Sphero(i)city technicalities

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Outline

- Response for Sopc_m vs So_m for Pythia Monash
- Projections to ensure the 10% Sopc is taken, in order to get the new So bining for the SoRM
- SoRM in So bins for 10% pc using Pythia Perugia0
- Answere to refere's questions: Chi2 calculation for Pythia and EPOS

- 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

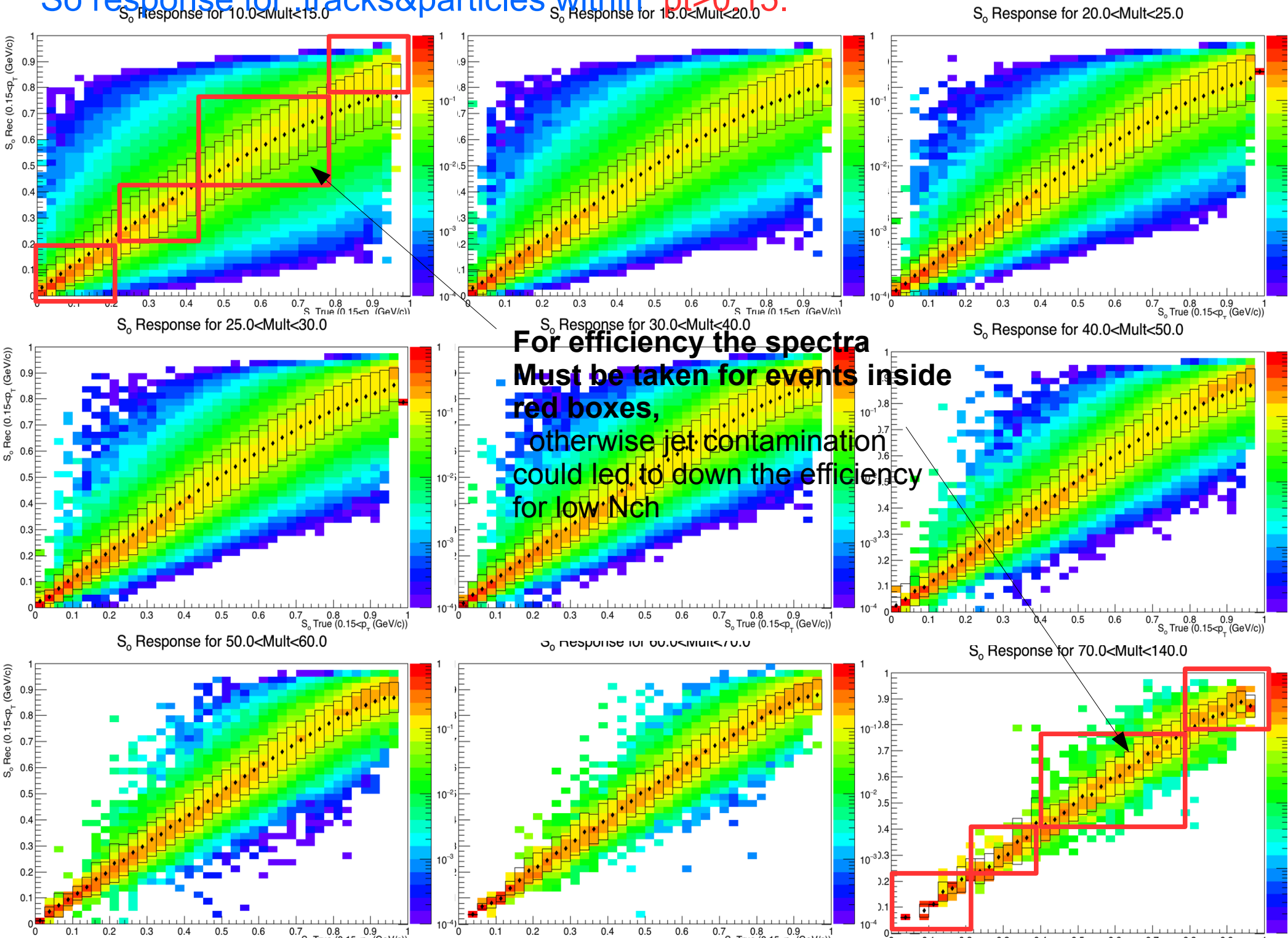
- Sphero(i)city is reconstructed using more than two tracks with transverse momentum greater than 0.15 GeV/c and within $|\eta| < 0.8$. Three sets of cuts were tested:
  - TPC: GetStandardTPCOnlyTrackCuts()+TPCrefit
  - Hybrid: CreateTrackCutsPWGJE(10001008)+CreateTrackCutsPWGJE(10011008)
  - Standard: 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)**

- pp data @ 13 TeV
- Period: LHC15f pass2
- Runs: 225031 225576 225757 226476 225035 225578 225762 226483 225037 225579 225763 226495 225041 225580 225766 226500 225043 225582 225768 225050 225586 226062 225051 225587 226170 225052 225707 226220 225106 225708 226225 225305 225709 226444 225307 225710 226445 225309 225716 226452 225313 225717 226466 225314 225719 226468 225322 225753 226472
- 48 M events were analyzed
- Software: AliRoot::v5-08-13a-1, AliPhysics::vAN-20160716-1
  - According with Evgeny's talk: https://indico.cern.ch/event/489470/, using recent software version: physics selection now implements: new background + pileup cuts
- kINT7 trigger, isIncompleteDAQ
- We use the recommended vertex selection for 13 TeV pp analyses:

https://twiki.cern.ch/twiki/bin/view/ALICE/PWGPPEvSelRun2pp

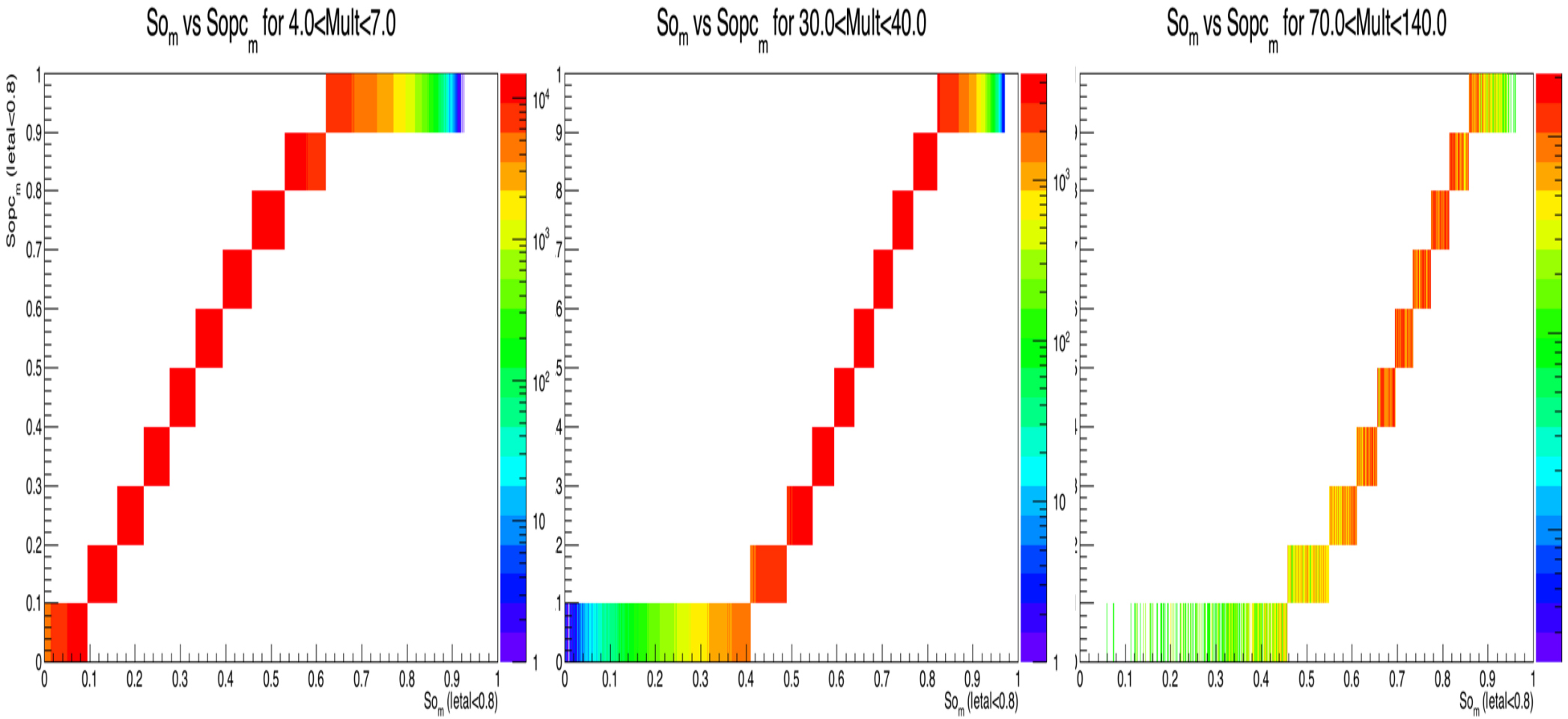
So response for tracks&particles within pt>0.15.



For efficiency the spectra Must be taken for events inside red boxes,
otherwise jet contamination could led to down the efficiency for low Nch

So response (som vs somperc)

- The idea: to get Soperc response matrix (Sopc_t vs Sopc_m)



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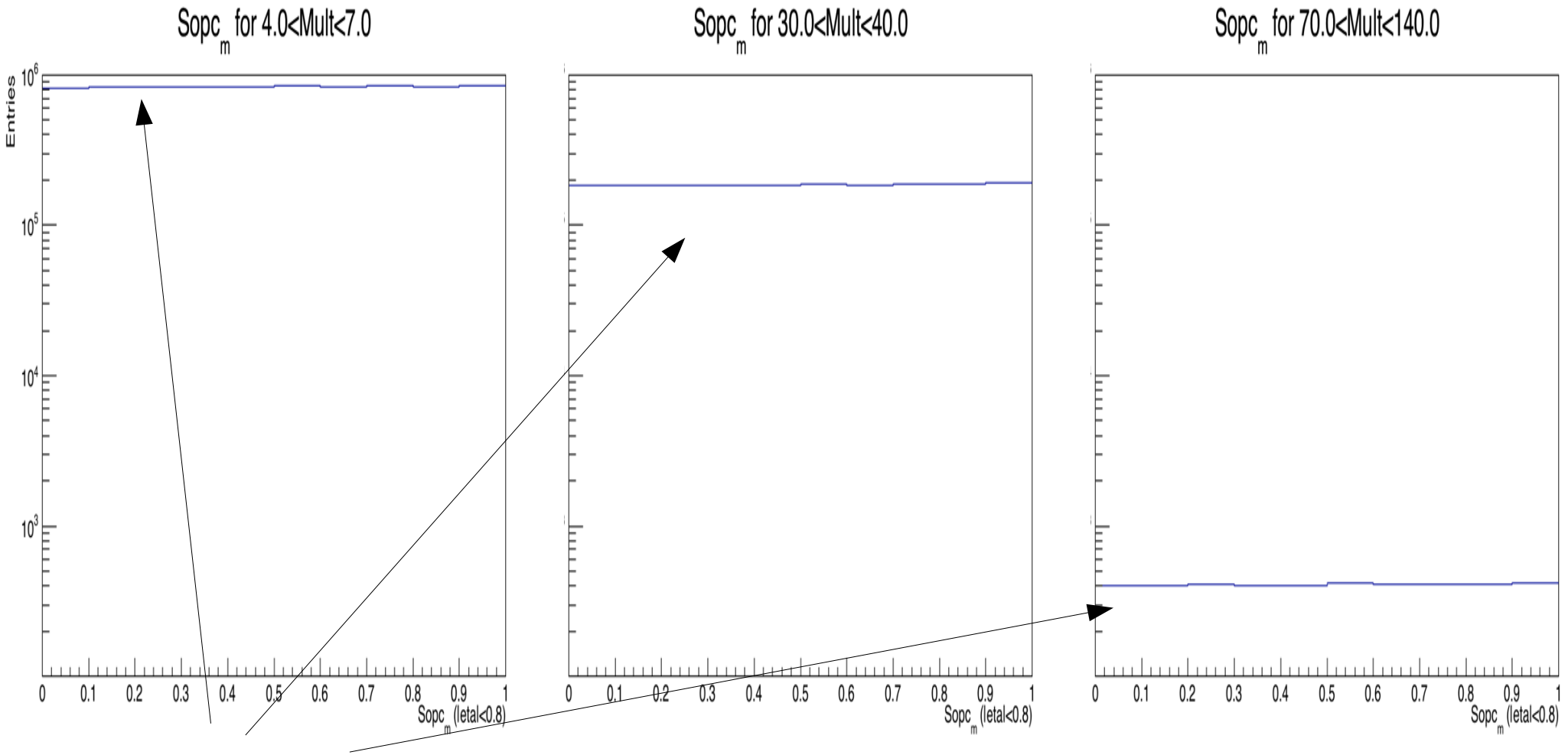
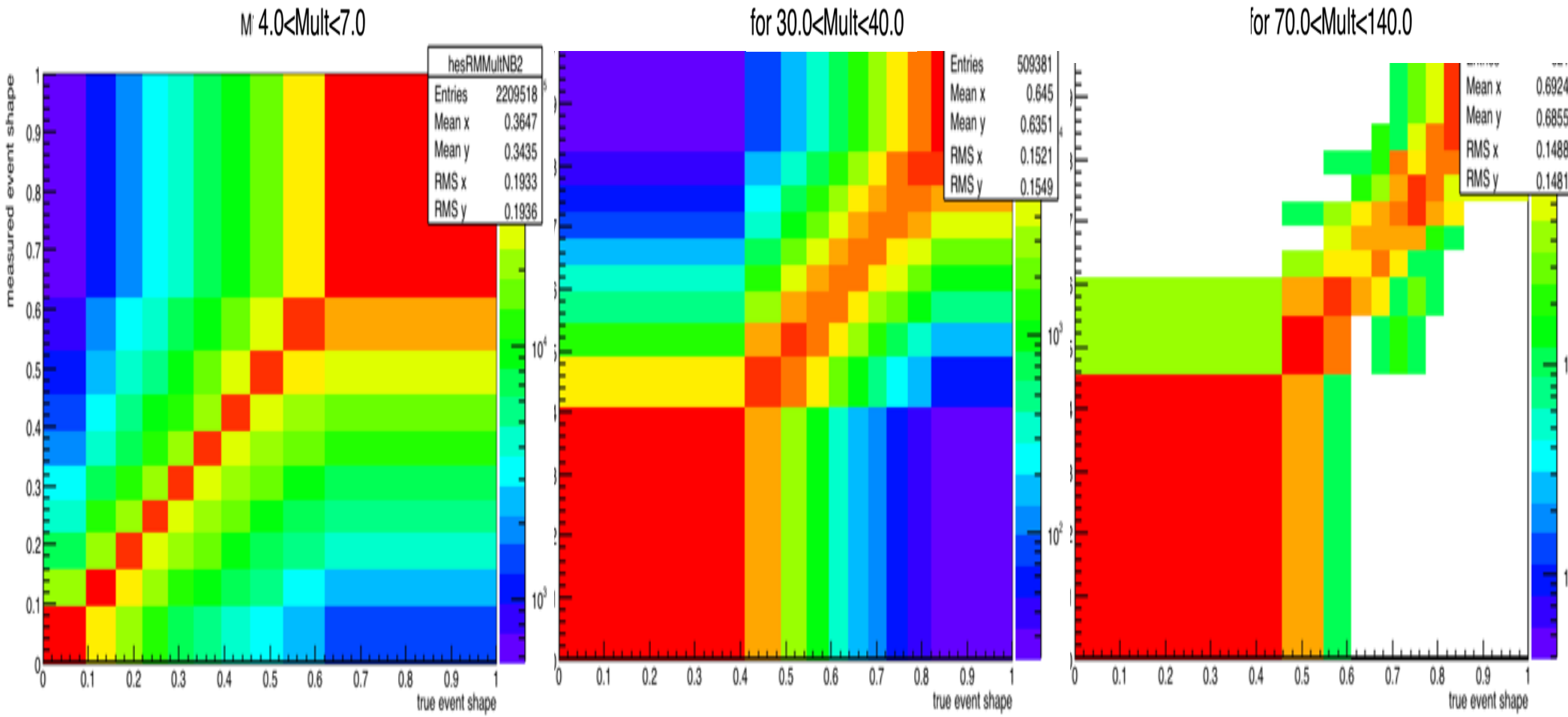


All entries to 10% of Sopc are of the same order

So response (som vs sot in bins corresponding to 10%pc)

- This was done with Perugia 0, in order to unfold Monash as data



All entries to 10% of Sopc are of the same order

- Calculation of Chi2 in order to answere the two last refere`s questions.

  For Pythia (CR, no CR)

dN/deta		Beta_T			Tkin			Chi2_miFCN	
binz	ptjet>5	5<ptjet<10	20<ptjet<25	ptjet>5	5<ptjet<10	20<ptjet<25	ptjet>5	5<ptjet<10	20<ptjet<25
0	0.235603	0.458924	0.466984	0.130237	0.117952	0.116517	3.28347	0.0844051	1.50712
1	0.267855	0.405684	0.471974	0.150281	0.130901	0.122964	1.23443	0.211819	0.192153
2	0.3295	0.42466	0.46066	0.148746	0.131665	0.128196	1.08755	0.371459	0.186932
3	0.352988	0.436739	0.47314	0.147962	0.131716	0.126577	1.03196	0.412505	0.220832
4	0.359541	0.441606	0.489634	0.147945	0.132362	0.123212	1.00389	0.413585	0.177859
5	0.364311	0.445365	0.50315	0.146718	0.132845	0.119781	1.01403	0.434367	0.194666
6	0.33475	0.447905	0.509936	0.150597	0.132922	0.120431	0.8561	0.360656	0.243851
7	0.300812	0.452296	0.510851	0.155789	0.132336	0.123777	0.917585	0.390048	0.516841
8	0.606388	0.45846	0.556484	0.0850605	0.129104	0.093683	0.611003	0.713898	0.531304
9	0.680481	0.376818	0.516938	0.0301462	0.126063	0.112439	0.458924	1.26018	1.19458

				NCR					
dN/deta		Beta_T			Tkin			Chi2	
binz	ptjet>5	5<ptjet<10	20<ptjet<25	ptjet>5	5<ptjet<10	20<ptjet<25	ptjet>5	5<ptjet<10	20<ptjet<25
0	0.226345	0.379451	0.473676	0.126855	0.118919	0.106398	4.64743	0.224575	1.08961
1	0.233474	0.29872	0.401718	0.135569	0.131603	0.123453	2.84187	0.581838	0.249739
2	0.230267	0.276472	0.320491	0.138533	0.13477	0.134393	2.62436	1.46475	0.306867
3	0.225967	0.264389	0.299972	0.140717	0.137974	0.135953	2.51269	1.7393	1.03019
4	0.221177	0.25672	0.291328	0.142214	0.14039	0.138698	2.42478	1.77893	1.35173
5	0.215434	0.25176	0.287311	0.143364	0.142208	0.140576	2.35625	1.794	1.3117
6	0.20888	0.249787	0.284437	0.144076	0.143188	0.141798	2.61223	1.732	1.29118
7	0.199028	0.24756	0.282802	0.143745	0.144687	0.143726	1.49569	1.68982	1.56443
8	0.237967	0.246738	0.284919	0.124701	0.145402	0.14233	0.803444	1.85746	1.45582
9	0.104439	0.244971	0.2768	0.3	0.147127	0.147067	0	2.23838	0.819405

- Calculation of Chi2 in order to answere the two last refere`s questions.

  For EPOS (Hydro, no Hydro)

				Hydro					
dN/deta		Beta_T			Tkin			Chi2	
binz	ptjet>5	5<ptjet<10	20<ptjet<25	ptjet>5	5<ptjet<10	20<ptjet<25	ptjet>5	5<ptjet<10	20<ptjet<25
0	0.25899	0.421773	0.33	0.122323	0.0999429	0.12596	5.55015	0.169318	1.10106
1	0.317589	0.446456	0.400229	0.134396	0.123279	0.142804	1.42341	0.360365	0.611004
2	0.400424	0.471146	0.443002	0.138082	0.133573	0.147498	1.08763	0.561077	0.620219
3	0.424769	0.480138	0.473513	0.142014	0.138155	0.144622	1.05433	0.694378	0.556179
4	0.438677	0.486788	0.482207	0.144909	0.141056	0.149161	1.14148	0.821225	0.731736
5	0.443575	0.491549	0.505442	0.14873	0.142965	0.140963	1.32596	0.923565	0.767189
6	0.457889	0.491209	0.507069	0.141779	0.145135	0.143377	1.47847	1.0541	0.730442
7	0.449659	0.498149	0.536677	0.130512	0.144498	0.125934	1.50268	1.22357	1.30293
8	0.592093	0.490303	0.555372	0.0432197	0.147059	0.118906	0.921137	1.43058	1.04094
9	0.104439	0.496513	0.603596	0.3	0.139891	0.0907416	0	1.87702	1.35148
				NoHydro					
dN/deta		Beta_T			Tkin			Chi2	
binz	ptjet>5	5<ptjet<10	20<ptjet<25	ptjet>5	5<ptjet<10	20<ptjet<25	ptjet>5	5<ptjet<10	20<ptjet<25
0	0.235603	0.418811	0.466984	0.130237	0.117952	0.116517	3.28347	0.0844051	1.50712
1	0.267855	0.405684	0.471974	0.150281	0.130901	0.122964	1.23443	0.211819	0.192153
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Conclusions

- The new So response matrix are getted in the binning for 10% pc in So.

- To do

  Get the <pt> spectra in So bins of Monash and unfold with Perugia 0.

- Do the same with data.

Backup

Efficiency So_{t} not = So_{r} cases: Only primary both in rec and true

MB

Jetty

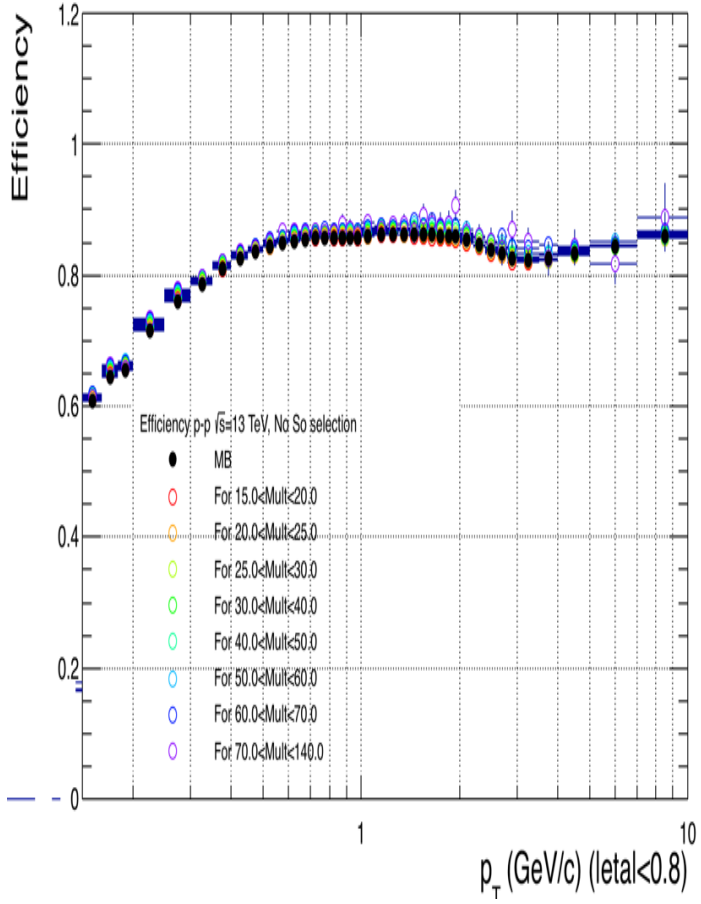
0.0% <So_{r}< 10%

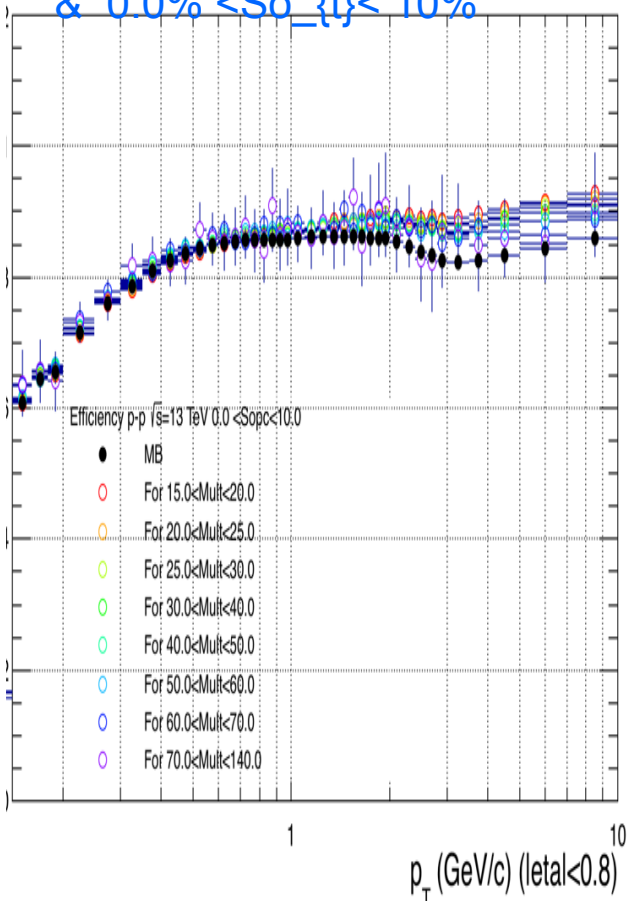
& 0.0% <So_{t}< 10%

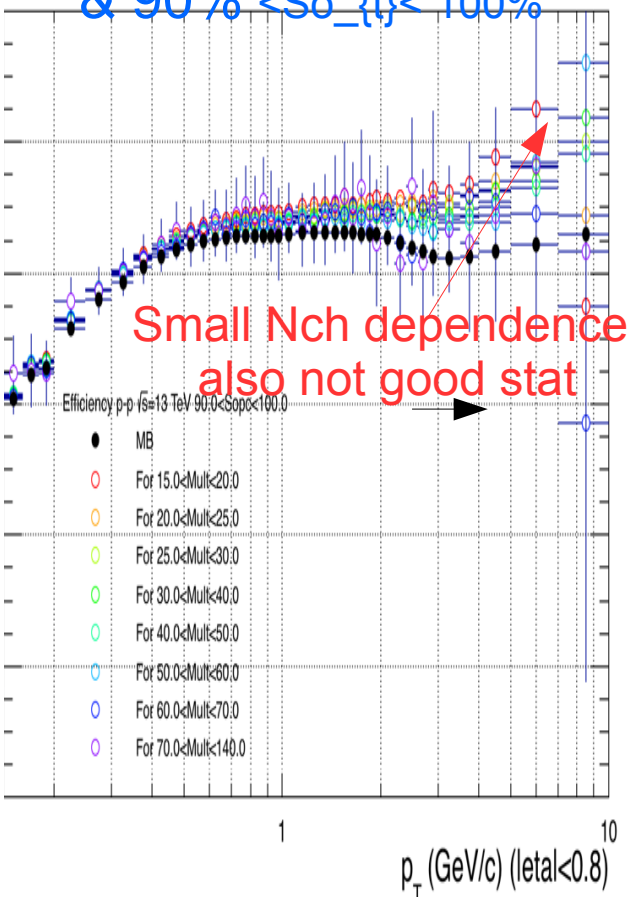
Isotropic

90% <So_{r}< 100%

& 90% <So_{t}< 100%





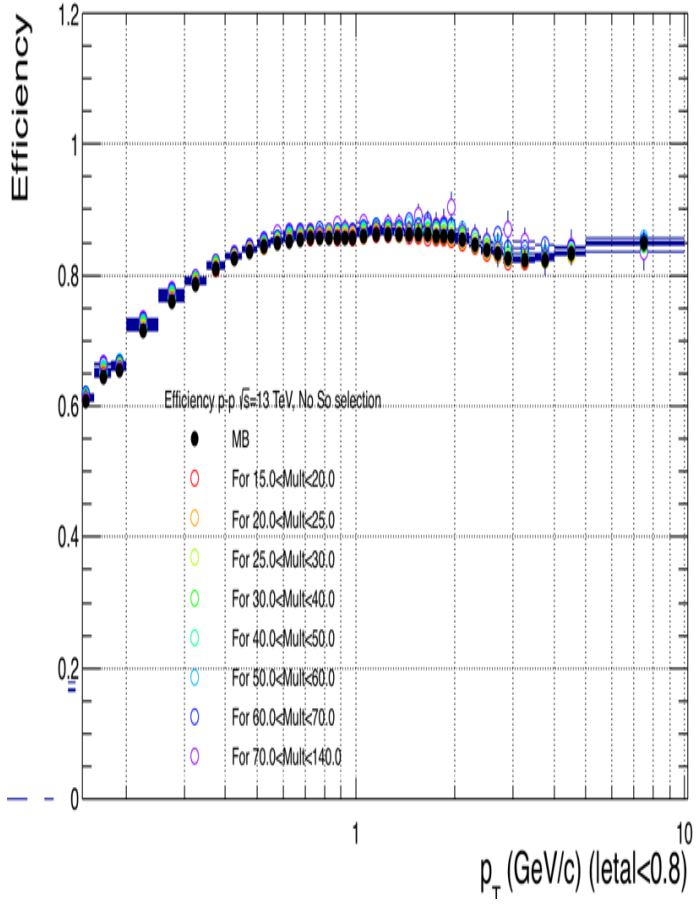


Pt Rebinning:

```
const Int_t nPtBins      = 43;
Double_t xBins[nPtBins+1]={0.01,0.1,0.12,0.14,0.16,0.18,0.2,0.2,0.3,0.35,0.4,0.45,0.5,0.55,0.6,0.65,
0.7,0.75,0.8,0.85,0.9,0.95,1,1.1,1.2,1.3,1.4,1.5,1.6,1.7,1.8,1.9,2,2.2,2.4,2.6,2.8,3,3.5,4,5,7,10,20}
```

Efficiency So_{t} not = So_{r} cases: Only primary both in rec and true

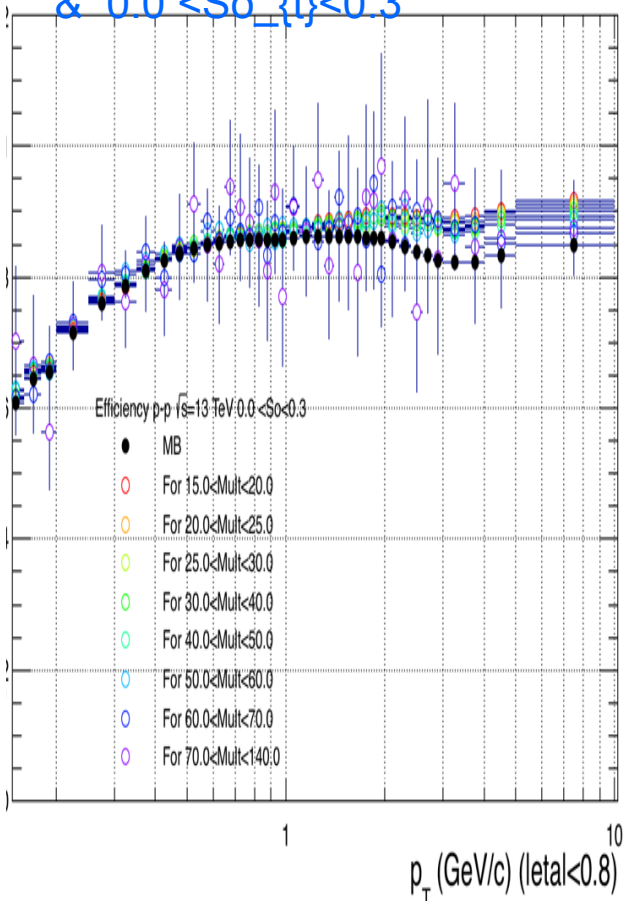
MB



Jetty

0.0 <So_{r}<0.3

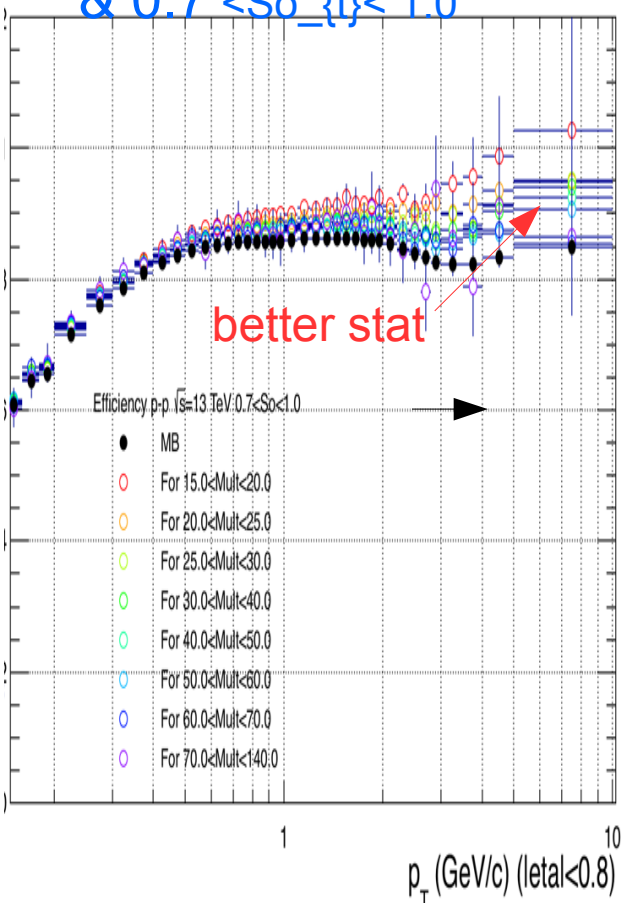
& 0.0 <So_{t}<0.3



Isotropic

0.7 <So_{r}< 1.0

& 0.7 <So_{t}< 1.0



Pt Rebinning:

```
const Int_t nPtBins      = 42;
Double_t xBins[nPtBins+1]={0.01,0.1,0.12,0.14,0.16,0.18,0.2,0.2,0.3,0.35,0.4,0.45,0.5,0.55,0.6,0.65,
0.7,0.75,0.8,0.85,0.9,0.95,1,1.1,1.2,1.3,1.4,1.5,1.6,1.7,1.8,1.9,2,2.2,2.4,2.6,2.8,3,3.5,4,5,10,20}
```