Measurement of Prompt and Non-prompt J/ψ in Pb-Pb Collisions at $\sqrt{s_{NN}} = 5.02$ TeV in Central Barrel

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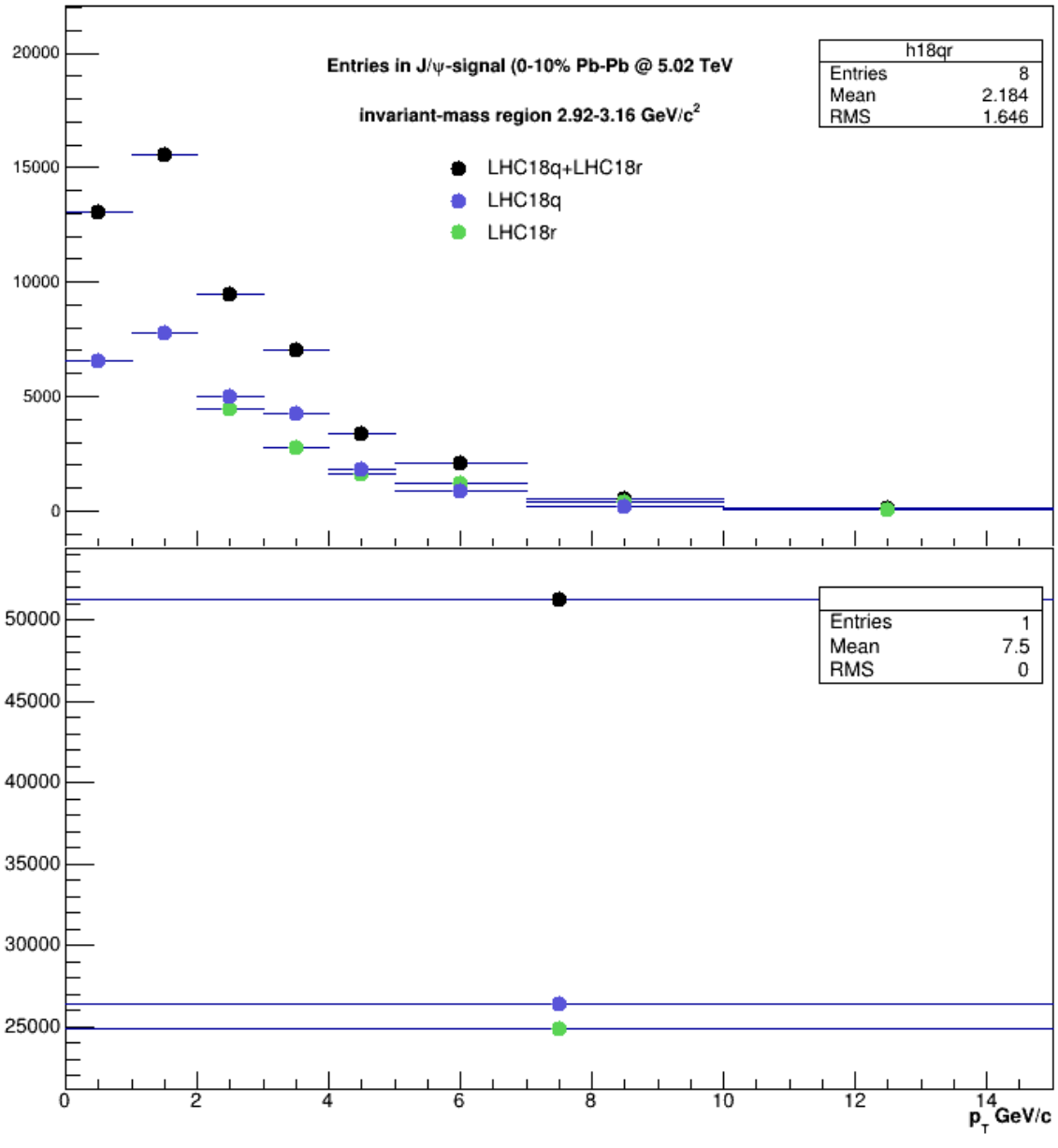
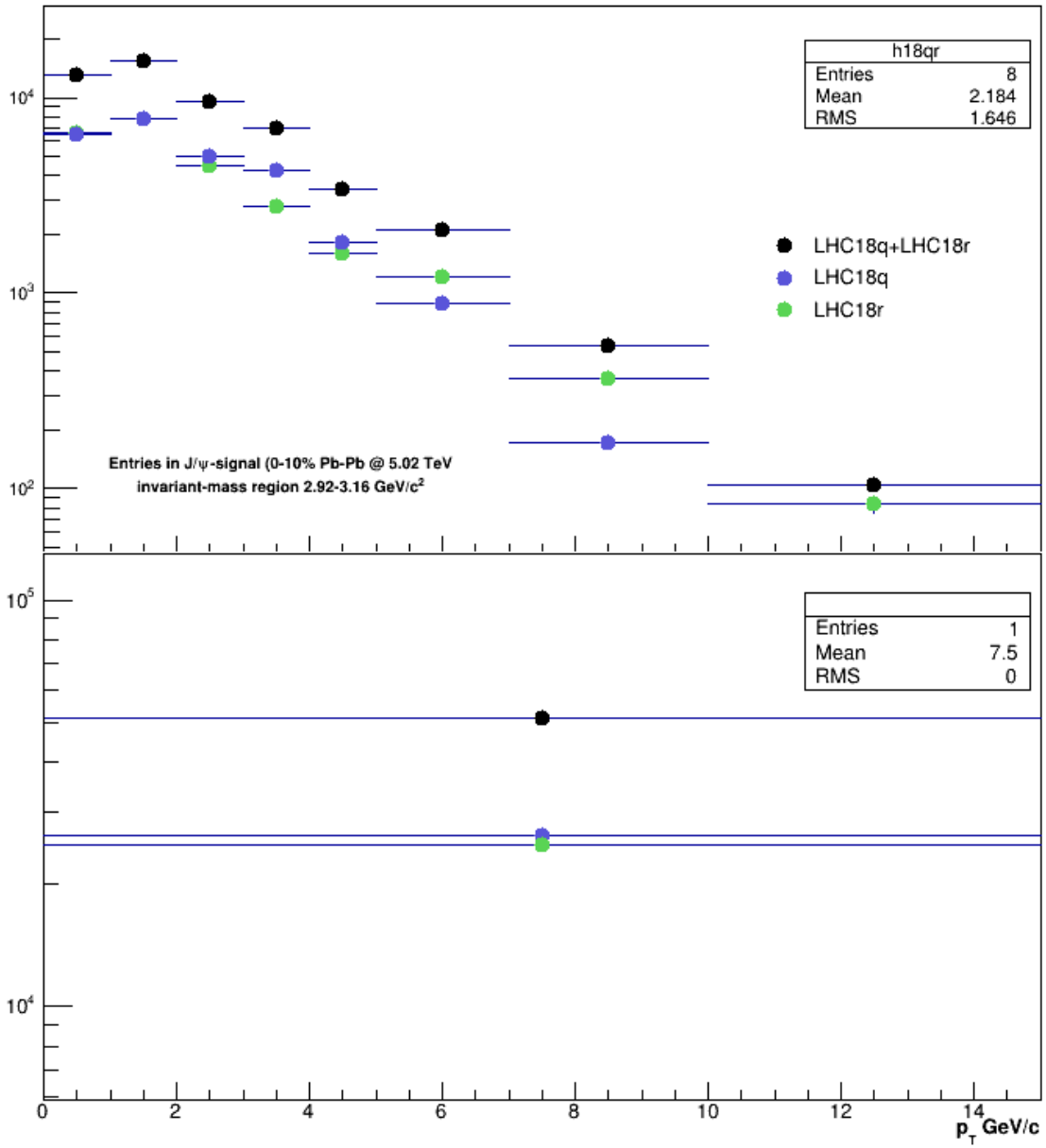
November 18, 2019

0-10% PbPb


Entries in J/ψ-signal (0-10% Pb-Pb @ 5.02 TeV
invariant-mass region 2.92-3.16 GeV/c²
LHC18q+LHC18r
LHC18q
LHC18r
h18qr
Entries 8
Mean 2.184
RMS 1.646
Entries 1
Mean 7.5
RMS 0
p_T GeV/c

0-10% PbPb


h18qr
Entries 8
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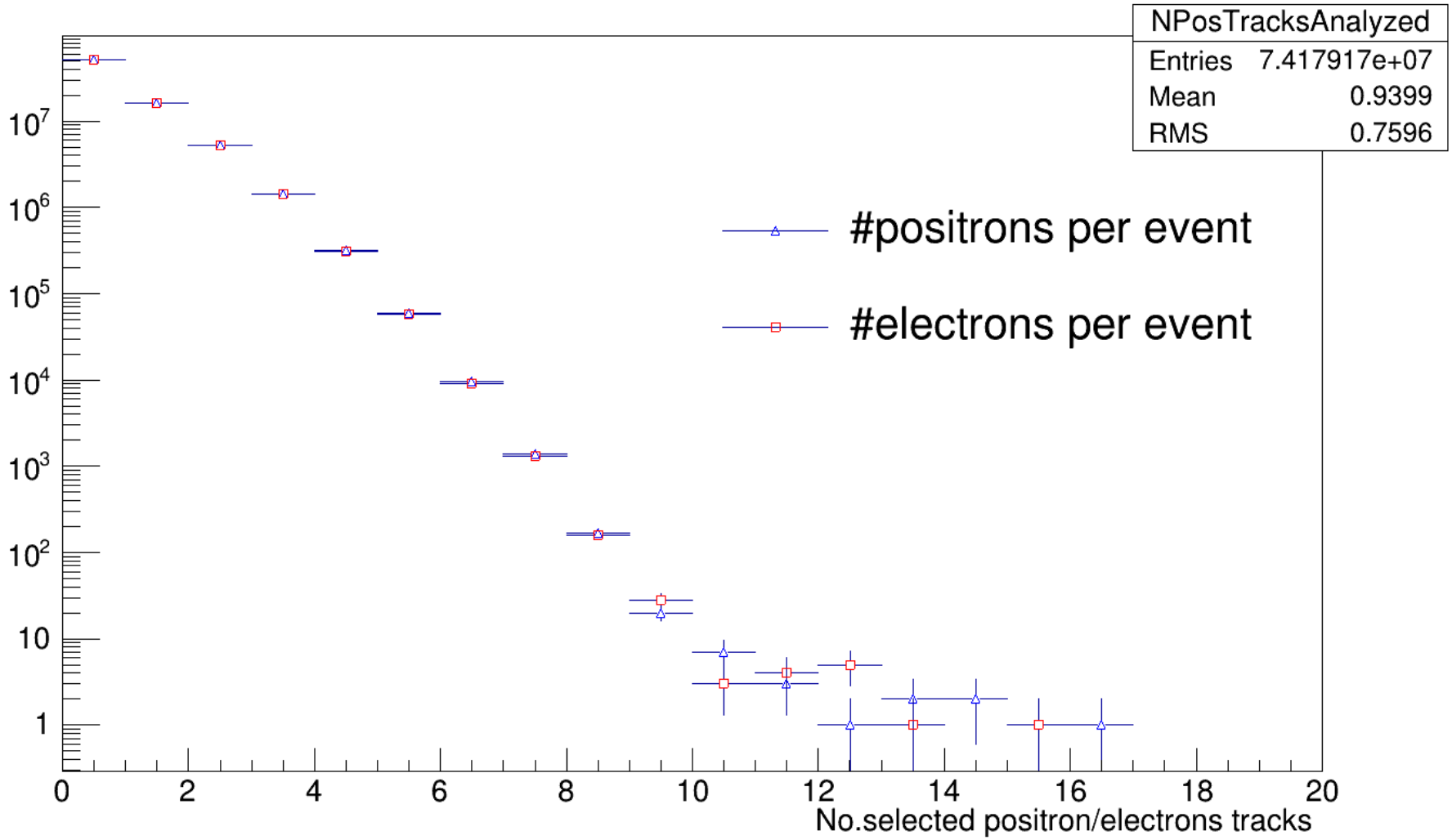
LHC18q
LHC18r
Entries in J/ψ-signal (0-10% Pb-Pb @ 5.02 TeV
invariant-mass region 2.92-3.16 GeV/c²
Entries 1
Mean 7.5
RMS 0
p_T GeV/c

Done this week and continues: (Following the above plot)

- Monitoring observables run-wise $\rightarrow$ the idea was to see the # of J/ψ-per run in 18q and 18r (code is ready).
  - 18r can be quantified run-wise.
  - 18q Histograms are missing the run information, because trees were merged before, So the analysis has to be re-run in parallel (currently copying them)
- For the Bullet-1, I compared *Same Event Like Sign* vs *Mixed Event Unlike sign* background rejection $\rightarrow$ because we per run we have many times less statistics than period, so it is good to monitor which technique reduces the combinatorial background better.
- For 18r period, we can monitor the observables run-wise for e.g. DCAs, dEdx ... (NOW!)

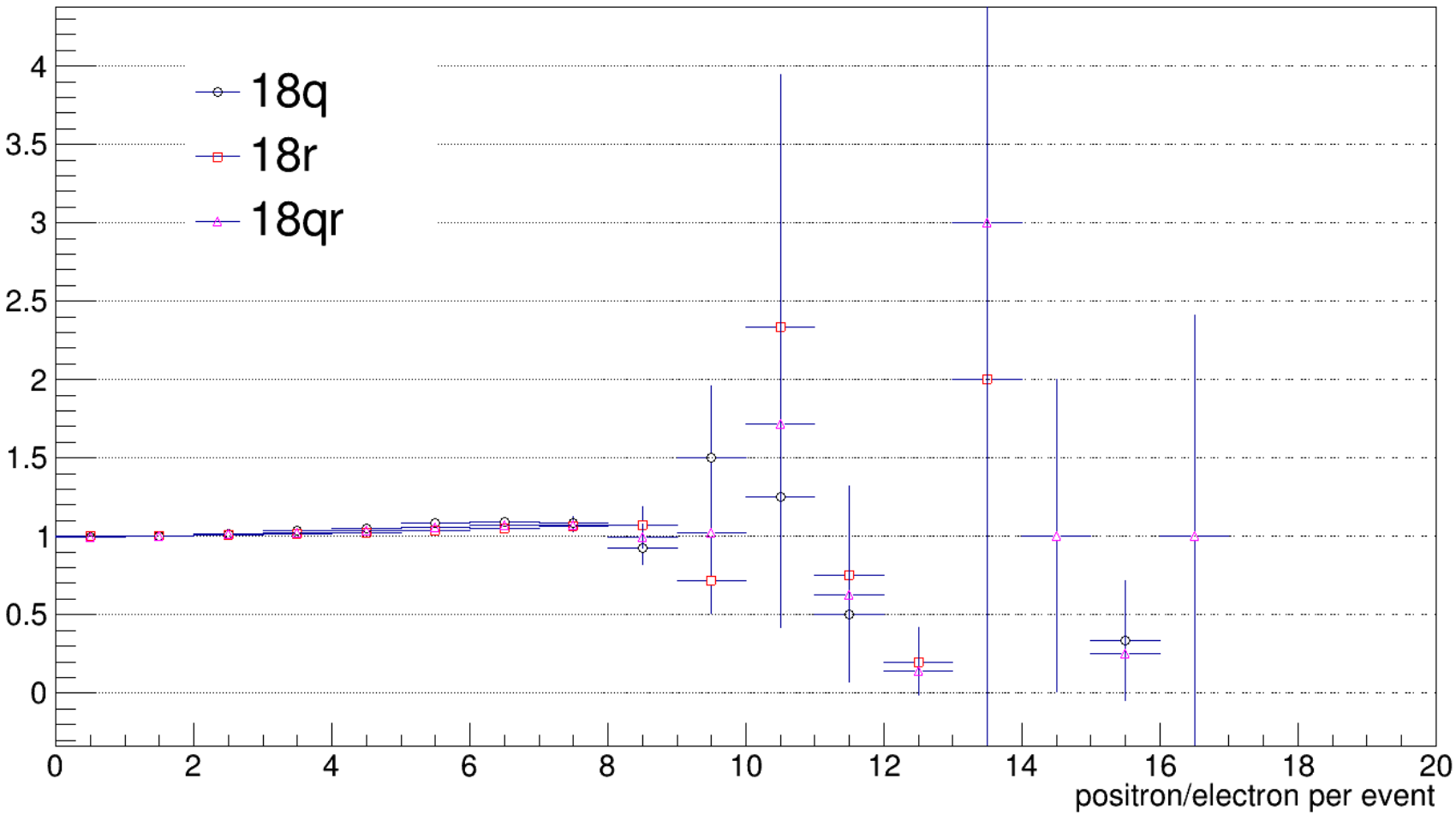
$e^+ - e^-$- Distributions

0-10% PbPb for LHC18r



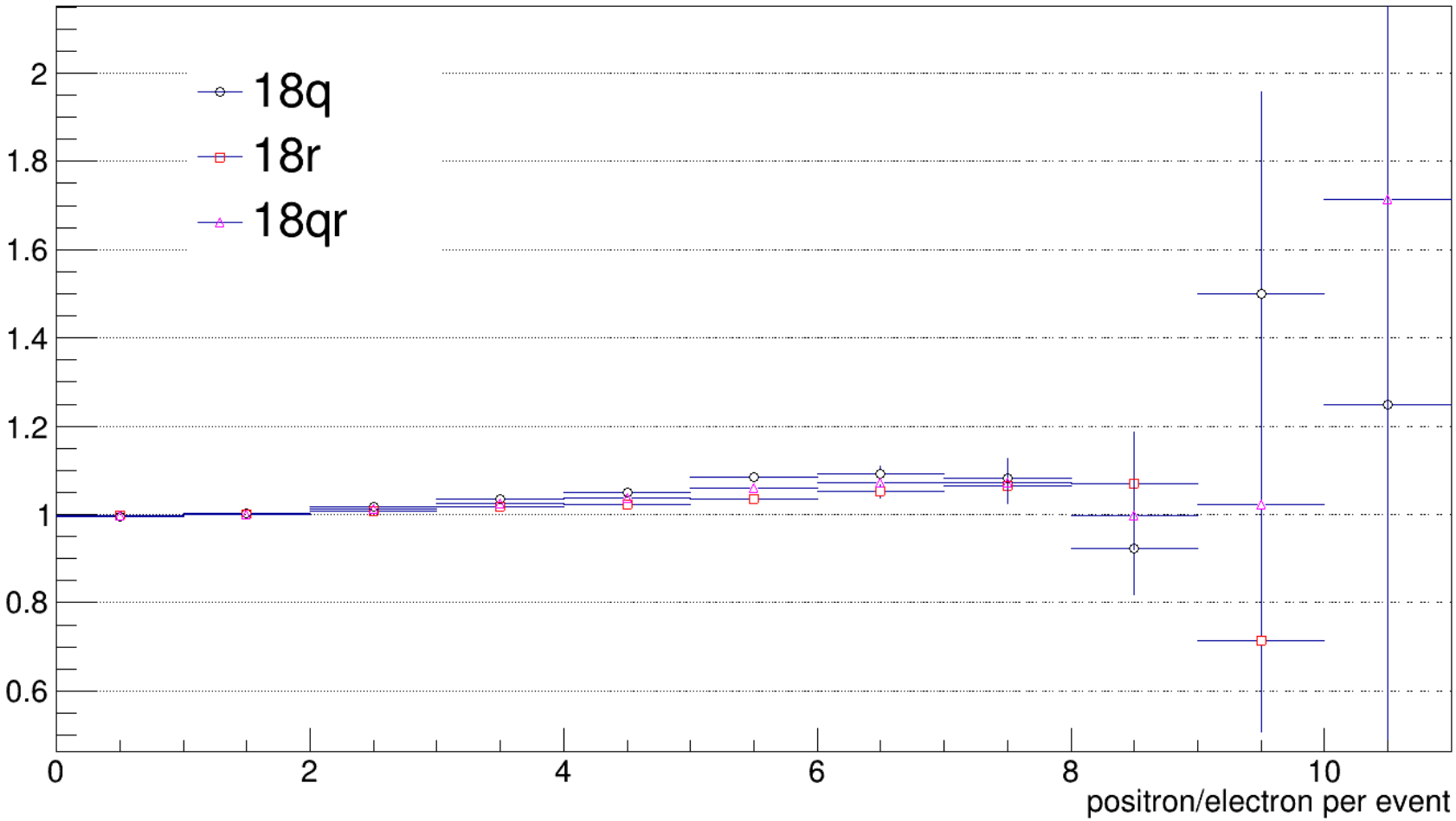
→ Further, we a comparision of $\frac{\#\ of\ pos}{\#\ of\ neg}$ ratio for 18q, 18r and 18q+18r.

0-10% PbPb

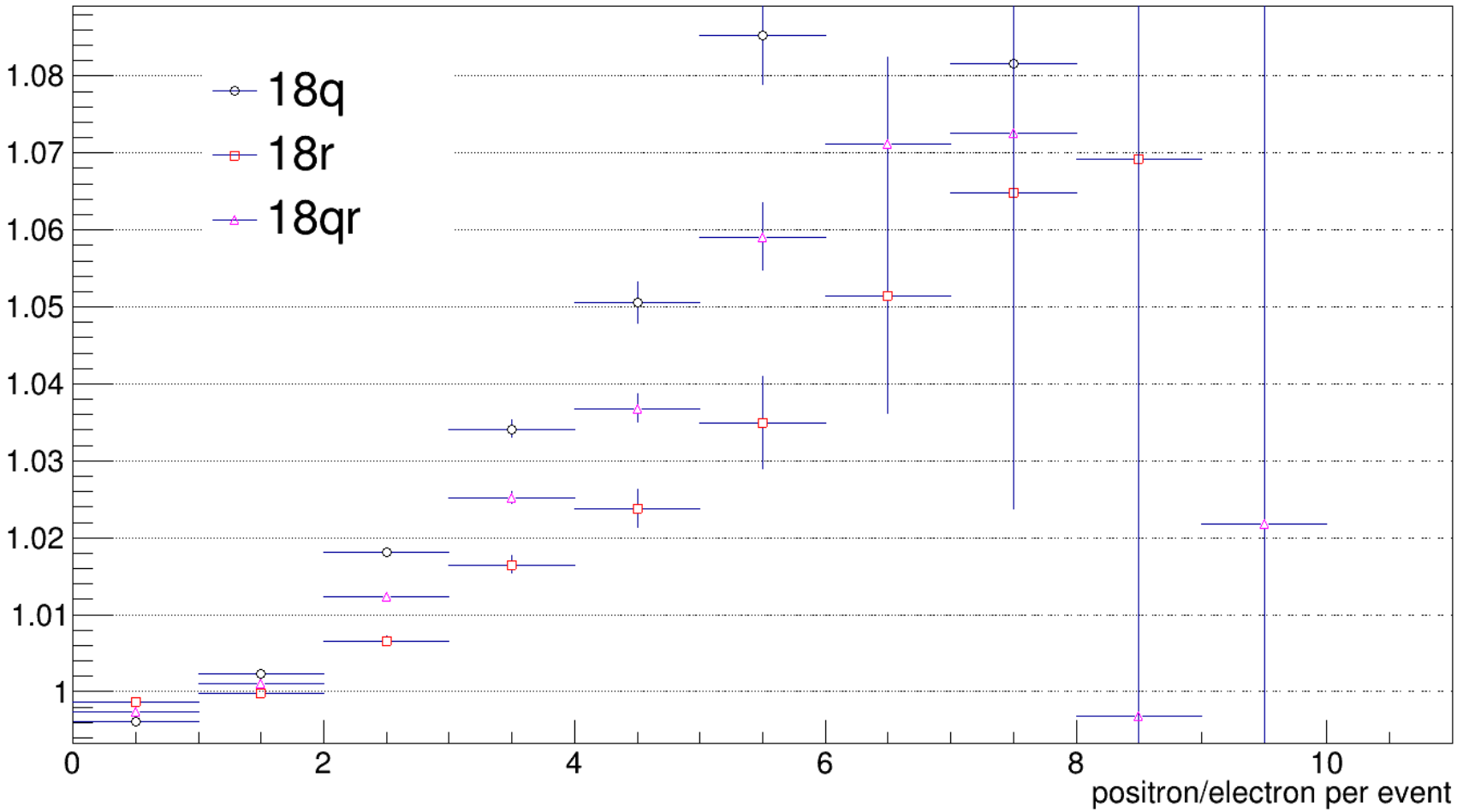


$\rightarrow$ Does it mean, In higher multiplicity events, more e^+e^- are mistagged??

0-10% PbPb

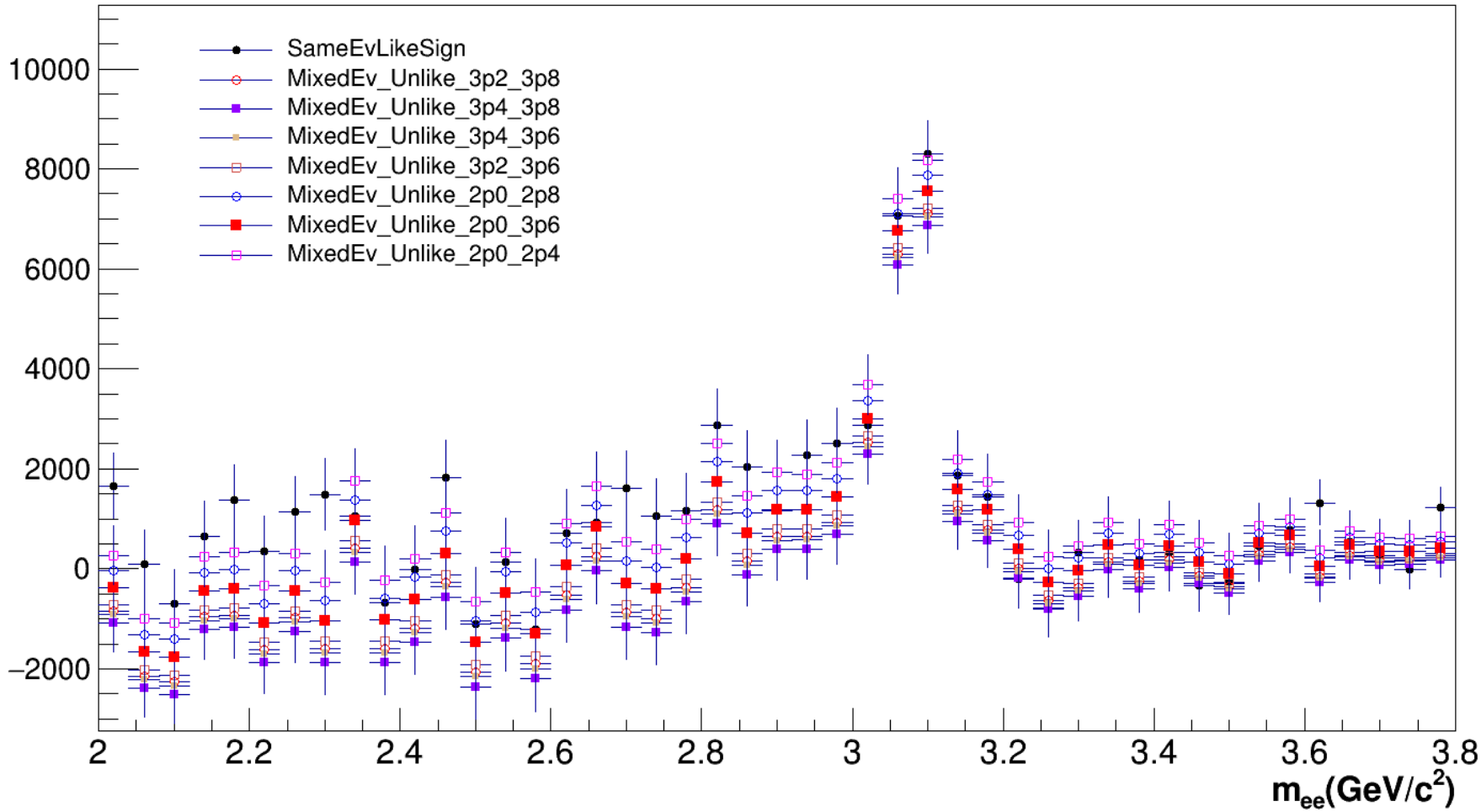

18q
18r
18qr
2
1.8
1.6
1.4
1.2
1
0.8
0.6
0
2
4
6
8
10
positron/electron per event

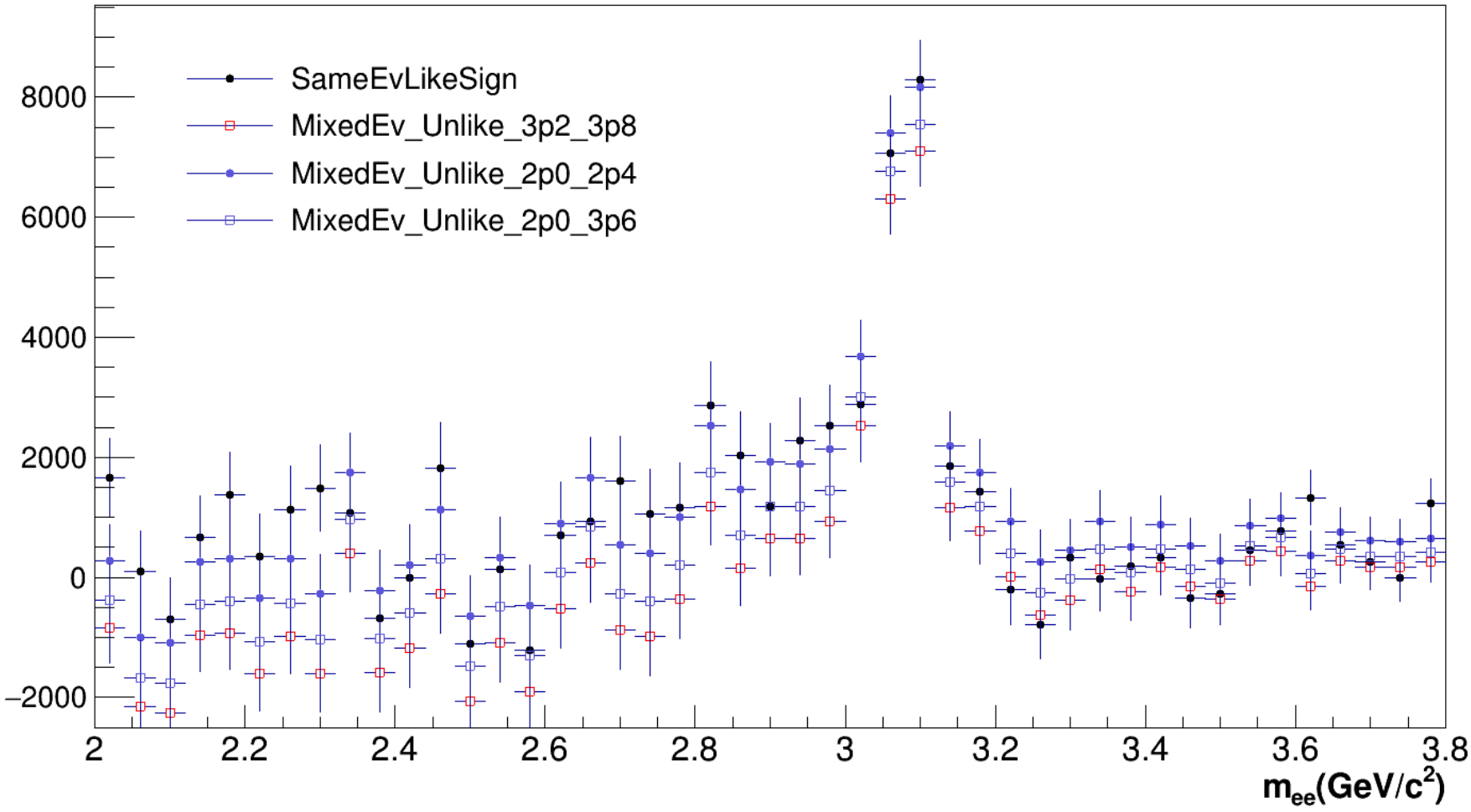
0-10% PbPb


18q
18r
18qr
1.08
1.07
1.06
1.05
1.04
1.03
1.02
1.01
1
0
2
4
6
8
10
positron/electron per event

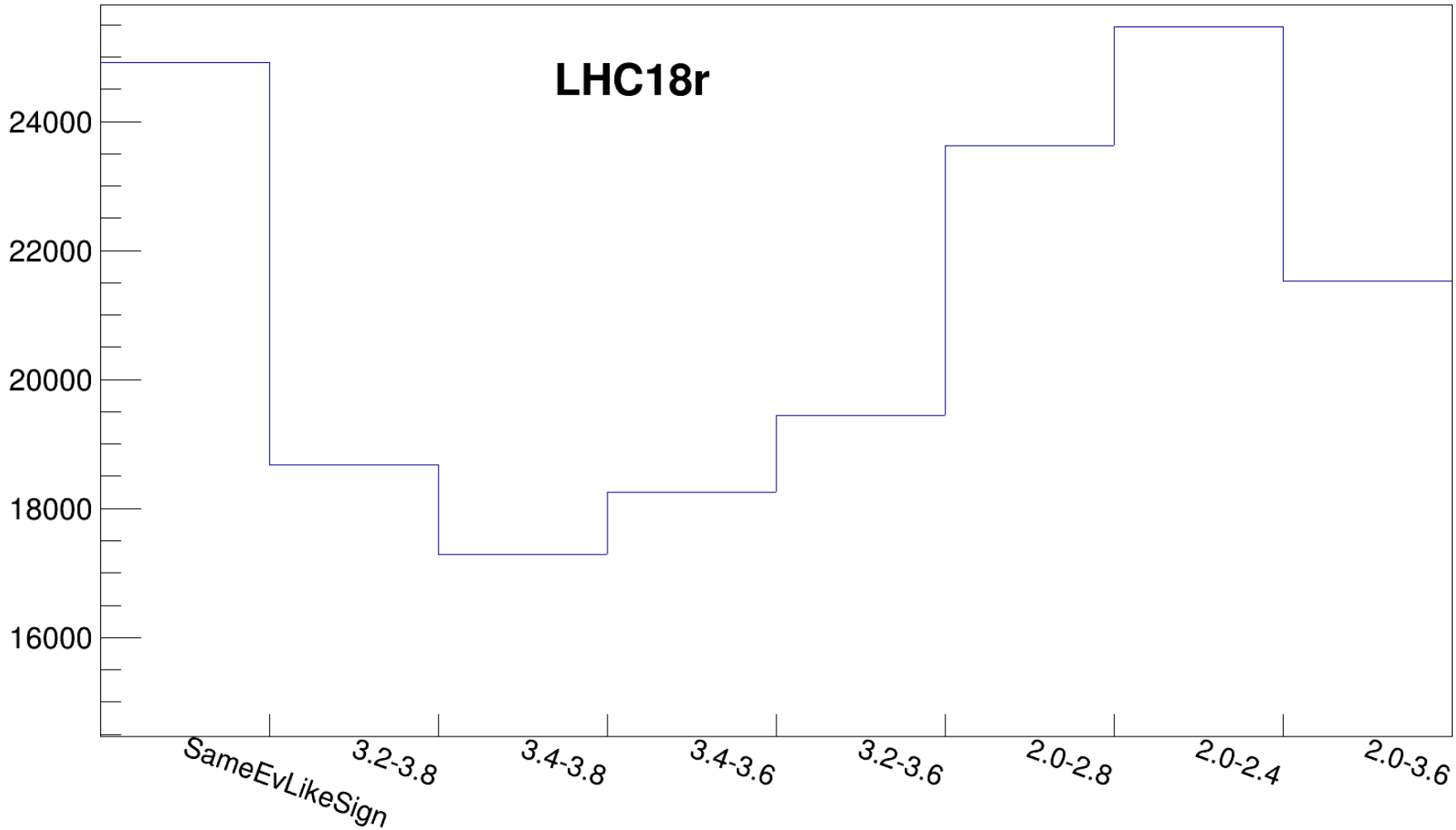
Same vs Mixed Bkg Rejection

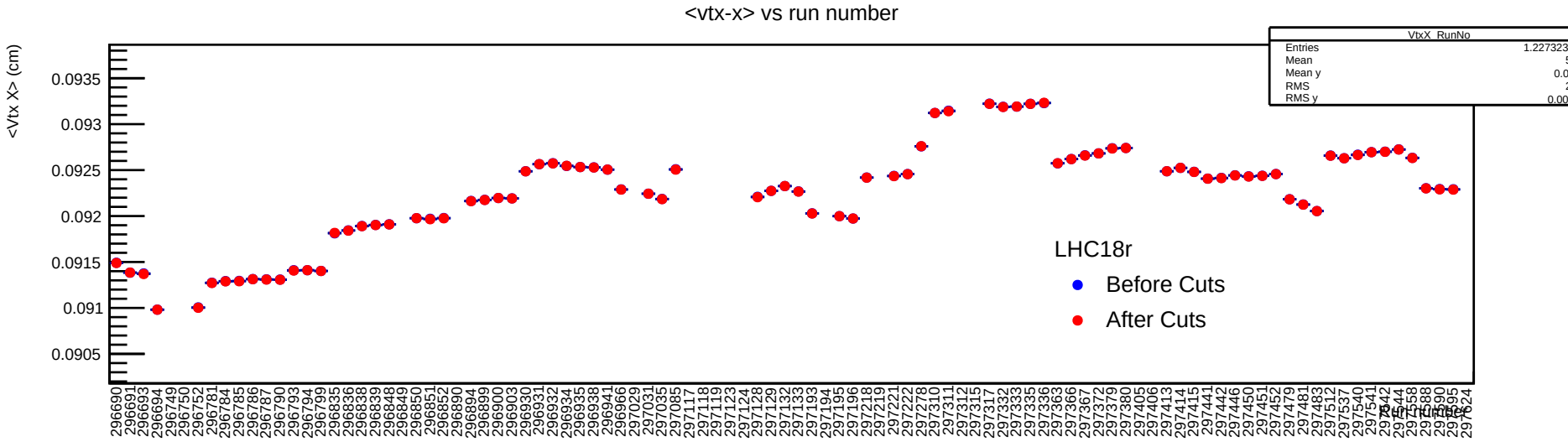
0-10% PbPb

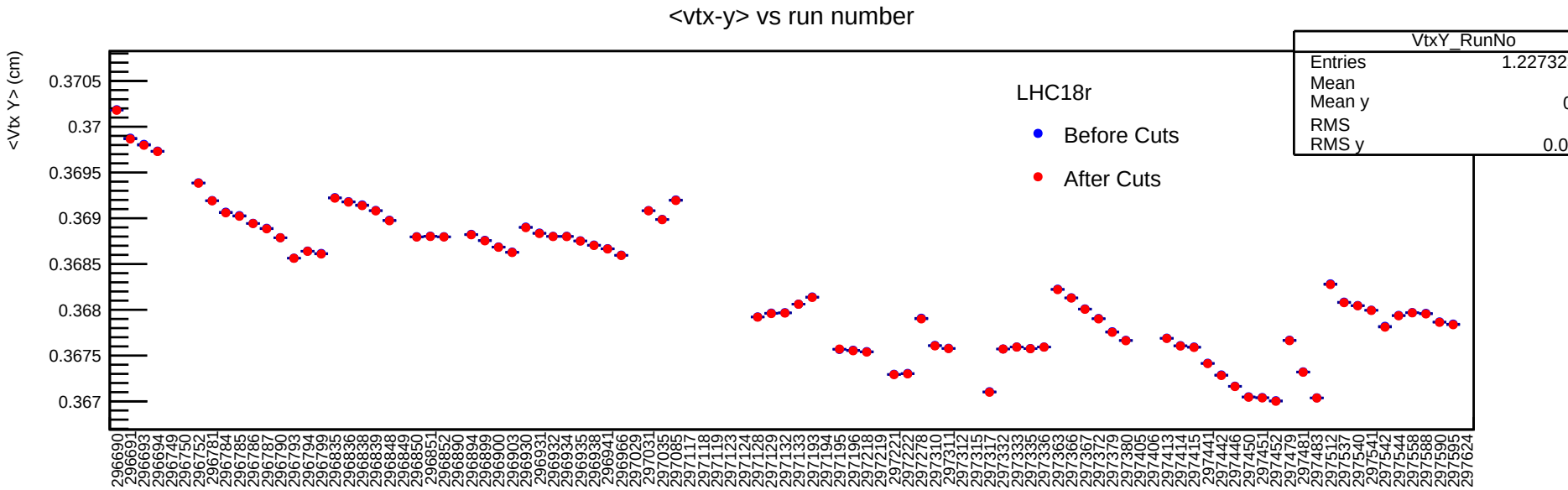

SameEvLikeSign
MixedEv_Unlike_3p2_3p8
MixedEv_Unlike_3p4_3p8
MixedEv_Unlike_3p4_3p6
MixedEv_Unlike_3p2_3p6
MixedEv_Unlike_2p0_2p8
MixedEv_Unlike_2p0_3p6
MixedEv_Unlike_2p0_2p4
10000
8000
6000
4000
2000
0
−2000
2
2.2
2.4
2.6
2.8
3
3.2
3.4
3.6
3.8
m_ee(GeV/c^2)


SameEvLikeSign
MixedEv_Unlike_3p2_3p8
MixedEv_Unlike_2p0_2p4
MixedEv_Unlike_2p0_3p6
8000
6000
4000
2000
0
−2000
2
2.2
2.4
2.6
2.8
3
3.2
3.4
3.6
3.8
m_ee(GeV/c^2)

Comparision of Signal Yield in 0-15GeV / 0-10%




<vtx-x> vs run number
<Vtx X> (cm)
0.0935
0.093
0.0925
0.092
0.0915
0.091
0.0905
VtxX_RunNo
Entries
Mean
Mean y
RMS
RMS y
LHC18r
Before Cuts
After Cuts


<vtx-y> vs run number
<Vtx Y> (cm)
0.3705
0.37
0.3695
0.369
0.3685
0.368
0.3675
0.367
LHC18r
Before Cuts
After Cuts
VtxY_RunNo
Entries 1.22732
Mean
Mean y
RMS
RMS y 0.0
296690
296691
296693
296694
296749
296750
296752
296781
296784
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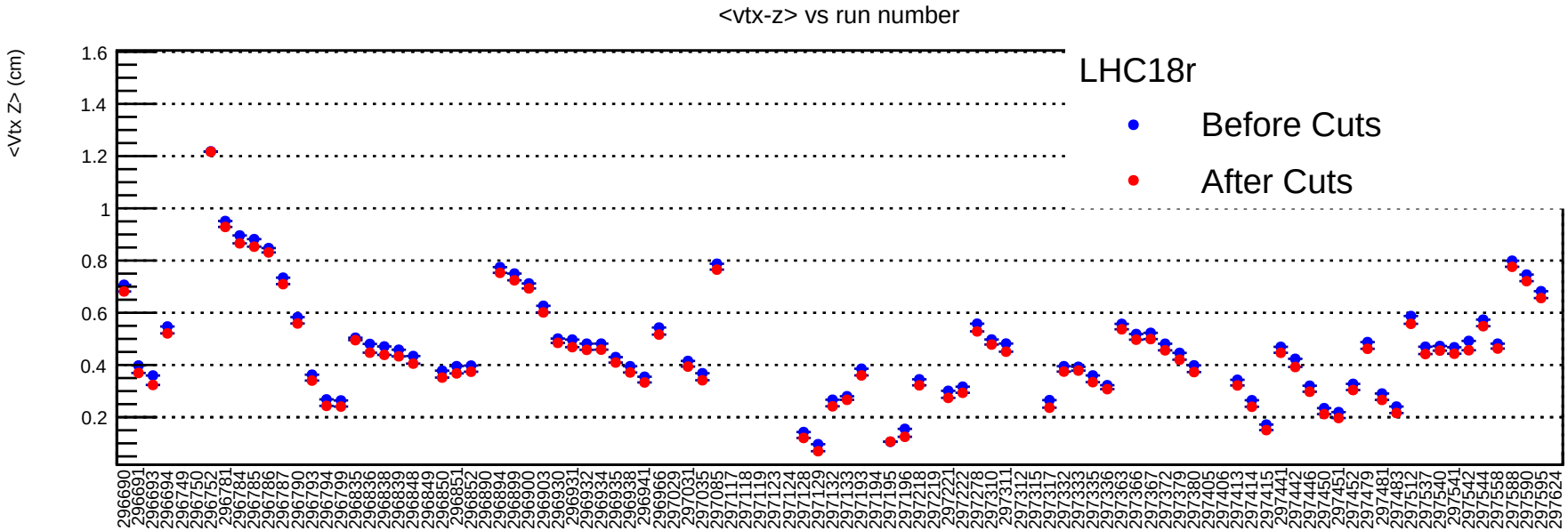
<vtx-z> vs run number
<Vtx Z> (cm)
1.6
1.4
1.2
1
0.8
0.6
0.4
0.2
LHC18r
Before Cuts
After Cuts
296690
296691
296693
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296787
296790
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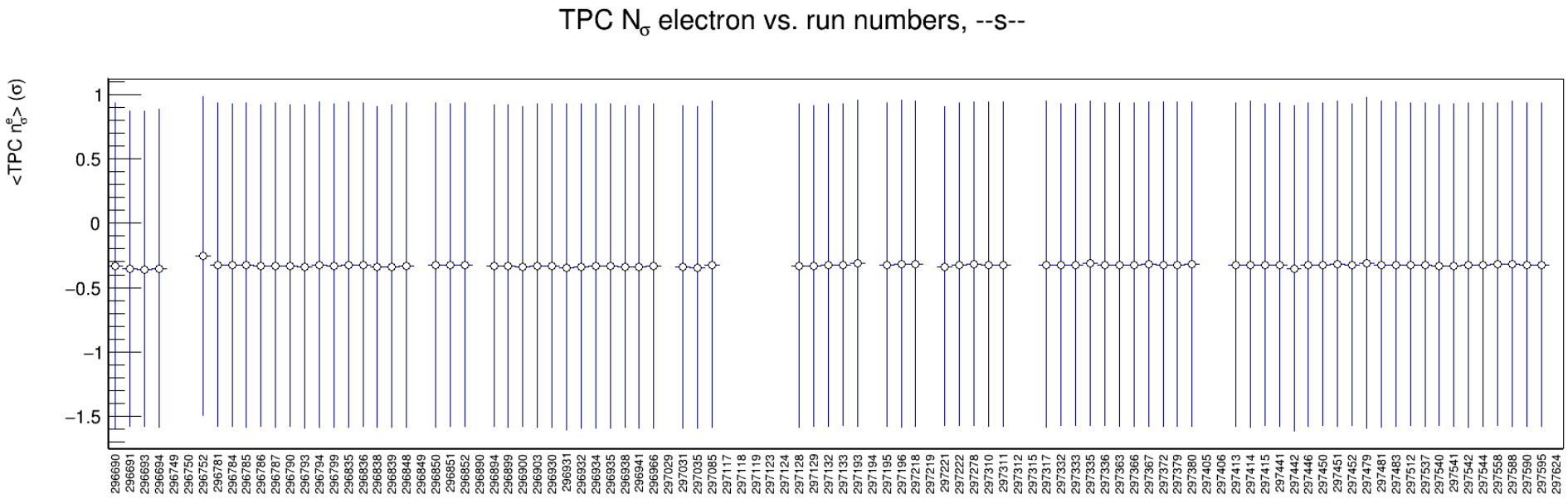
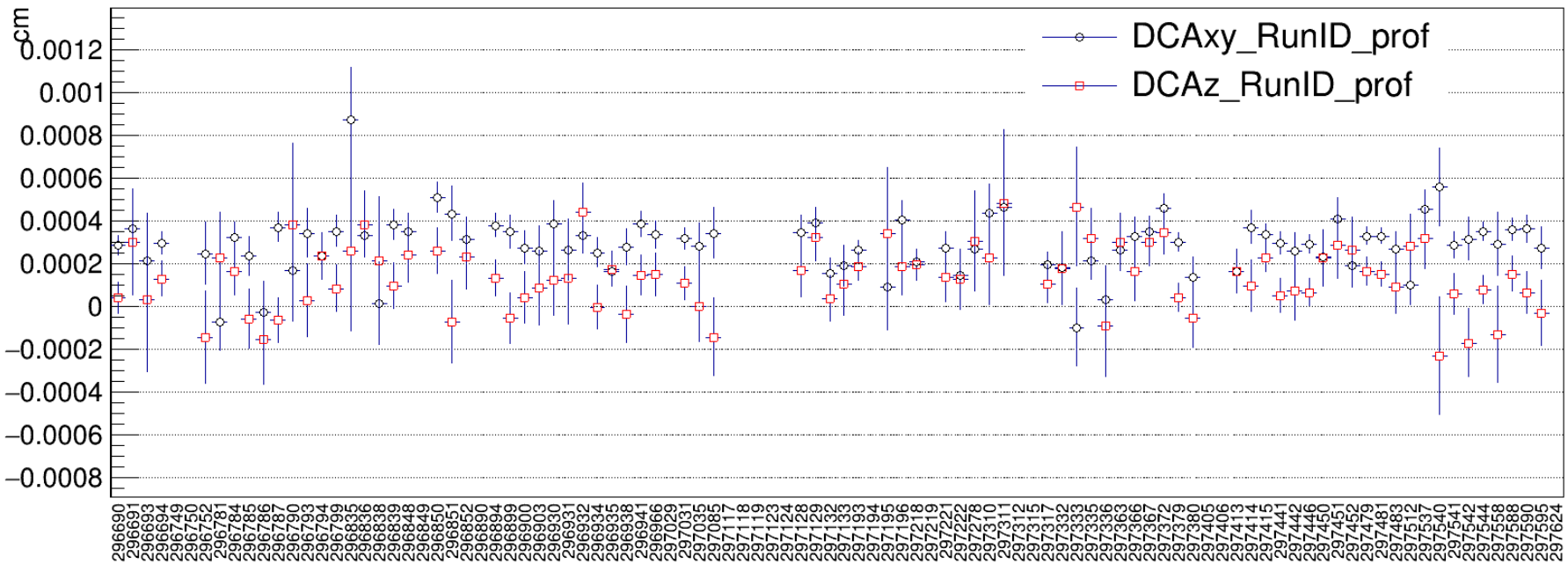

TPC N_σ electron vs. run numbers, --s--
<TPC n^e_σ> (σ)
1
0.5
0
−0.5
−1
−1.5
296690 296691 296693 296694 296749 296750 296752 296781 296784 296785 296786 296787 296790 296793 296794 296799 296835 296836 296838 296839 296848 296849 296850 296851 296852 296890 296894 296899 296900 296903 296930 296931 296932 296934 296935 296938 296941 296966 297029 297031 297035 297085 297117 297118 297119 297123 297124 297128 297129 297132 297133 297193 297194 297195 297196 297218 297219 297221 297222 297278 297310 297311 297312 297315 297317 297332 297333 297335 297336 297363 297366 297367 297372 297379 297380 297405 297406 297413 297414 297415 297441 297442 297446 297450 297451 297452 297479 297481 297483 297512 297537 297540 297541 297542 297544 297558 297588 297590 297595 297624


cm
0.0012
0.001
0.0008
0.0006
0.0004
0.0002
0
−0.0002
−0.0004
−0.0006
−0.0008
DCAxy_RunID_prof
DCAz_RunID_prof
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What's Next??

- J/ψ in MC (Meeting tomorrow at 10:00AM with Ionut)
- PsProper Length.