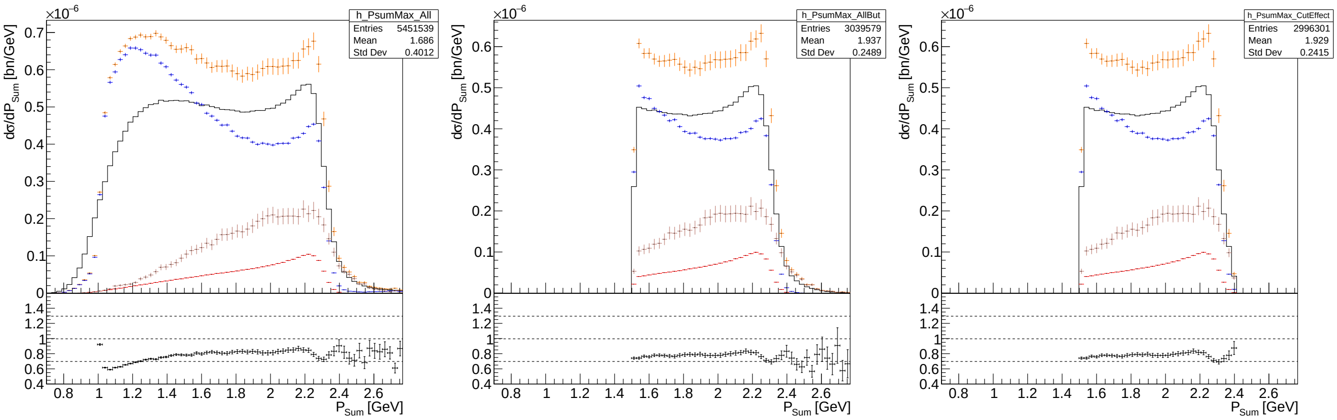

Figure 1: Progress of $\mathrm{P}_{\mathrm{Sum}}$ Max cut.

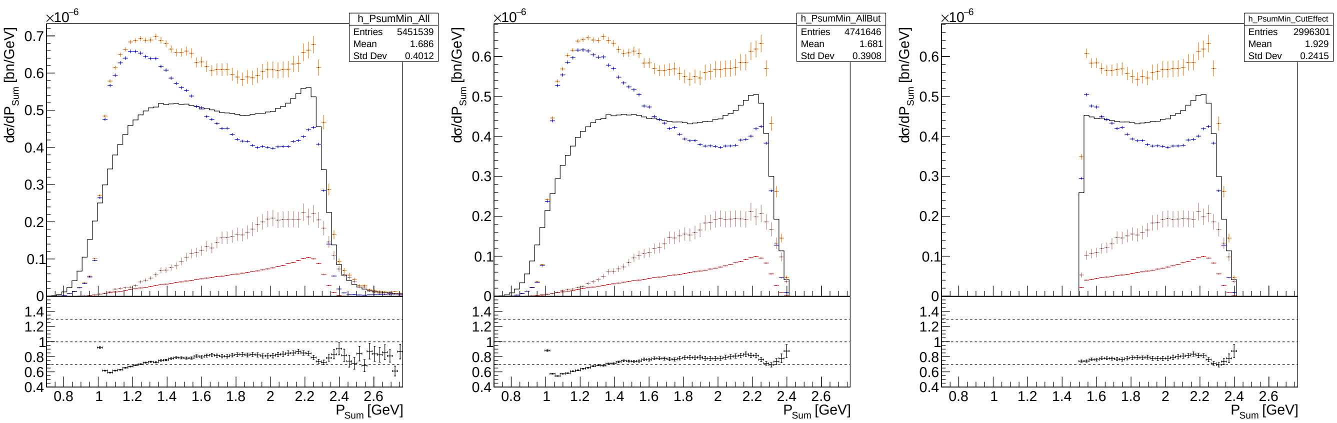

Figure 2: Progress of $\mathrm{P}_{\mathrm{Sum}}$ Min cut.

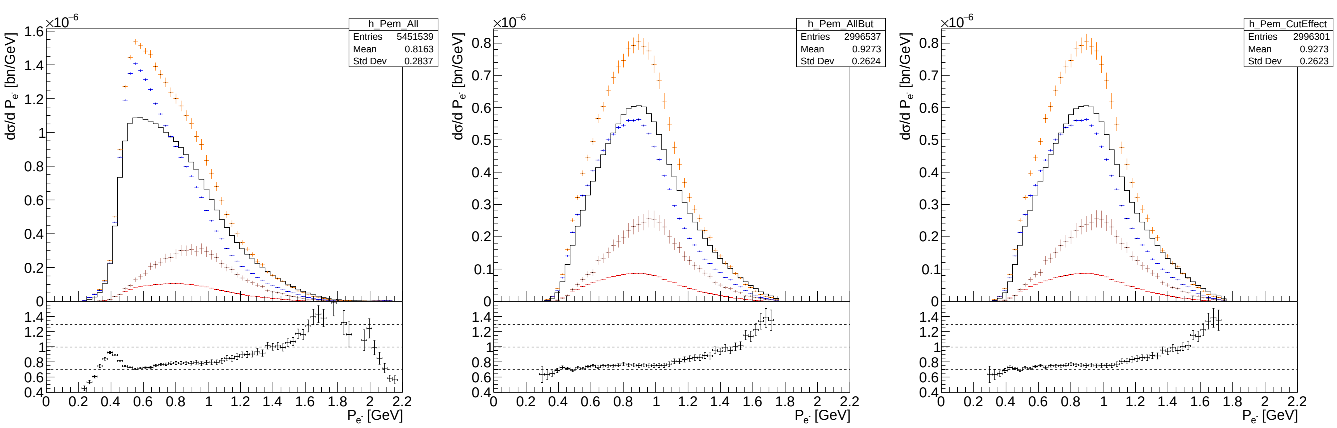

Figure 3: Progress of P_{e^-} cut.

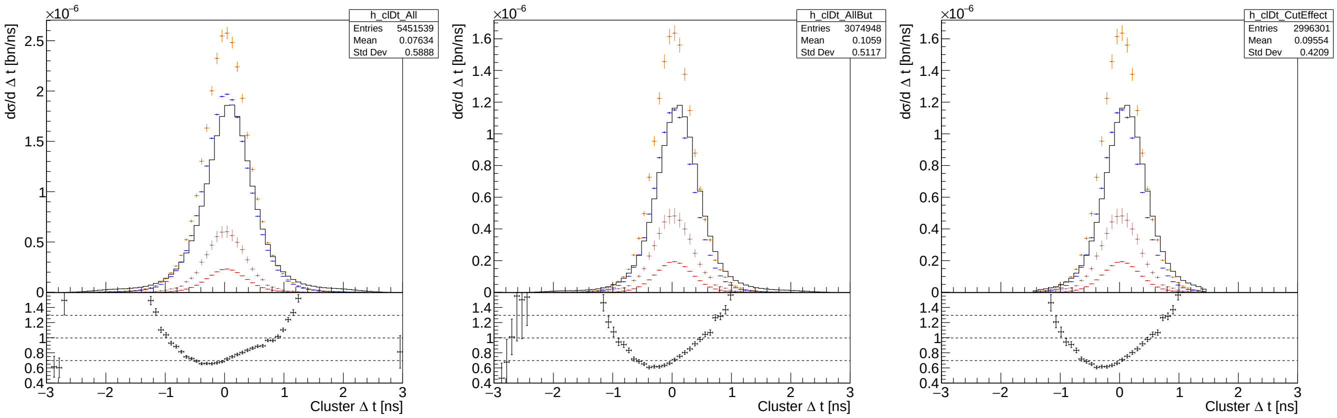

Figure 4: Progress of Cluster time difference cut.

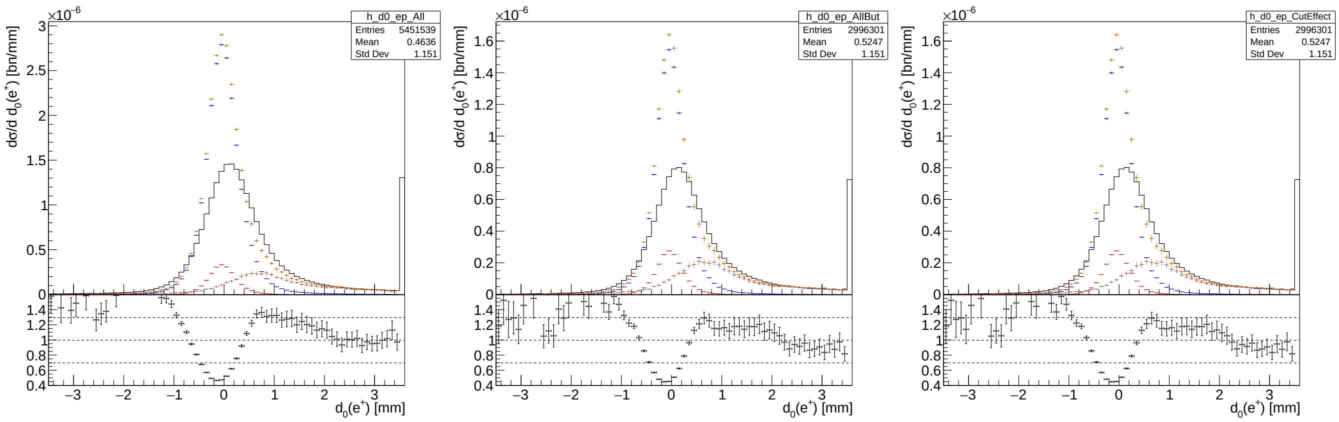

Figure 5: Progress of positron d_0 cut.

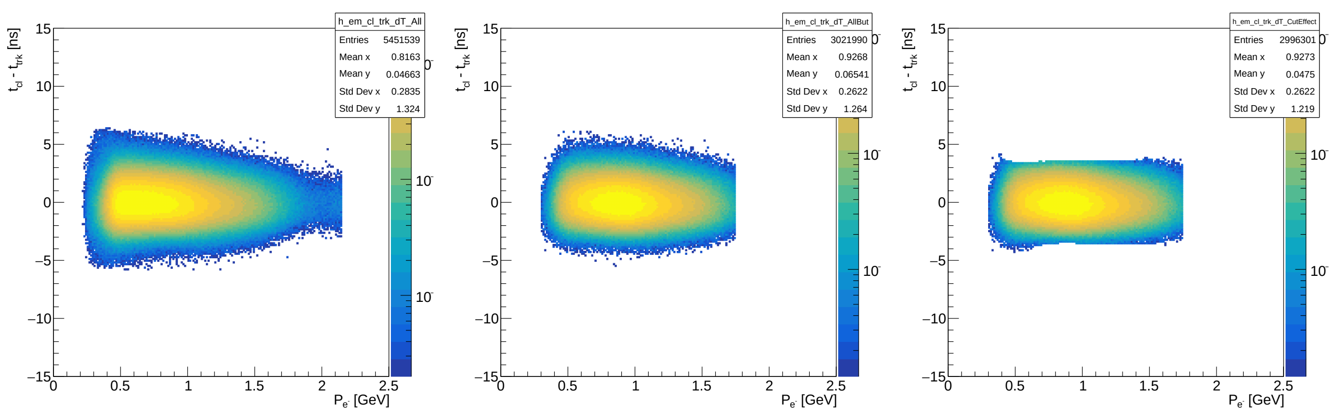

Figure 6: Electrons Data: Cluster track time difference as a function of Momentum.

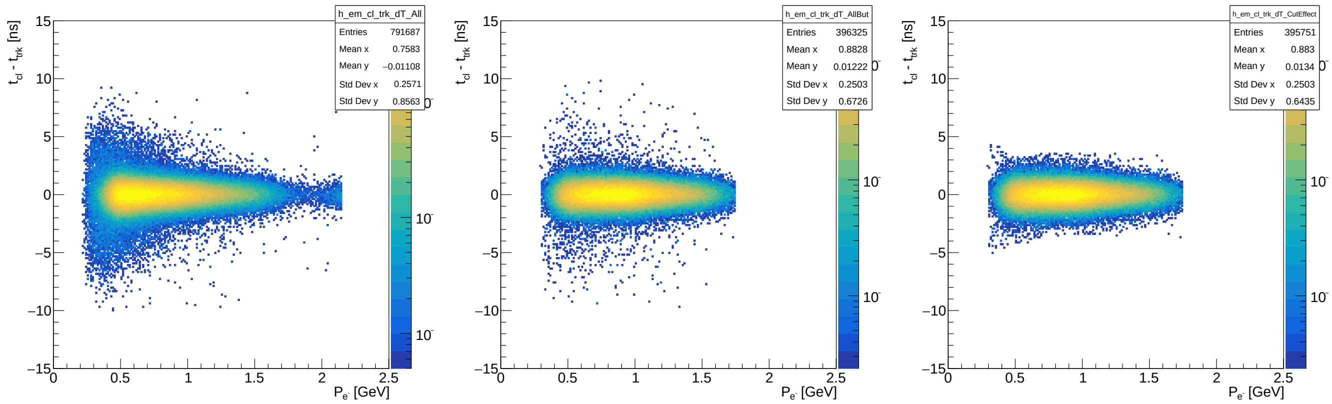

Figure 7: Electrons Tridents: Cluster track time difference as a function of Momentum.

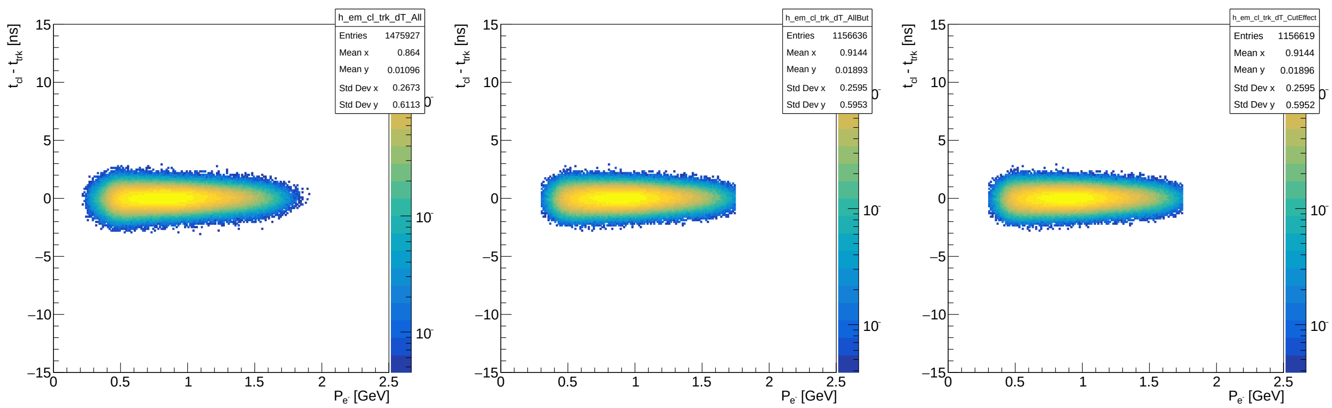

Figure 8: Electrons Rad Tridents: Cluster track time difference as a function of Momentum.

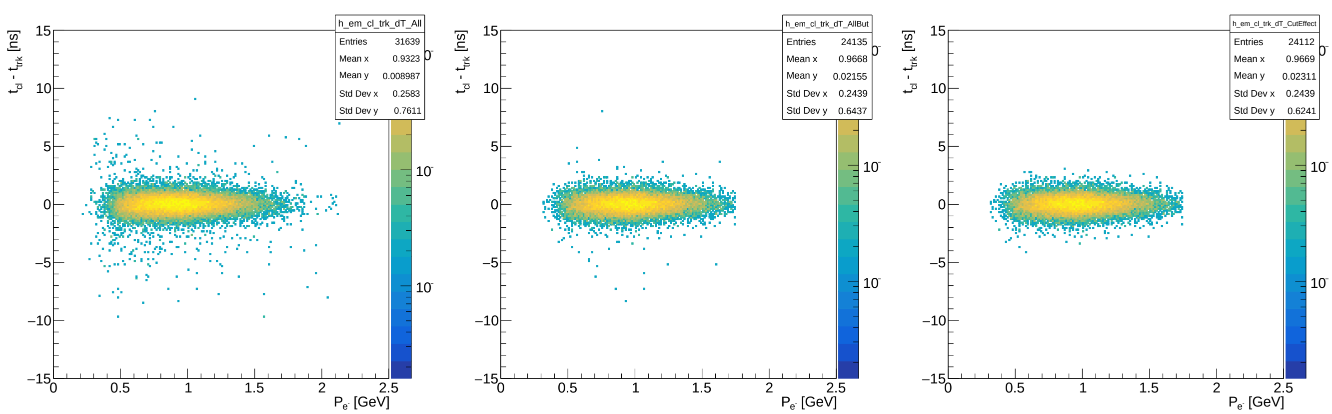

Figure 9: Electrons WABs: Cluster track time difference as a function of Momentum.

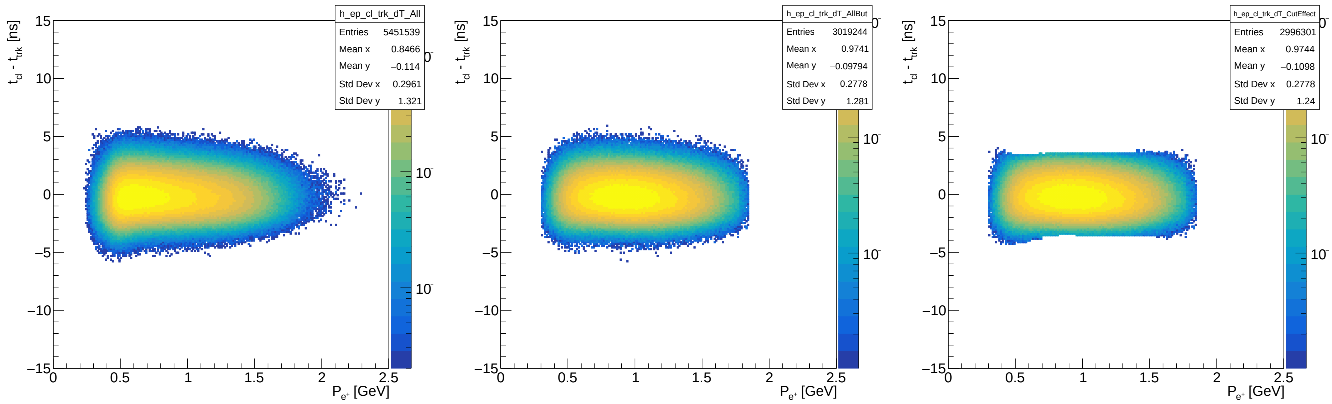

Figure 10: Positrons Data: Cluster track time difference as a function of Momentum.

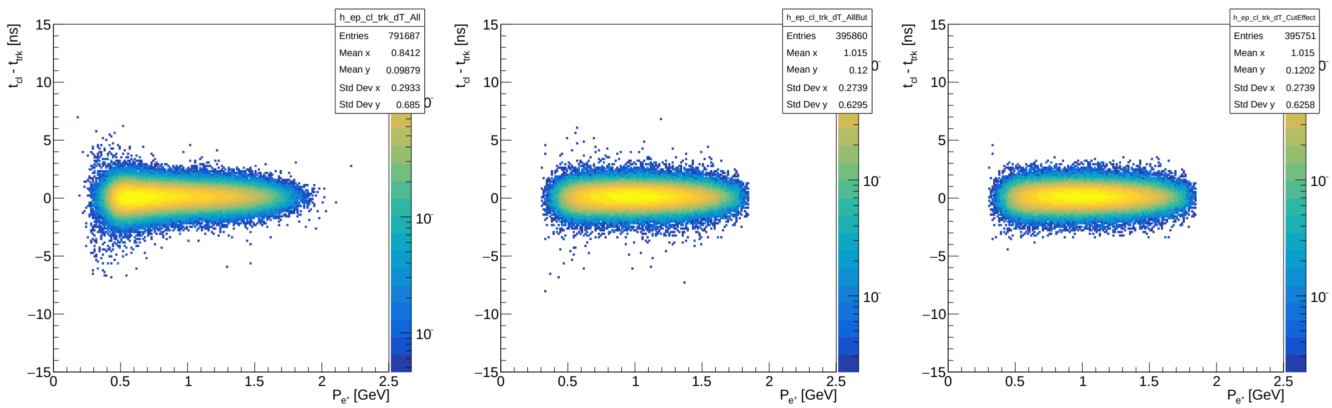

Figure 11: Positrons Tridents: Cluster track time difference as a function of Momentum.

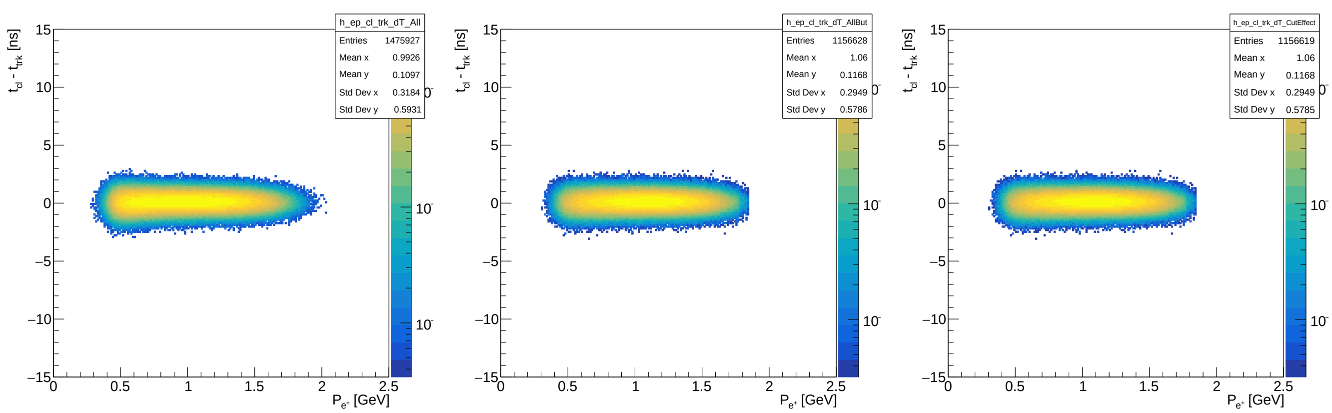

Figure 12: Positrons Rad Tridents: Cluster track time difference as a function of Momentum.

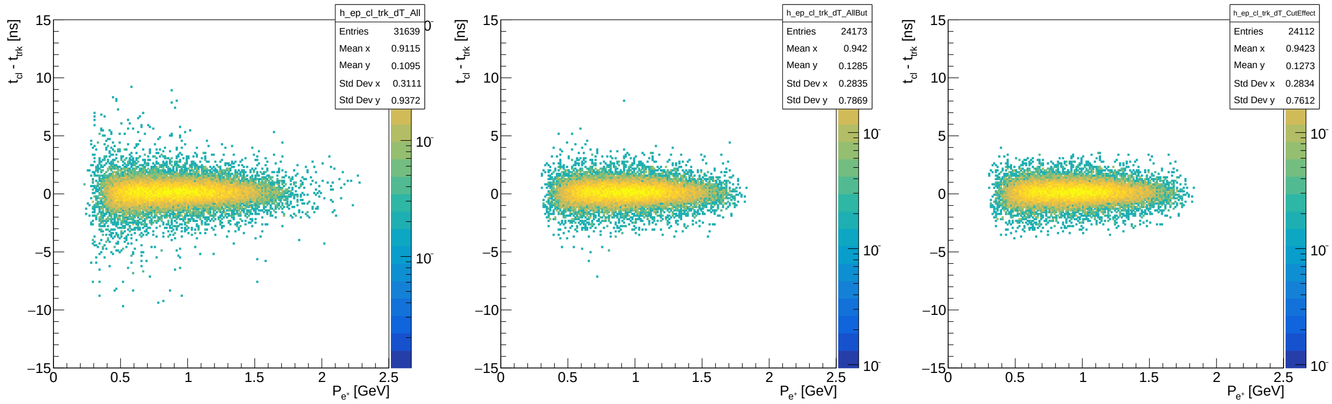

Figure 13: Positrons WABs: Cluster track time difference as a function of Momentum.

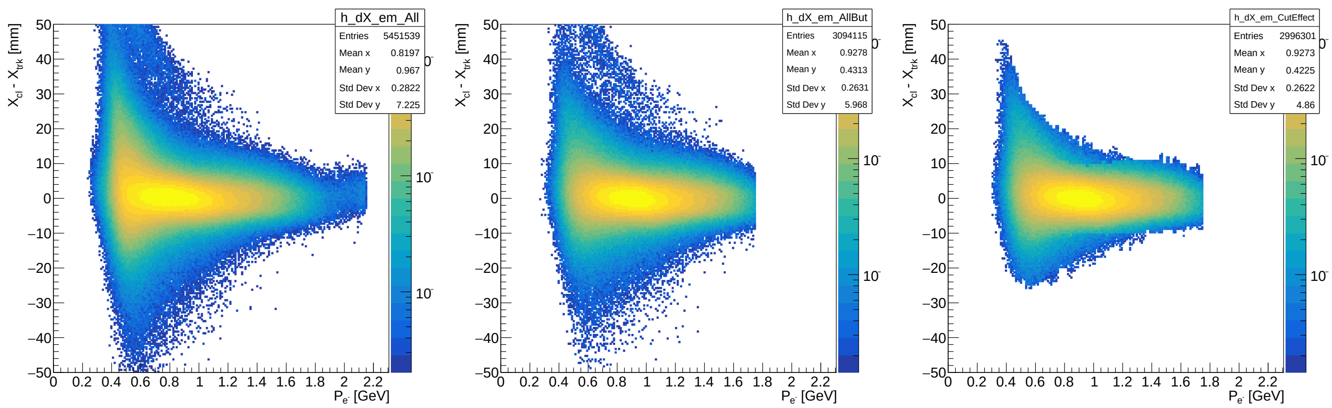

Figure 14: Electrons Data: Cluster track X coordinate difference as a function of momentum.

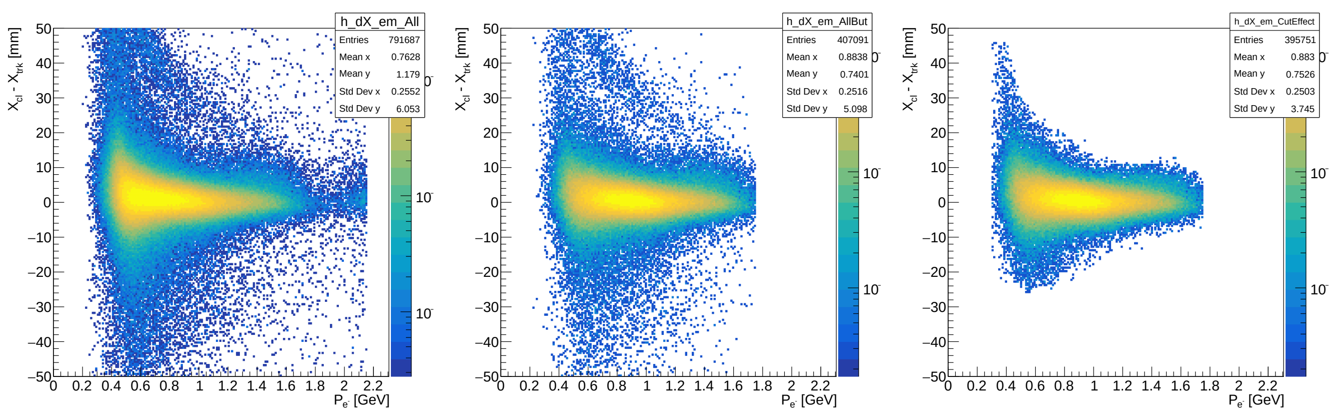

Figure 15: Electrons Tridents: Cluster track X coordinate difference as a function of momentum.

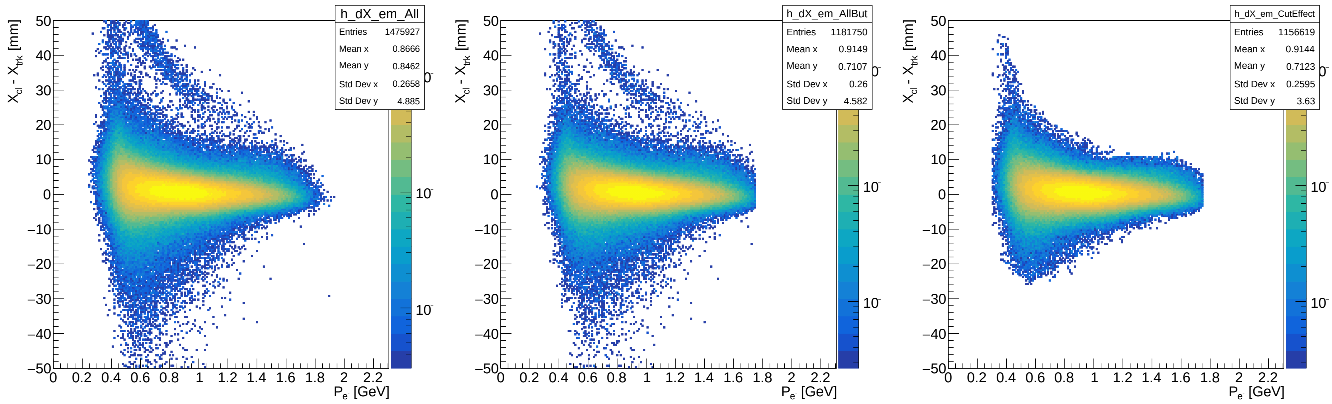

Figure 16: Electrons Rad Tridents: Cluster track X coordinate difference as a function of momentum.

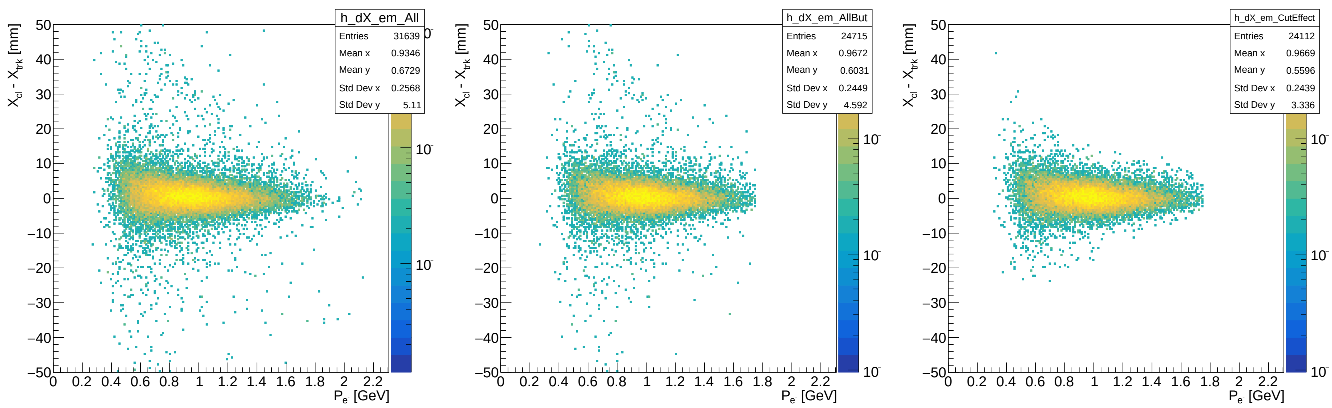

Figure 17: Positrons Rad Tridents: Cluster track X coordinate difference as a function of momentum.

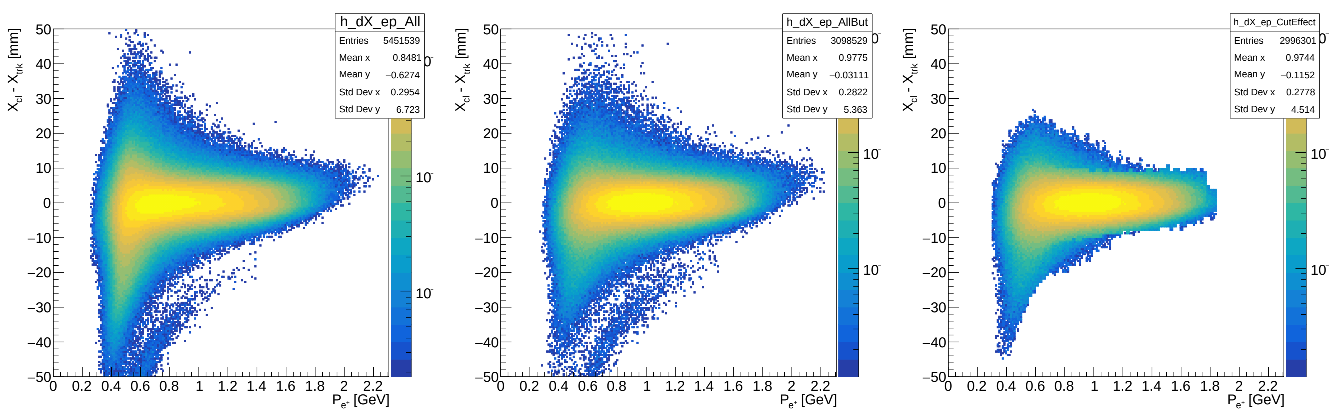

Figure 18: Positrons Data: Cluster track X coordinate difference as a function of momentum.

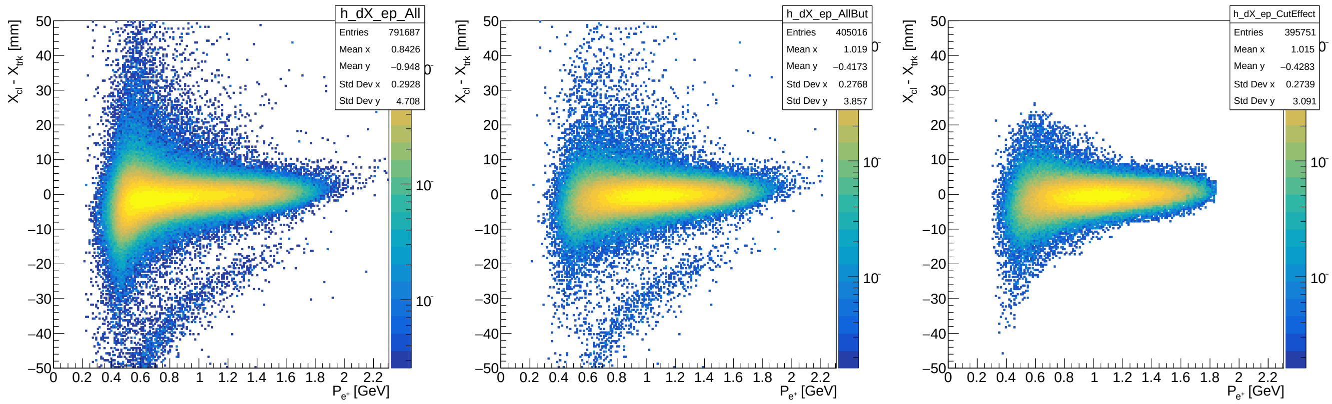

Figure 19: Positrons Tridents: Cluster track X coordinate difference as a function of momentum.

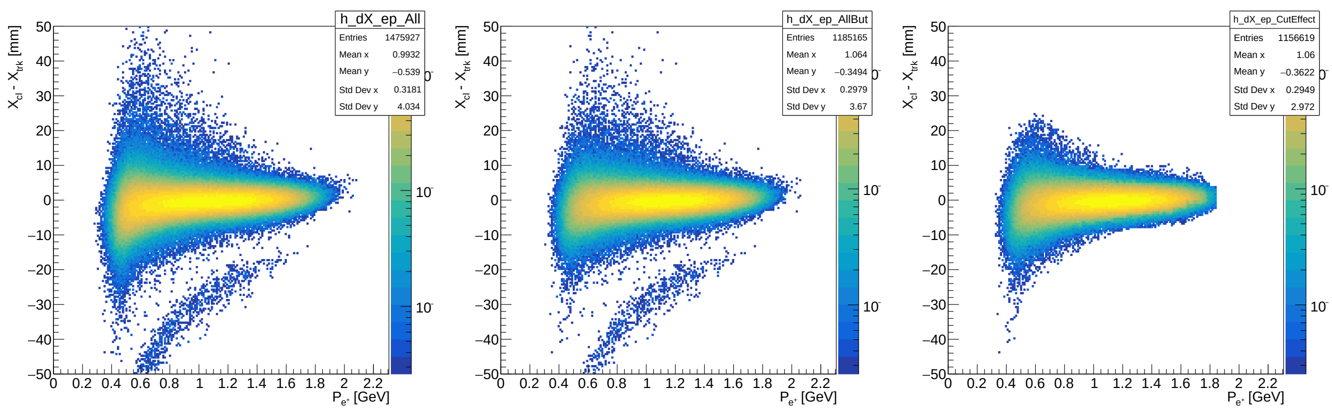

Figure 20: Positrons Rad Tridents: Cluster track X coordinate difference as a function of momentum.

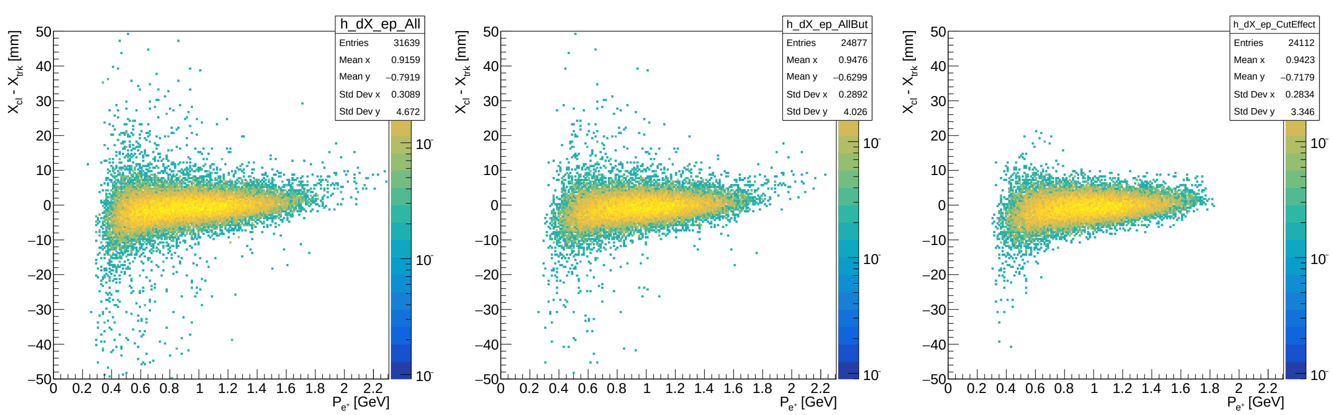

Figure 21: Positrons Rad Tridents: Cluster track X coordinate difference as a function of momentum.

PSum comparison for different mass bins

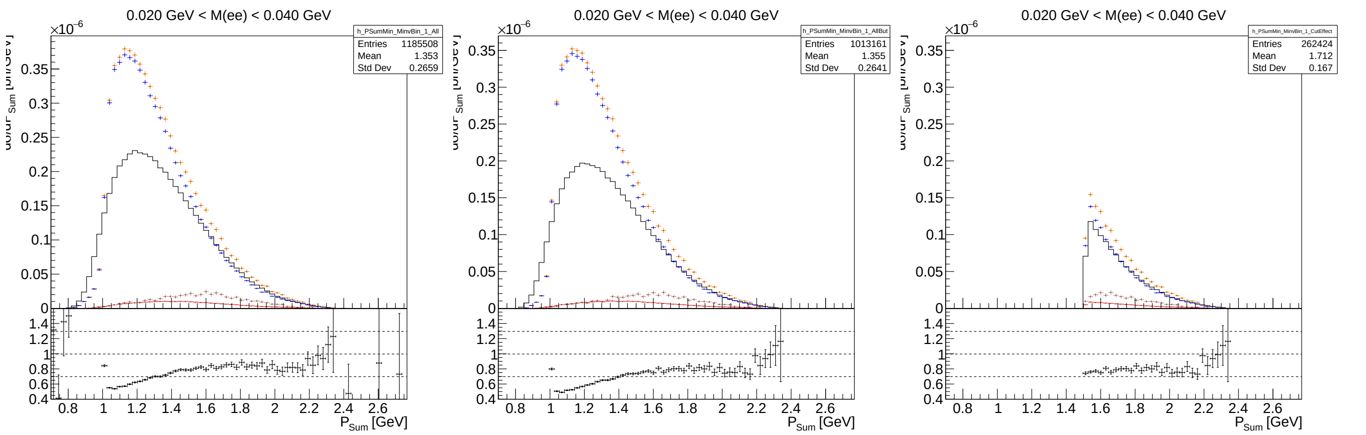

Figure 22: Progress of P_{Sum} Min cut, for the 20 MeV < M(ee) < 40 MeV

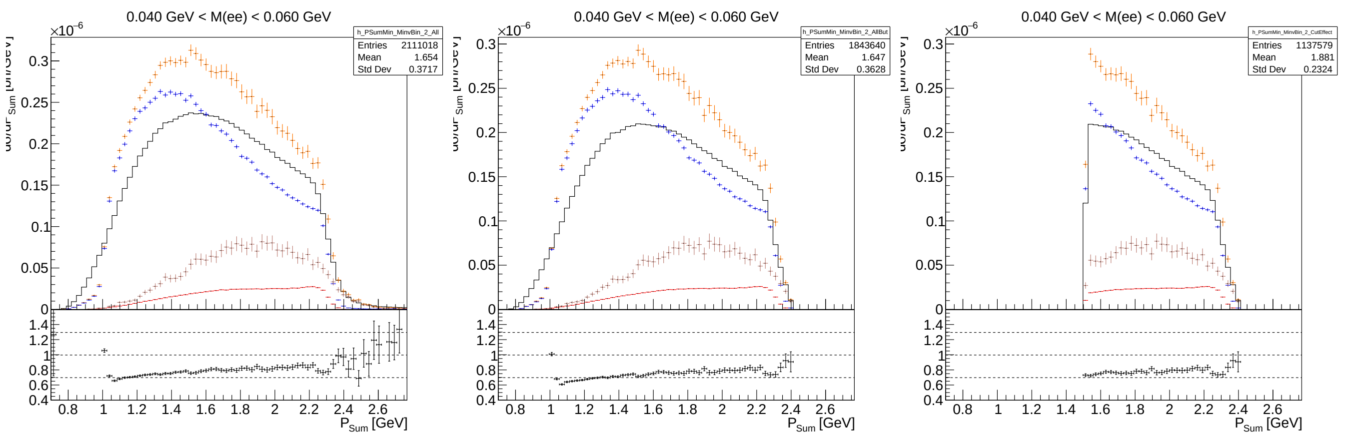

Figure 23: Progress of P_{Sum} Min cut, for the 40 MeV < M(ee) < 60 MeV

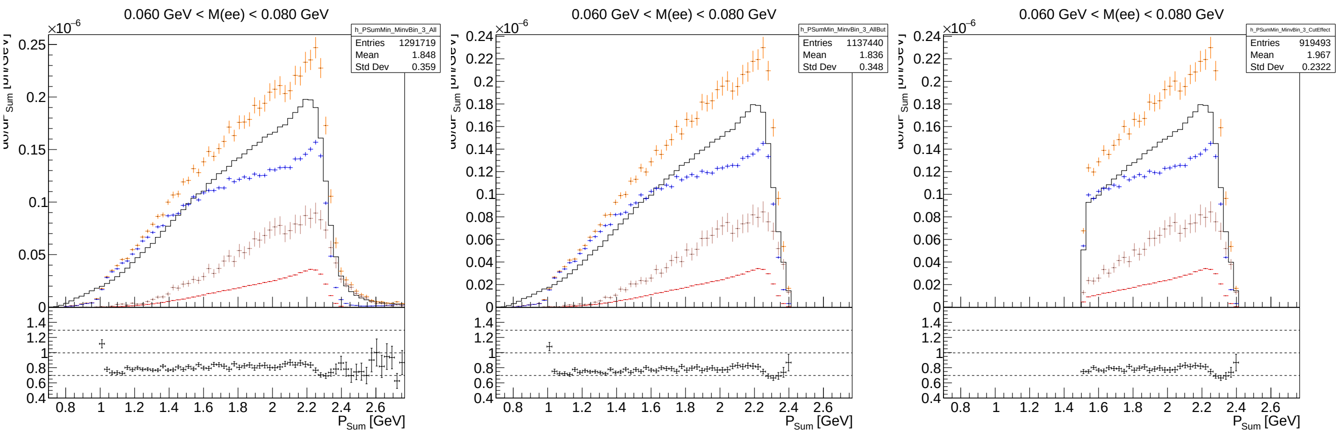

Figure 24: Progress of P_{Sum} Min cut, for the 60 MeV < M(ee) < 80 MeV

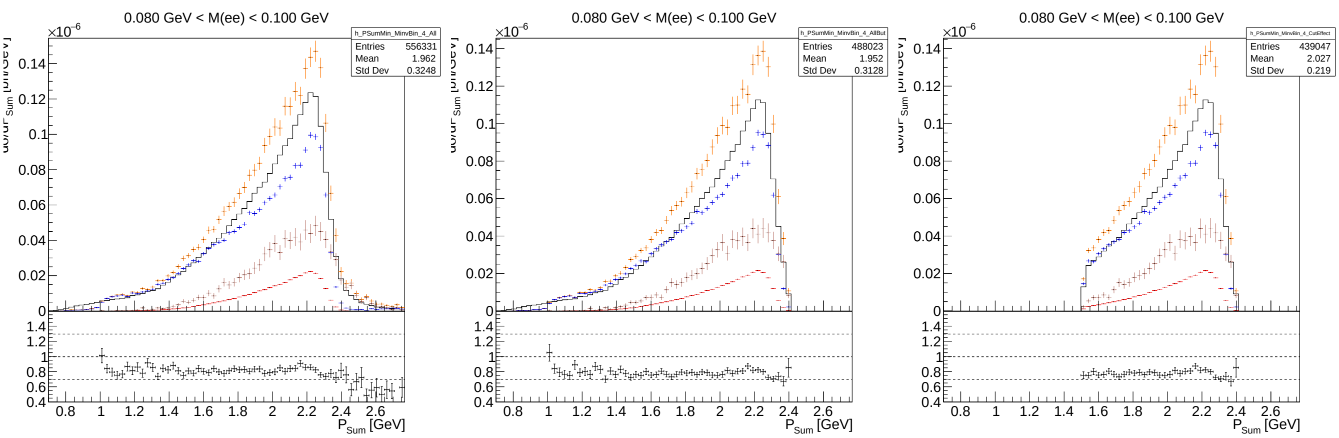

Figure 25: Progress of P_{Sum} Min cut, for the 80 MeV < M(ee) < 100 MeV

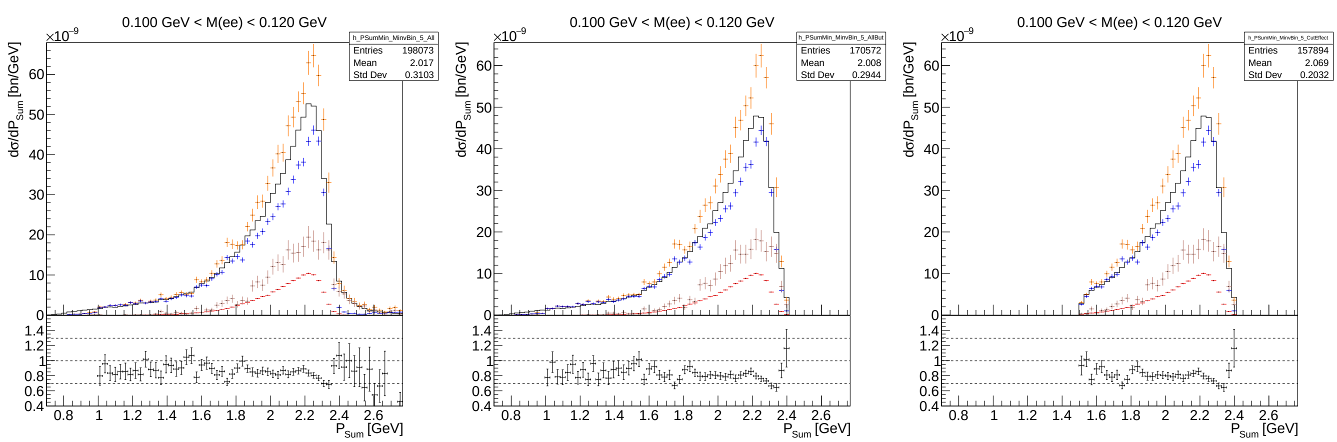

Figure 26: Progress of P_{Sum} Min cut, for the 100 MeV < M(ee) < 120 MeV

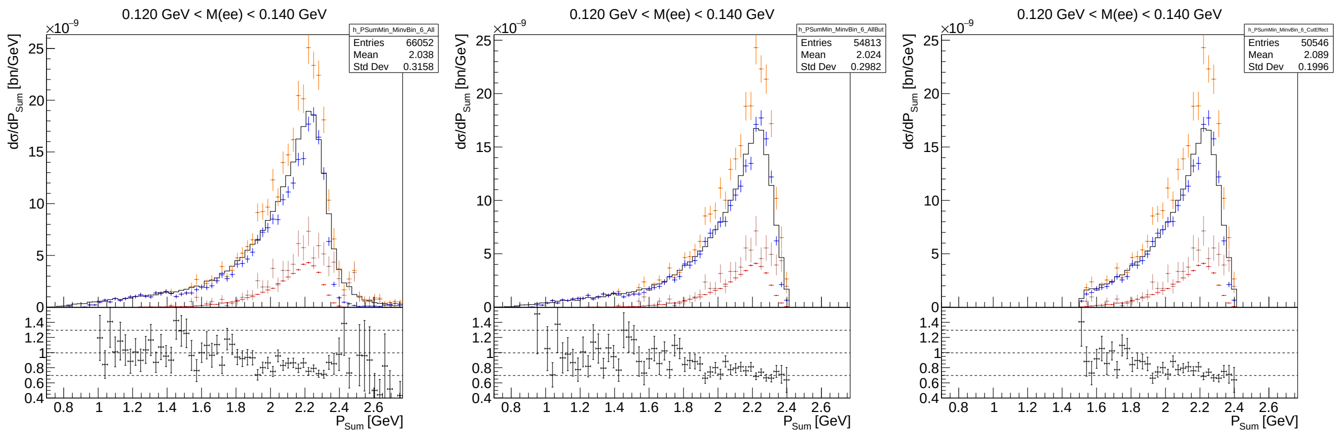

Figure 27: Progress of P_{Sum} Min cut, for the 120 MeV < M(ee) < 140 MeV

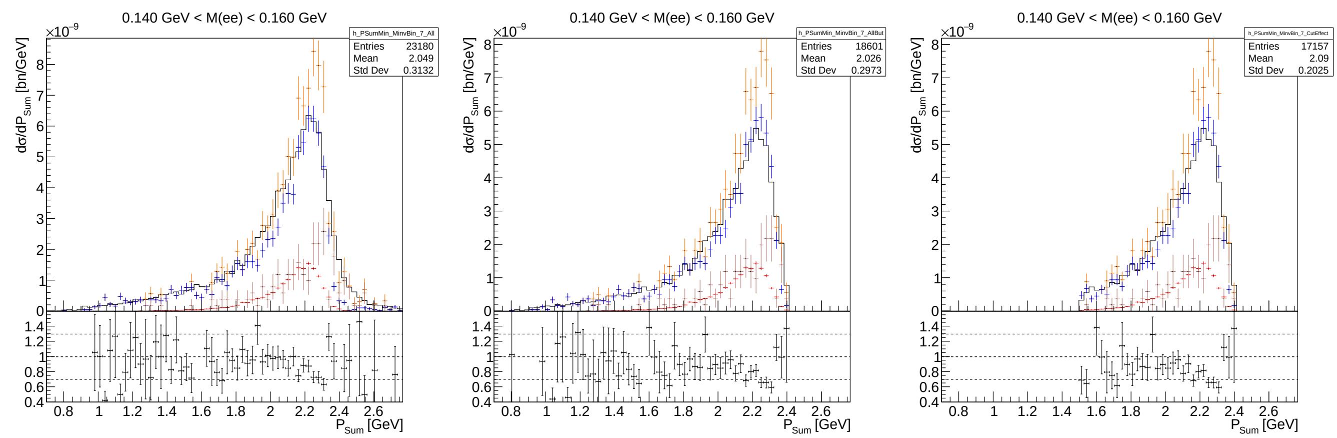

Figure 28: Progress of P_{Sum} Min cut, for the 140 MeV < M(ee) < 160 MeV

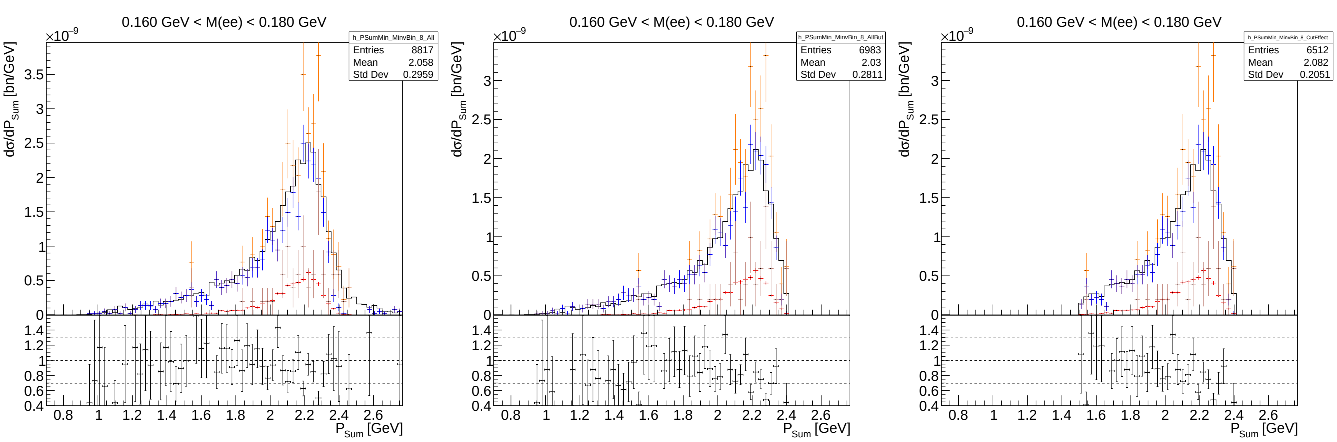

Figure 29: Progress of P_{Sum} Min cut, for the 160 MeV < M(ee) < 180 MeV

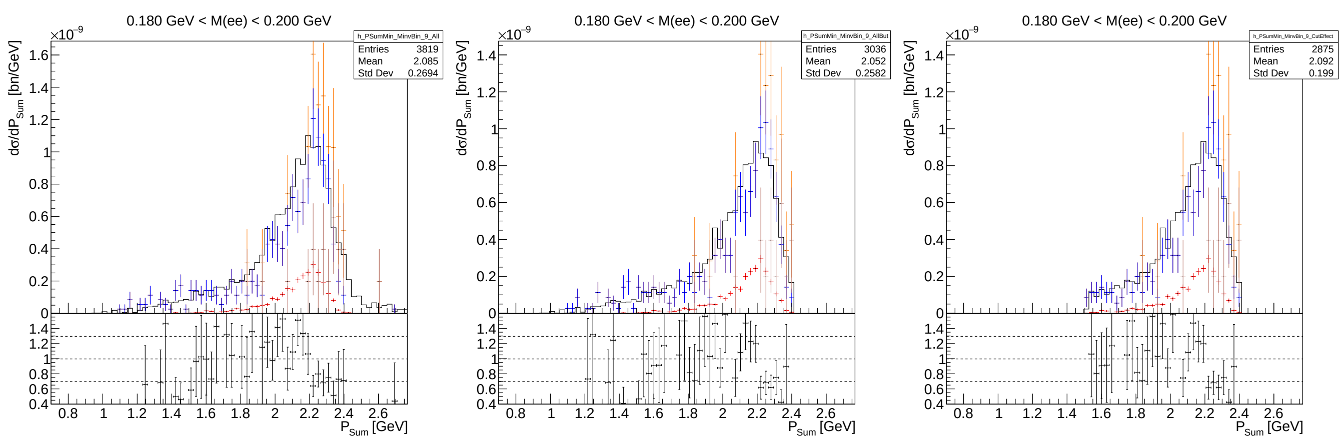

Figure 30: Progress of P_{Sum} Min cut, for the 180 MeV < M(ee) < 200 MeV

CutEfficiencies

CutDescription	Data	Tri-beam	Rad-beam	Wab-beam	Tri + Wab
PsumMax	0.996642	0.998874	0.99886	0.986888	0.99791
PsumMin	0.577276	0.539613	0.82845	0.904647	0.557511
clDt	0.973965	0.99436	0.997402	0.992964	0.994249
Pem	0.999911	0.999972	0.999969	1	0.999975
d0_ep	0.922387	0.958224	0.970544	0.495193	0.892889
em_cl_trk_dT	0.991506	0.998557	0.999986	0.999115	0.998602
ep_cl_trk_dT	0.993081	0.999867	0.999992	0.996909	0.999631
dX_em	0.971858	0.978334	0.983098	0.979822	0.978452
dX_ep	0.970964	0.982677	0.980798	0.959015	0.980751
PSumMin_MinvBin_0	0	0	0	-nan	0
PSumMin_MinvBin_1	0.19857	0.186411	0.406967	0.569364	0.191415
PSumMin_MinvBin_2	0.546532	0.537062	0.785559	0.871142	0.553007
PSumMin_MinvBin_3	0.769339	0.765048	0.916863	0.959658	0.779528
PSumMin_MinvBin_4	0.883268	0.882856	0.964886	0.977893	0.890604
PSumMin_MinvBin_5	0.916717	0.916973	0.979517	0.981481	0.922139
PSumMin_MinvBin_6	0.913699	0.922699	0.984234	1	0.928075
PSumMin_MinvBin_7	0.912254	0.917006	0.983266	0.966667	0.920878
PSumMin_MinvBin_8	0.924821	0.917559	0.987507	1	0.922718
PSumMin_MinvBin_9	0.935687	0.917333	0.993248	1	0.920279
PSumMin_MinvBin_10	0.963074	0.964912	1	1	0.966279
PSumMin_MinvBin_11	0.97546	1	0.98951	1	1

Rad Fraction

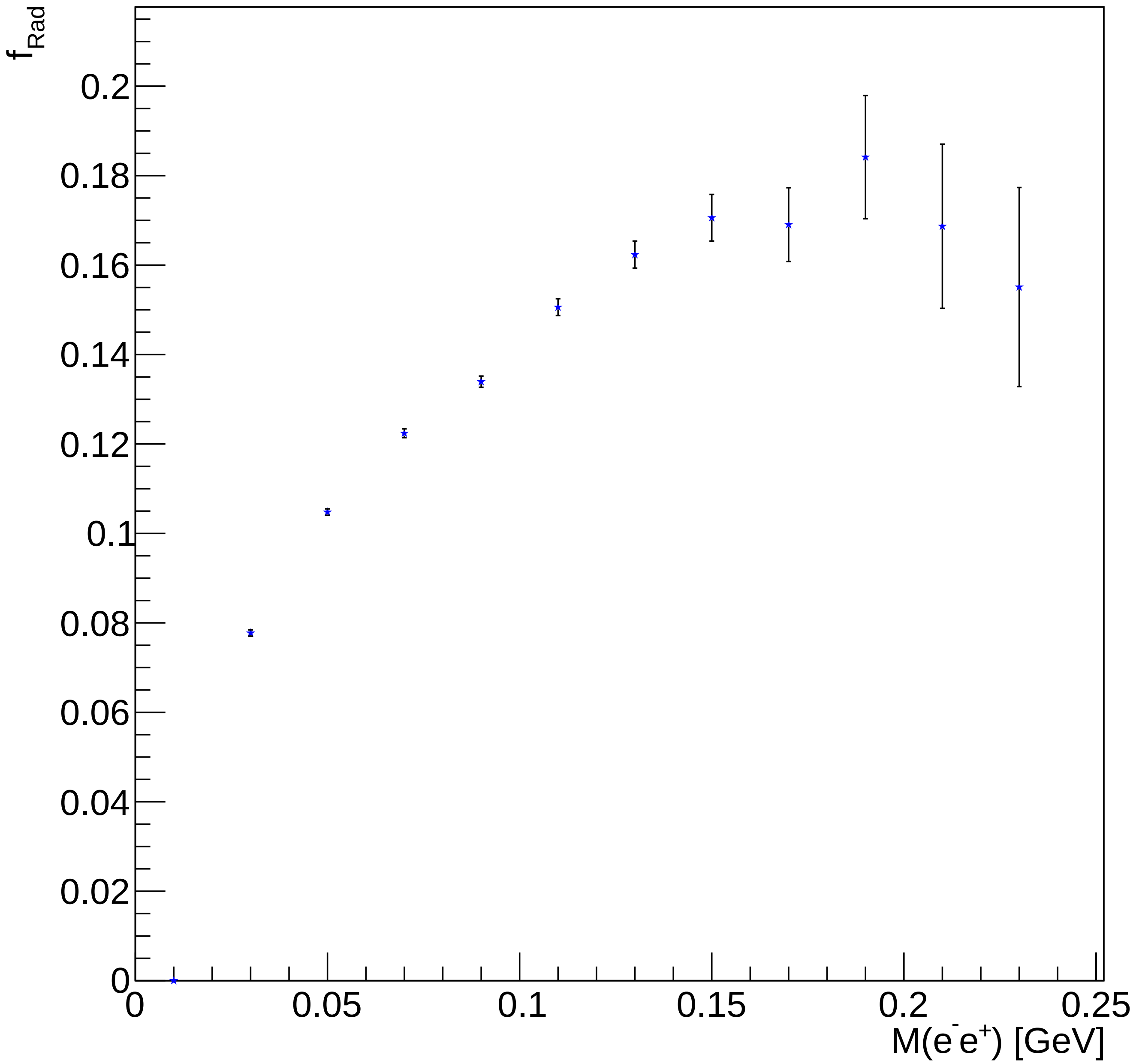

Figure 31: Radiative fraction as a function of mass.

Cut Categories

Final selection of events were categorized depending which cuts a givem V0 is passed. A single integer number is a representation of what cuts were passed for a given V0 candidate.

- If the bit 0 is set, it means there is only on V0 that pass all the given set of cuts. otherwise it is not set
- If the bit 1 is set, it means the d_0 cut is applie to the e^+ of a given V0, otherwise it is not set.
- If the bit 2 is set, it means a L1 required for given V0 candidate.

The figure below show the cut and bit correspondence. As an axample the Cut category 5 is "101", and it means L1 is required for e^+, No cut on d_0 and there is only one V0 in the event that pass the given set of cuts.

```
// =====     The Cut Keyword
// =====             |------ L1 requirement for e+ (1: required, 0: Not required)
// =====             |
// =====             | ----- d0 cut (1: applied, 0: Not applied)
// =====             | |
// =====             | | --- # of V0 candidates: (1: if # of V0s with a given conditions is one, 0: otherwise)
// =====             | | |
// =====             | | |
// = bit - - 6 5 4 3 2 1 0
```

Figure 32: Bit representation of cut set.

Invariant mass distributions

Figures in this section represent 10% of all 2016 run data, more preciesly fils that have file number ending eith 0.

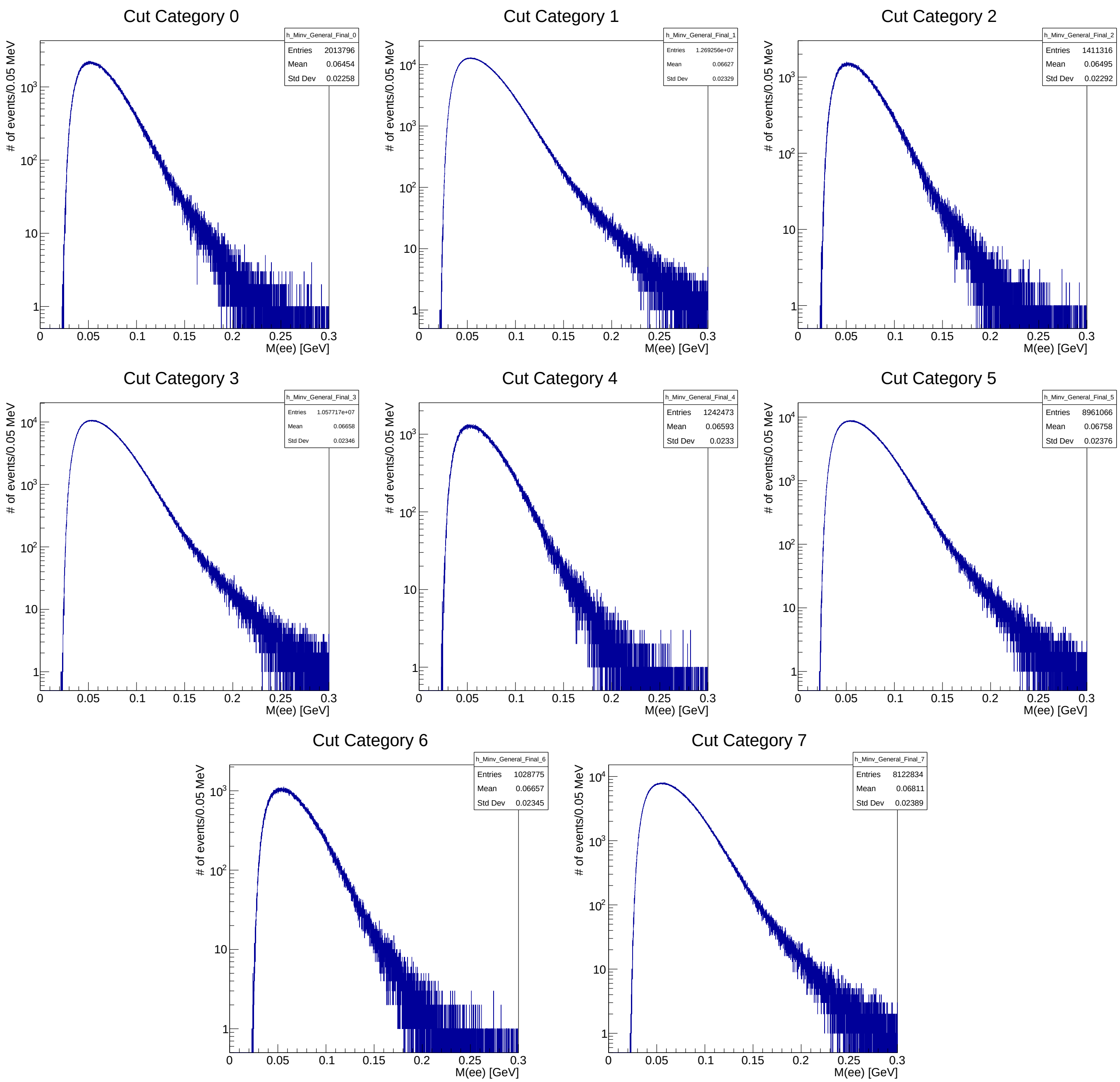

Figure 33: The mass distributions for difference cut categories. These figures represent the blinded 10% sample of rh 2016 Run.

Run By Run Variations

Note the Run 8043 is excluded from these plots, I think the luminosity is not properly calculated for this particular run. it’s normalization is about $\times 4$ is of from the rest of runs.

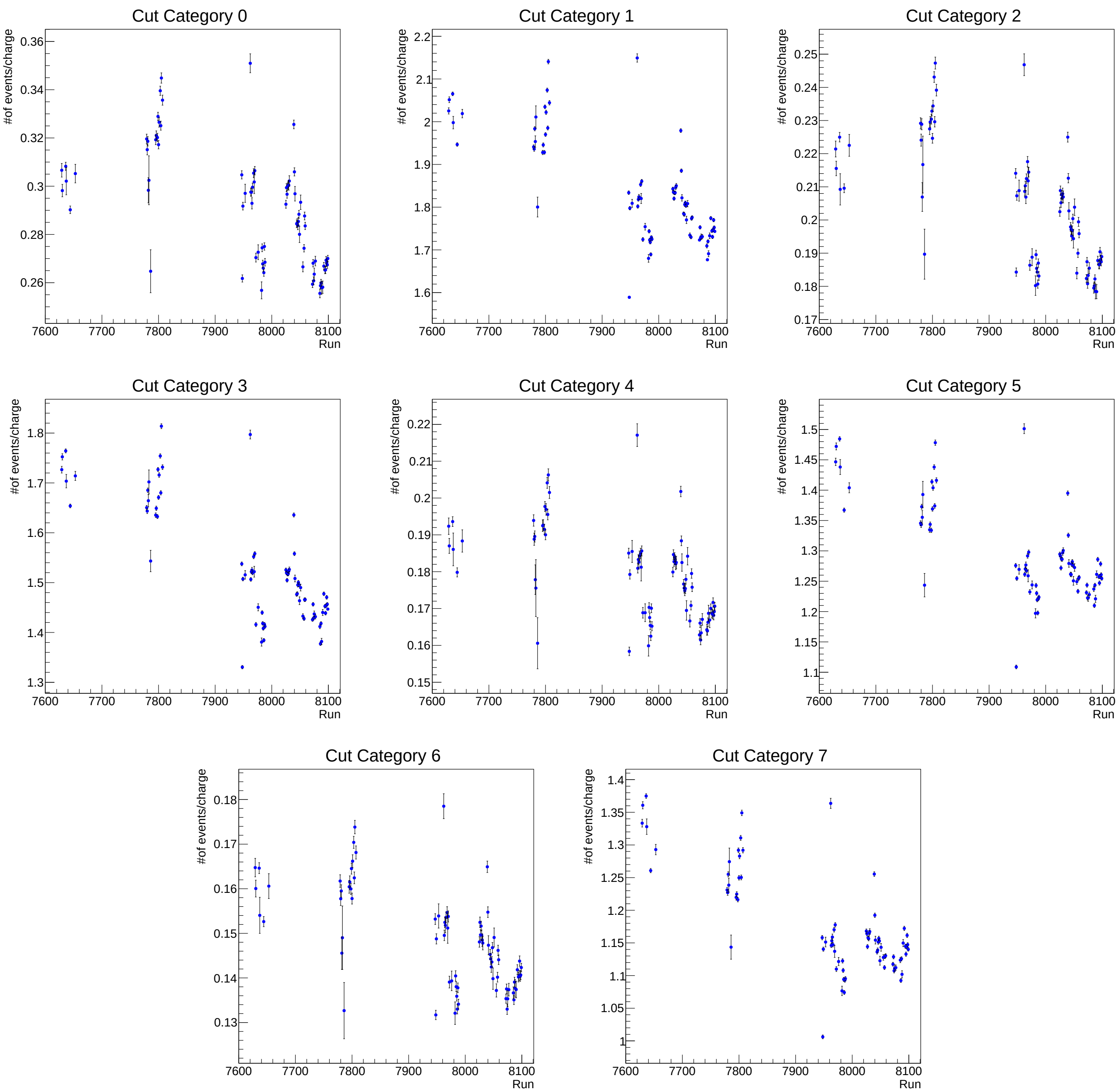

Figure 34: Integrated number of final events normalized by charge for different runs. different plots represent different cut categoried.