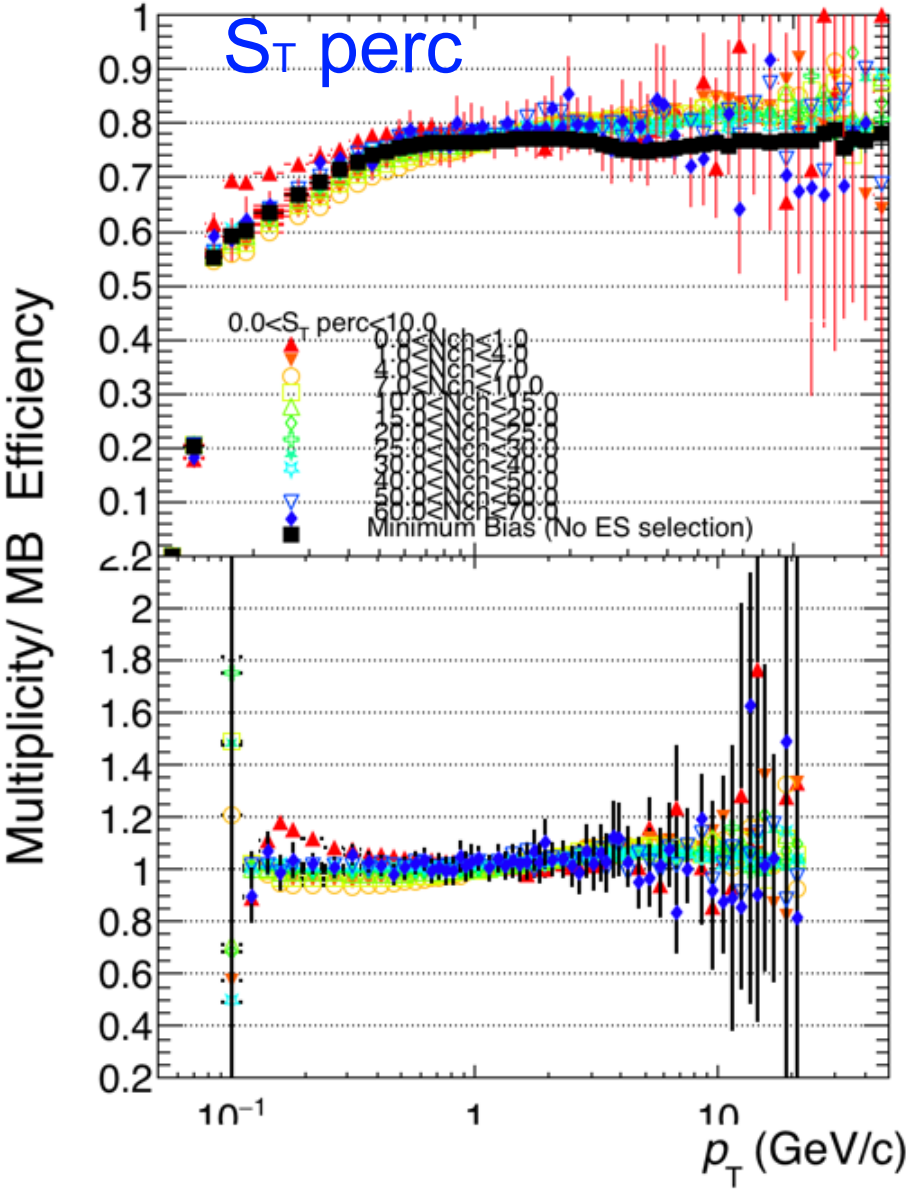




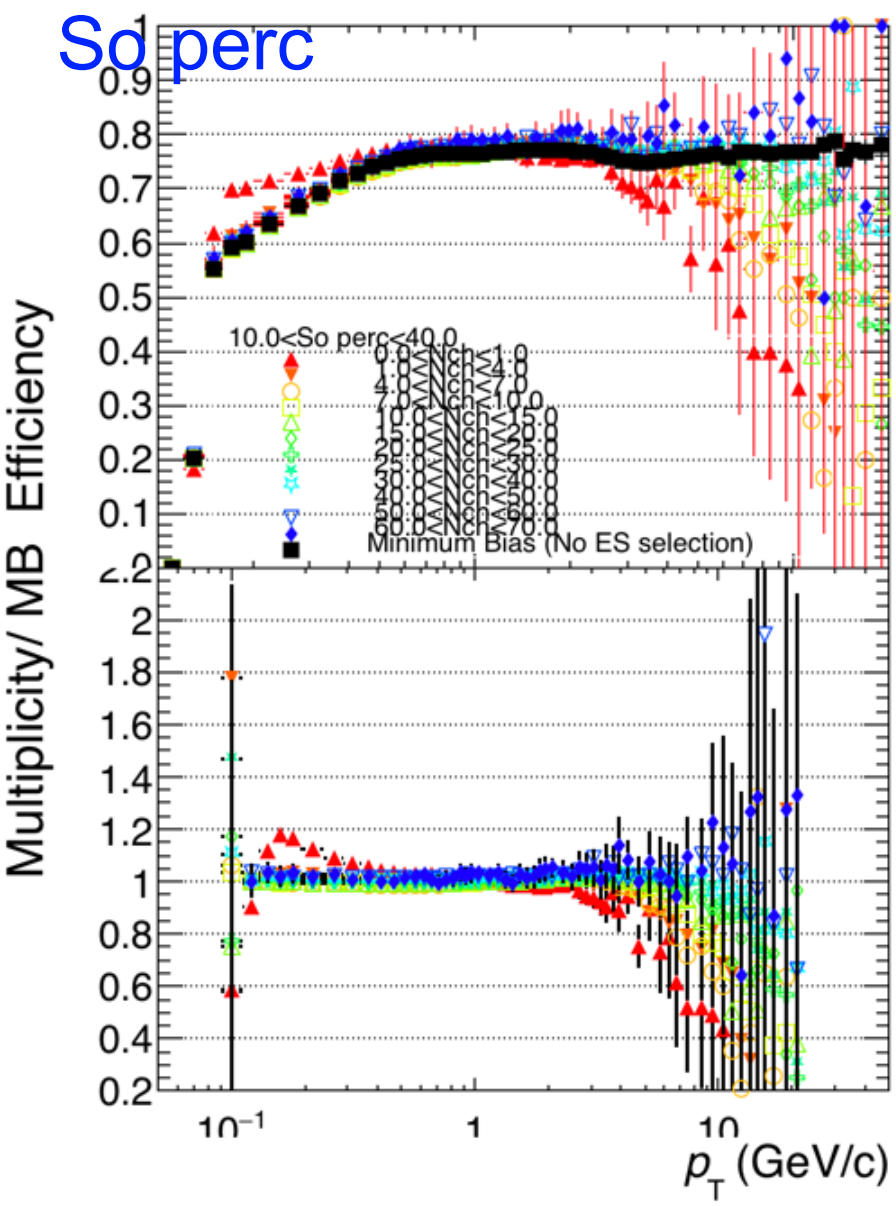
- For three different sets of sphero(i)city distribution percentage
- BinA= {0.0,10.0,40.0,90.0,100.0};
- BinB= {0.0,20.0,40.0,80.0,100.0};
- BinC= {0.0,30.0,40.0,70.0,100.0};

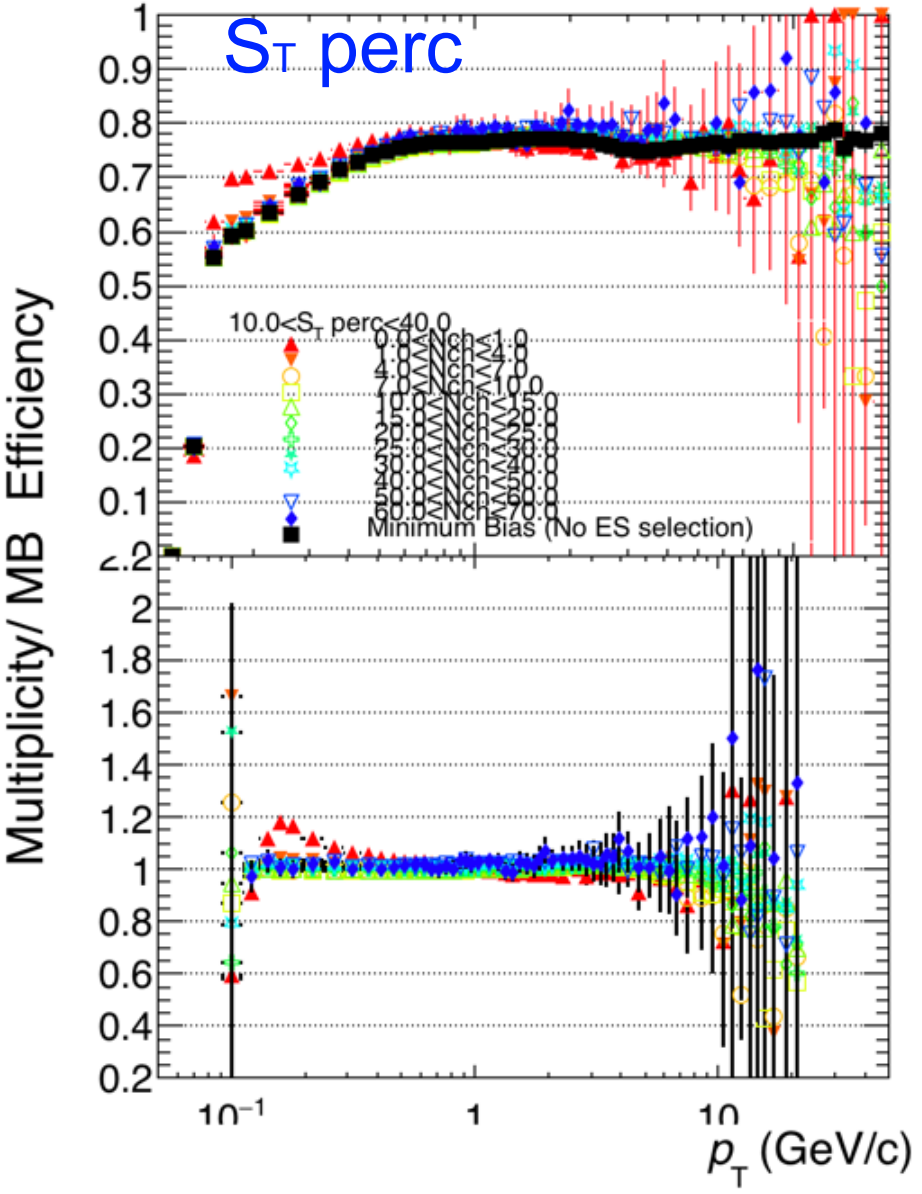
Spherocity Bin A Sphericity



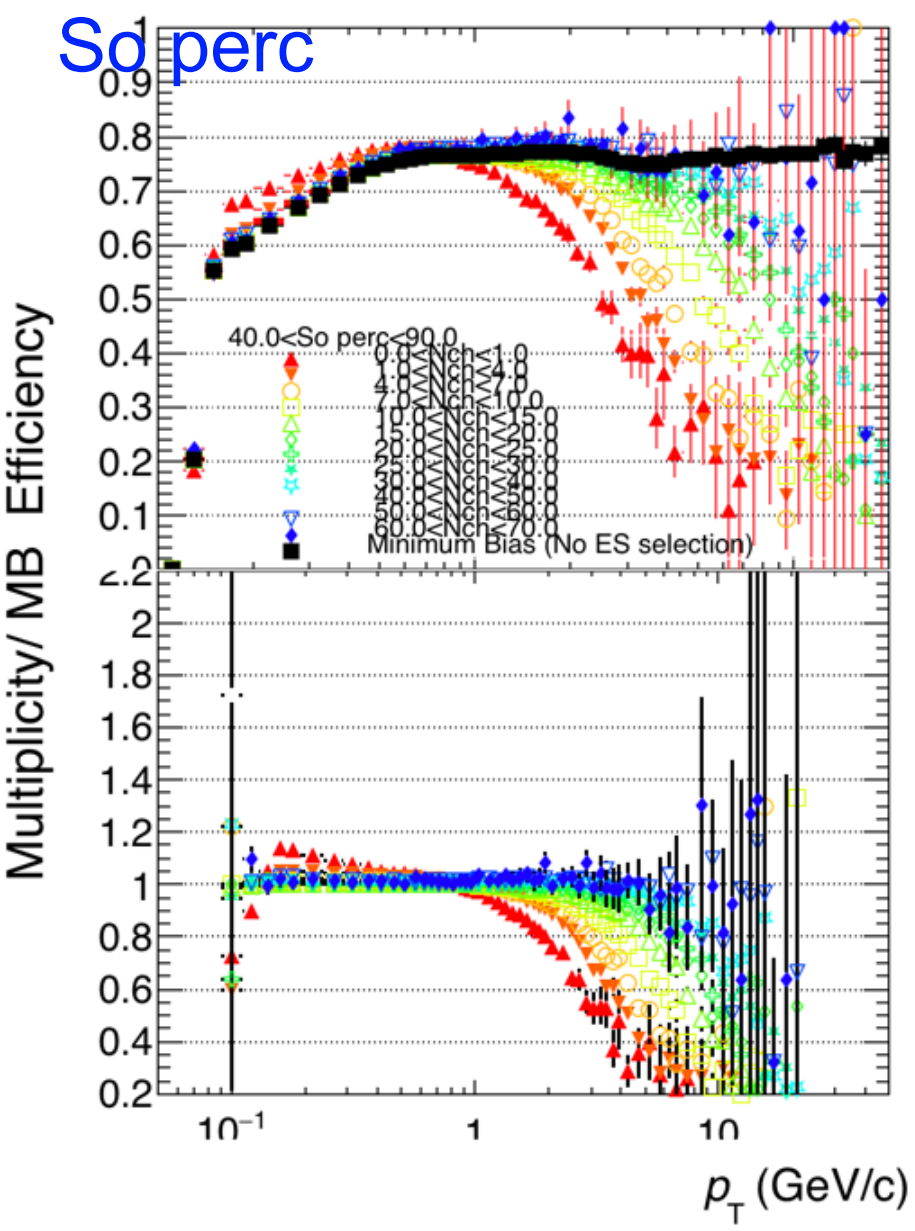


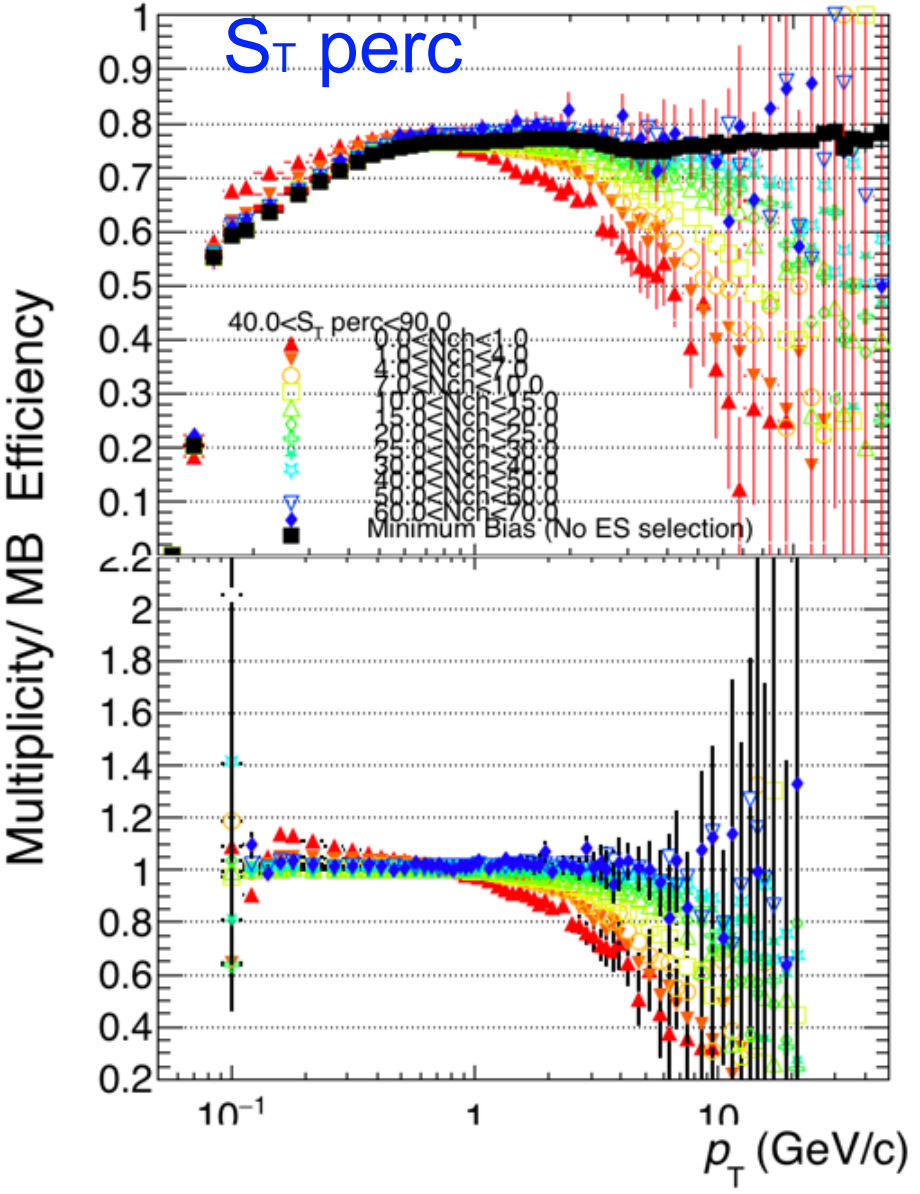
Spherocity Bin A Sphericity





Spherocity Bin A Sphericity





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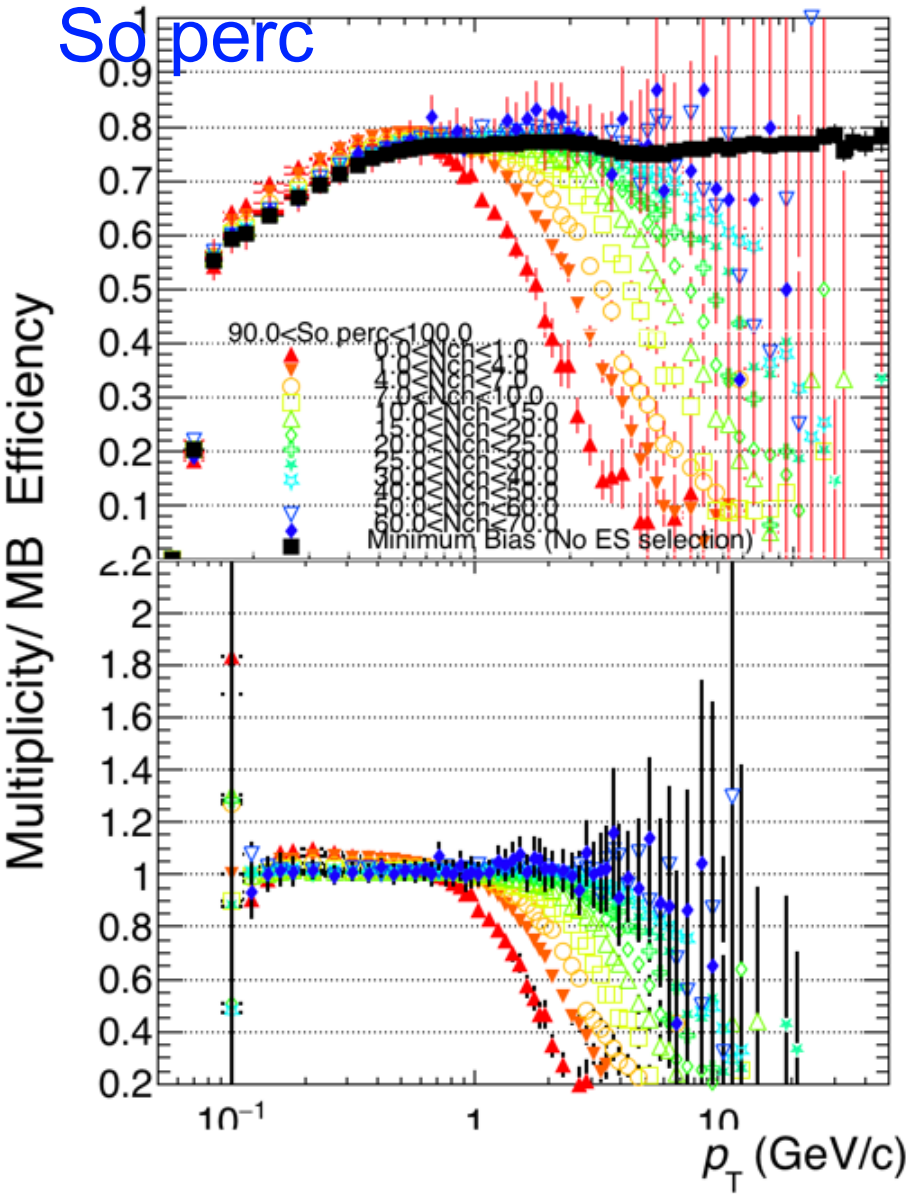
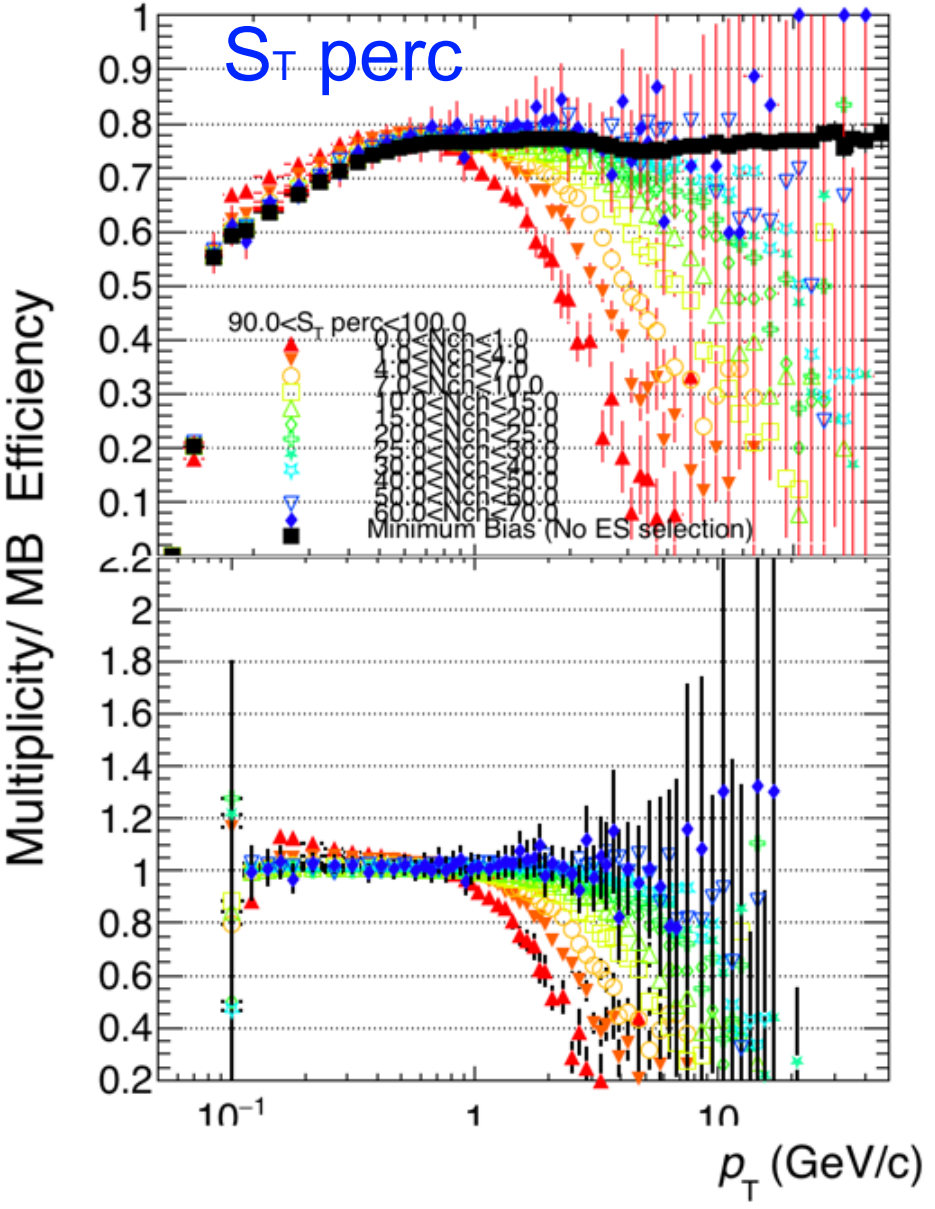
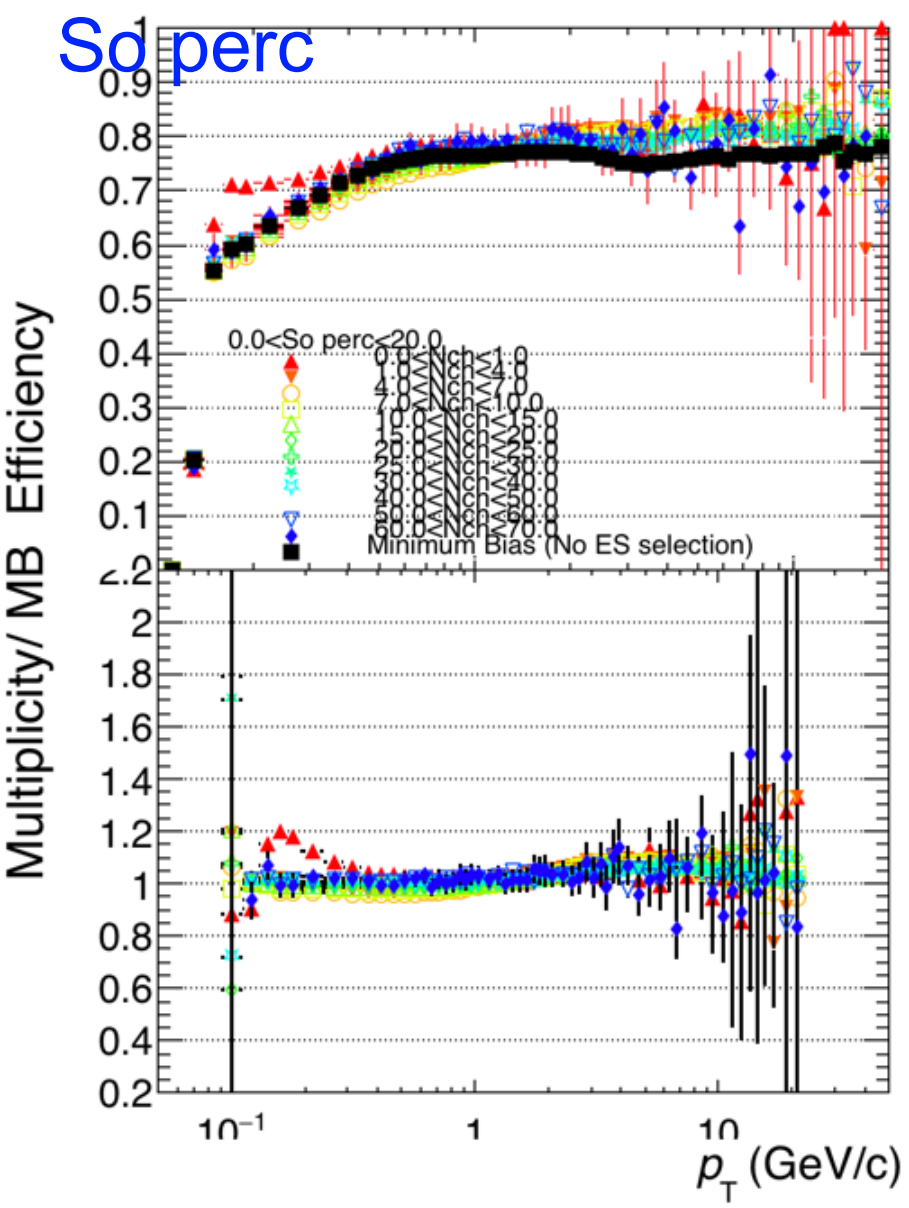
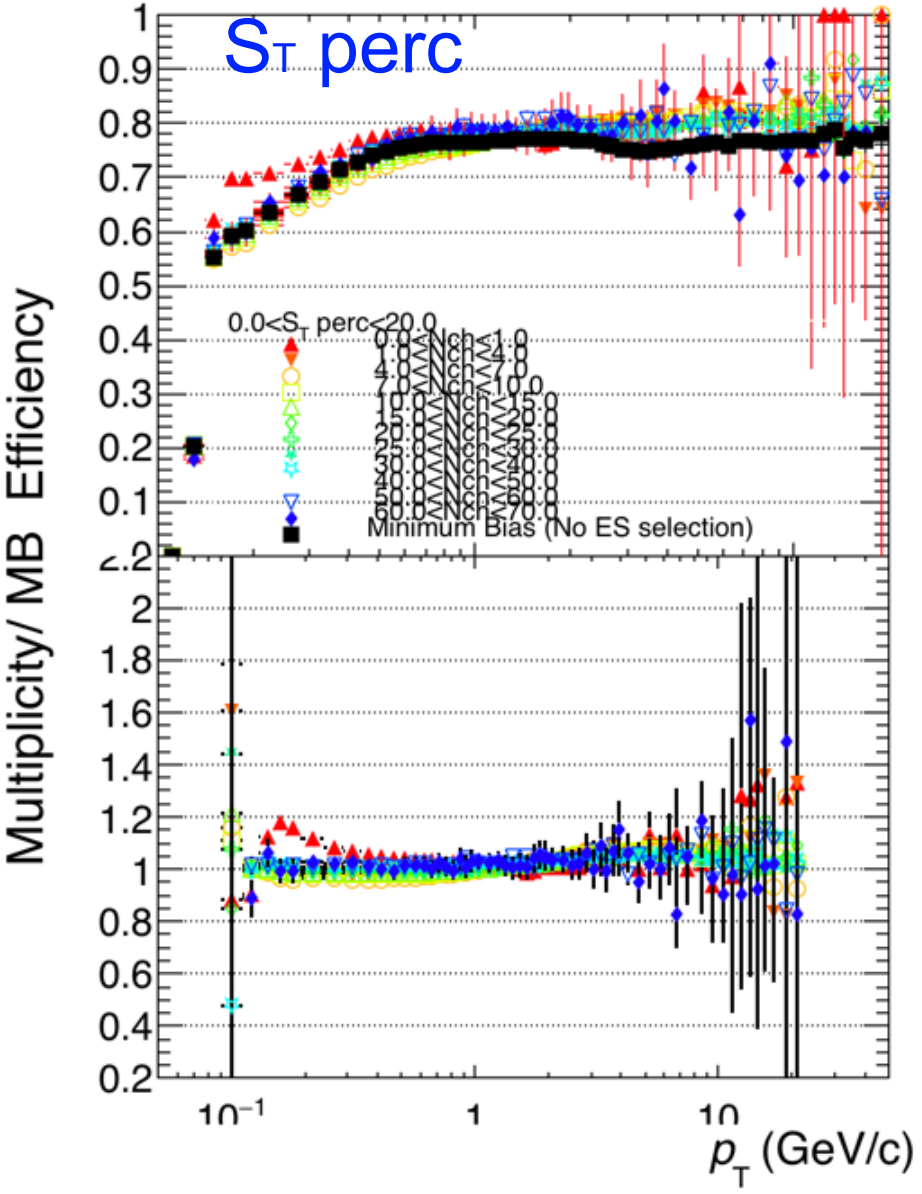


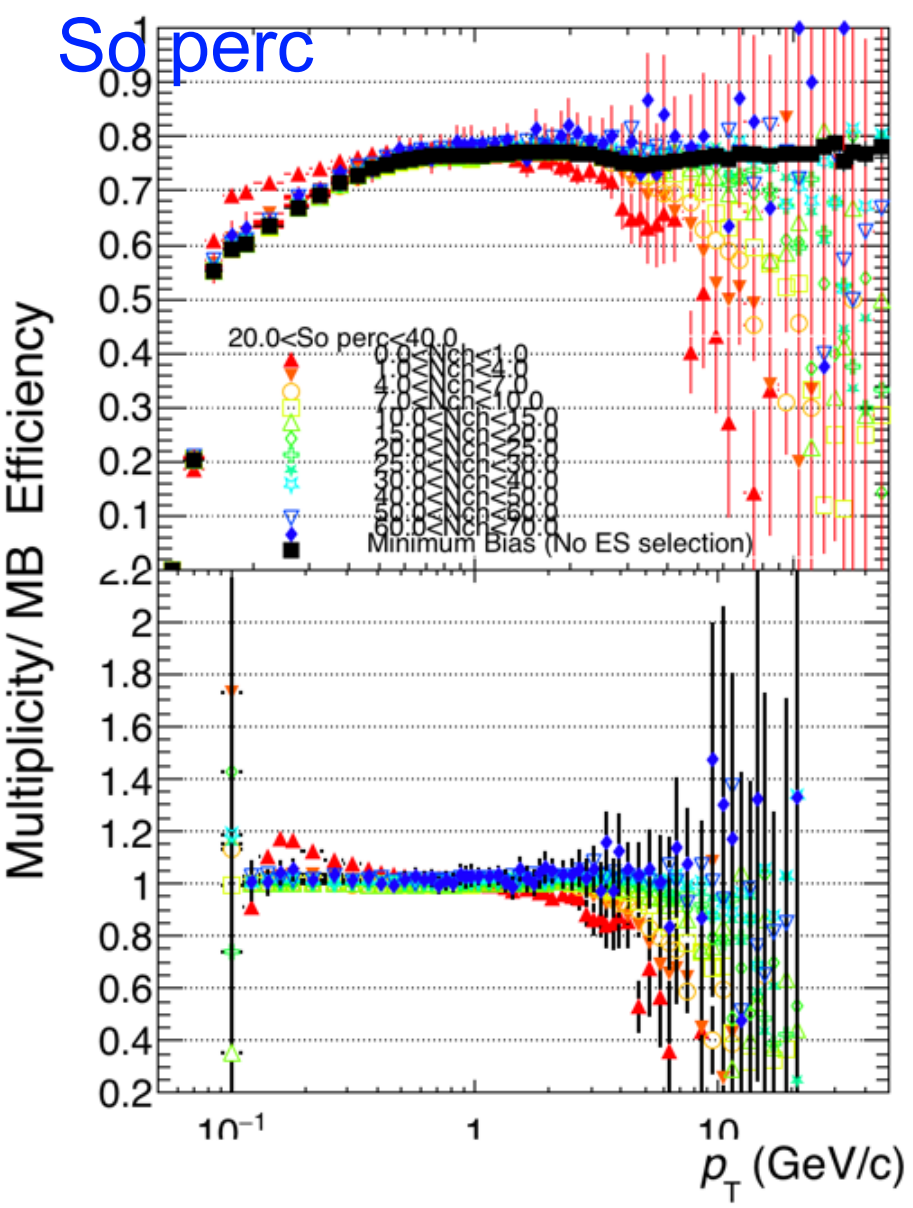


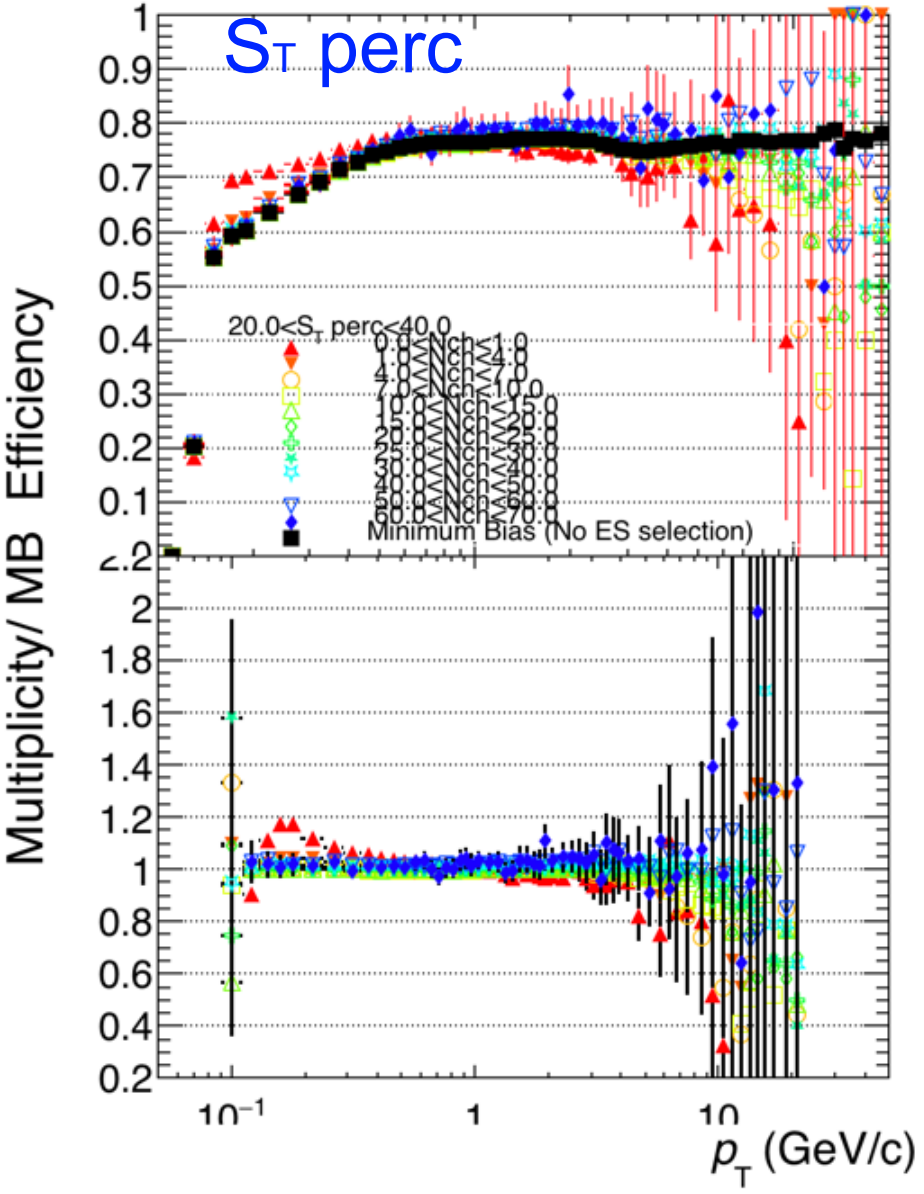
Spherocity Bin B Sphericity



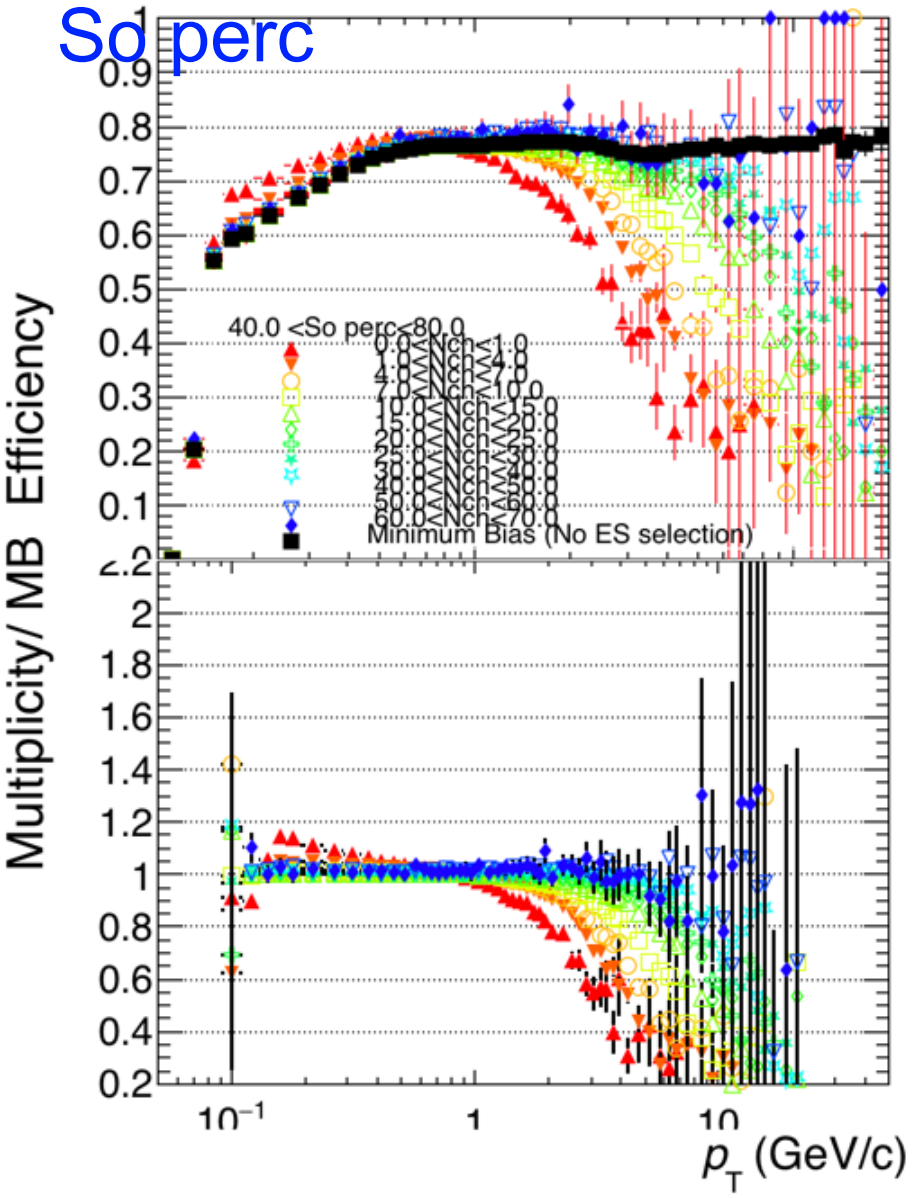


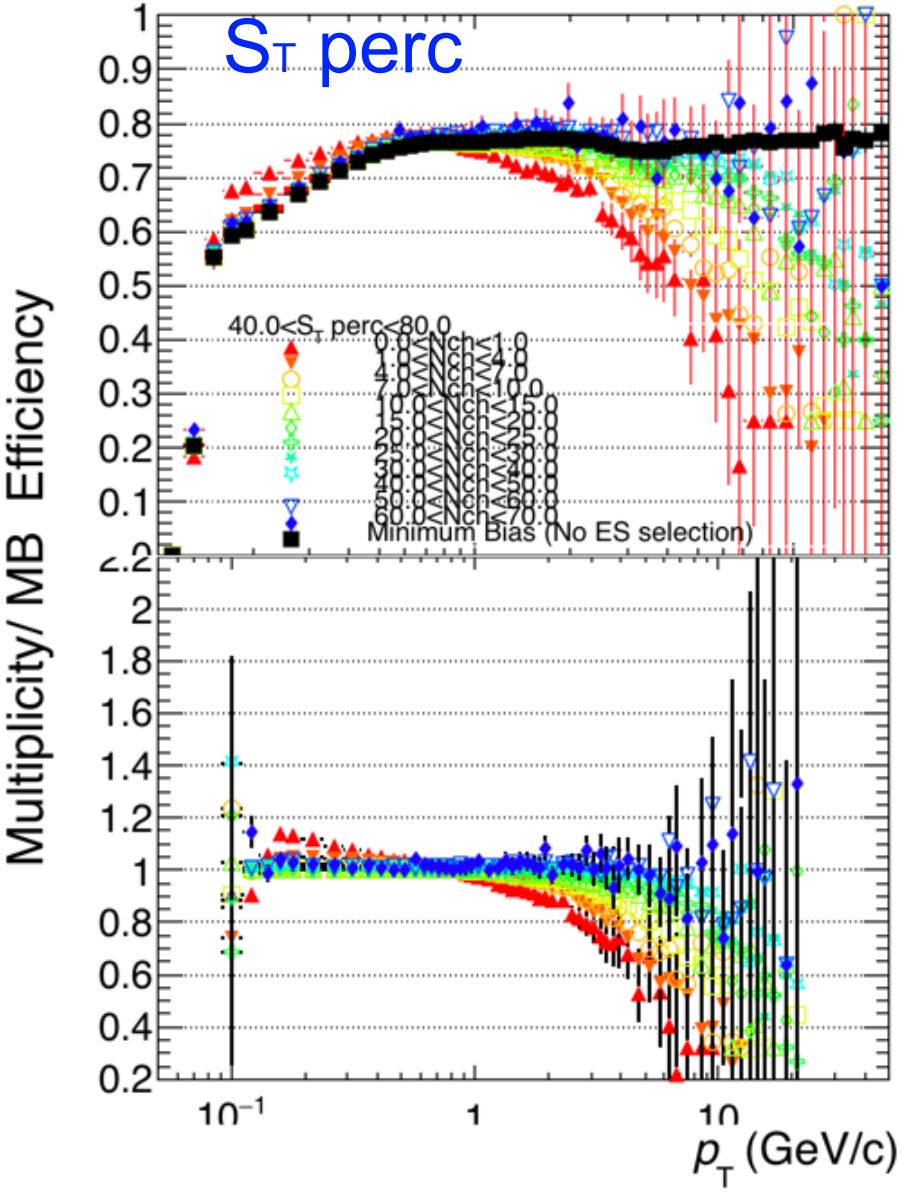
Spherocity Bin B Sphericity



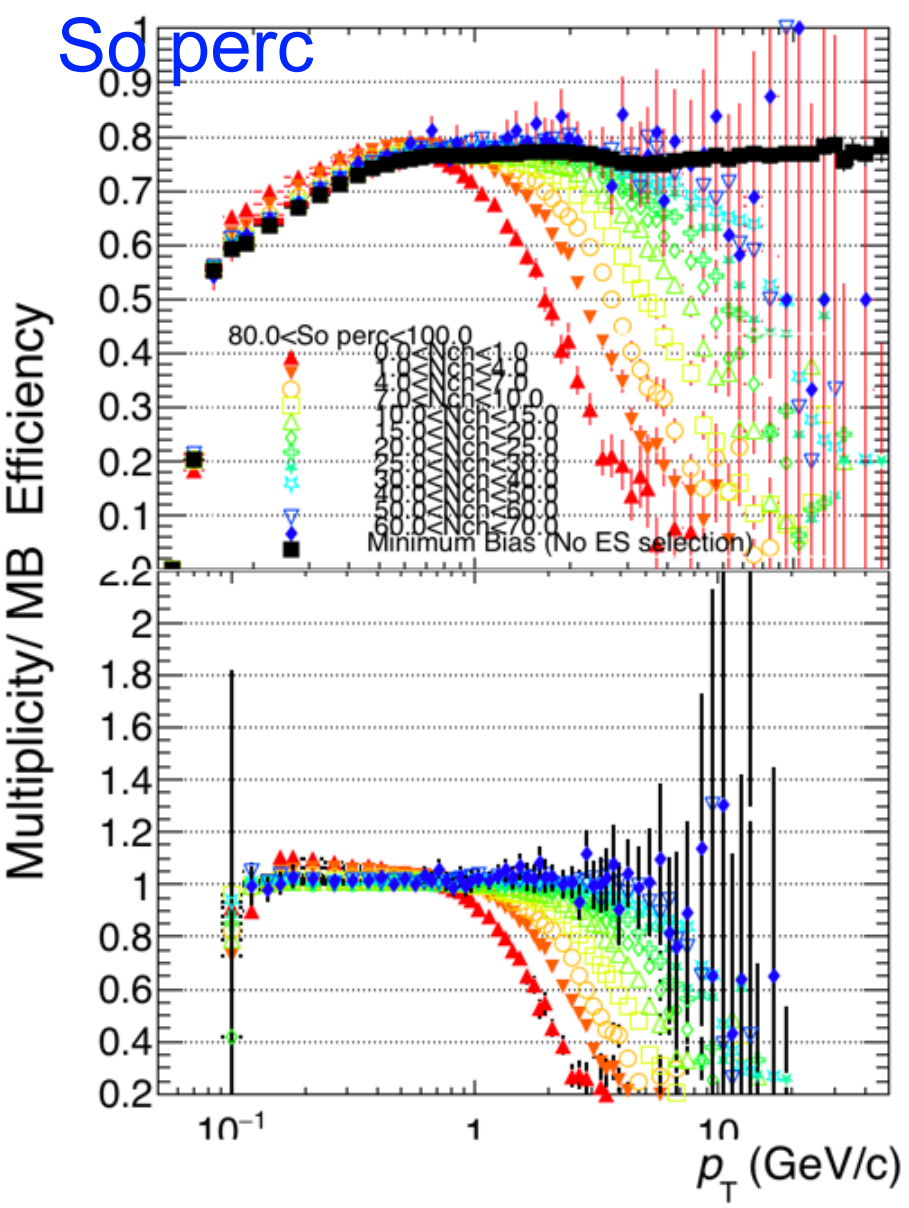


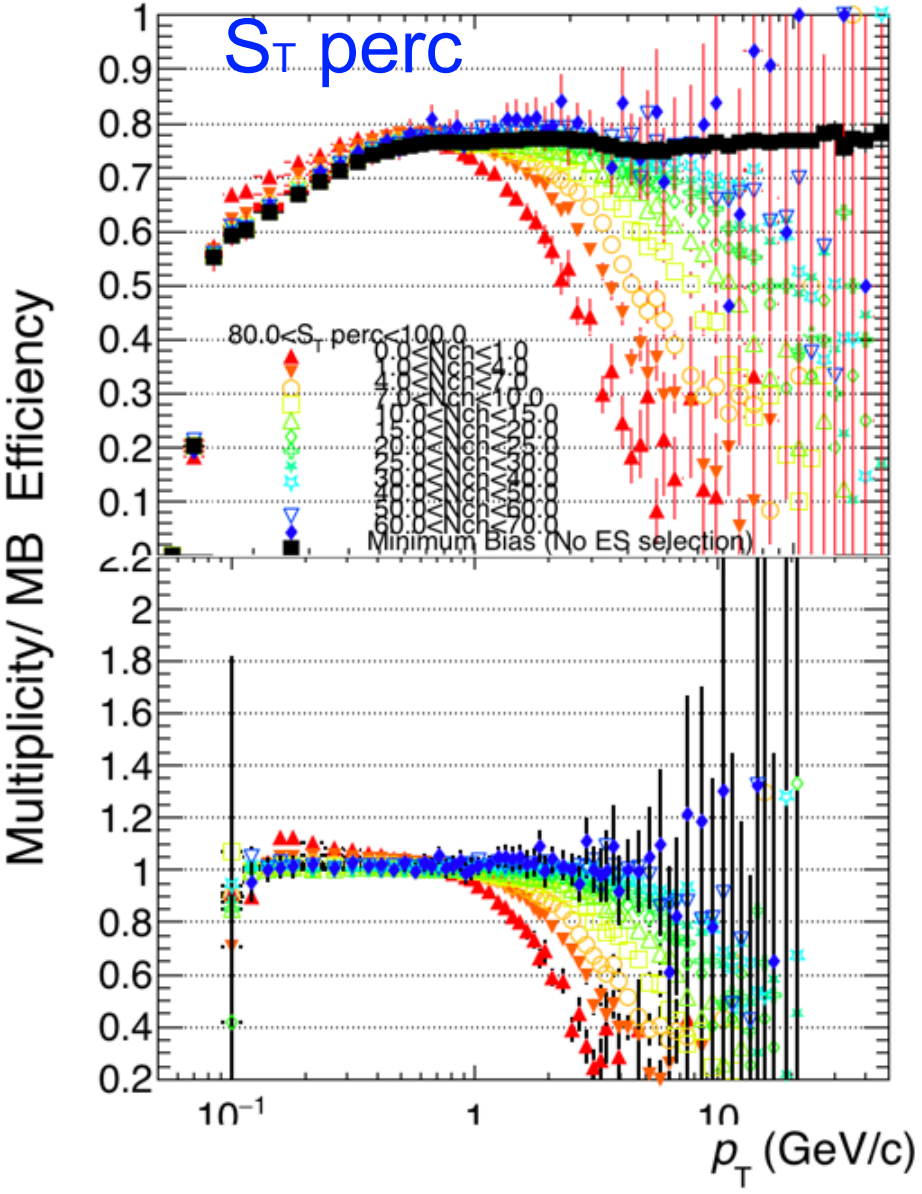
Spherocity Bin B Sphericity



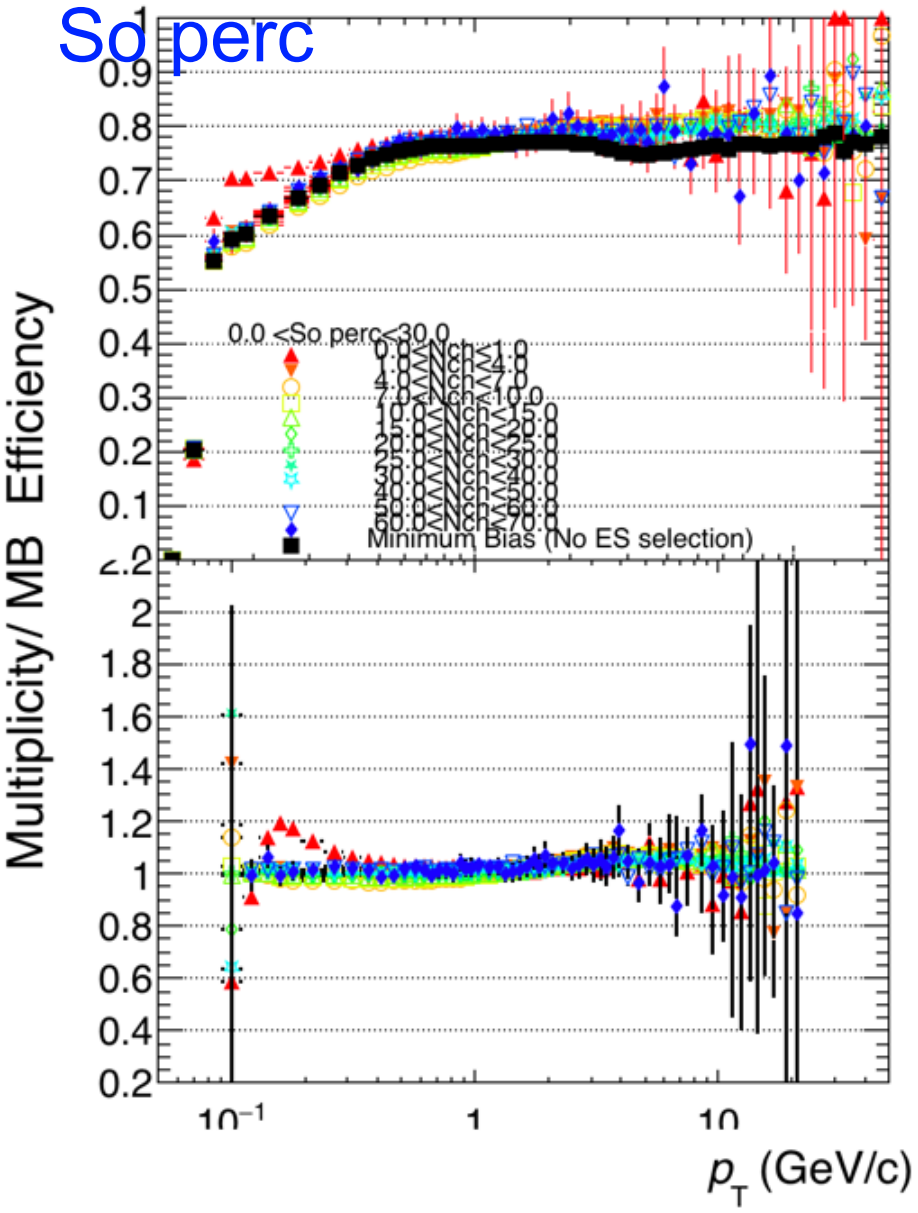


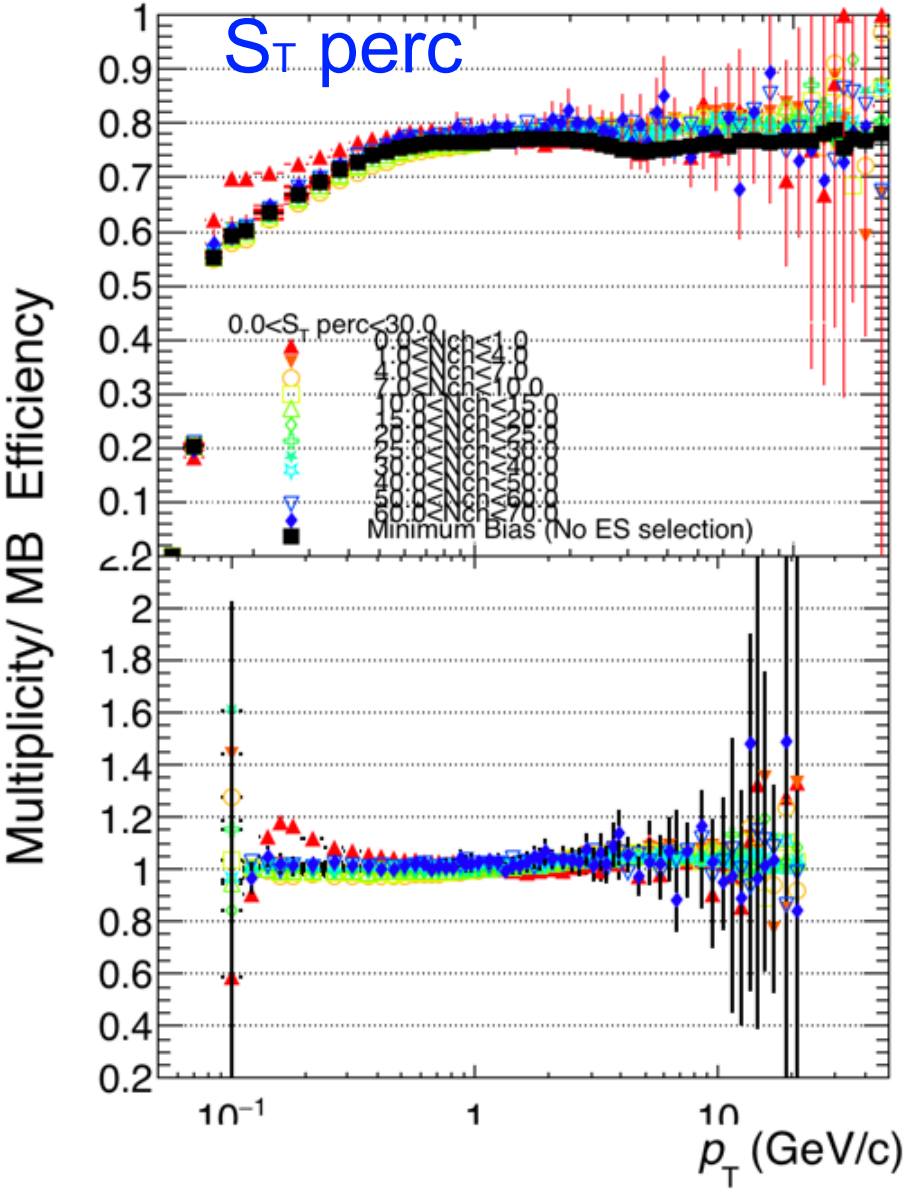
Spherocity Bin B Sphericity



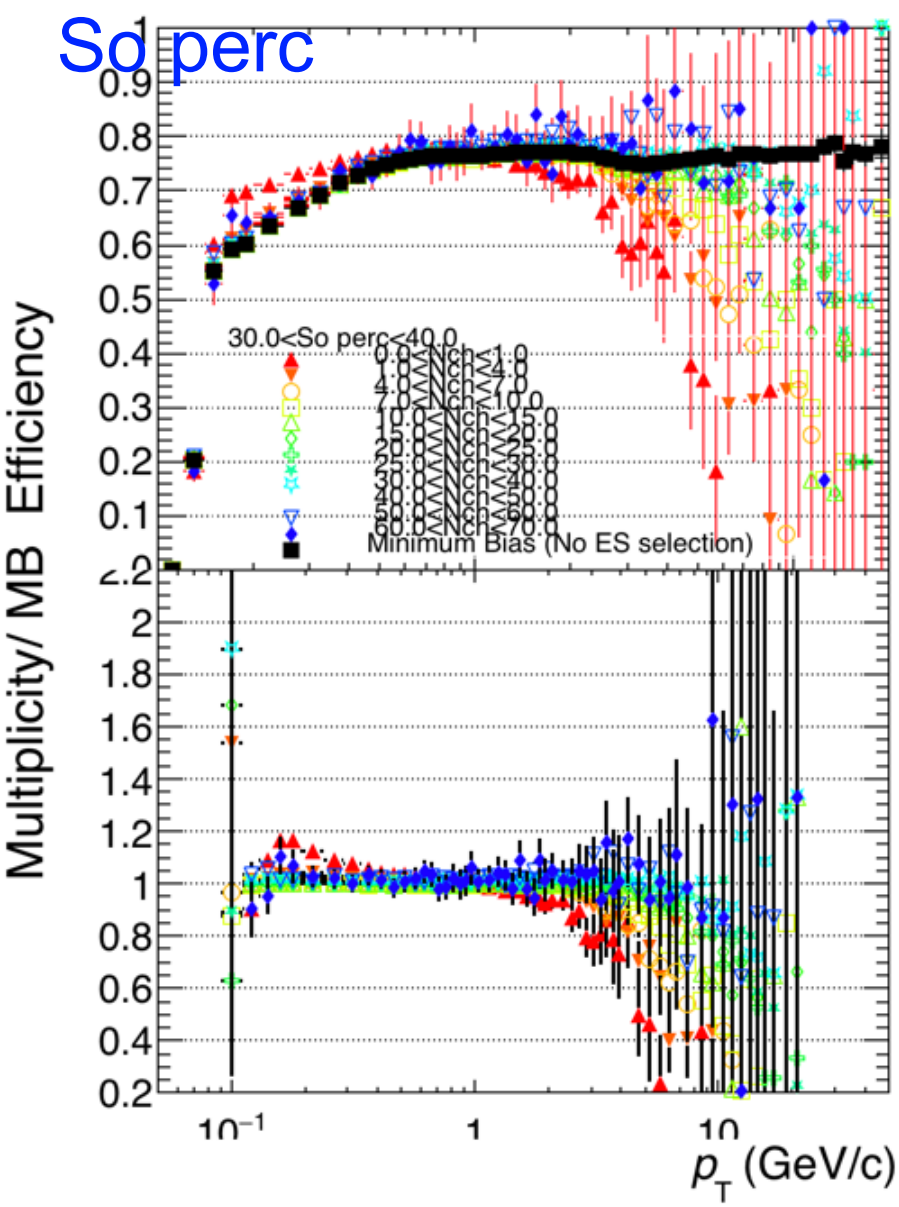


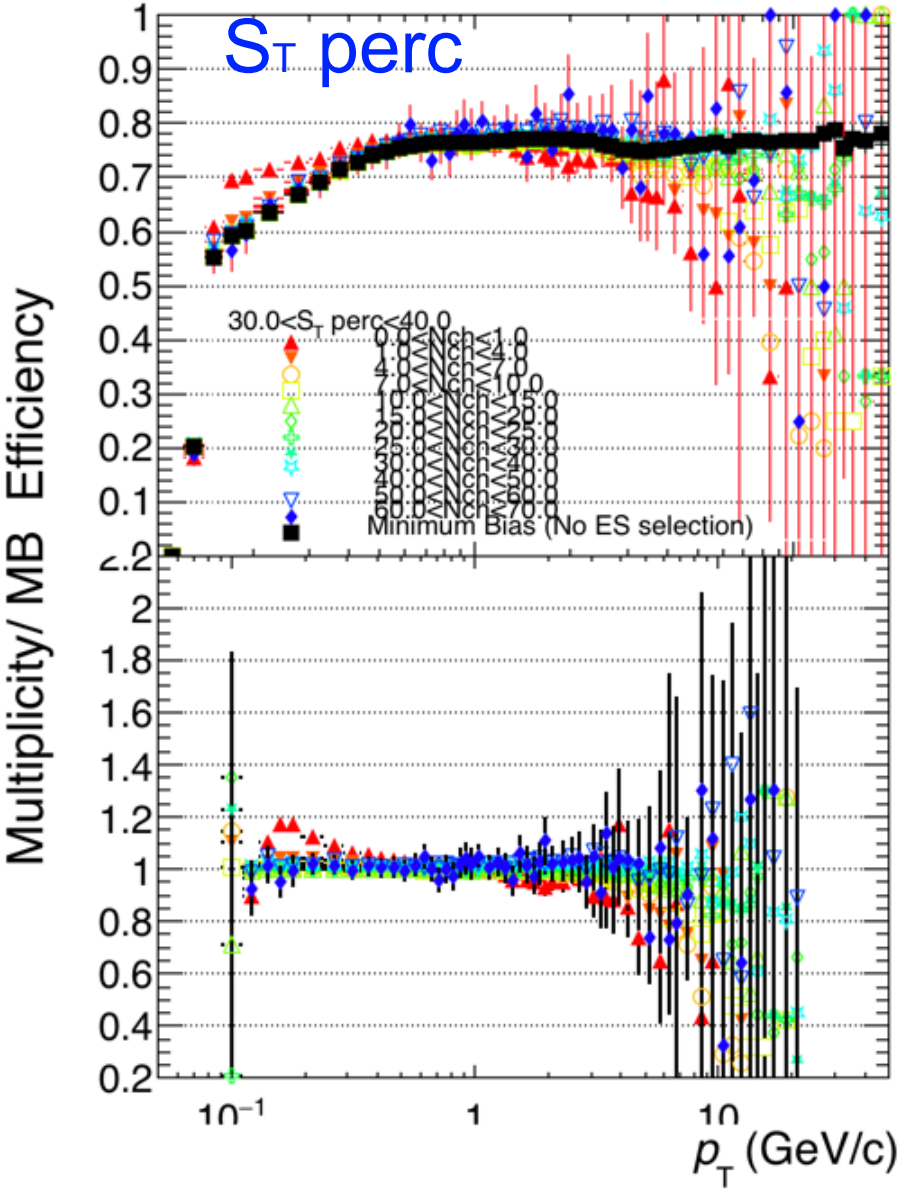
Spherocity Bin C Sphericity



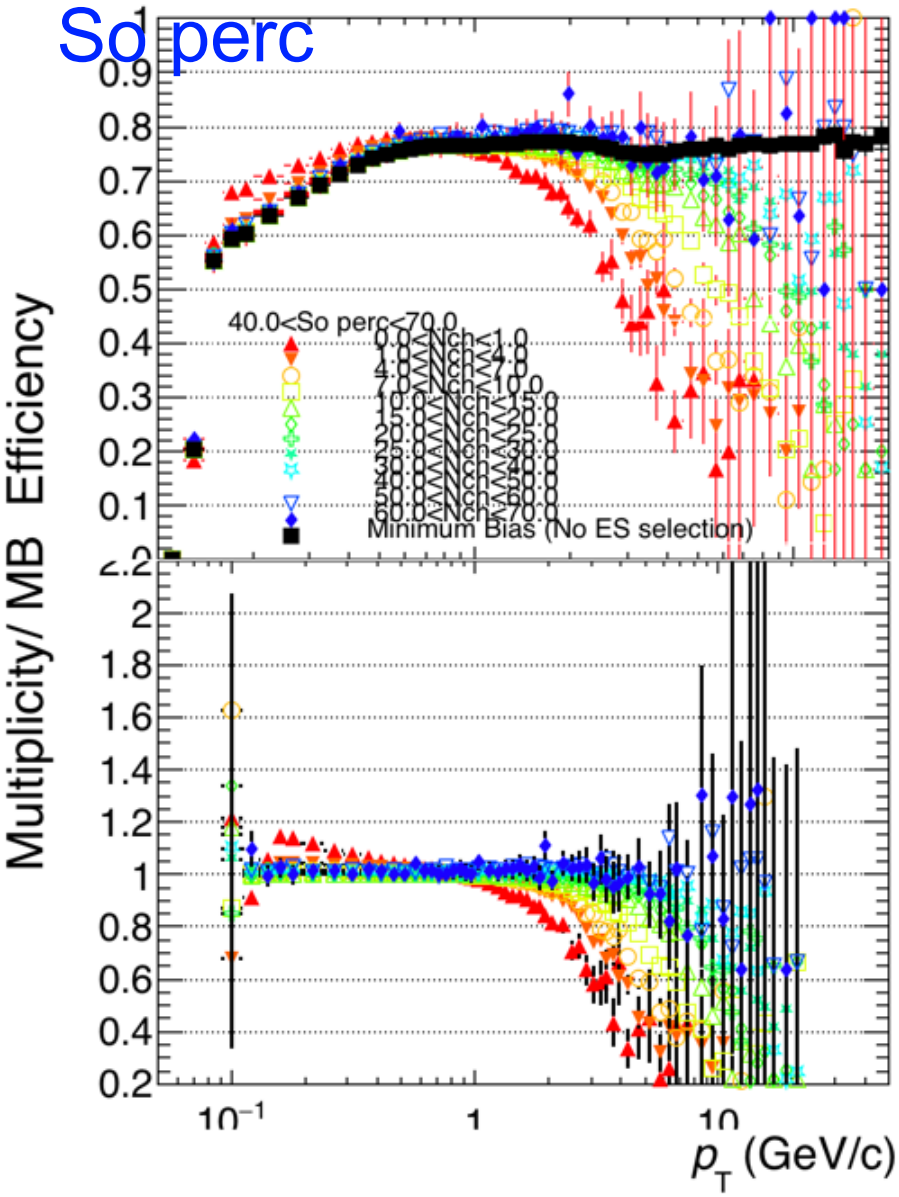


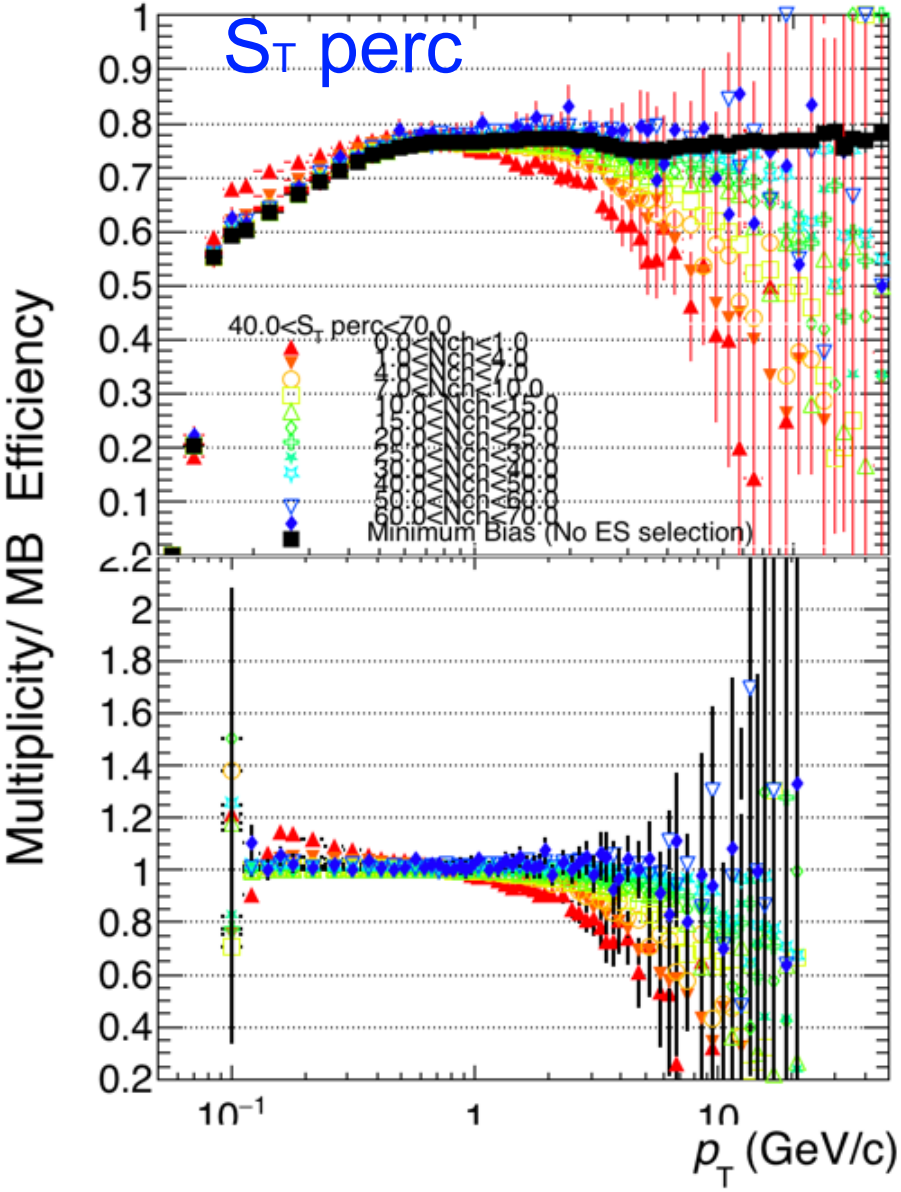
Spherocity Bin C Sphericity





Spherocity Bin C Sphericity





Spherocity Bin C Sphericity