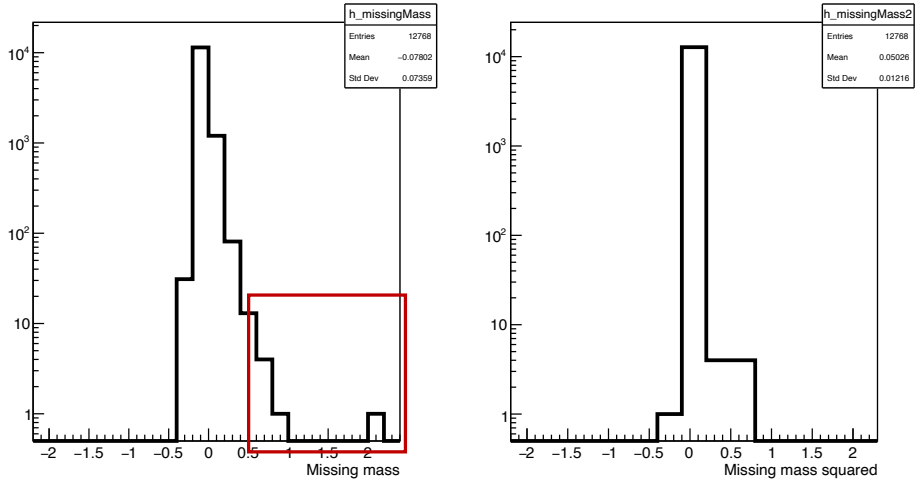
Residue background Checks

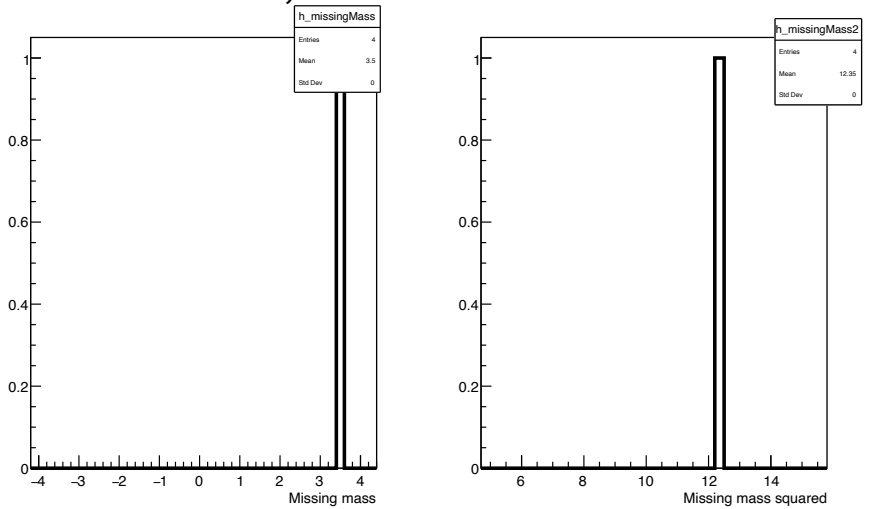
Missing mass before the cut on Signal

20,220 events used



Missing mass before the cut on DIS

2,500 events used



Allowed Jpsi mass cut range is 2.7 to 3.4

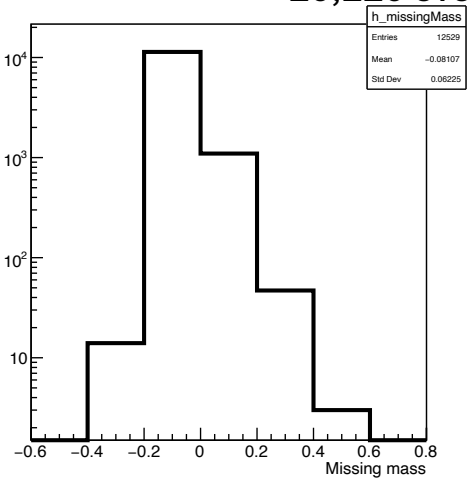
New Condition to be applied
If (abs(Missing mass)>0.5) skip;

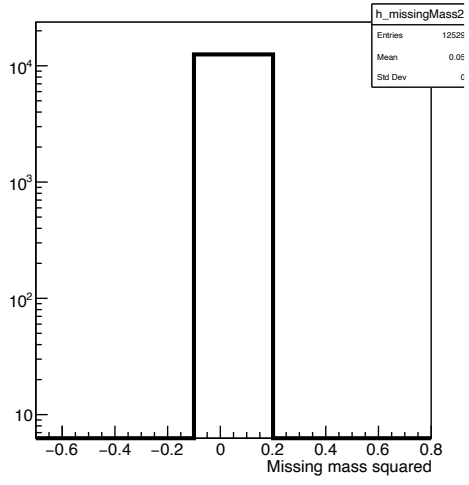
"... this is either getting better or more wrong than before"

Residue background Checks

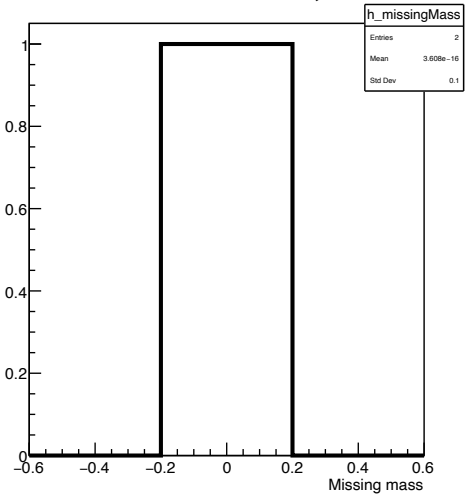
Missing mass with the cut on Signal

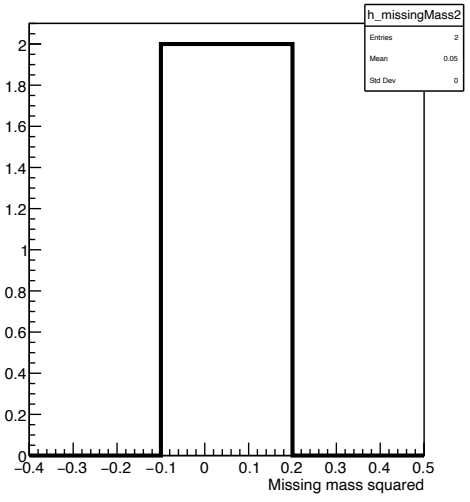
20,220 events used





77,000 events used





Allowed Jpsi mass cut range is 2.7 to 3.4

MCParticlesHeadOnFrameNoBeamFX

"... this is either getting better or more wrong than before"

Residue background Checks

Data for Generation –> $1 < Q^2 < 10$

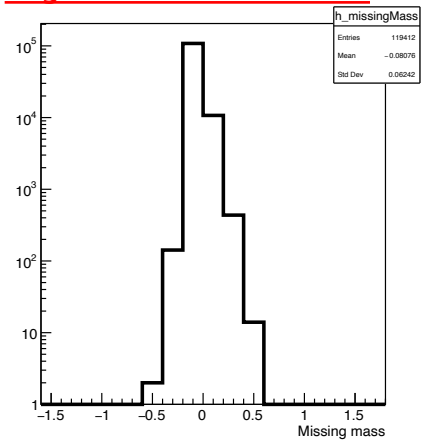
10x130 GeV

	Background	DVMP Signal
Cross section	0.63928175476836346 μb	1.9943×10^(−2) μb
Luminosity	8x10^(-4) fb^(-1)	10 fb^(-1)
# of Events	500,000	199,430

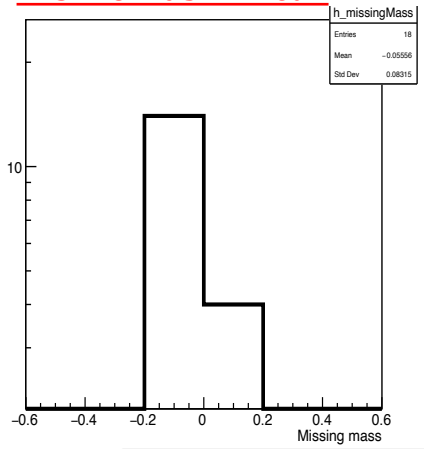
"... this is either getting better or more wrong than before"

Residue background Checks

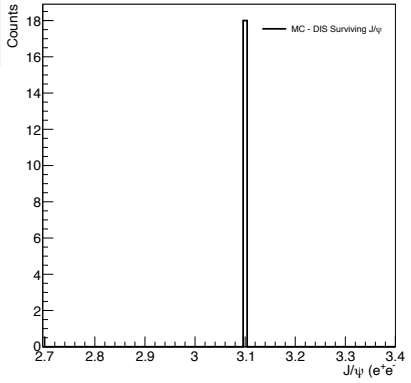
Signal MC has Mx cut



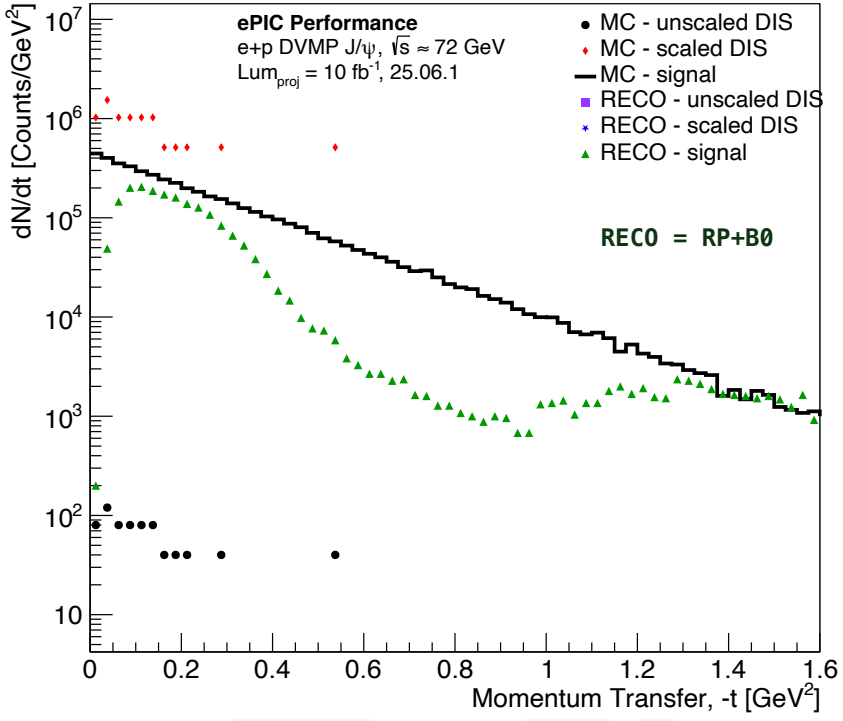
DIS MC has Mx cut



18 events survived



Printout



In the MC level, the surviving events are not the BKG but J/psi product in pythia

"... this is either getting better or more wrong than before"

Residue background Checks

Printout of the 18 DIS events before remove Jpsi events

```
MC Level
SC Proton ->  ; Mass: 0.93827 ; Pz: 129.394 ; Eta: 6.82576
SC Electron ->  ; Mass: 0.00051 ; Pz: -5.53216 ; Eta: -2.31227
DC Electron ->  ; Mass: 0.00051 ; Pz: -3.55631 ; Eta: -1.70389
DC Positron ->  ; Mass: 0.00051 ; Pz: -0.280295 ; Eta: -0.239073
```

```
MC Level
SC Proton ->  ; Mass: 0.93827 ; Pz: 129.452 ; Eta: 6.6412
SC Electron ->  ; Mass: 0.00051 ; Pz: -3.50861 ; Eta: -1.73013
DC Electron ->  ; Mass: 0.00051 ; Pz: -0.392152 ; Eta: -0.35482
DC Positron ->  ; Mass: 0.00051 ; Pz: -5.51156 ; Eta: -2.07037
```

```
MC Level
SC Proton ->  ; Mass: 0.93827 ; Pz: 129.128 ; Eta: 6.20056
SC Electron ->  ; Mass: 0.00051 ; Pz: -6.43702 ; Eta: -2.3896
DC Electron ->  ; Mass: 0.00051 ; Pz: -0.543845 ; Eta: -0.258436
DC Positron ->  ; Mass: 0.00051 ; Pz: -2.11063 ; Eta: -1.91828
```

```
MC Level
SC Proton ->  ; Mass: 0.93827 ; Pz: 126.244 ; Eta: 6.95304
SC Electron ->  ; Mass: 0.00051 ; Pz: -8.85602 ; Eta: -2.33415
DC Electron ->  ; Mass: 0.00051 ; Pz: 0.317434 ; Eta: 0.292606
DC Positron ->  ; Mass: 0.00051 ; Pz: 2.47376 ; Eta: 0.931764
```

```
MC Level
SC Proton ->  ; Mass: 0.93827 ; Pz: 129.704 ; Eta: 7.53802
SC Electron ->  ; Mass: 0.00051 ; Pz: -1.79663 ; Eta: -2.07356
DC Electron ->  ; Mass: 0.00051 ; Pz: -7.91265 ; Eta: -3.21915
DC Positron ->  ; Mass: 0.00051 ; Pz: 0.0330883 ; Eta: 0.0620988
```

```
MC Level
SC Proton ->  ; Mass: 0.93827 ; Pz: 128.698 ; Eta: 5.96431
SC Electron ->  ; Mass: 0.00051 ; Pz: -7.88935 ; Eta: -2.37983
DC Electron ->  ; Mass: 0.00051 ; Pz: -0.501576 ; Eta: -0.246053
DC Positron ->  ; Mass: 0.00051 ; Pz: -0.285672 ; Eta: -0.237375
```

```
MC Level
SC Proton ->  ; Mass: 0.93827 ; Pz: 127.344 ; Eta: 6.45729
SC Electron ->  ; Mass: 0.00051 ; Pz: -8.92861 ; Eta: -2.9078
DC Electron ->  ; Mass: 0.00051 ; Pz: -0.579747 ; Eta: -0.752356
DC Positron ->  ; Mass: 0.00051 ; Pz: 2.19727 ; Eta: 1.06374
```

```
MC Level
SC Proton ->  ; Mass: 0.93827 ; Pz: 129.027 ; Eta: 6.81096
SC Electron ->  ; Mass: 0.00051 ; Pz: -7.31949 ; Eta: -2.72701
DC Electron ->  ; Mass: 0.00051 ; Pz: -0.352352 ; Eta: -0.285538
DC Positron ->  ; Mass: 0.00051 ; Pz: -1.32719 ; Eta: -0.639134
```

```
MC Level
SC Proton ->  ; Mass: 0.93827 ; Pz: 127.362 ; Eta: 7.11231
SC Electron ->  ; Mass: 0.00051 ; Pz: -8.91598 ; Eta: -2.85629
DC Electron ->  ; Mass: 0.00051 ; Pz: 1.40559 ; Eta: 0.654287
DC Positron ->  ; Mass: 0.00051 ; Pz: 0.174791 ; Eta: 0.141202
```

```
MC Level
SC Proton ->  ; Mass: 0.93827 ; Pz: 129.288 ; Eta: 8.7059
SC Electron ->  ; Mass: 0.00051 ; Pz: -6.26032 ; Eta: -2.59592
DC Electron ->  ; Mass: 0.00051 ; Pz: -0.215919 ; Eta: -0.141162
DC Positron ->  ; Mass: 0.00051 ; Pz: -2.78023 ; Eta: -2.06083
```

```
MC Level
SC Proton ->  ; Mass: 0.93827 ; Pz: 128.908 ; Eta: 6.3617
SC Electron ->  ; Mass: 0.00051 ; Pz: -7.43882 ; Eta: -2.74391
DC Electron ->  ; Mass: 0.00051 ; Pz: 0.336613 ; Eta: 0.379362
DC Positron ->  ; Mass: 0.00051 ; Pz: -1.76815 ; Eta: -0.788096
```

```
MC Level
SC Proton ->  ; Mass: 0.93827 ; Pz: 128.207 ; Eta: 9.10471
SC Electron ->  ; Mass: 0.00051 ; Pz: -8.20578 ; Eta: -2.34476
DC Electron ->  ; Mass: 0.00051 ; Pz: -0.5394 ; Eta: -0.535634
DC Positron ->  ; Mass: 0.00051 ; Pz: 0.569403 ; Eta: 0.245829
```

```
MC Level
SC Proton ->  ; Mass: 0.93827 ; Pz: 128.988 ; Eta: 6.61519
SC Electron ->  ; Mass: 0.00051 ; Pz: -5.25971 ; Eta: -1.87419
DC Electron ->  ; Mass: 0.00051 ; Pz: -3.49947 ; Eta: -1.67652
DC Positron ->  ; Mass: 0.00051 ; Pz: 0.0146783 ; Eta: 0.0140973
```

```
MC Level
SC Proton ->  ; Mass: 0.93827 ; Pz: 129.617 ; Eta: 6.3607
SC Electron ->  ; Mass: 0.00051 ; Pz: -2.49885 ; Eta: -1.72451
DC Electron ->  ; Mass: 0.00051 ; Pz: -1.121 ; Eta: -0.872299
DC Positron ->  ; Mass: 0.00051 ; Pz: -5.95904 ; Eta: -2.06633
```

```
MC Level
SC Proton ->  ; Mass: 0.93827 ; Pz: 129.353 ; Eta: 6.48866
SC Electron ->  ; Mass: 0.00051 ; Pz: -3.94837 ; Eta: -1.78449
DC Electron ->  ; Mass: 0.00051 ; Pz: -0.175866 ; Eta: -0.145699
DC Positron ->  ; Mass: 0.00051 ; Pz: -4.6925 ; Eta: -4.06072
```

```
MC Level
SC Proton ->  ; Mass: 0.93827 ; Pz: 128.888 ; Eta: 7.15518
SC Electron ->  ; Mass: 0.00051 ; Pz: -6.30838 ; Eta: -1.80684
DC Electron ->  ; Mass: 0.00051 ; Pz: -2.24104 ; Eta: -1.5088
DC Positron ->  ; Mass: 0.00051 ; Pz: -0.302672 ; Eta: -0.15161
```

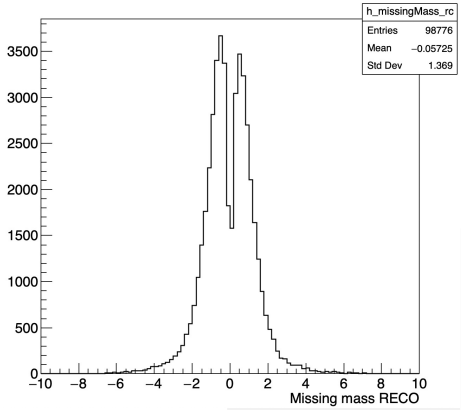
```
MC Level
SC Proton ->  ; Mass: 0.93827 ; Pz: 129.659 ; Eta: 6.51593
SC Electron ->  ; Mass: 0.00051 ; Pz: -2.95617 ; Eta: -2.38283
DC Electron ->  ; Mass: 0.00051 ; Pz: -3.38828 ; Eta: -1.45979
DC Positron ->  ; Mass: 0.00051 ; Pz: -3.28518 ; Eta: -1.56058
```

```
MC Level
SC Proton ->  ; Mass: 0.93827 ; Pz: 126.577 ; Eta: 6.93677
SC Electron ->  ; Mass: 0.00051 ; Pz: -8.74635 ; Eta: -2.29623
DC Electron ->  ; Mass: 0.00051 ; Pz: 0.432952 ; Eta: 0.381742
DC Positron ->  ; Mass: 0.00051 ; Pz: 1.86256 ; Eta: 0.68737
```

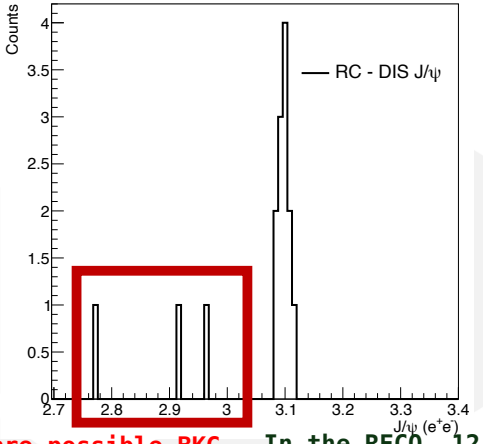
"... this is either getting better or more wrong than before"

Residue background Checks

Signal RC has no Mx cut

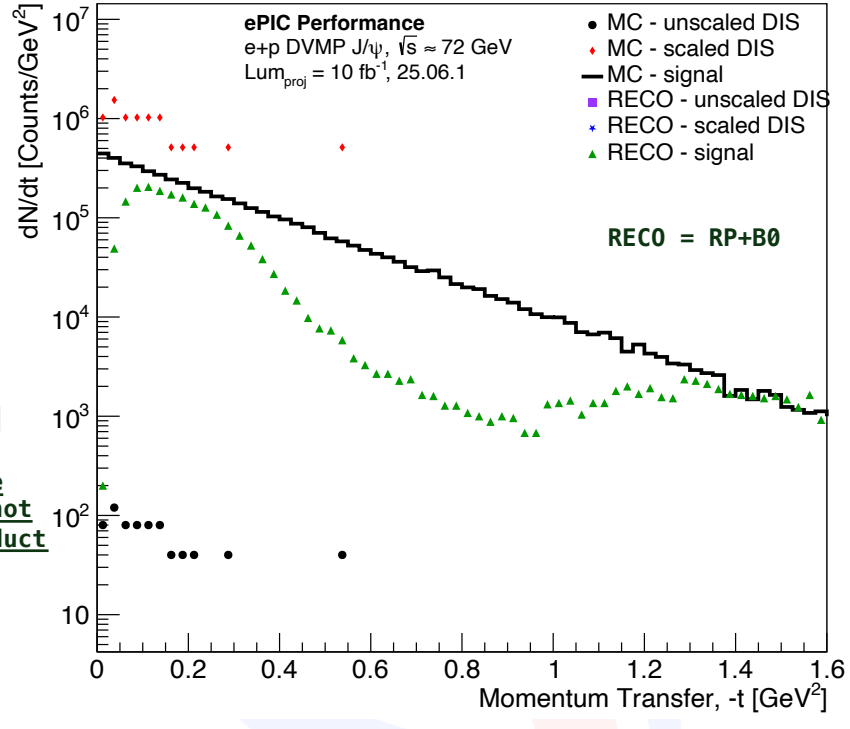


DIS RC has no Mx cut
15 events survived



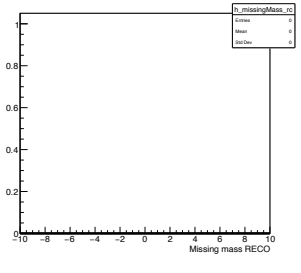
3 events are possible BKG mimicking J/psi

In the RECO, 12 of the surviving events are not the BKG but J/psi product in pythia

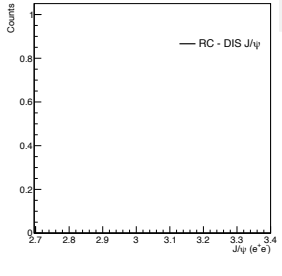


Here, missing mass cut was not applied to the RECO but was applied to the MC

DIS RC has Mx cut

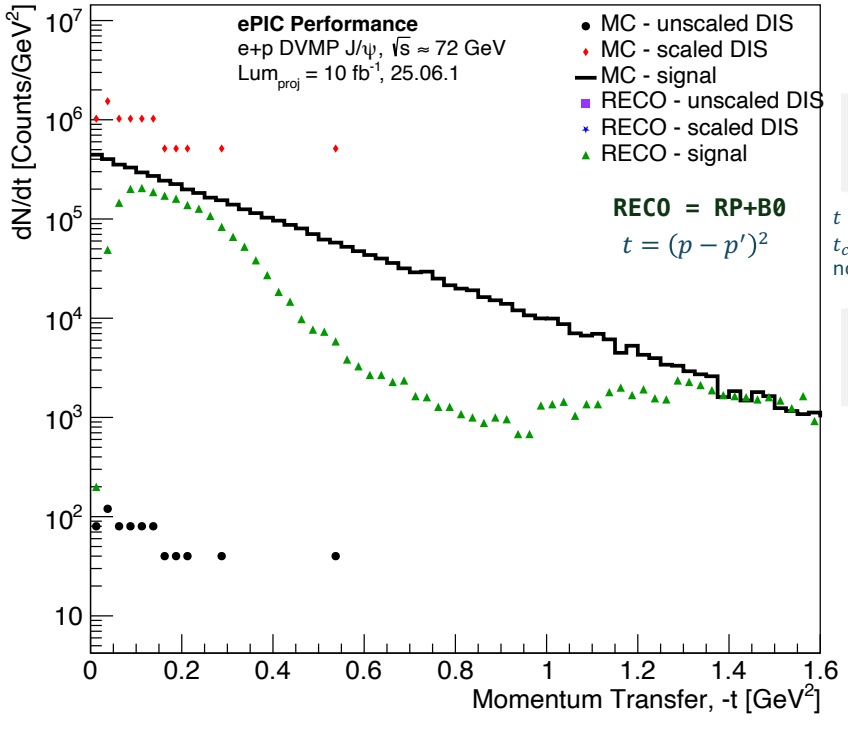


No J/psi events

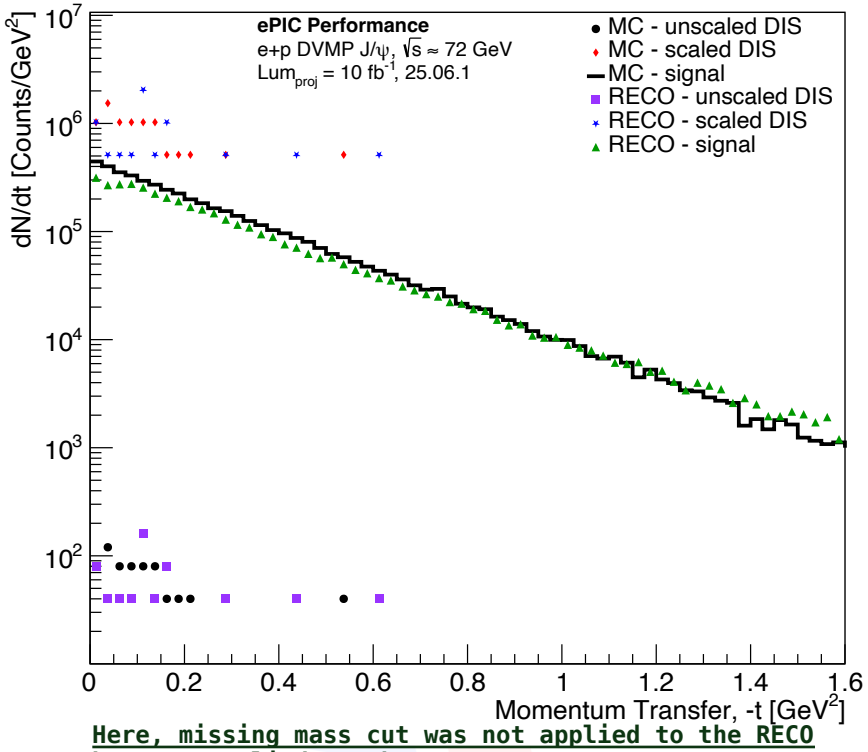


"... this is either getting better or more wrong than before"

Residue background Checks



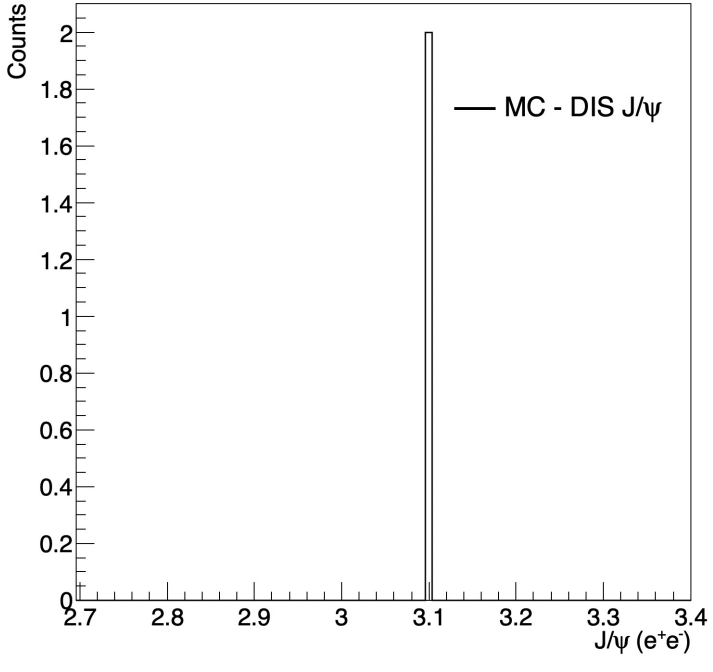
$t = (p - p')^2$ for the RP and B0
$t_{cor} = (p - p'_{cor})^2$ where there are no contributions from Rp and B0

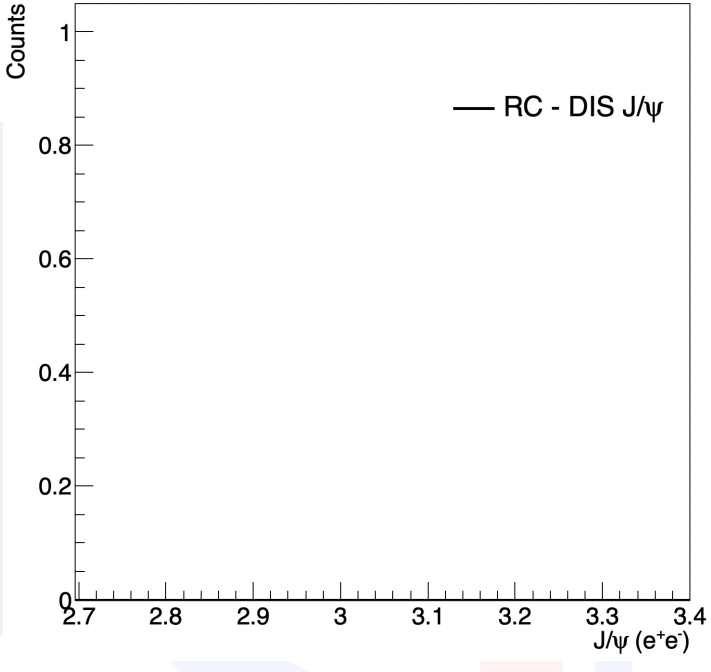


Here, missing mass cut was not applied to the RECO but was applied to the MC

"... this is either getting better or more wrong than before"

Residue background Checks

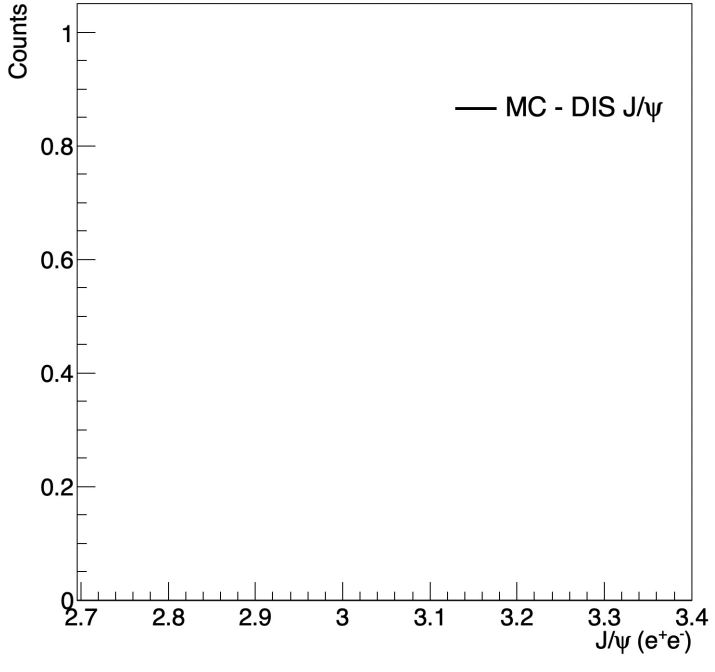


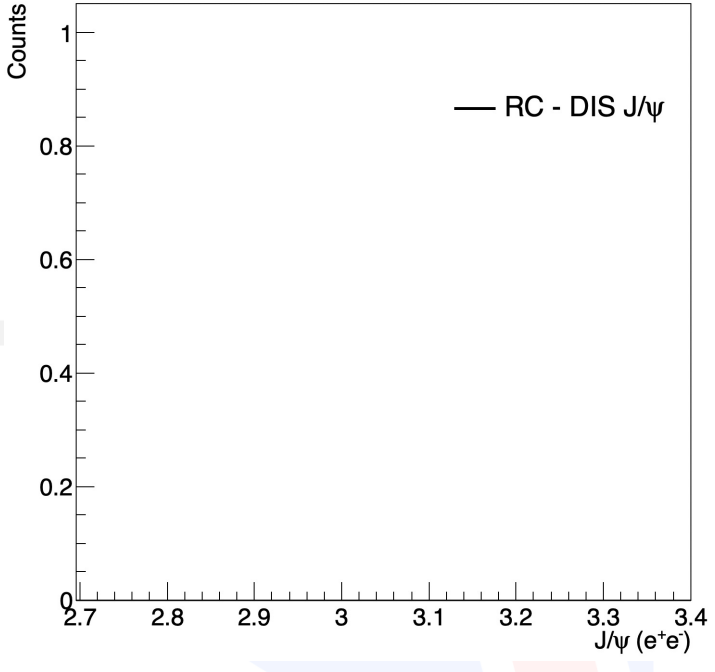


Now we can proceed to remove Jpsi produced by pythia
Extra condition on the DIS sample skip Jpsi within 3.095 to 3.105

"... this is either getting better or more wrong than before"

Residue background Checks



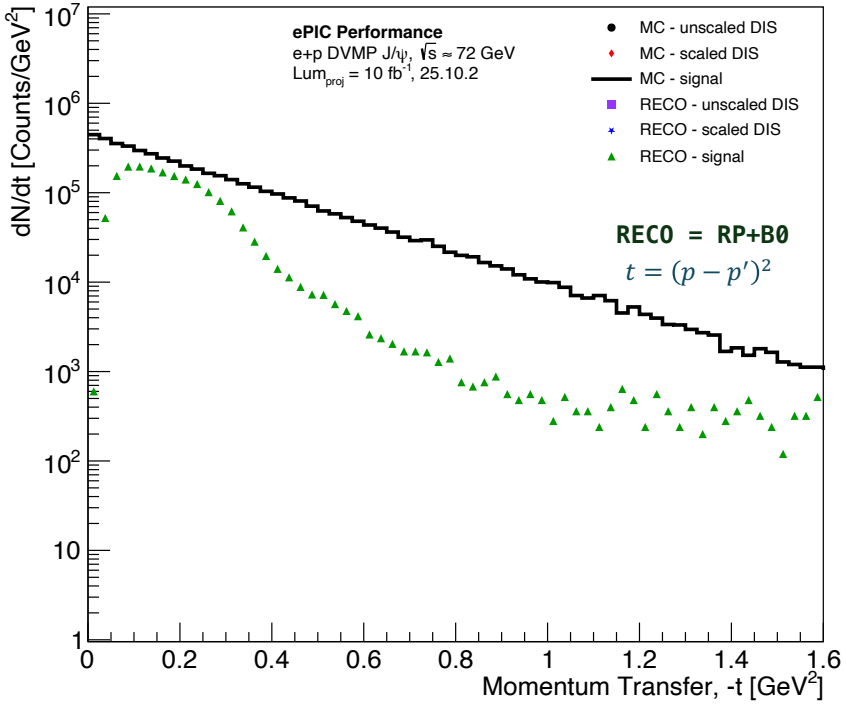


There are no more events captured

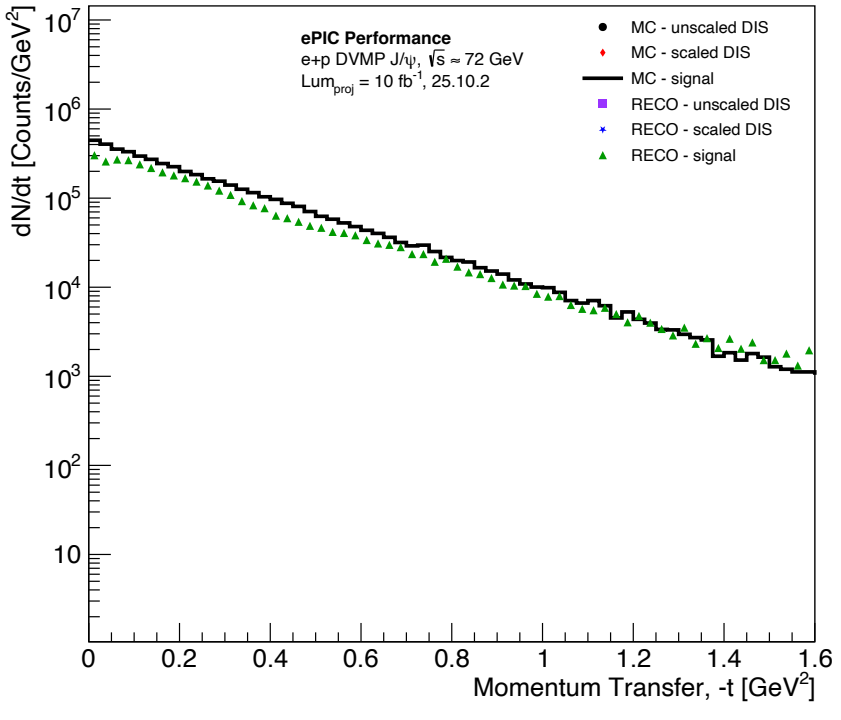
"... this is either getting better or more wrong than before"

Residue background Checks

Now, using the October lAger sample



$t = (p - p')^2$ for the RP and B0
$t_{cor} = (p - p'_{cor})^2$ where there ar
no contributions from Rp and B0



Here, missing mass cut was applied to both RECO and MC

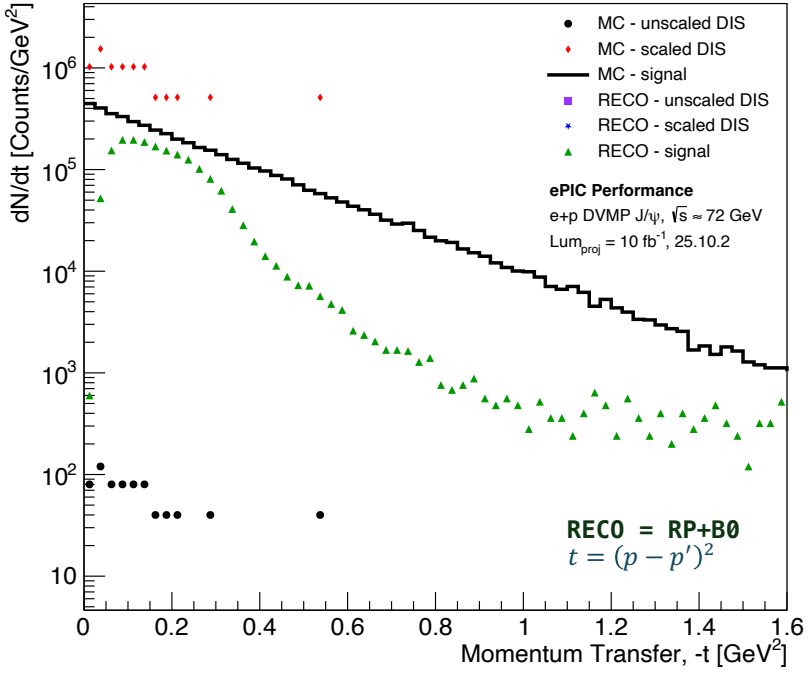
Less number of events observed in B0 detector compared to previous campaigns

"... this is either getting better or more wrong than before"

Residue background Checks

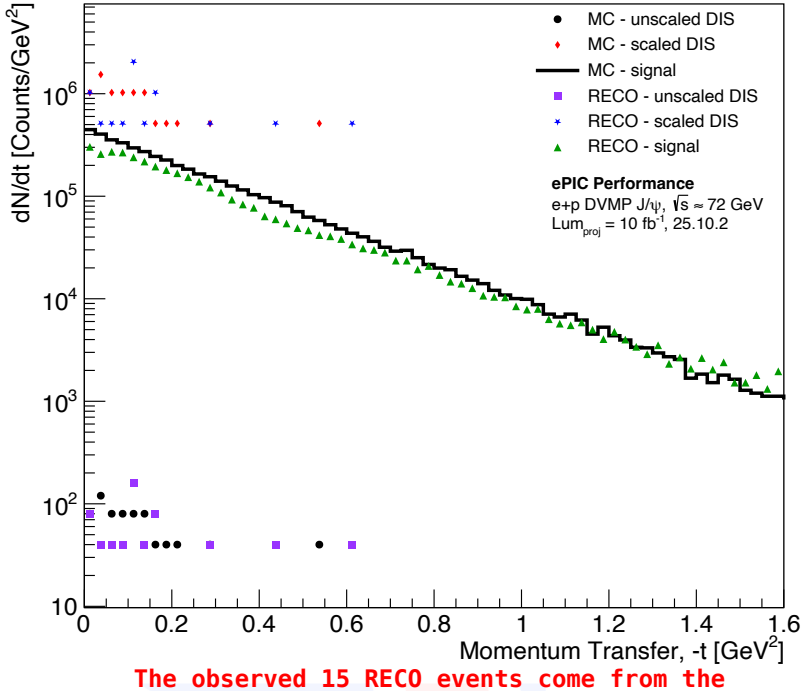
Restoring the Jpsi's produced in pythia

Now, using the October lAger sample



Here, missing mass cut was applied to both RECO and MC

$t = (p - p')^2$ for the RP and B0
$t_{cor} = (p - p'_{cor})^2$ where there are no contributions from Rp and B0



The observed 15 RECO events come from the $t_{cor} = (p - p'_{cor})^2$

"... this is either getting better or more wrong than before"