W Analysis Updates

Devika Gunarathne

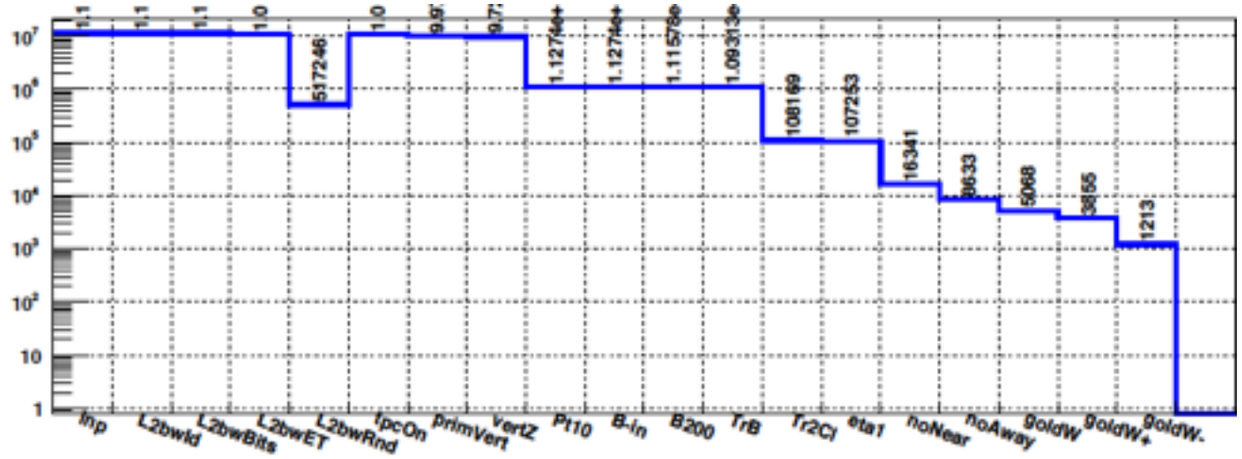
- Data Sample
- Event Selection
- BG Estimation
- AL calculation

Data / Embedding Sample

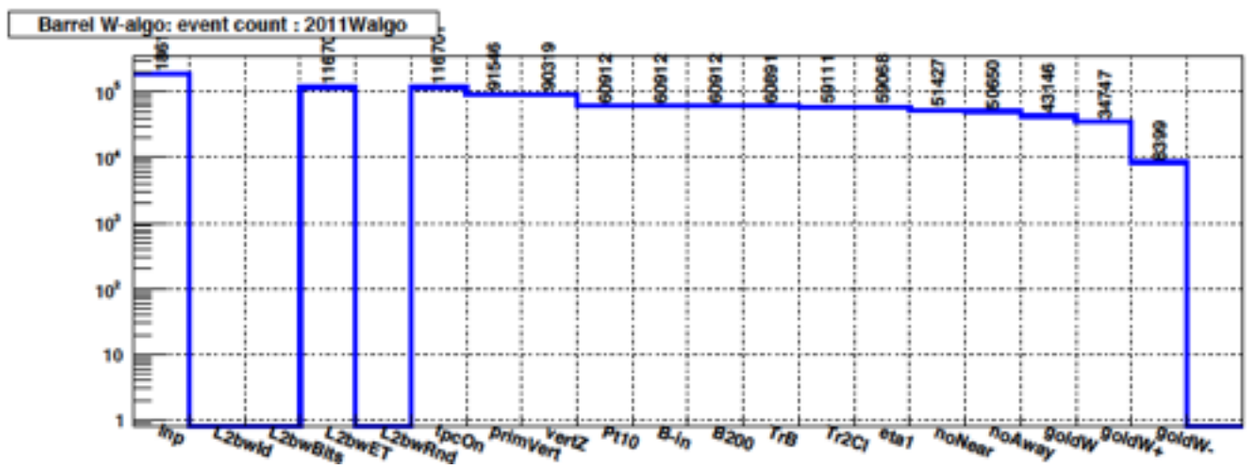
- Total # of runs used: st-WB : 930, Lumi: 119.05 pb^{-1}
- st-WE : 892 , Lumi: 120.67 pb^{-1}
- Embedding Total Events : Wplus -136589, Wminus - 43703, Z - 30945
- Event selection cuts used - same as run 12.

W event Count

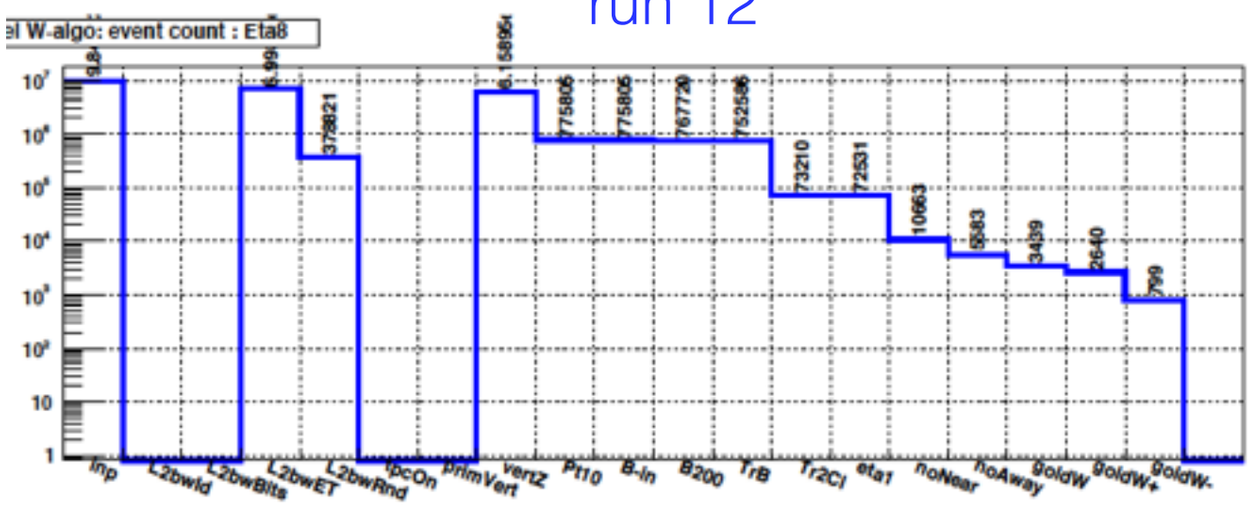
run 13 st_WB



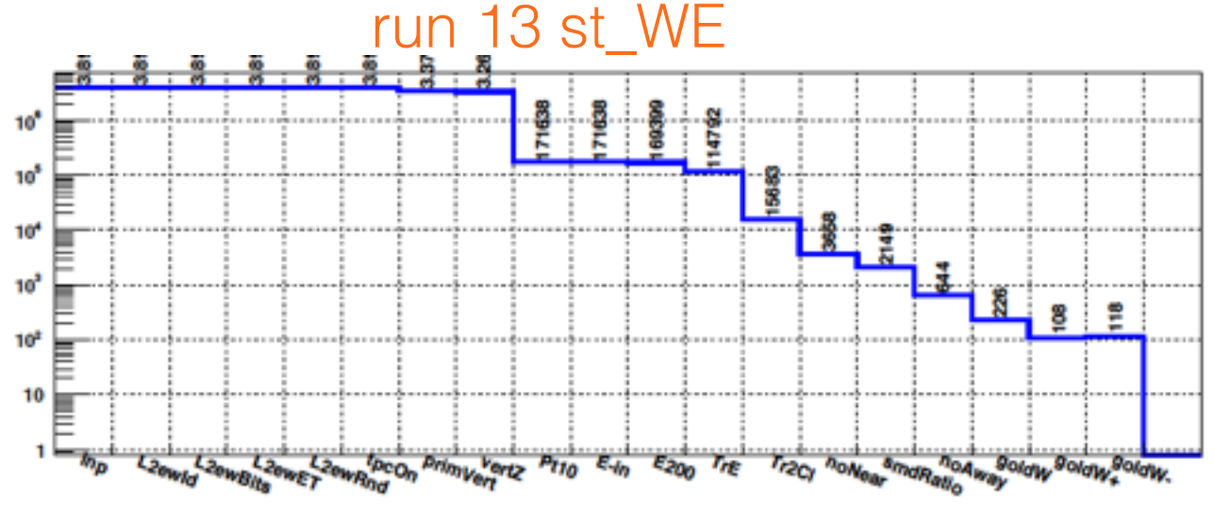
Embedding



run 12



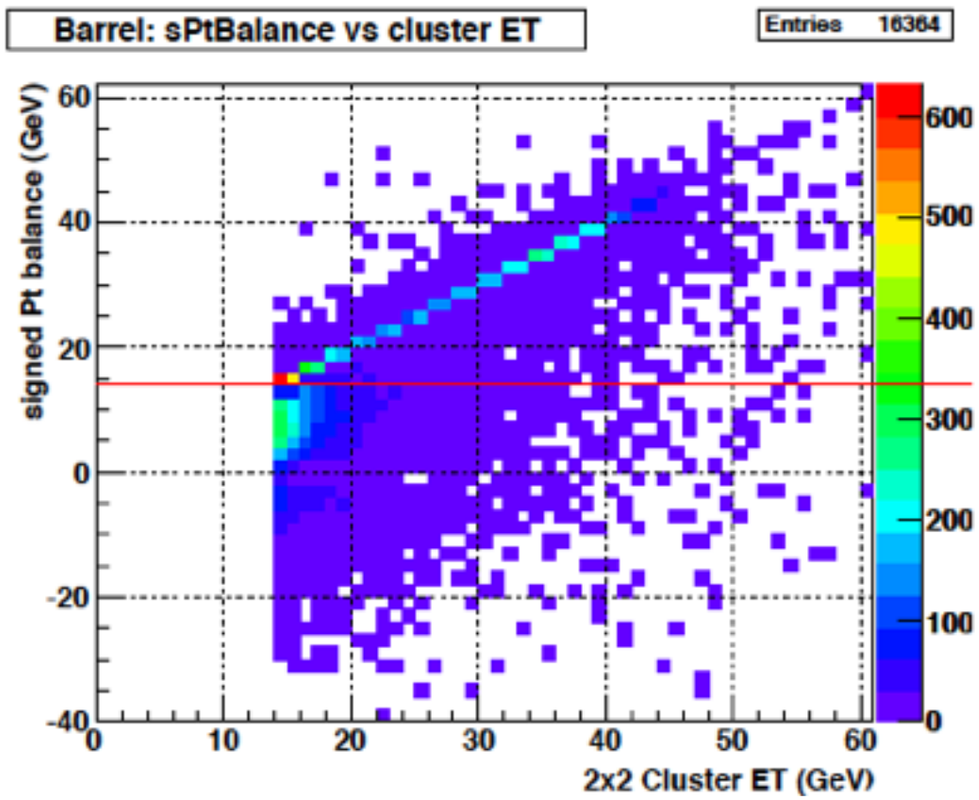
run 13 st_WE

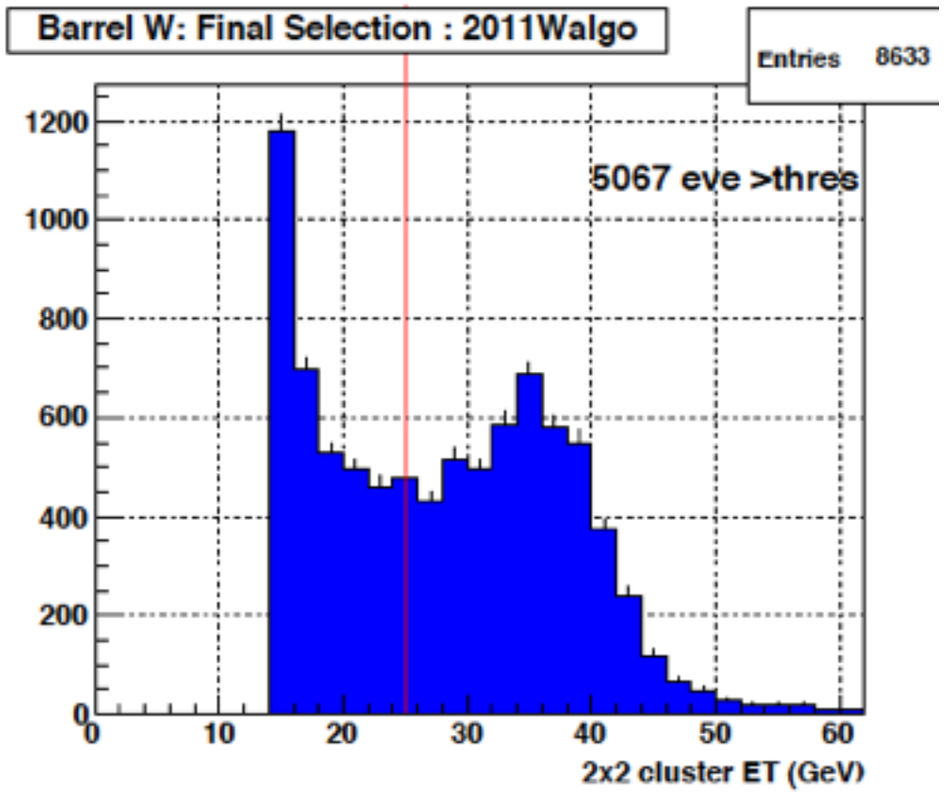


	Prim. Ver	VerZ	PT=10G					isolation 1	isolation 2	signPT-balance	Golden W	W+	W-
run13-st-WB	88.174	85.997	9.964	9.964	9.862	9.662	0.956	0.948	0.144	0.076	0.045	0.034	0.011
run12	0.000	62.576	7.882	7.882	7.800	7.646	0.744	0.737	0.108	0.057	0.035	0.027	0.008
embedding	0.000	48.525	32.726	32.726	32.726	32.715	31.758	31.735	27.630	27.213	23.181	18.668	4.513
run13 st-WE	86.517	83.577	4.365	4.365	4.306	2.916	0.397	0.093	0.053	0.016	0.006	0.003	0.003

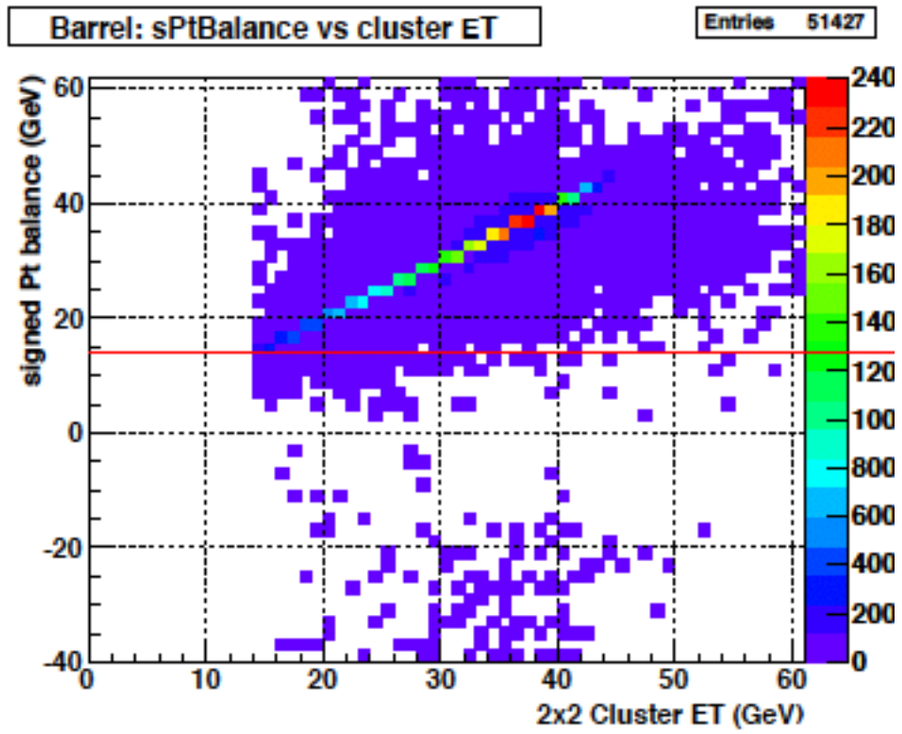
Barrel W event selection

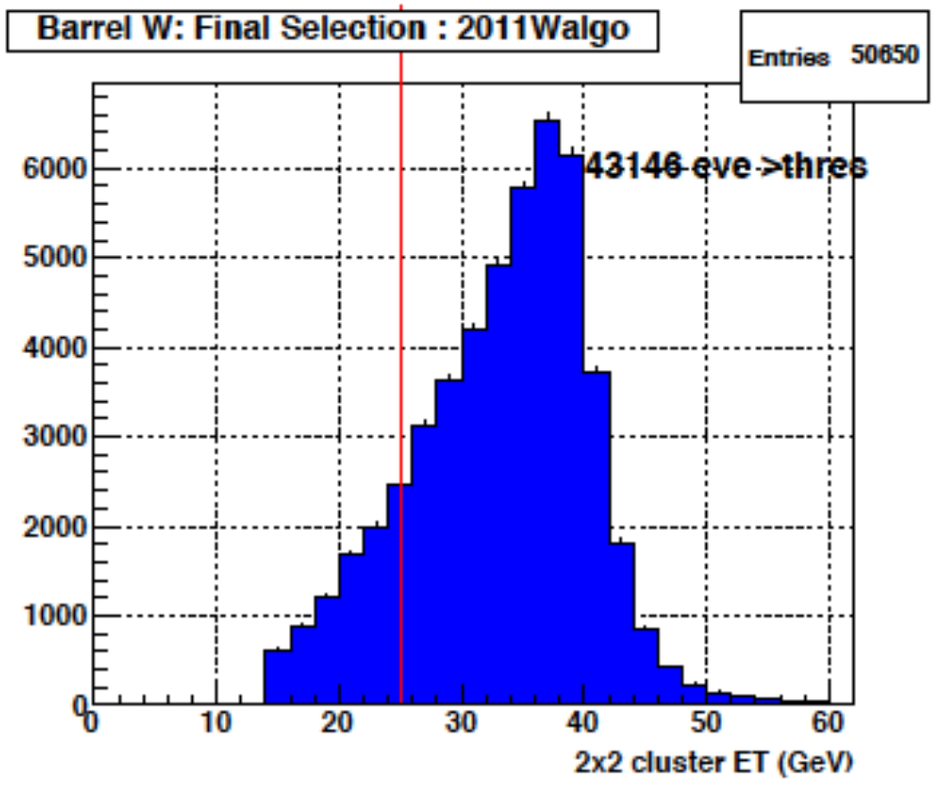
run 13 st_WB





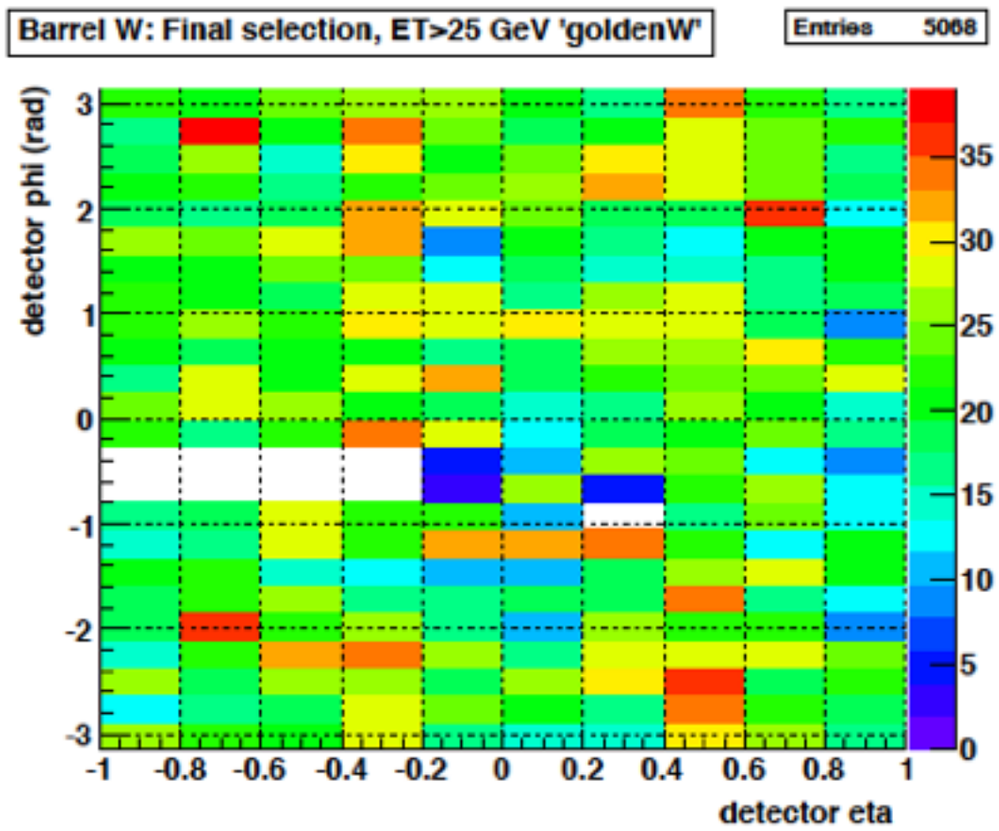
Embedding

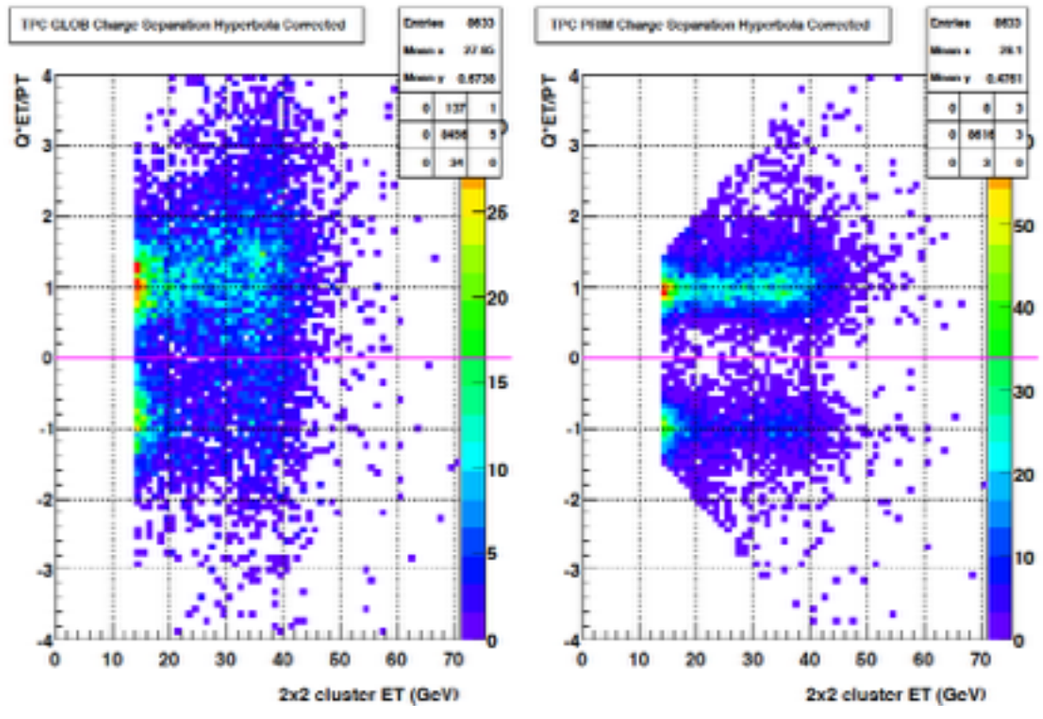




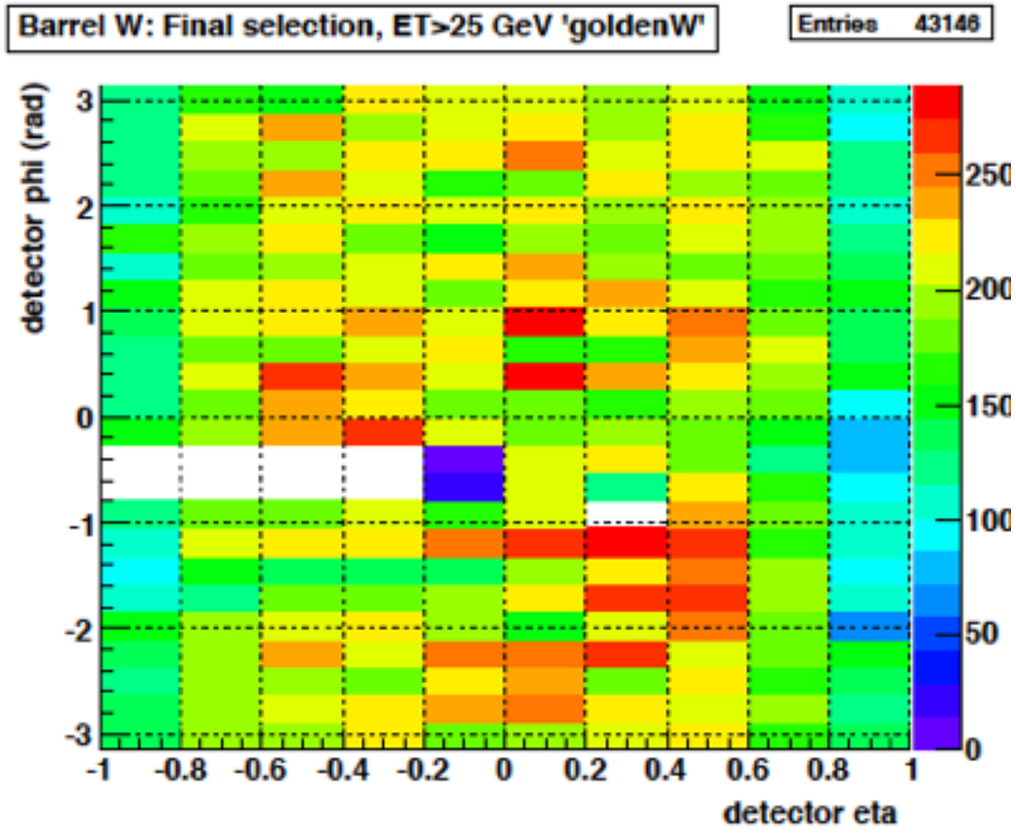
Barrel W event selection

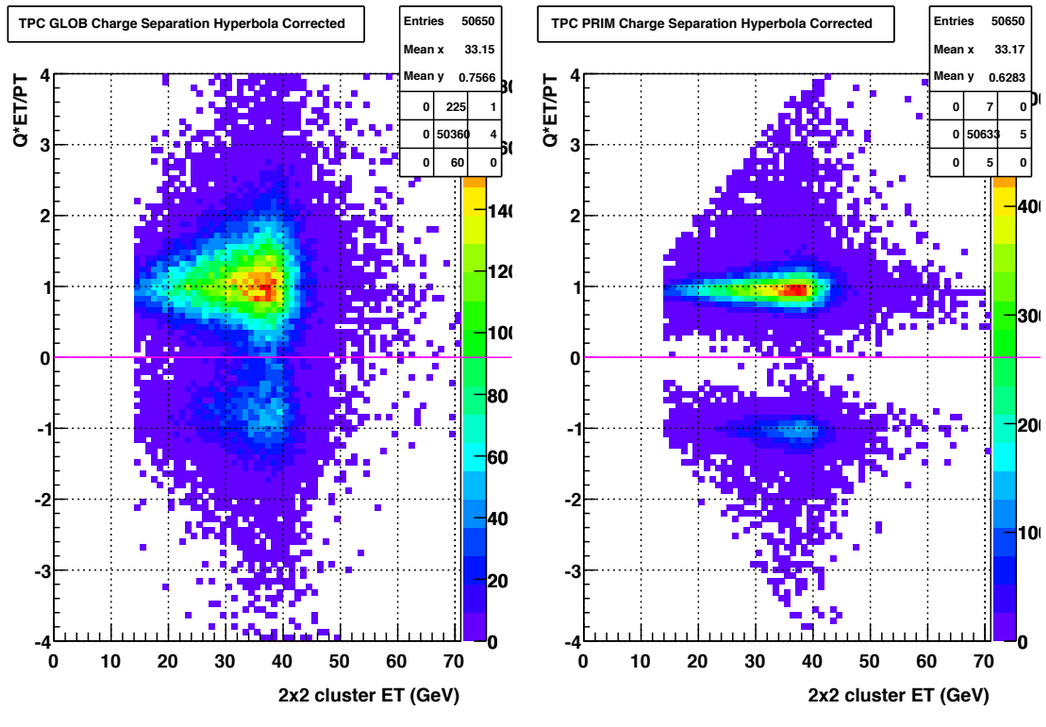
run 13 st_WB



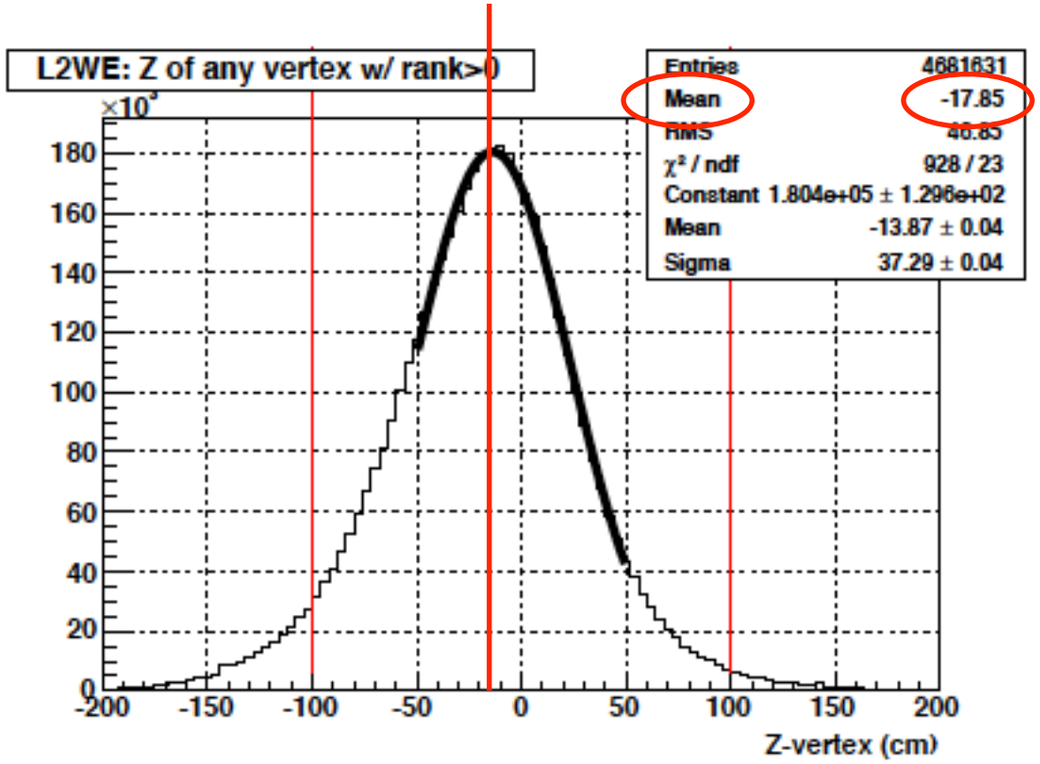


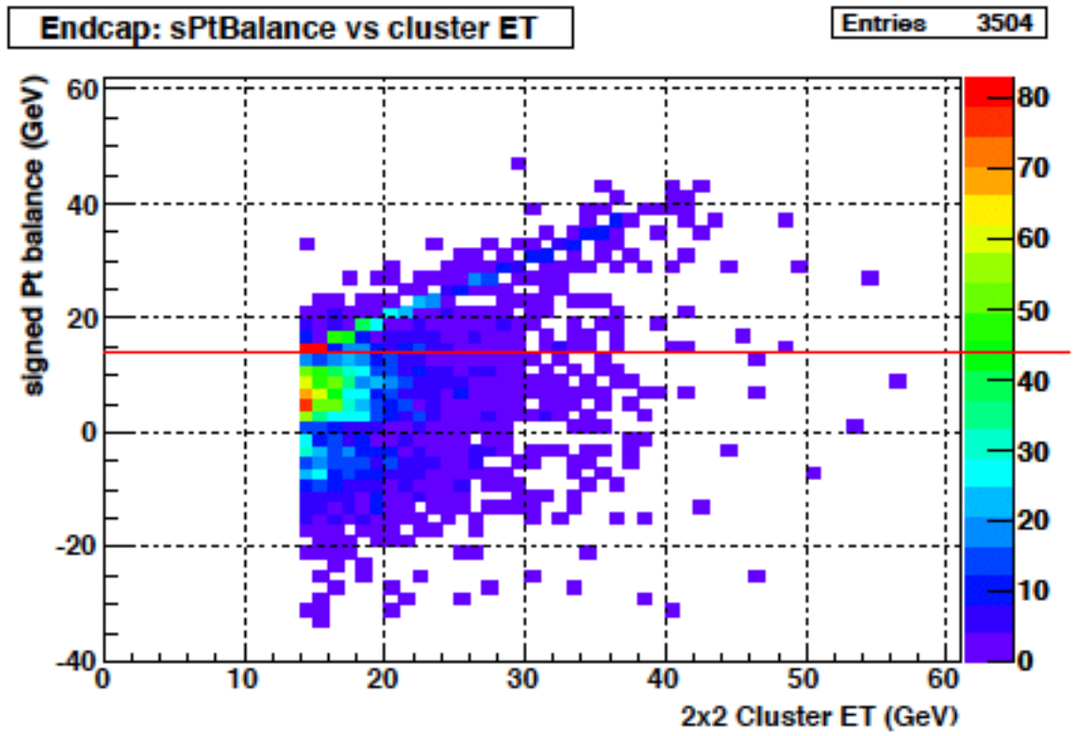
Embedding

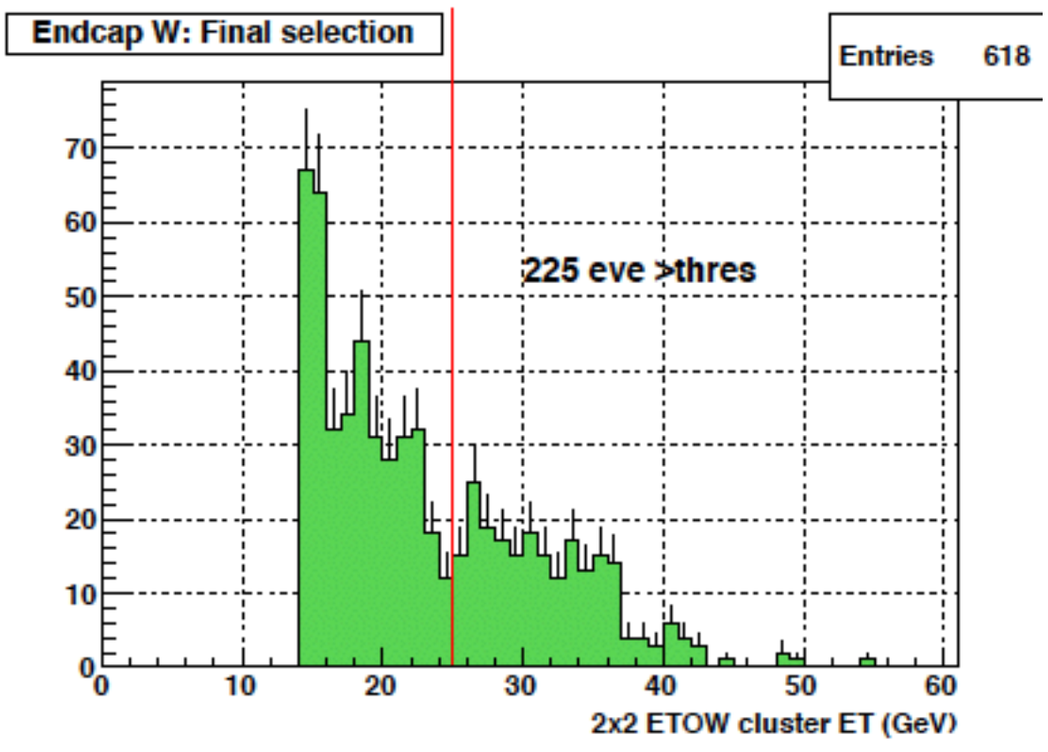


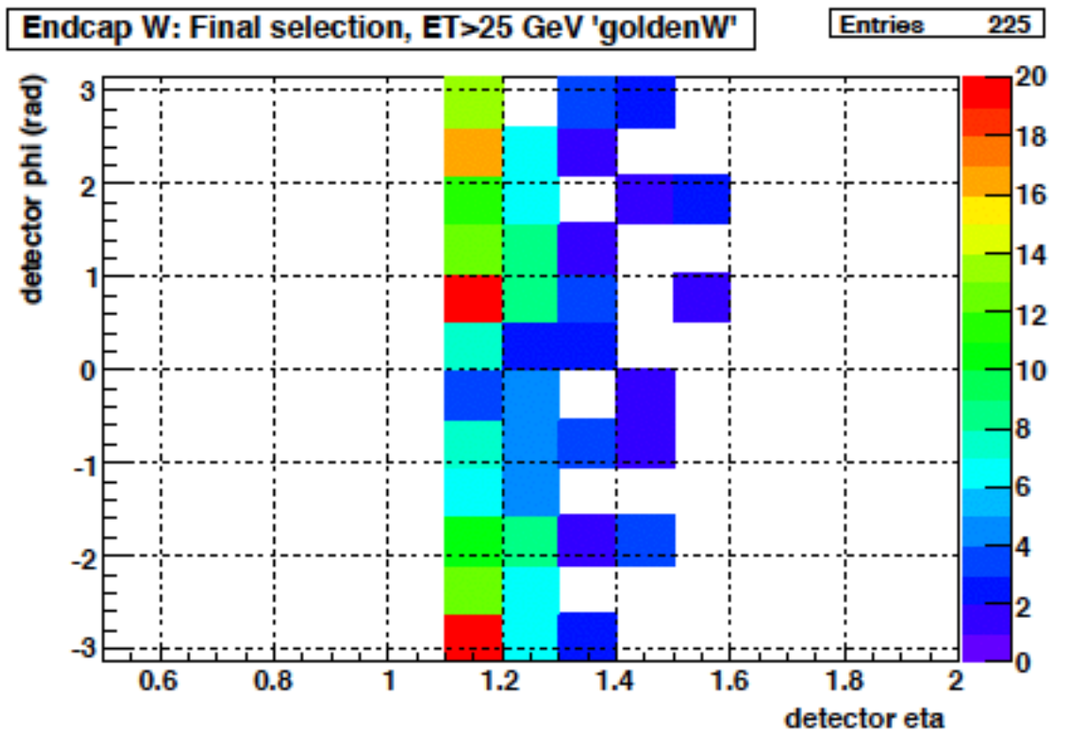


Endcap W event selection



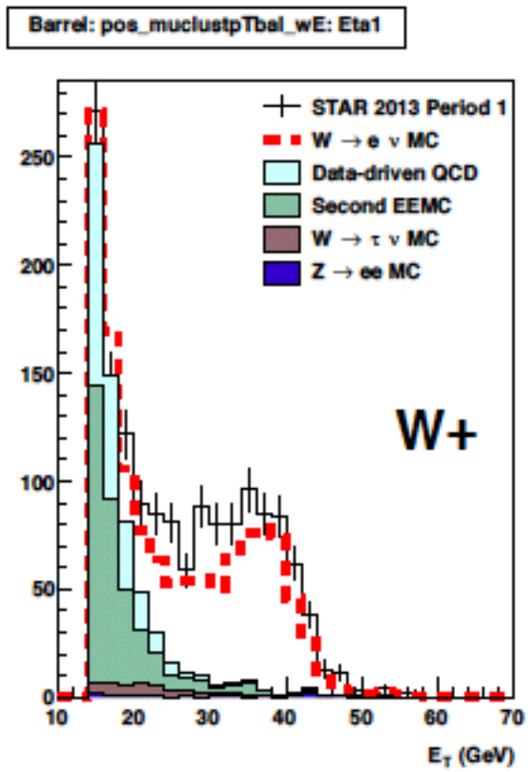


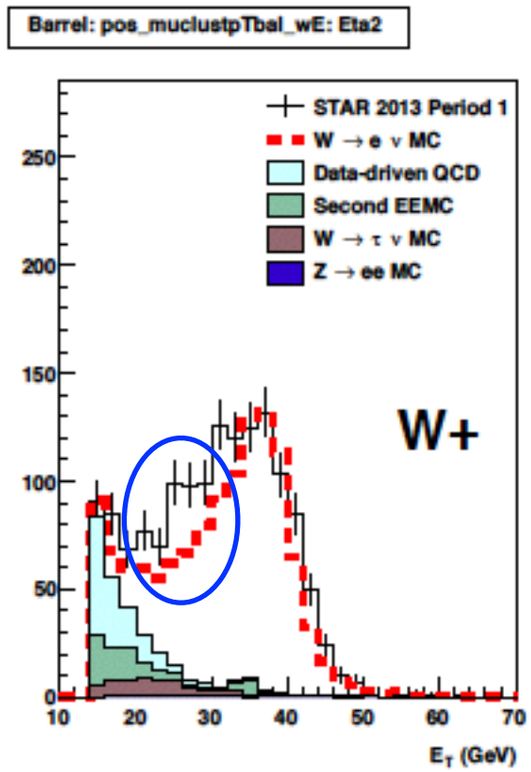


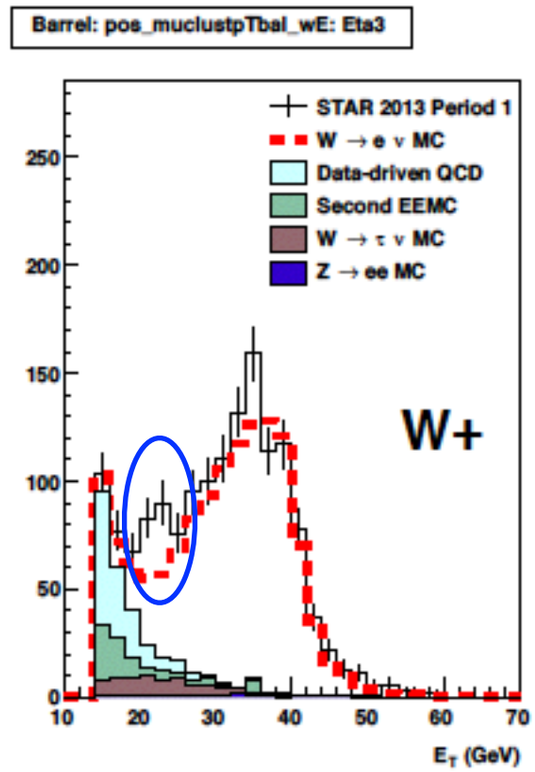


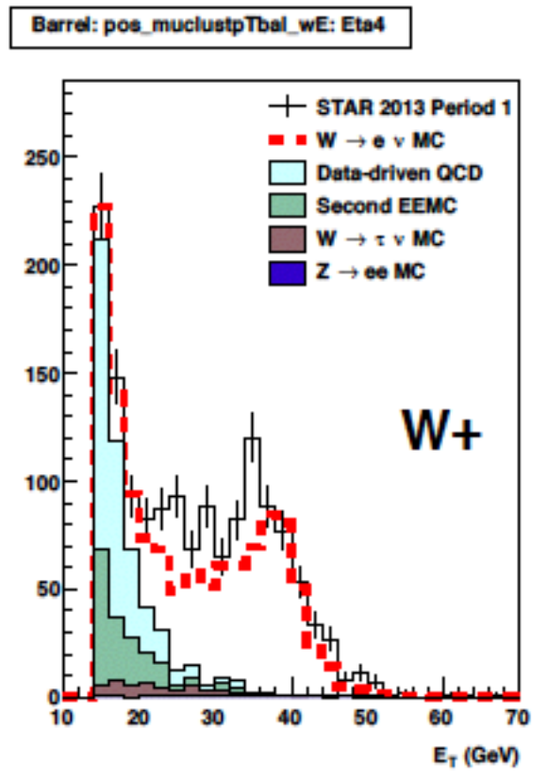
BG for W^+ star Eta 1-4

run 13

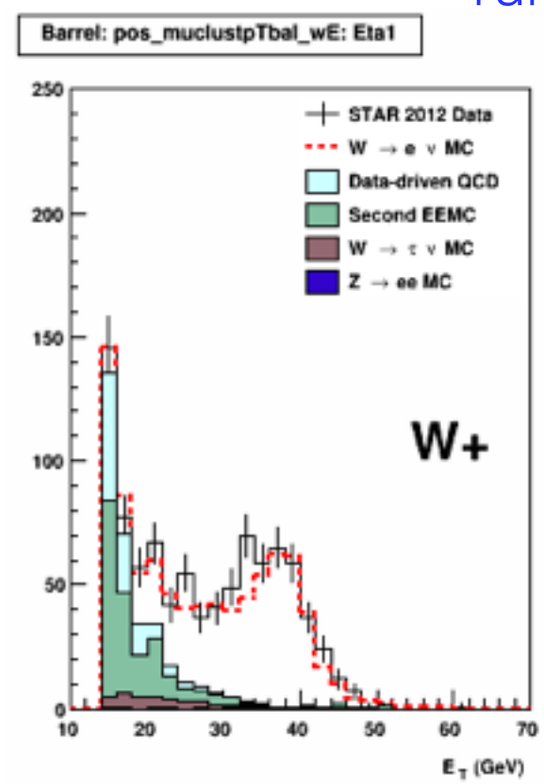


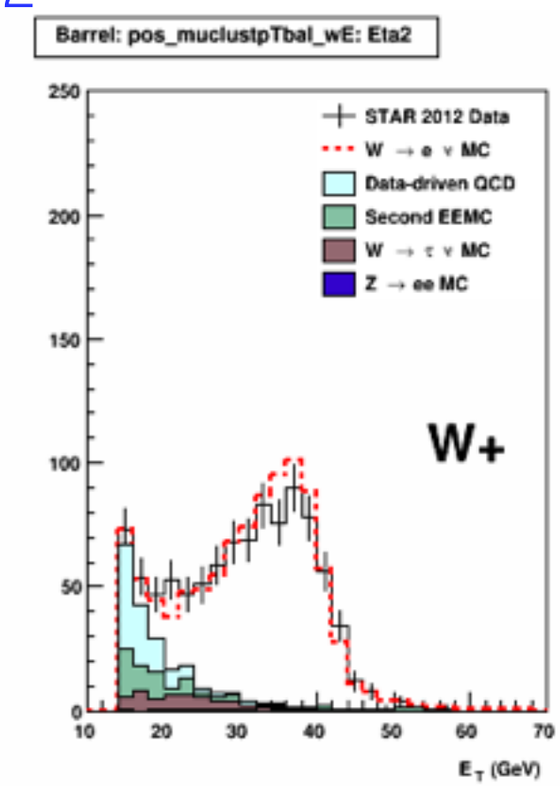


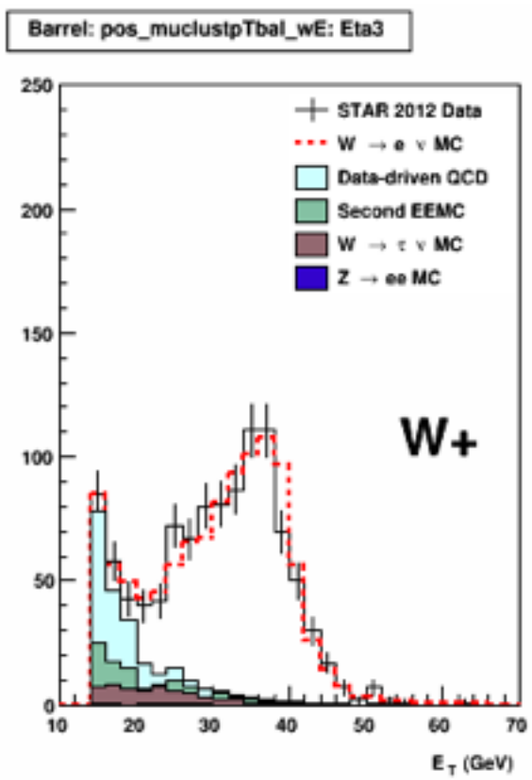


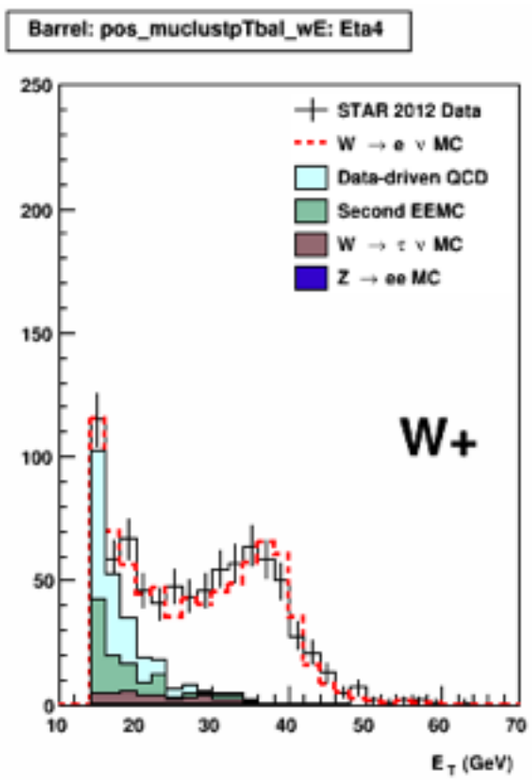


run 12



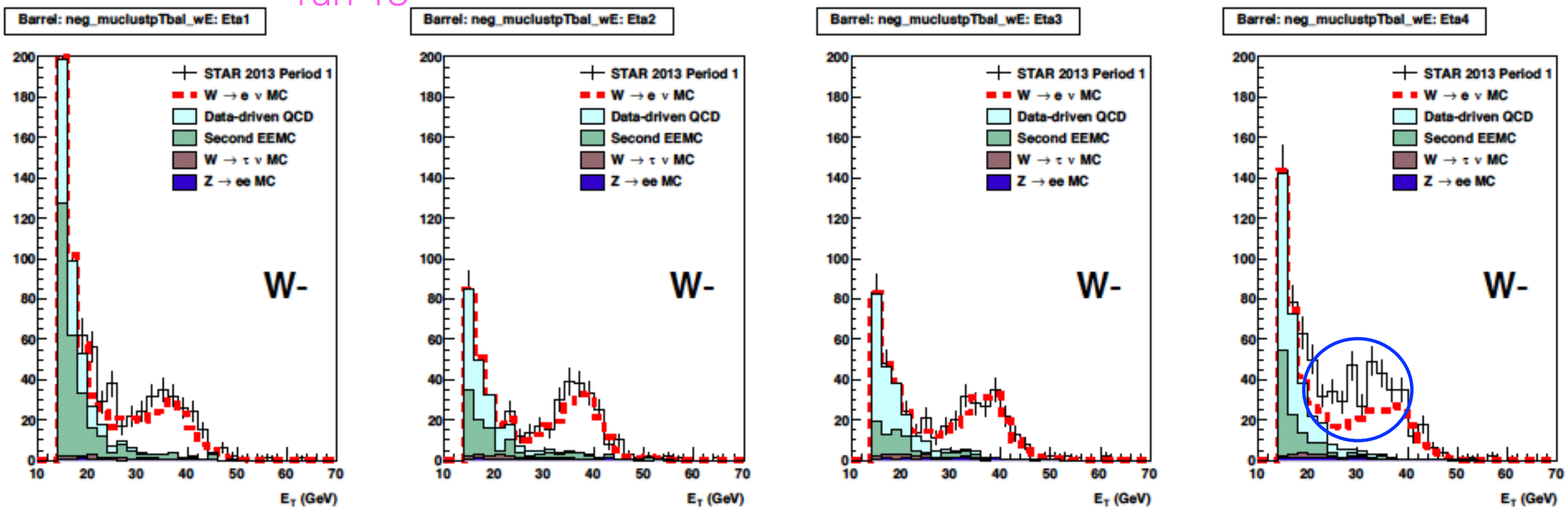




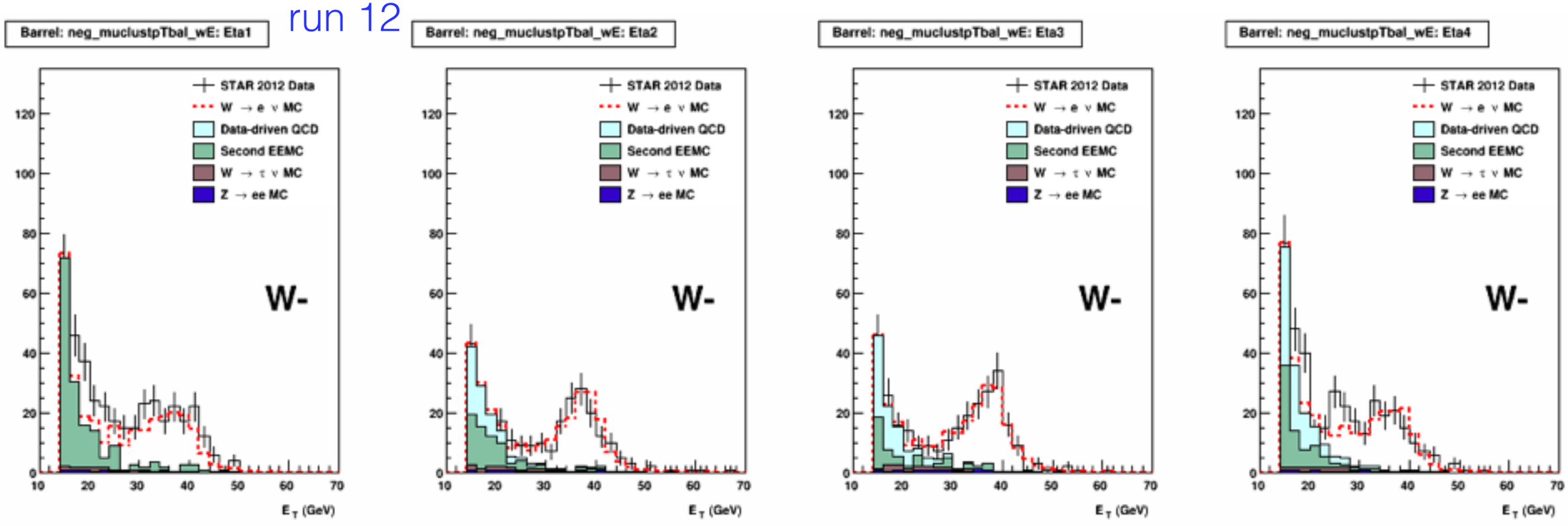


BG for W^+ Star Eta Bin 1-4

run 13

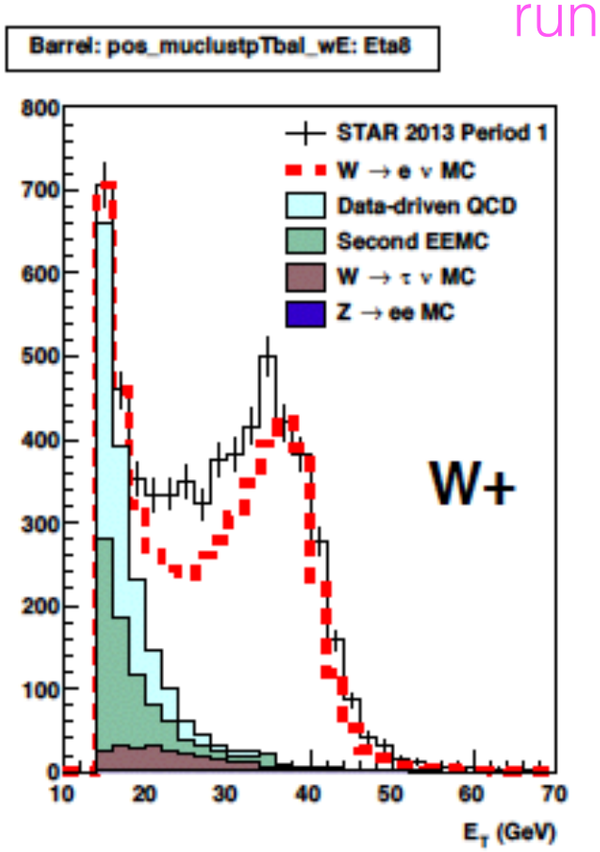


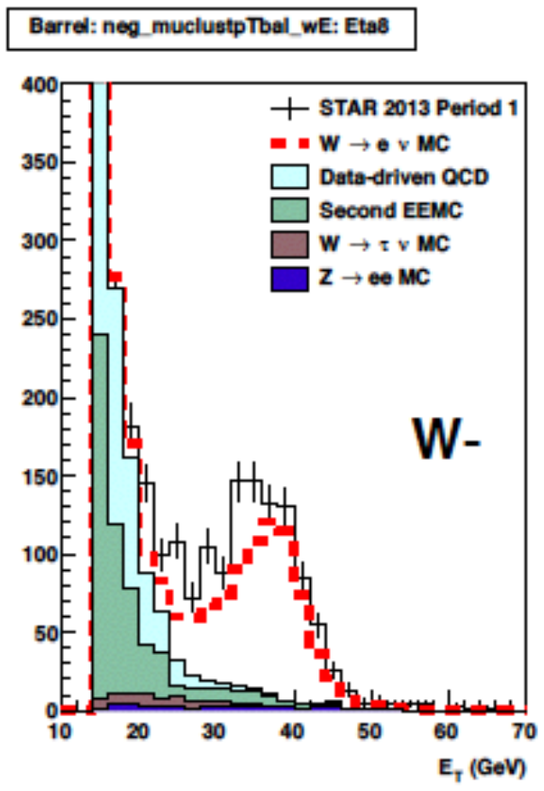
run 12



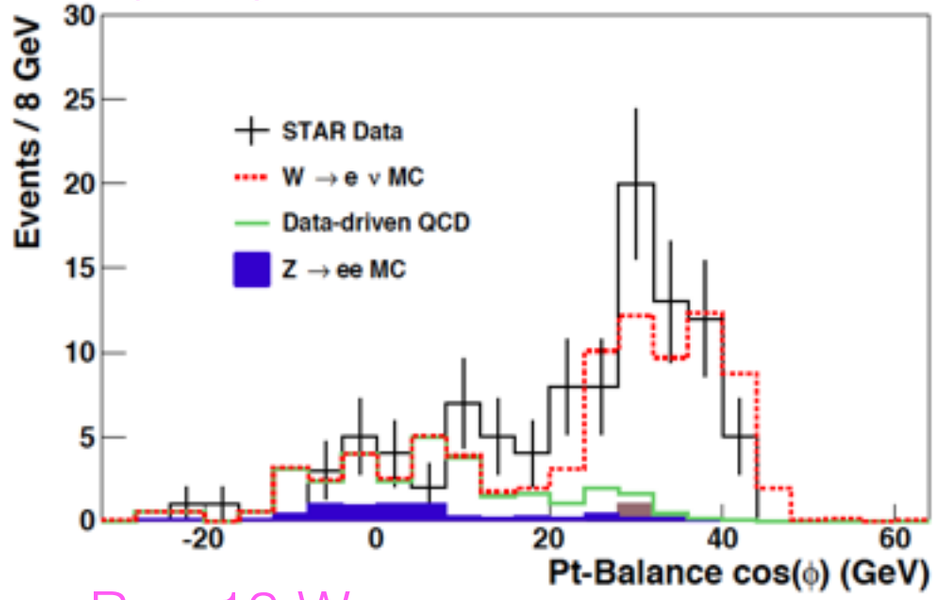
Total Barrel / Endcap BG for $W^{+/-}$

run 13

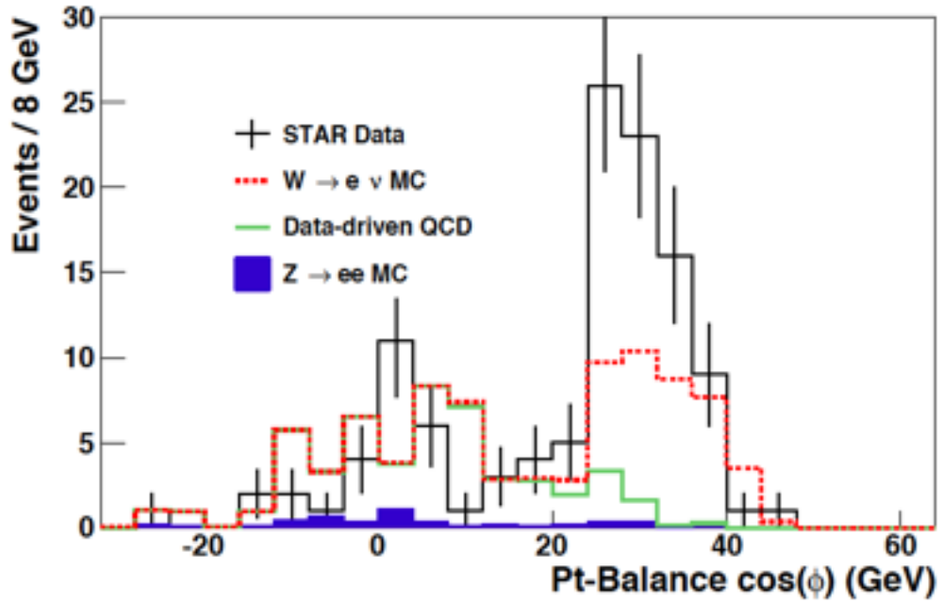




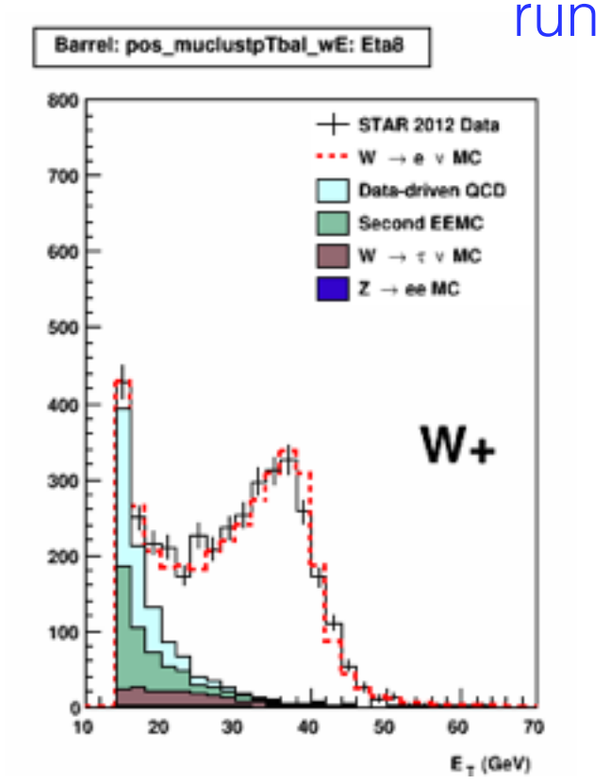
Run 13 W^{+}

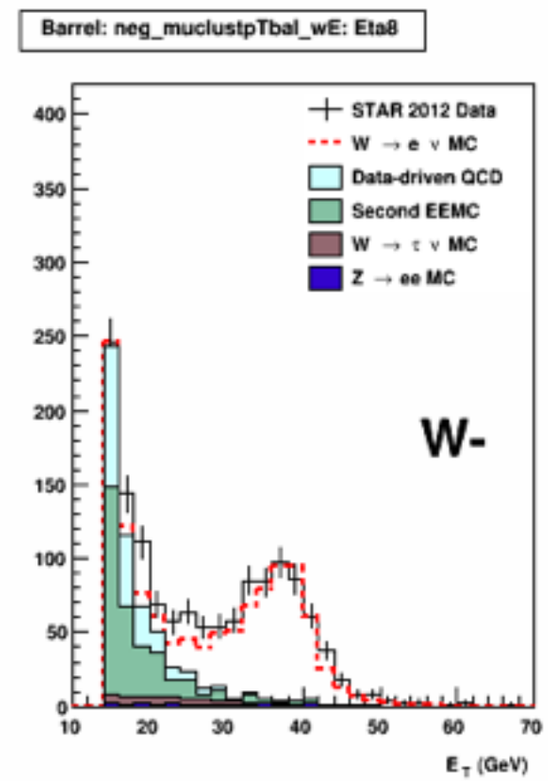


Run 13 W^{-}



run 12





BG Summary

Of yields 25<ET<50 GeV

run 13

starPhys EtaBin	raw Yield	qcd Bkgd	second EEMC	zee Bkgd	wTau Yield	total Bkgd	(totalBG /rawW) %	wYield	**(sigW/ rawW)%**	beta +/- err	+syst	-syst
1	746	10.53	31	5.33	11.01	46.86	6.28	699.14	93.7185	0.937 +/- 0.008	0.007	0.008
2	1039	9.87	16	5.61	19.45	31.48	3.03	1007.52	96.9702	0.970 +/- 0.004	0.005	0.011
3	1031	10.09	15	7.72	21.77	32.81	3.18	998.19	96.8177	0.968 +/- 0.004	0.004	0.01
4	761	19.36	10	5.98	14.24	35.33	4.64	725.67	95.3574	0.954 +/- 0.005	0.009	0.022
8	3586	46.71	68	23.54	66.47	138.25	3.86	3447.75	96.1447	0.961 +/- 0.002	0.004	0.007

run 12

starPhys EtaBin	raw Yield	qcd Bkgd	second EEMC	zee Bkgd	wTau Yield	total Bkgd	(totalBG /rawW) %	wYield	**(sigW/ rawW)%**	beta +/- err	+syst	-syst
1	488	5.57	20	3.61	9.86	29.18	5.98	458.82	94.0205	0.940 +/- 0.009	0.005	0.008
2	663	6.53	9	4.86	14.33	20.39	3.08	642.61	96.9246	0.969 +/- 0.006	0.005	0.01
3	746	11.17	11	4.34	16.43	26.51	3.55	719.49	96.4464	0.964 +/- 0.005	0.006	0.012
4	466	9.55	8	4.42	11.26	21.97	4.71	444.03	95.2854	0.953 +/- 0.008	0.008	0.016
8	2369	27.38	46	16.64	52.01	90.02	3.80	2278.98	96.2001	0.962 +/- 0.003	0.003	0.006

BG Summary

Of yields 25<ET<50 GeV

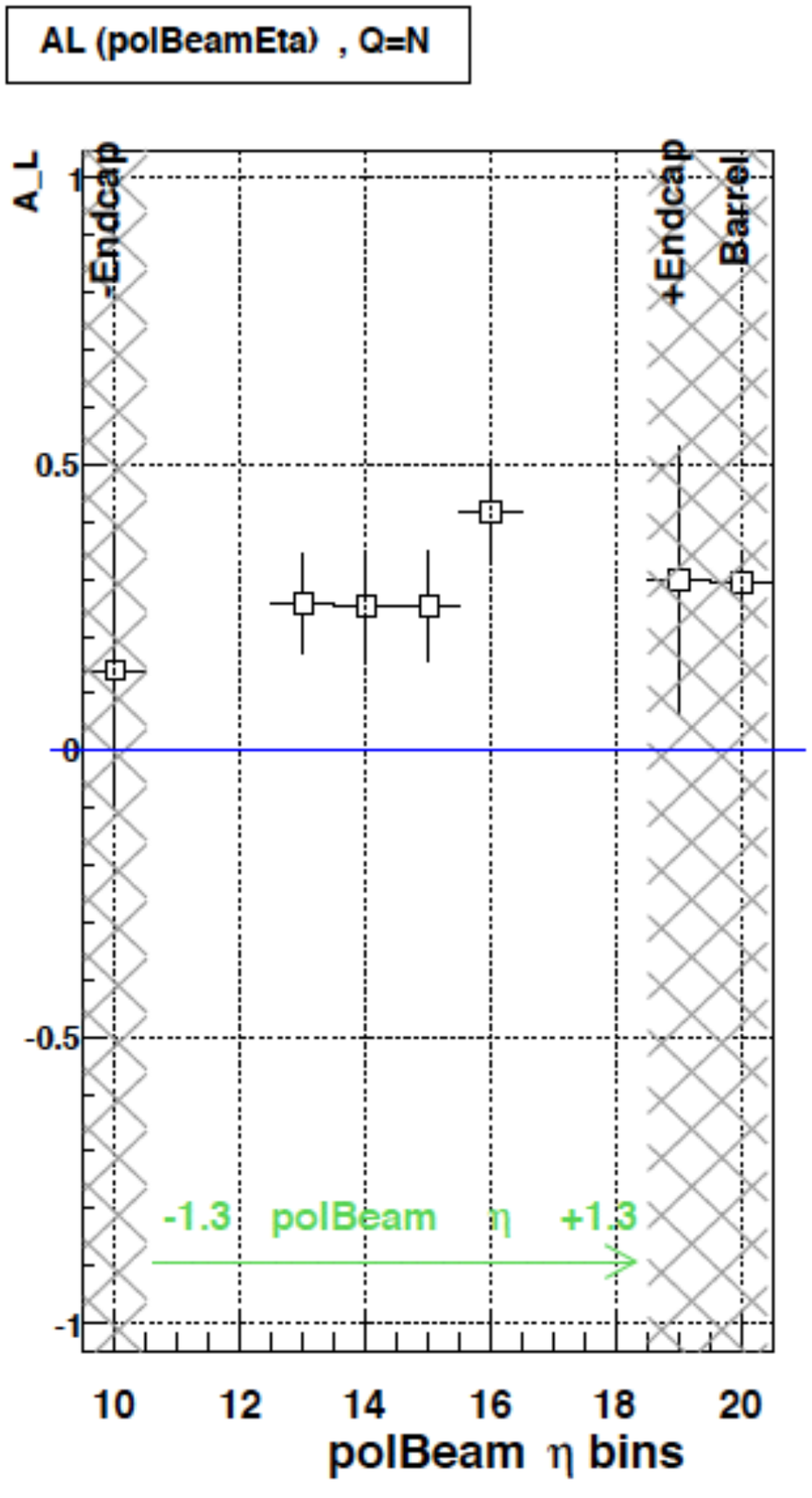
run 13

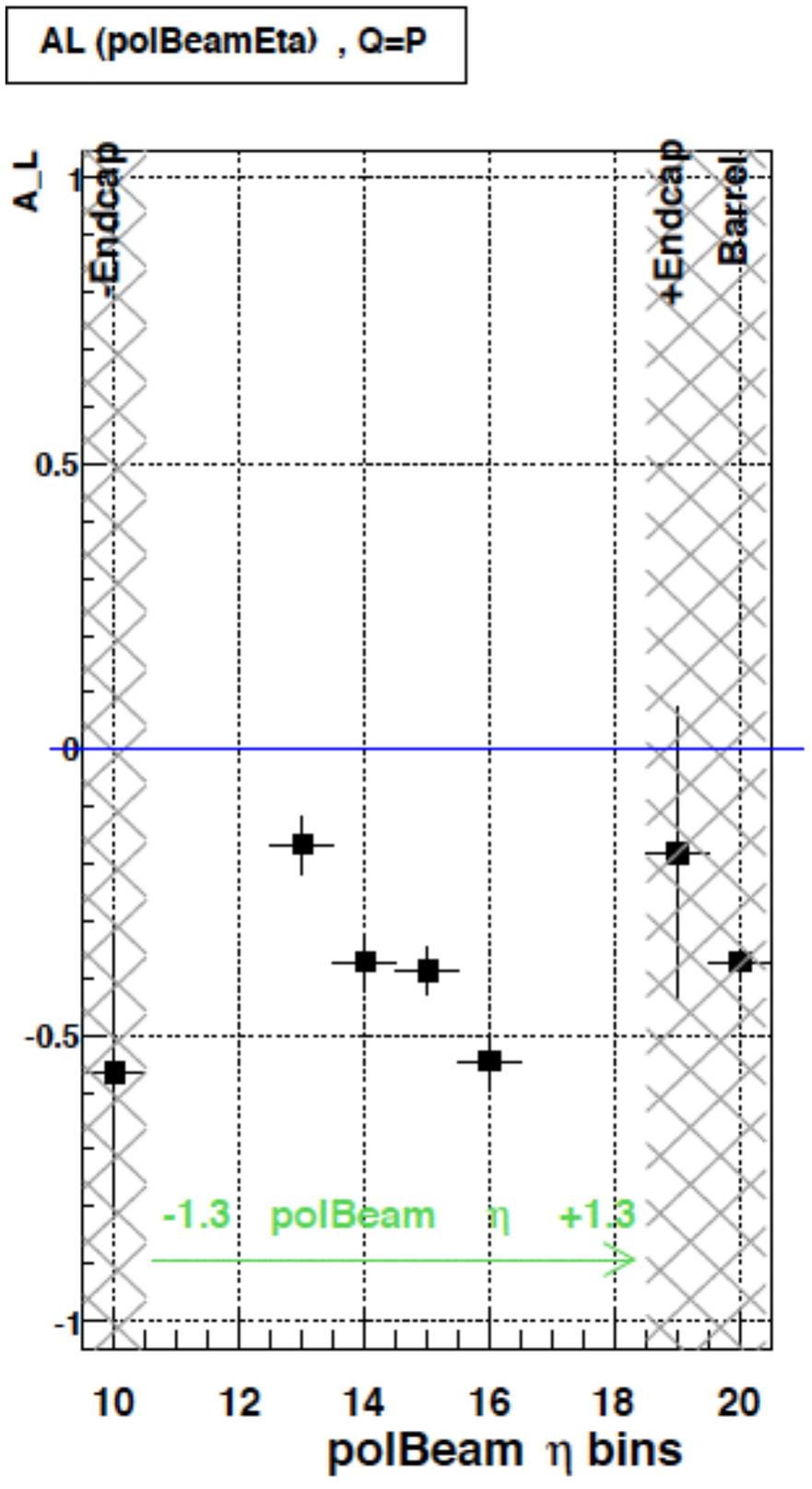
starPhys EtaBin	raw Yield	qcd Bkgd	second EEMC	zee Bkgd	wTau Yield	total Bkgd	(totalBG /rawW) %	wYield	(sigW/ rawW) %	beta +/- err	+syst	-syst
1	259	6.65	25	4.97	4.53	36.62	14.14	222.38	85.8610	0.859 +/- 0.021	0.012	0.016
2	239	8.99	17	6.53	4.19	32.52	13.61	206.48	86.3933	0.864 +/- 0.019	0.023	0.024
3	232	10.39	11	7.45	4.95	28.84	12.43	203.16	87.5690	0.876 +/- 0.016	0.02	0.038
4	323	11.8	7	7.45	3.27	26.24	8.12	296.76	91.8762	0.919 +/- 0.011	0.014	0.039
8	1069	33.59	59	24.83	17.02	117.42	10.98	951.58	89.0159	0.890 +/- 0.008	0.009	0.015

run 12

starPhy sEtaBin	raw Yield	qcd Bkgd	second EEMC	zee Bkgd	wTau Yield	total Bkgd	(totalBG/ rawW)%	wYield	(sigW/ rawW)%	beta +/- err	+syst	-syst
1	185	0	14	3.31	3.19	17.31	9.36	167.69	90.6432	0.906 +/- 0.021	0	0.017
2	152	3.6	6	3.98	3.54	13.57	8.93	138.43	91.0724	0.911 +/- 0.022	0.015	0.02
3	171	5.71	9	5.23	4.02	19.94	11.66	151.06	88.3392	0.883 +/- 0.023	0.014	0.03
4	169	6.41	3	3.46	4.02	12.87	7.62	156.13	92.3846	0.924 +/- 0.015	0.013	0.051
8	681	12.37	29	14.21	14.77	55.58	8.16	625.42	91.8385	0.918 +/- 0.008	0.005	0.018

AL vs Pol. Eta Bin





AL Summary

W+

star EtaBin	Yield Sum	Yield ++	Yield +-	Yield -+	Yield --	1/ sqrt(sum)	beta
1	745	114	230	143	257	0.037	0.94
2	1039	155	261	255	366	0.031	0.97
3	1031	166	248	250	365	0.031	0.97
4	761	126	160	218	256	0.036	0.95
7	66	9	21	15	21	0.123	0.88
8	3523	551	882	854	1229	0.017	0.96

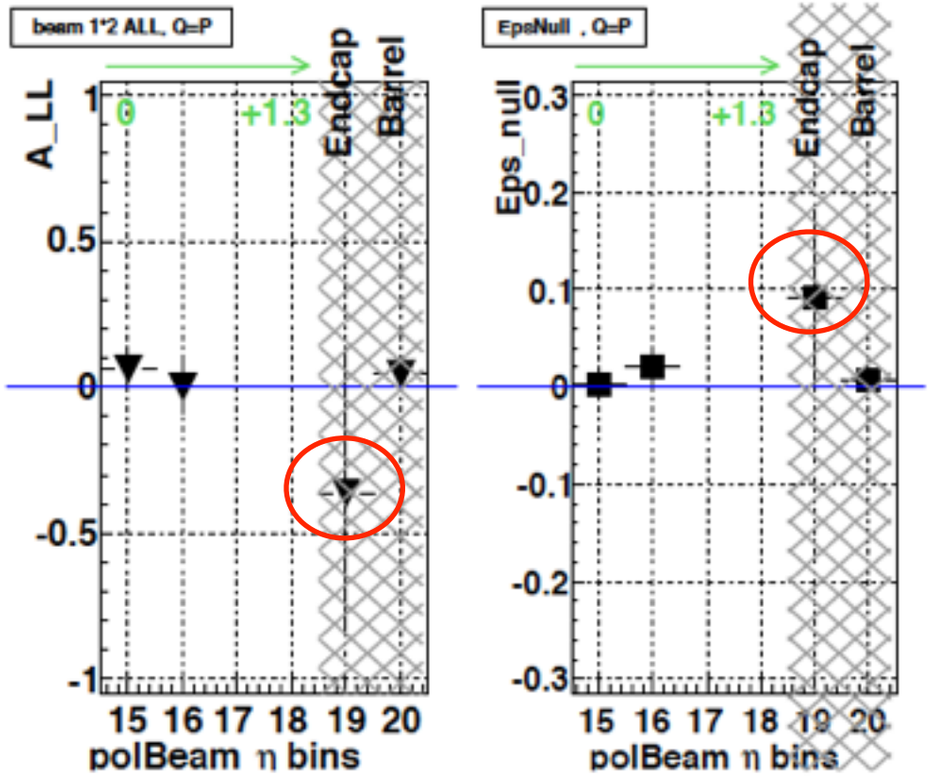
pol Eta	AL			Star Eta mean	bin	
10	-0.564	+/-	0.249	-1.189	+/-	0.147
13	-0.166	+/-	0.05	-0.722	+/-	0.144
14	-0.371	+/-	0.041	-0.247	+/-	0.144
15	-0.386	+/-	0.041	0.253	+/-	0.144
16	-0.545	+/-	0.049	0.728	+/-	0.143
19	-0.181	+/-	0.257	1.189	+/-	0.147
20	-0.372	+/-	0.022	0.007	+/-	0.516

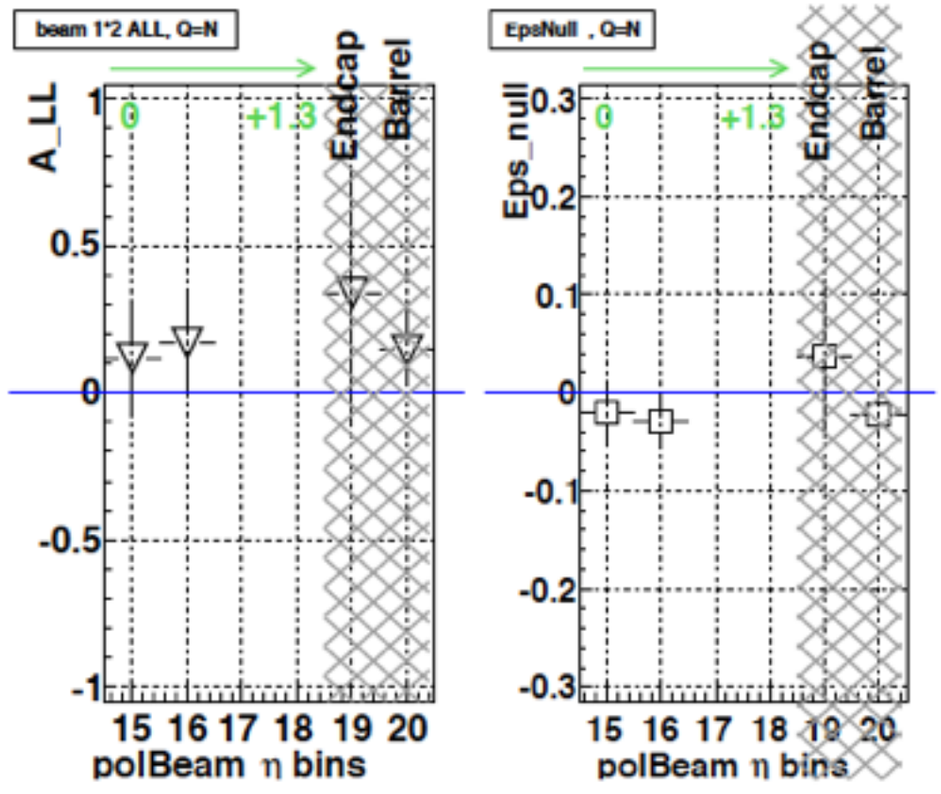
W-

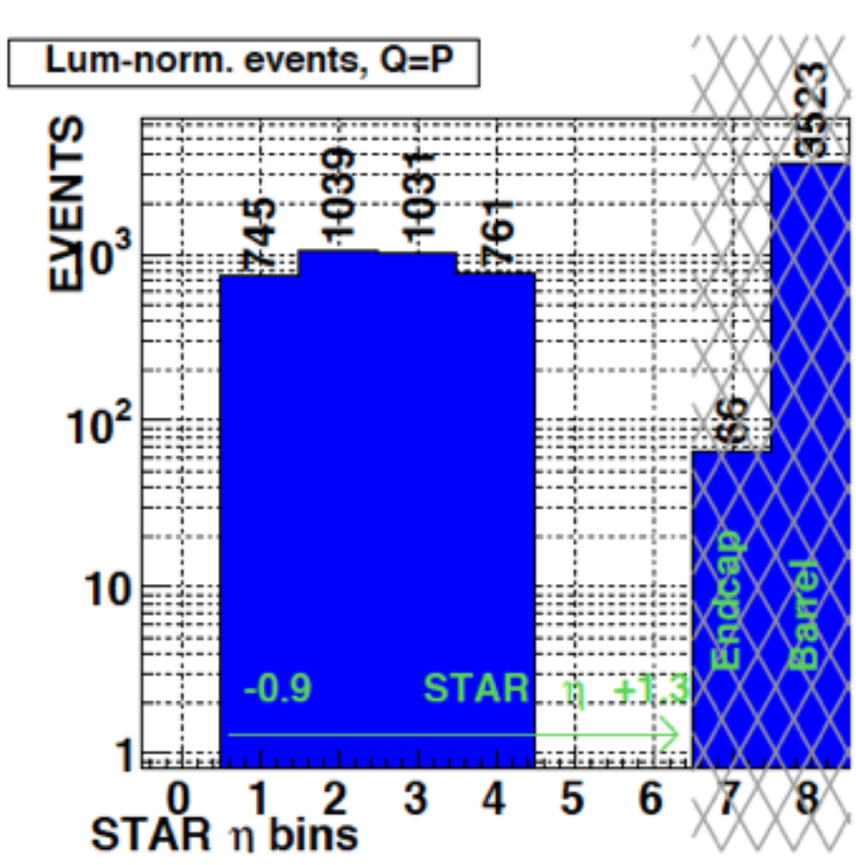
star- EtaBin	Yield Sum	Yield ++	Yield +-	Yield -+	Yield --	1/ sqrt(sum)	beta
1	259	99	50	69	42	0.062	0.86
2	238	77	55	60	47	0.065	0.87
3	232	73	54	59	47	0.066	0.87
4	323	101	81	78	63	0.056	0.91
7	81	26	20	17	18	0.111	0.87
8	1016	335	233	256	192	0.031	0.89

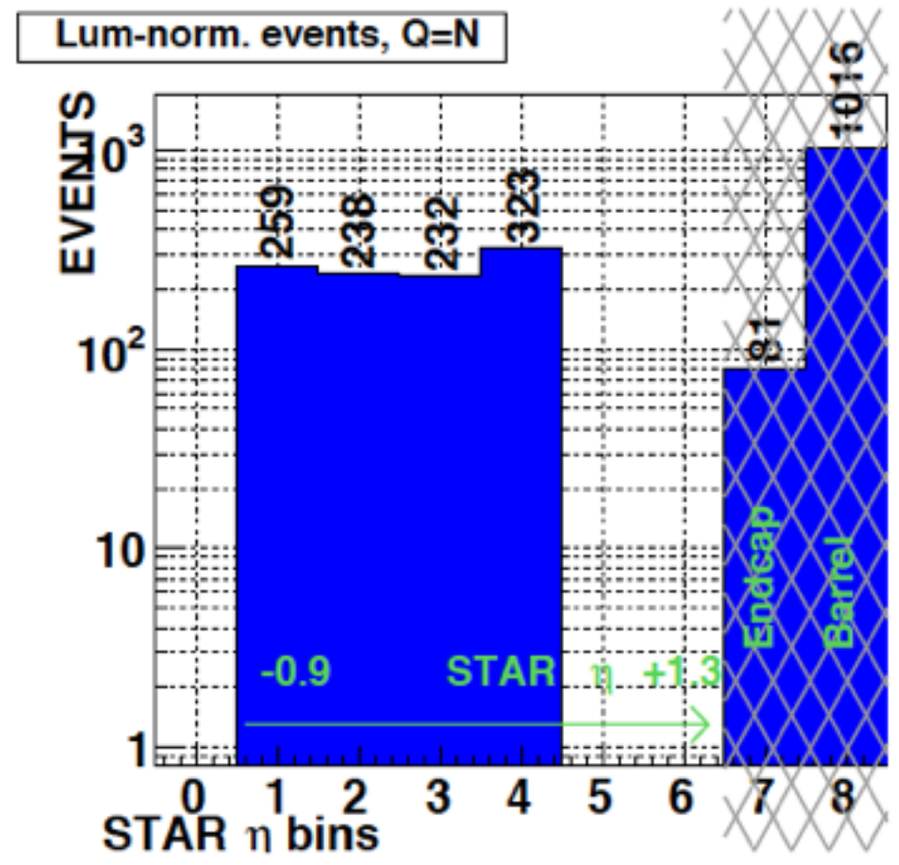
pol Eta	AL			Star Eta mean	bin	
10	0.14	+/-	0.236	1.214	+/-	0.155
13	0.257	+/-	0.086	-0.753	+/-	0.149
14	0.253	+/-	0.097	-0.261	+/-	0.146
15	0.253	+/-	0.097	0.262	+/-	0.151
16	0.416	+/-	0.084	0.743	+/-	0.147
19	0.299	+/-	0.234	1.214	+/-	0.155
20	0.293	+/-	0.046	0.037	+/-	0.578

ALL & eps


beam 1*2 ALL, Q=P
A_LL
0
+1.3
Endcap
Barrel
polBeam η bins
EpsNull , Q=P
Eps_null
polBeam η bins

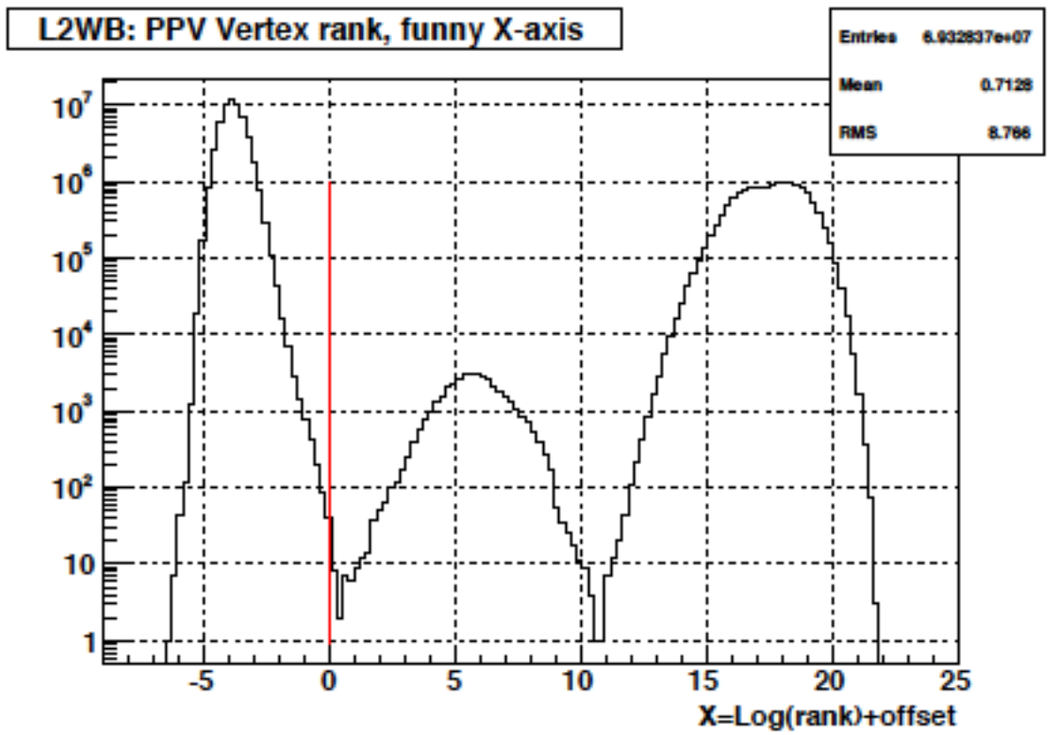

beam 1*2 ALL, Q=N
A_LL
0
+1.3
Endcap
Barrel
polBeam η bins
EpsNull , Q=N
Eps_null
polBeam η bins

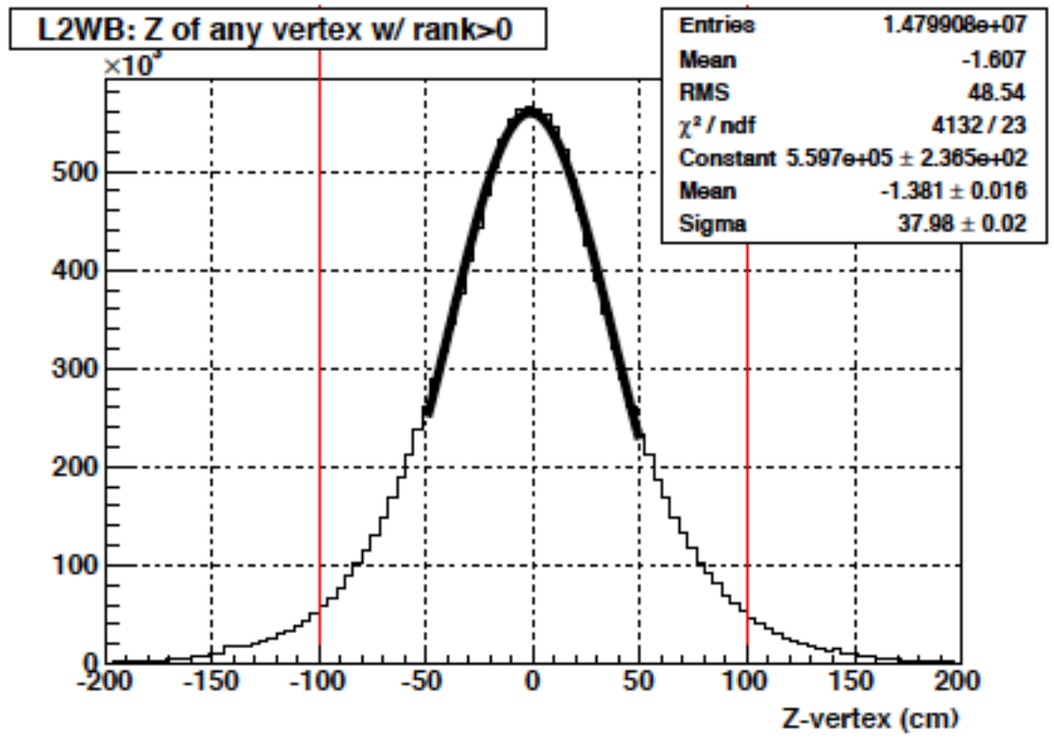

Lum-norm. events, Q=P
EVENTS
745
1039
1031
761
66
3523
-0.9
STAR η +1.3
Endcap
Barrel
STAR η bins

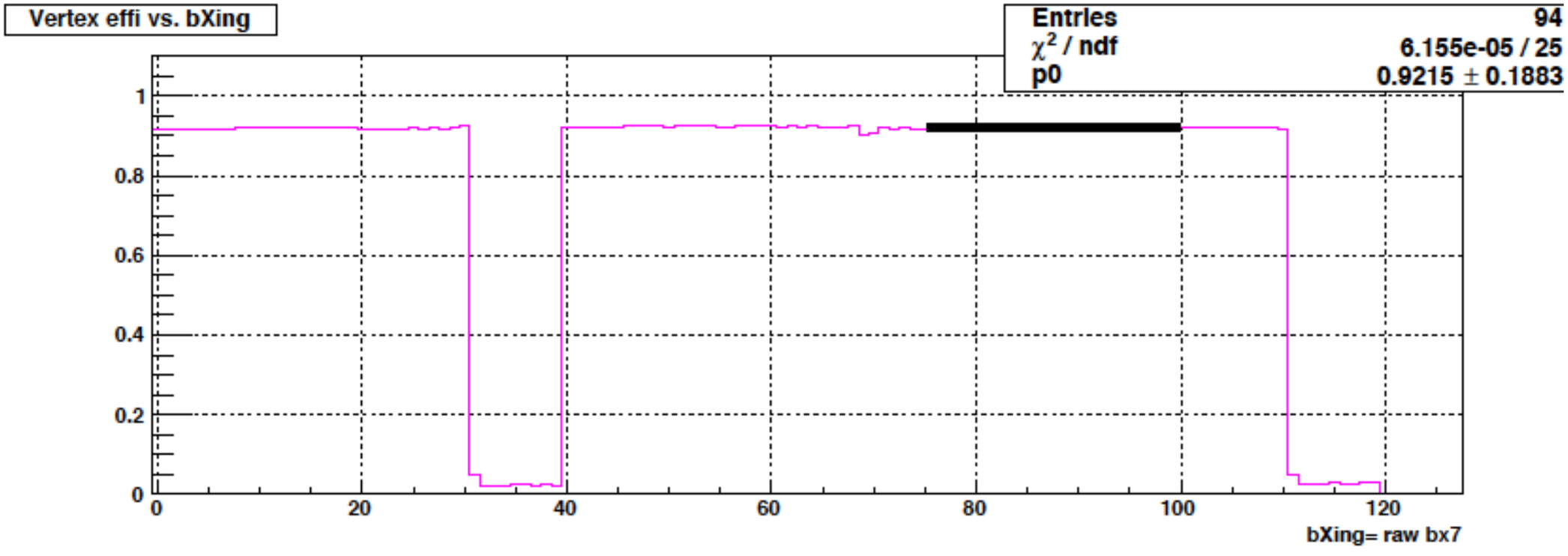

Lum-norm. events, Q=N
EVENTS
259
238
232
323
91
1016
-0.9
STAR η +1.3
Endcap
Barrel
STAR η bins

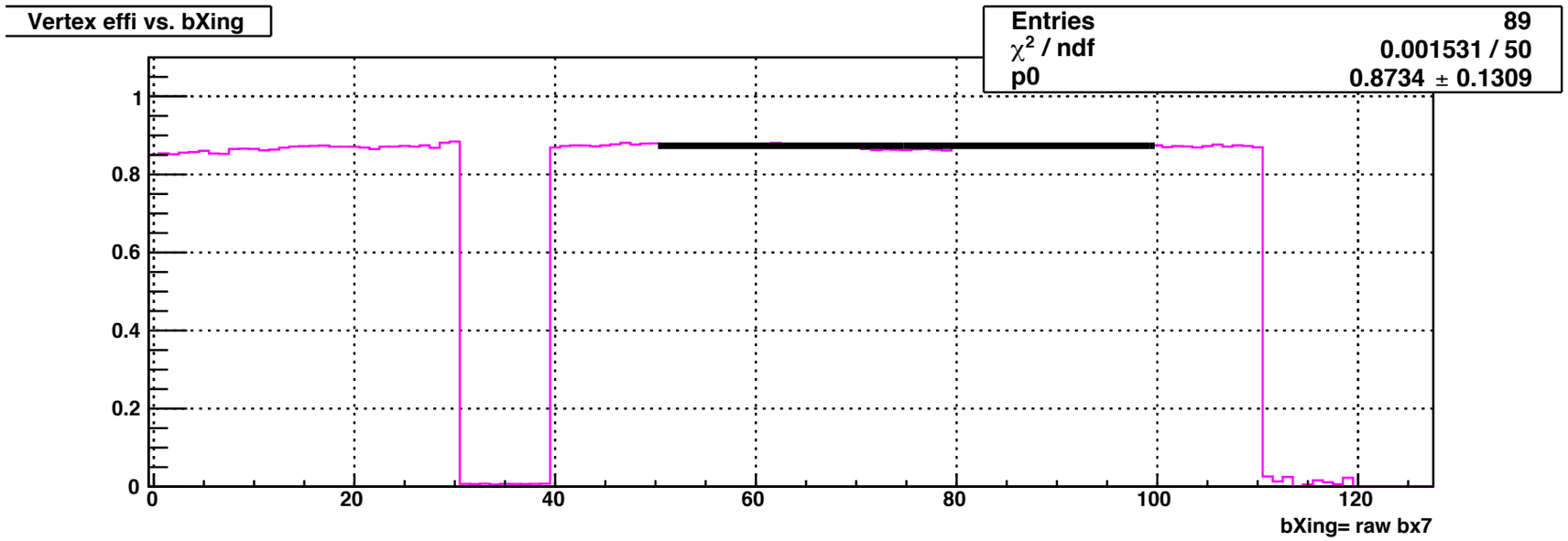
Summary

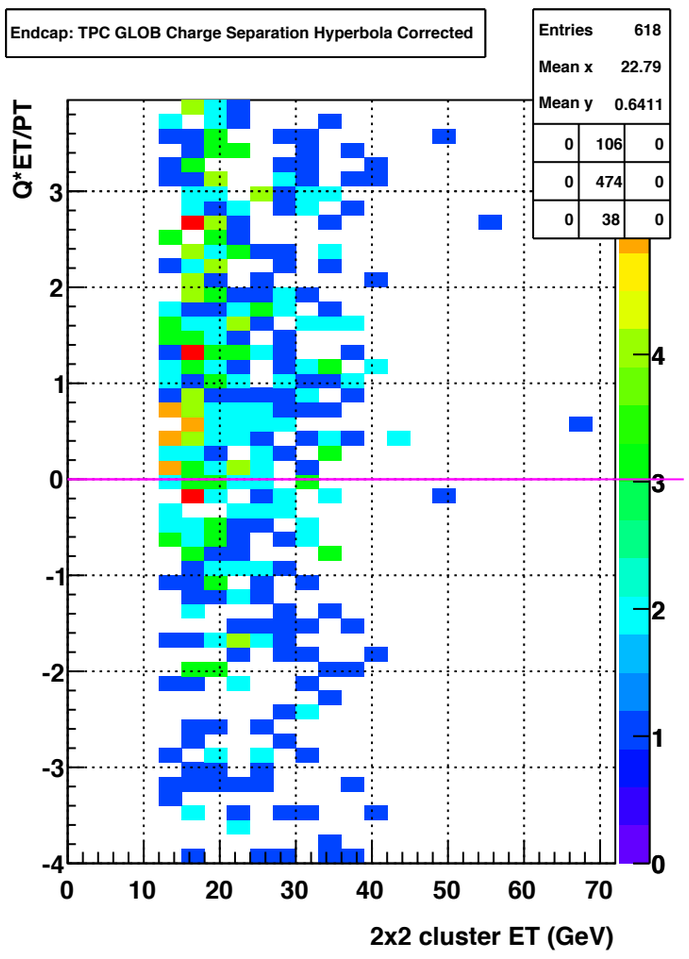
- Events Selection cuts seems efficient even with larger luminosity compare to run 12.
- AL here is not yet Final for the period 1
- Results need to cross check before presenting to spin pwg.

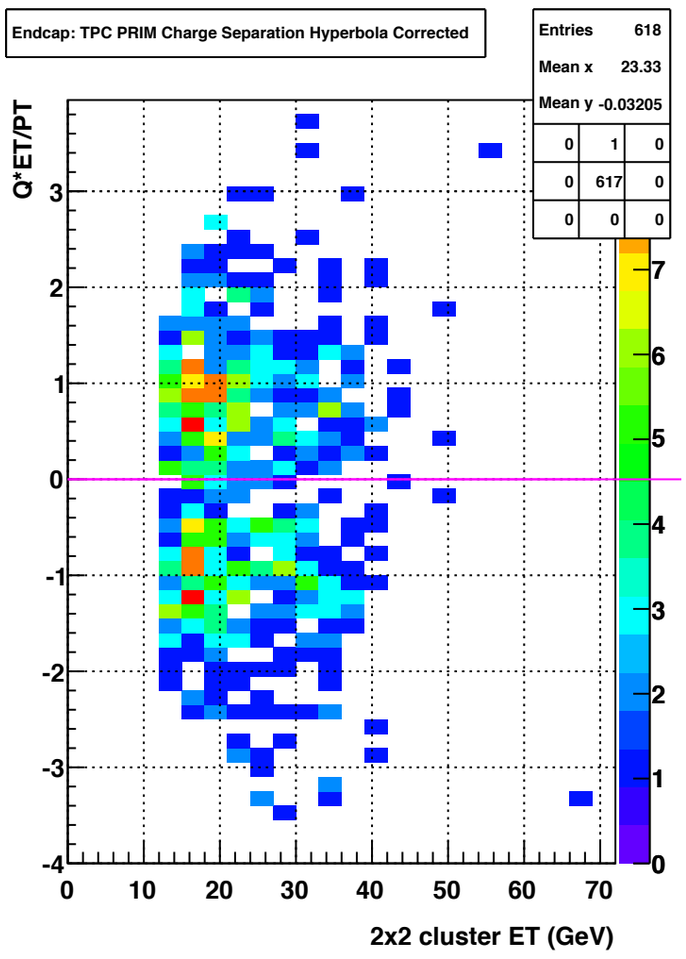

L2WB: PPV Vertex rank, funny X-axis
Entries 6.932837e+07
Mean 0.7128
RMS 8.766
X=Log(rank)+offset


L2WB: Z of any vertex w/ rank>0
Entries 1.479908e+07
Mean -1.607
RMS 48.54
χ² / ndf 4132 / 23
Constant 5.597e+05 ± 2.365e+02
Mean -1.381 ± 0.016
Sigma 37.98 ± 0.02
Z-vertex (cm)


Vertex effi vs. bXing
Entries 94
χ² / ndf 6.155e-05 / 25
p0 0.9215 ± 0.1883
bXing= raw bx7


Vertex effi vs. bXing
Entries 89
χ² / ndf 0.001531 / 50
p0 0.8734 ± 0.1309
1
0.8
0.6
0.4
0.2
0
0
20
40
60
80
100
120
bXing= raw bx7


Endcap: TPC GLOB Charge Separation Hyperbola Corrected
Entries 618
Mean x 22.79
Mean y 0.6411
0 106 0
0 474 0
0 38 0
Q*ET/PT
3
2
1
0
-1
-2
-3
-4
0
10
20
30
40
50
60
70
4
3
2
1
0
2x2 cluster ET (GeV)


Endcap: TPC PRIM Charge Separation Hyperbola Corrected
Entries 618
Mean x 23.33
Mean y -0.03205
0 1 0
0 617 0
0 0 0
Q*ET/PT
3
2
1
0
-1
-2
-3
-4
0
10
20
30
40
50
60
70
7
6
5
4
3
2
1
0
2x2 cluster ET (GeV)

W+

polBeam-bin	events,***	ALL	***	,sig*sqrt(M)		
15	2070	0.063	+/-	0.078	nSig=0.8	3.54
16	1506	0.001	+/-	0.094	nSig=0.0	3.63
19	66	-0.363	+/-	0.475	nSig=0.8	3.86
20	3523	0.044	+/-	0.06	nSig=0.7	3.57
polBeam-bin.	events,	***	NULL	***		
15	2070	0.002	+/-	0.078	nSig=0.0	
16	1506	0.02	+/-	0.094	nSig=0.2	
19	66	0.091	+/-	0.475	nSig=0.2	
20	3523	0.008	+/-	0.06	nSig=0.1	

W-

polBeam-bin.	events,***	ALL	***	,sig*sqrt(M)		
15	470	0.117	+/-	0.181	nSig=0.6	3.93
16	582	0.17	+/-	0.16	nSig=1.1	3.85
19	81	0.339	+/-	0.436	nSig=0.8	3.92
20	1016	0.145	+/-	0.121	nSig=1.2	3.85
polBeam-bin.	events,	***	NULL	***		
15	470	-0.021	+/-	0.181	nSig=0.1	
16	582	-0.029	+/-	0.16	nSig=0.2	
19	81	0.037	+/-	0.436	nSig=0.1	
20	1016	-0.022	+/-	0.121	nSig=0.2	