

# CohJ/ $\psi$ Analysis (**OS- $\mu\mu$** )(**DC**)(**2-track**)

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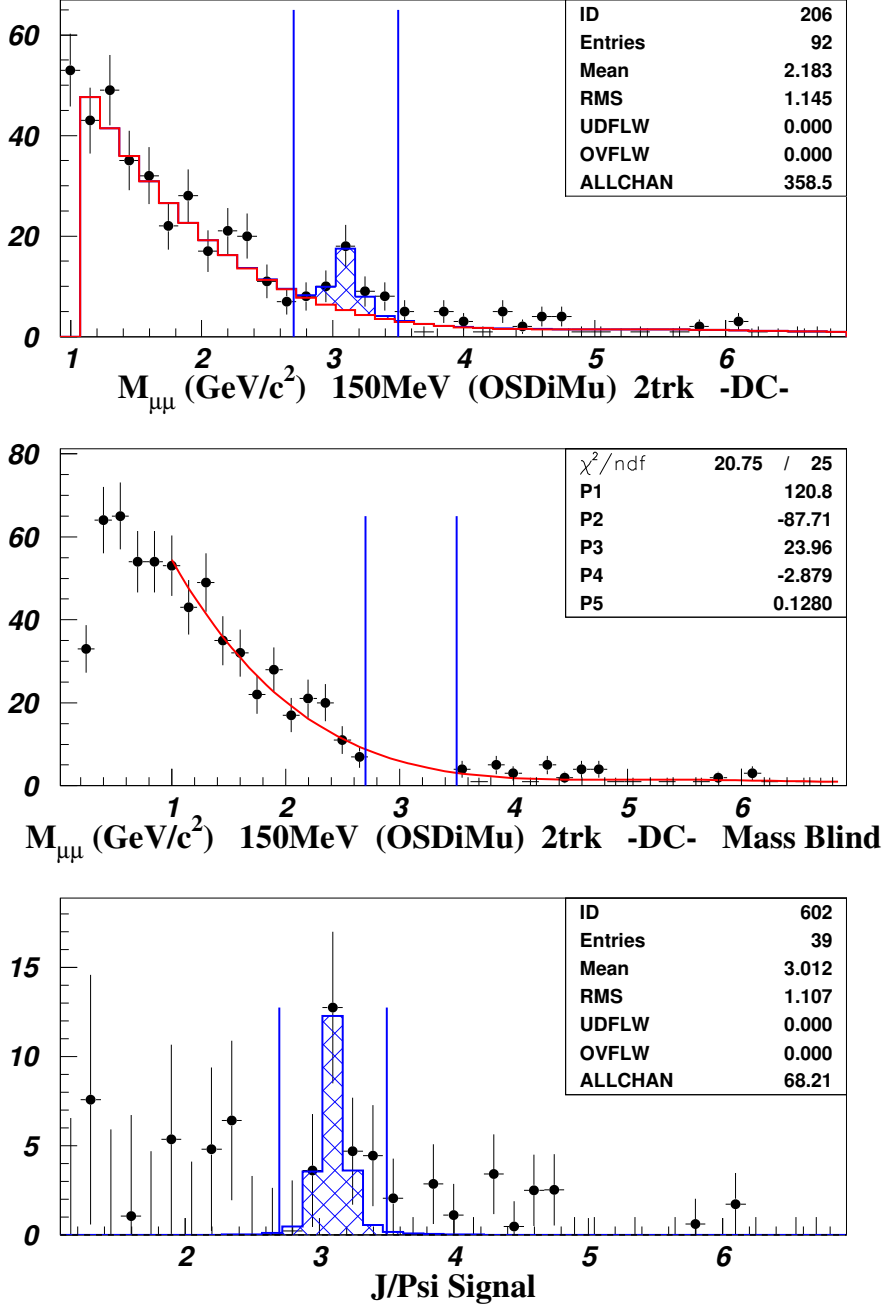
# 1 Zeroth Norms

	Gen Number	Zroth Norm
CCDIS	4116629.0	1440000.0
NCDIS	2451852.2	547200.0
JPsi	337363.3	29.6
CohPi+	824186.4	10000.0
CohRho+	147680.4	7380.1
aNuMu CC	384881.8	36000.0
QE	418257.5	32000.0
CohPi0	179844.8	5000.0
Nue CC	396271.9	21600.0
aNue CC	193616.5	2160.0
aNuMu NC	189598.9	13680.0
CohRho0	25235.8	1000.0
Res	934139.8	50400.0
CohPhi0	4075.9	200.0

Table 1: Generated Number of MC Events

## Extra Normalizations:

- \* Coh $\pi^+$ : 0.985 (From 2V0 analysis)
- \* Coh $\pi^0$ : 0.985 (From 2V0 analysis)
- \* Coh $\rho^+$ : 0.669 (From CohRho0 measurment)
- \* Coh $\rho^0$ : 0.669 (From CohRho0 measurment)
- \* OBG: 0.22 (from CohRho0 analysis)

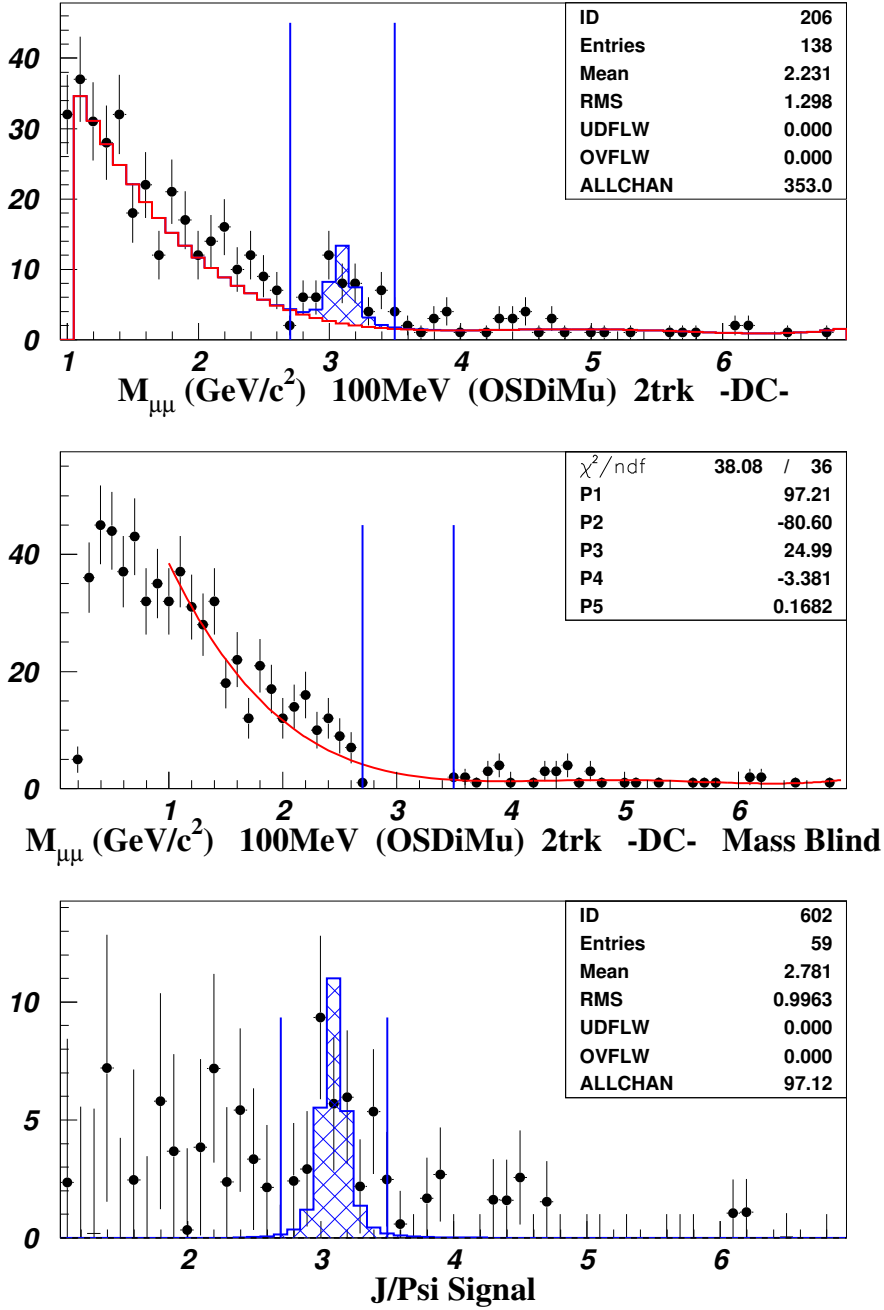


Signal range	2.72-3.47
Number of signal	<b>25.73</b>
Background	27.27
Statistical error	7.28
Significance	<b>3.53</b>

Signal range	2.87-3.32
Number of signal	<b>21.05</b>
Background	15.95
Statistical error	6.08
Significance	<b>3.46</b>

Signal range	3.02-3.17
Number of signal	<b>12.75</b>
Background	5.25
Statistical error	4.24
Significance	<b>3.01</b>

Figure 1: 150MeV Data Fit. Signal MC set to calculations in 2nd range. (./figs/data-fit-150mev.pdf)(sigcalc-150mev.tex)



Signal range	2.75-3.45
Number of signal	<b>33.88</b>
Background	17.12
Statistical error	7.14
Significance	<b>4.74</b>
Signal range	2.85-3.35
Number of signal	<b>26.10</b>
Background	11.90
Statistical error	6.16
Significance	<b>4.23</b>
Signal range	2.95-3.25
Number of signal	<b>20.99</b>
Background	7.01
Statistical error	5.29
Significance	<b>3.97</b>

Figure 2: 100MeV Data Fit. Signal MC set to calculations in 2nd range. (./figs/data-fit-100mev.pdf)(sigcalc-150mev.tex)

## 2 MC $\chi^2$ Fit

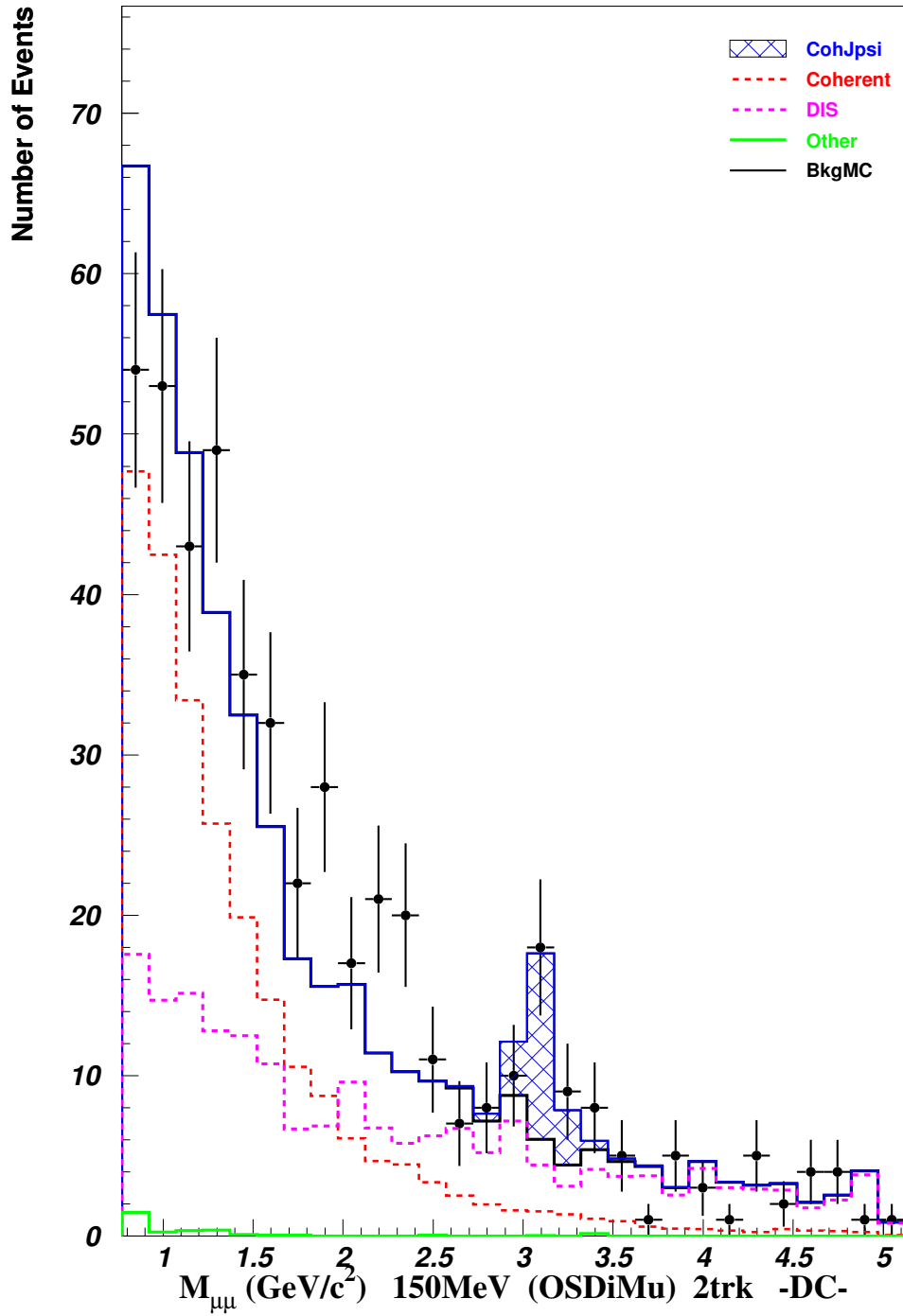


Figure 3: (./figs/mass-0.9to5-150mev.pdf)

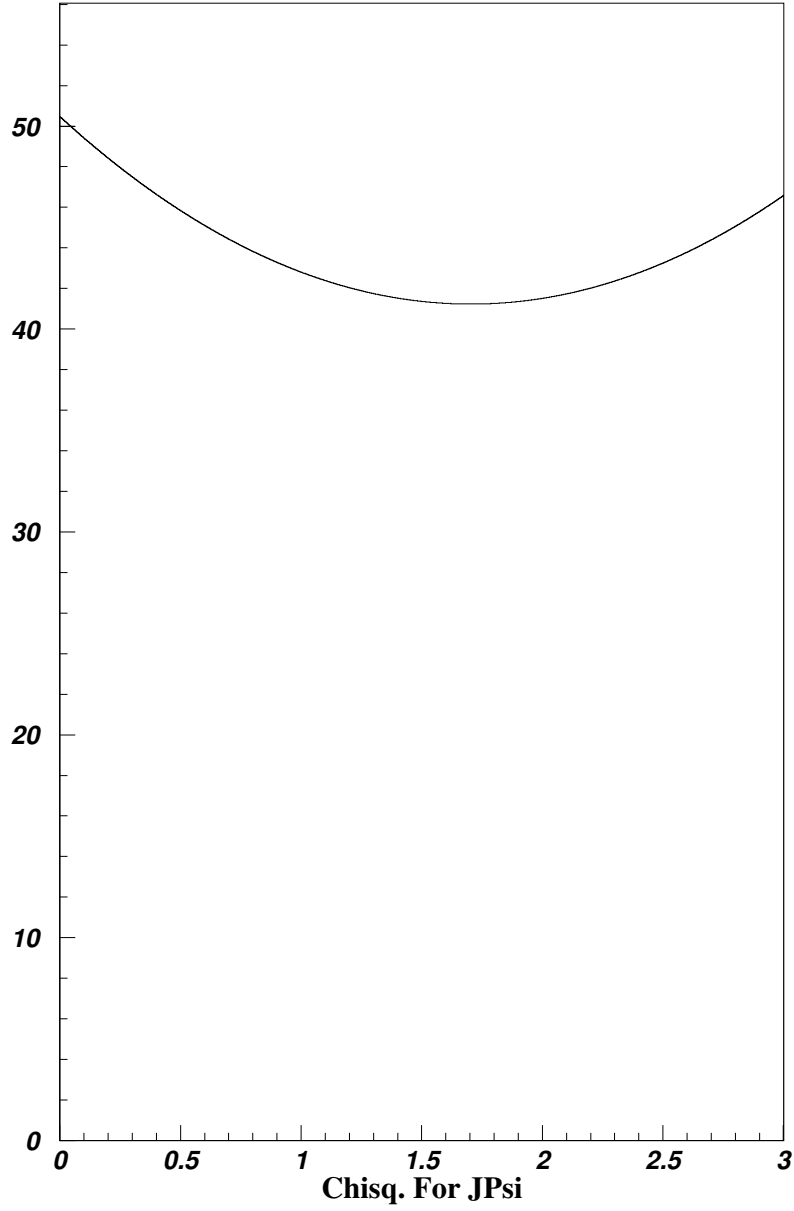


Figure 4: (chisq-jpsi.pdf)

$\chi^2$ Min 41.231		
Number of bins used: 29.		
One $\sigma$ : 1.192		
Norm at Min $\chi^2$	JPsi	
$-1 \sigma$	1.703	
	1.091	( 35.9%)
$+1 \sigma$	2.315	( 35.9%)

Table 2:  $\chi^2$  for JPsi on plot: 'Mmumu'

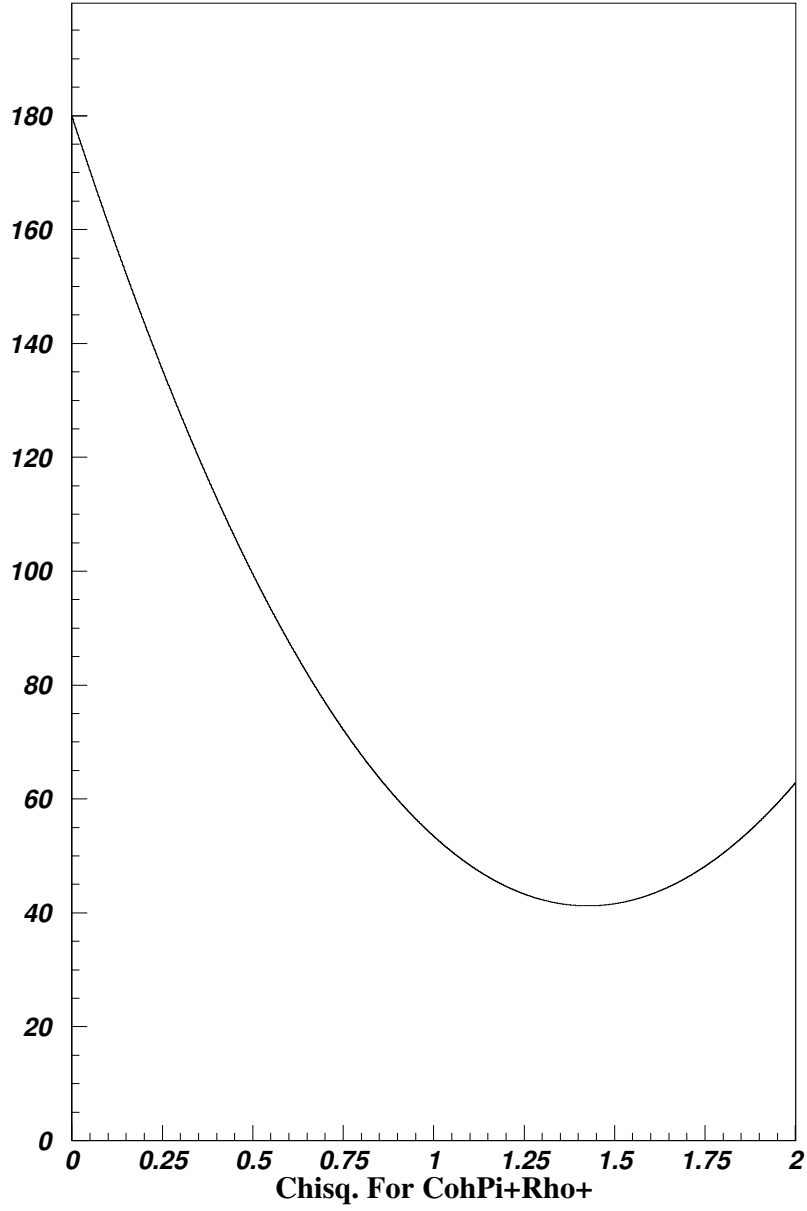


Figure 5: (chisq-cohpi.pdf)

$\chi^2$ Min 41.231		
Number of bins used: 29.		
One $\sigma$ : 1.192		
Norm at Min $\chi^2$	CohPi+Rho+	
-1 $\sigma$	1.425	
	1.293	( 9.3%)
+1 $\sigma$	1.559	( 9.4%)

Table 3:  $\chi^2$  for CohPi+Rho+ on plot: 'Mmumu'

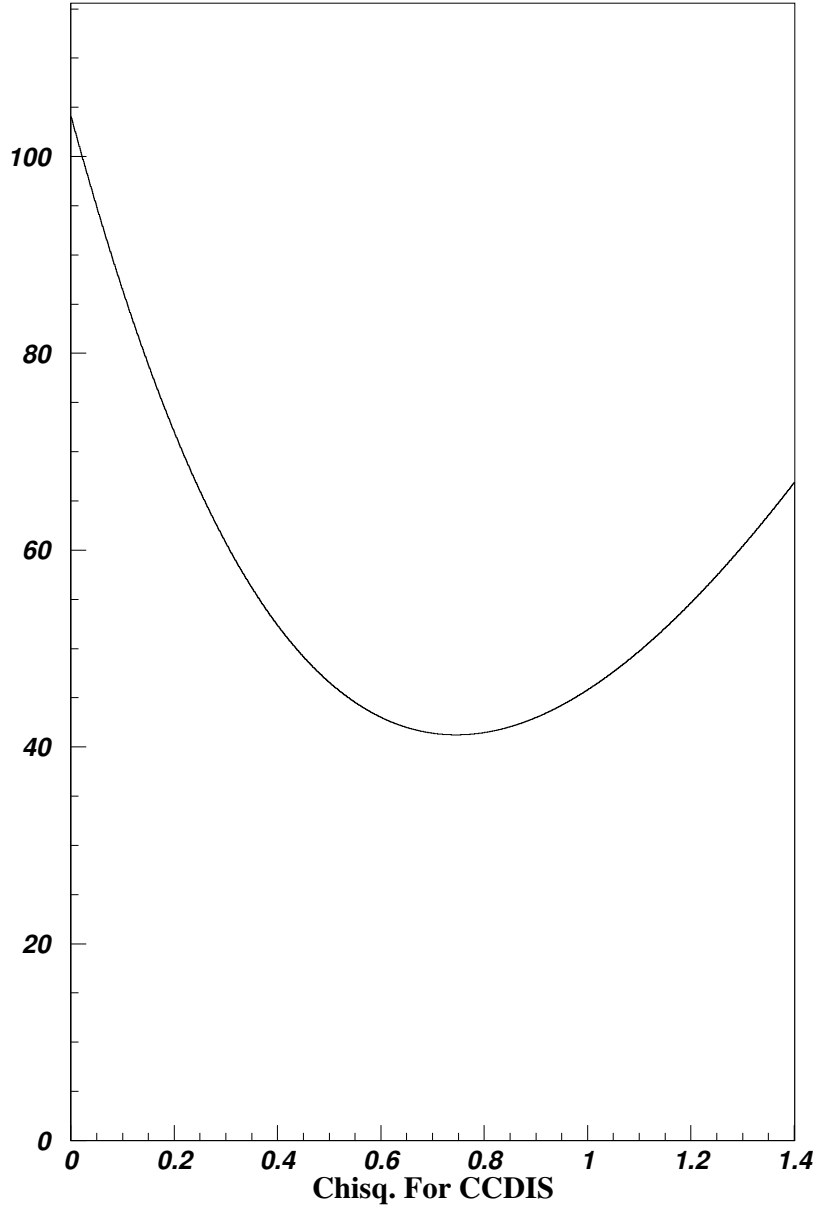


Figure 6: (chisq-ccdiss.pdf)

$\chi^2$ Min 41.231		
Number of bins used: 29.		
One $\sigma$ : 1.192		
Norm at Min $\chi^2$	CCDIS	
$-1 \sigma$	0.745	
	0.626	( 16.0%)
$+1 \sigma$	0.871	( 16.9%)

Table 4:  $\chi^2$  for CCDIS on plot: 'Mmumu'



### 3 Summary Cut Tables

Cut Name	CCDIS	Coh $\pi^+$	Coh $\rho^+$	Coh $J/\psi$	Other	Total	Data
1) Raw Events	1942.2	12354.9	5034.4	47.5	3968.7	23347.7	10253.0
2) OBGfid,Trig+CohGenTh	1942.2	12354.9	5034.4	47.5	3968.7	23347.7	10253.0
3) Pfermi & W2	1942.2	12354.9	5034.4	47.5	3968.7	23347.7	10253.0
4) Fid. Vol. -X	1828.8	11804.8	4811.1	45.5	3758.5	22248.6	9028.0
5) Fid. Vol. -Y	1697.0	11346.3	4616.0	43.8	3550.5	21253.5	7591.0
6) Fid. Vol. -Z (OFF)	1697.0	11346.3	4616.0	43.8	3550.5	21253.5	7591.0
7) At Least 1 Mu	1697.0	11196.9	4263.7	43.8	277.3	17478.7	7591.0
8) ncand=2,3,4	1697.0	11196.9	4263.7	43.8	277.3	17478.7	7591.0
9) tnchgd=2	1525.2	10962.8	4164.4	43.4	236.1	16931.9	4867.0
10) +/- Tracks (V0)	1471.0	10954.4	4157.6	43.4	214.3	16840.7	4242.0
11) Tube/Veto Cut	1471.0	10954.4	4157.6	43.4	214.3	16840.7	4242.0
12) 2 Muons (1mux)	1471.0	1194.3	773.9	40.0	180.1	3659.3	4242.0
13) PmuAsymj0.0	288.6	252.7	213.5	20.1	97.7	872.5	974.0
14) Theta<2.62 rad	288.1	252.4	213.3	20.1	97.7	871.6	942.0
15) Pt+wrt- >0.05	288.1	252.2	213.0	20.1	97.7	871.1	940.0
16) Mee > 2.0 (OFF)	288.1	252.2	213.0	20.1	97.7	871.1	940.0
17) Upstream Hanger cut	272.8	250.7	212.0	20.1	93.2	848.8	922.0
18) nsecond<4	265.9	247.8	208.2	20.1	91.3	833.3	900.0
19) Fid. Vol. Hanger cut	236.8	238.1	193.5	19.9	82.4	770.7	833.0
20) No Hangers fromPVert	218.1	236.7	191.7	19.9	74.0	740.4	803.0
21) Pz>0 for tracks	218.1	236.7	191.7	19.9	74.0	740.4	803.0
22) Thprimord<0.4	200.6	232.6	145.8	19.9	67.5	666.3	715.0
23) Nunh*fracunh<200	200.6	232.6	145.6	19.9	67.5	666.2	710.0
24) Emumu>2GeV	200.6	232.6	145.6	19.9	67.5	666.2	710.0
25) P+,P->0.5	200.6	232.6	145.6	19.9	67.5	666.2	710.0
26) P+,P->1.0 (2.5mux)	200.6	232.6	145.6	19.9	67.5	666.2	710.0
27) Emumu>5GeV (8mux)	200.0	232.4	145.5	19.9	67.5	665.4	709.0
28) Phi12>90deg (OFF)	200.0	232.4	145.5	19.9	67.5	665.4	709.0
29) Pmumu>10GeV (OFF)	200.0	232.4	145.5	19.9	67.5	665.4	709.0

Table 5: Summary Cut Table (**all events**)

Cut Name	CCDIS	Coh $\pi^+$	Coh $\rho^+$	Coh $J/\psi$	Other	Total	Data
1) Raw Events	1761.8	11519.0	4736.0	1.4	3961.4	21979.5	9792.0
2) OBGfid,Trig+CohGenTh	1761.8	11519.0	4736.0	1.4	3961.4	21979.5	9792.0
3) Pfermi & W2	1761.8	11519.0	4736.0	1.4	3961.4	21979.5	9792.0
4) Fid. Vol. -X	1656.7	11005.7	4525.9	1.2	3751.8	20941.4	8594.0
5) Fid. Vol. -Y	1536.4	10574.5	4341.8	1.2	3544.2	19998.1	7176.0
6) Fid. Vol. -Z (OFF)	1536.4	10574.5	4341.8	1.2	3544.2	19998.1	7176.0
7) At Least 1 Mu	1536.4	10425.2	3989.6	1.2	271.2	16223.5	7176.0
8) ncand=2,3,4	1536.4	10425.2	3989.6	1.2	271.2	16223.5	7176.0
9) tnchgd=2	1375.9	10204.7	3894.4	1.2	230.5	15706.7	4511.0
10) +/- Tracks (V0)	1325.1	10196.7	3887.8	1.0	209.8	15620.5	3893.0
11) Tube/Veto Cut	1325.1	10196.7	3887.8	1.0	209.8	15620.5	3893.0
12) 2 Muons (1mux)	1325.1	1160.7	737.3	1.0	176.0	3400.1	3893.0
13) PmuAsymj0.0	255.0	249.4	205.6	0.5	95.0	805.5	904.0
14) Theta<2.62 rad	254.5	249.1	205.5	0.5	94.9	804.5	872.0
15) Pt+wrt- >0.05	254.5	248.9	205.2	0.5	94.9	804.1	870.0
16) Mee > 2.0 (OFF)	254.5	248.9	205.2	0.5	94.9	804.1	870.0
17) Upstream Hanger cut	240.7	247.5	204.3	0.5	90.6	783.7	852.0
18) nsecond<4	234.3	244.7	200.6	0.5	88.9	769.0	830.0
19) Fid. Vol. Hanger cut	208.0	235.1	186.2	0.5	80.3	710.2	767.0
20) No Hangers fromPVert	192.1	233.7	184.5	0.5	72.4	683.2	738.0
21) Pz>0 for tracks	192.1	233.7	184.5	0.5	72.4	683.2	738.0
22) Thprimord<0.4	176.3	229.7	140.5	0.5	66.4	613.5	661.0
23) Nunh*fracunh<200	176.3	229.7	140.5	0.5	66.4	613.5	656.0
24) Emumu>2GeV	176.3	229.7	140.5	0.5	66.4	613.5	656.0
25) P+,P->0.5	176.3	229.7	140.5	0.5	66.4	613.5	656.0
26) P+,P->1.0 (2.5mux)	176.3	229.7	140.5	0.5	66.4	613.5	656.0
27) Emumu>5GeV (8mux)	175.8	229.6	140.4	0.5	66.4	612.7	655.0
28) Phi12>90deg (OFF)	175.8	229.6	140.4	0.5	66.4	612.7	655.0
29) Pmumu>10GeV (OFF)	175.8	229.6	140.4	0.5	66.4	612.7	655.0

Table 6: Summary Cut Table (**mass blind**)

Cut Name	CCDIS	Coh $\pi^+$	Coh $\rho^+$	Coh $J/\psi$	Other	Total	Data
1) Raw Events	180.4	835.8	298.4	46.2	7.6	1368.3	461.0
2) OBGfid,Trig+CohGenTh	180.4	835.8	298.4	46.2	7.6	1368.3	461.0
3) Pfermi & W2	180.4	835.8	298.4	46.2	7.6	1368.3	461.0
4) Fid. Vol. -X	172.0	799.0	285.1	44.3	6.6	1307.0	434.0
5) Fid. Vol. -Y	160.5	771.8	274.2	42.6	6.2	1255.3	415.0
6) Fid. Vol. -Z (OFF)	160.5	771.8	274.2	42.6	6.2	1255.3	415.0
7) At Least 1 Mu	160.5	771.8	274.2	42.6	6.2	1255.3	415.0
8) ncand=2,3,4	160.5	771.8	274.2	42.6	6.2	1255.3	415.0
9) tncgdc=2	149.2	758.1	270.0	42.4	5.5	1225.3	356.0
10) +/- Tracks (V0)	145.9	757.7	269.6	42.4	4.6	1220.2	349.0
11) Tube/Veto Cut	145.9	757.7	269.6	42.4	4.6	1220.2	349.0
12) 2 Muons (1mux)	145.9	33.6	36.5	39.0	4.1	259.1	349.0
13) PmuAsymj0.0	33.6	3.3	7.8	19.6	2.7	67.0	70.0
14) Theta<2.62 rad	33.6	3.3	7.8	19.6	2.7	67.0	70.0
15) Pt+wrt- >0.05	33.6	3.3	7.8	19.6	2.7	67.0	70.0
16) Mee > 2.0 (OFF)	33.6	3.3	7.8	19.6	2.7	67.0	70.0
17) Upstream Hanger cut	32.1	3.3	7.7	19.6	2.5	65.2	70.0
18) nsecond<4	31.6	3.1	7.6	19.6	2.3	64.2	70.0
19) Fid. Vol. Hanger cut	28.8	3.0	7.3	19.4	2.0	60.5	66.0
20) No Hangers fromPVert	26.0	3.0	7.1	19.4	1.6	57.1	65.0
21) Pz>0 for tracks	26.0	3.0	7.1	19.4	1.6	57.1	65.0
22) Thprimord<0.4	24.1	2.8	5.3	19.4	1.2	52.9	54.0
23) Nunh*fracunh<200	24.1	2.8	5.3	19.4	1.2	52.9	54.0
24) Emumu>2GeV	24.1	2.8	5.3	19.4	1.2	52.9	54.0
25) P+,P->0.5	24.1	2.8	5.3	19.4	1.2	52.9	54.0
26) P+,P->1.0 (2.5mux)	24.1	2.8	5.3	19.4	1.2	52.9	54.0
27) Emumu>5GeV (8mux)	24.1	2.8	5.3	19.4	1.2	52.9	54.0
28) Phi12>90deg (OFF)	24.1	2.8	5.3	19.4	1.2	52.9	54.0
29) Pmumu>10GeV (OFF)	24.1	2.8	5.3	19.4	1.2	52.9	54.0

Table 7: Summary Cut Table (**mass sig.**)

## 4 Plots

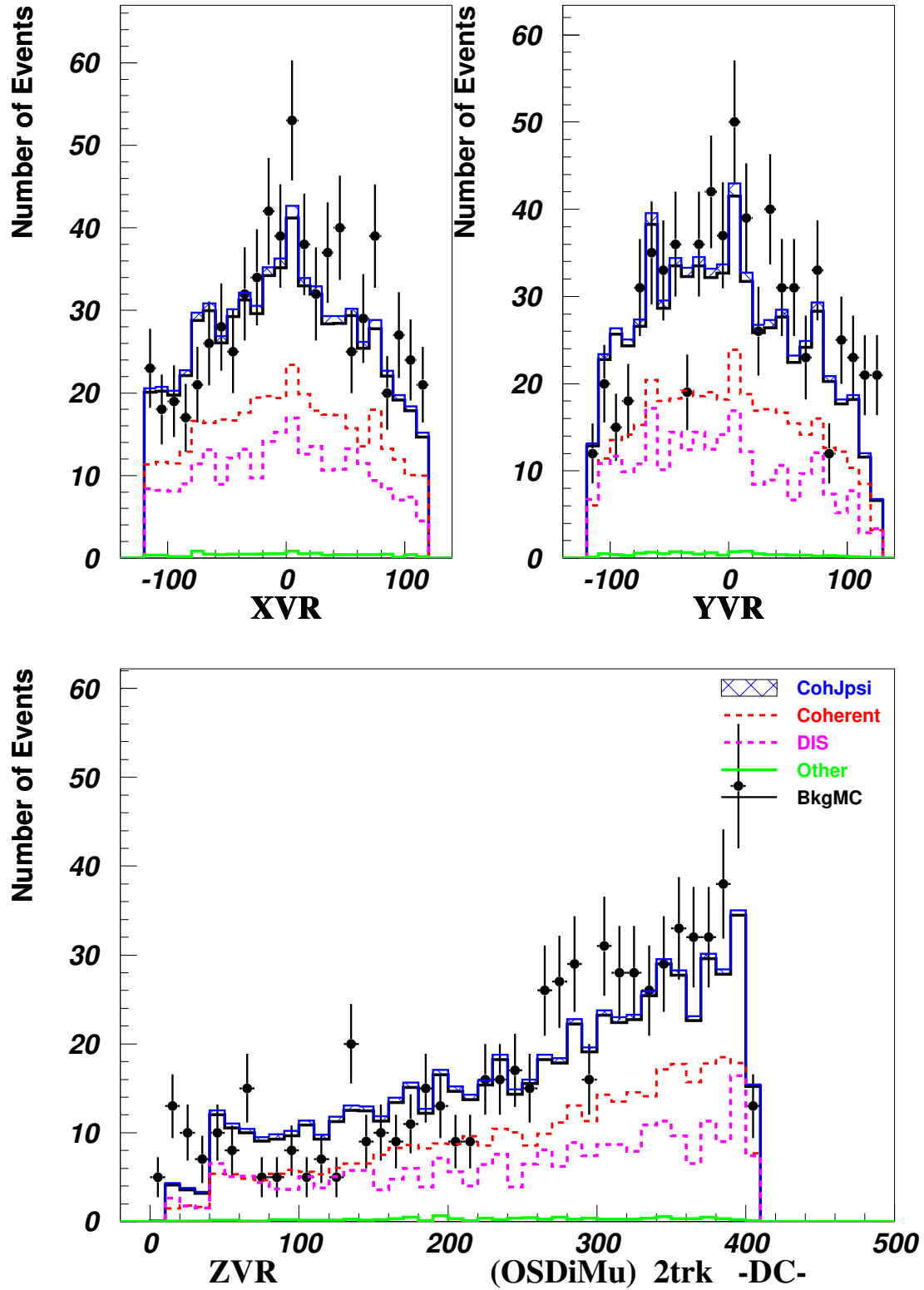


Figure 7: (./figs/vertex.pdf)

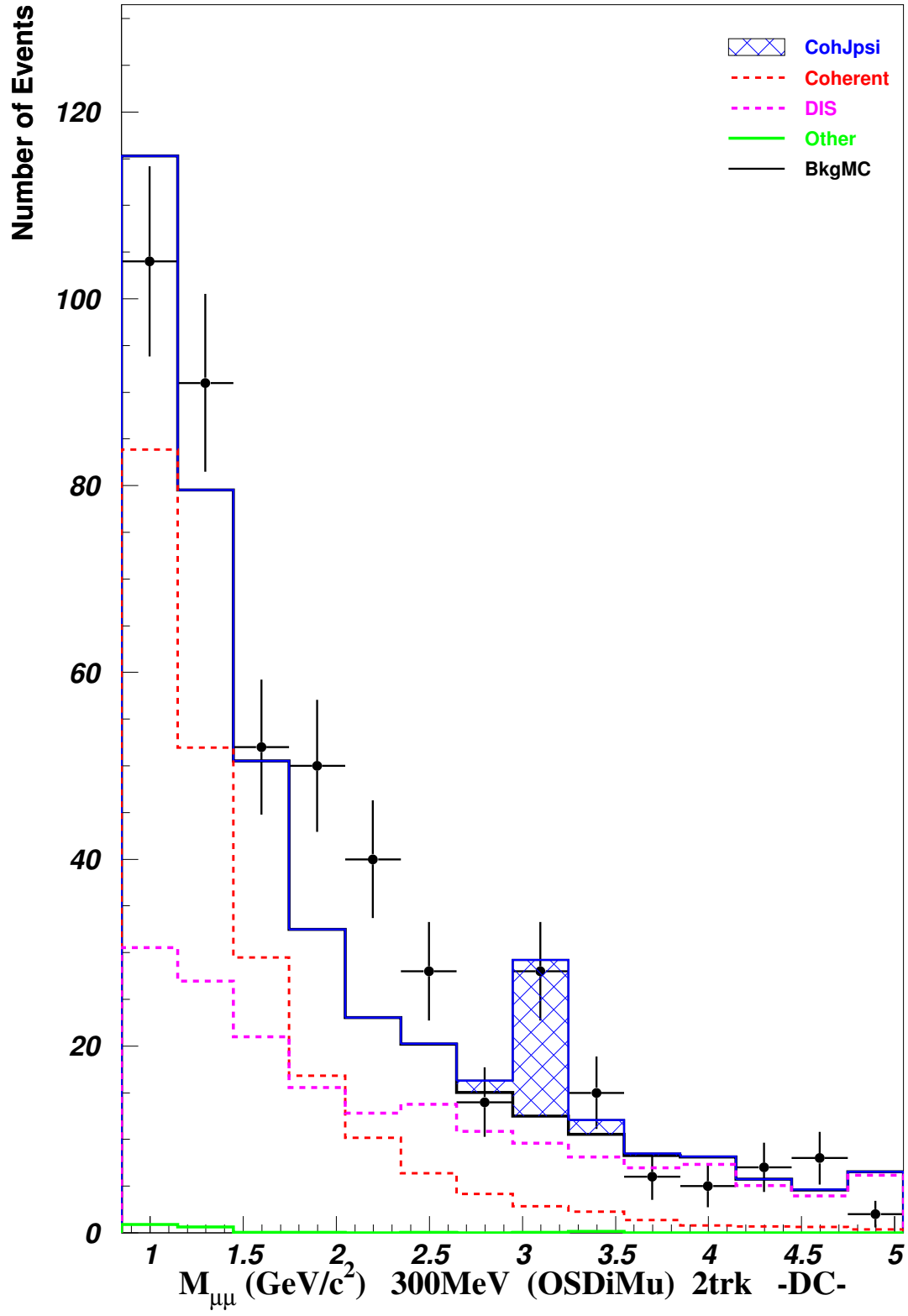


Figure 8: (./figs/mass-0.9to5-300mev.pdf)

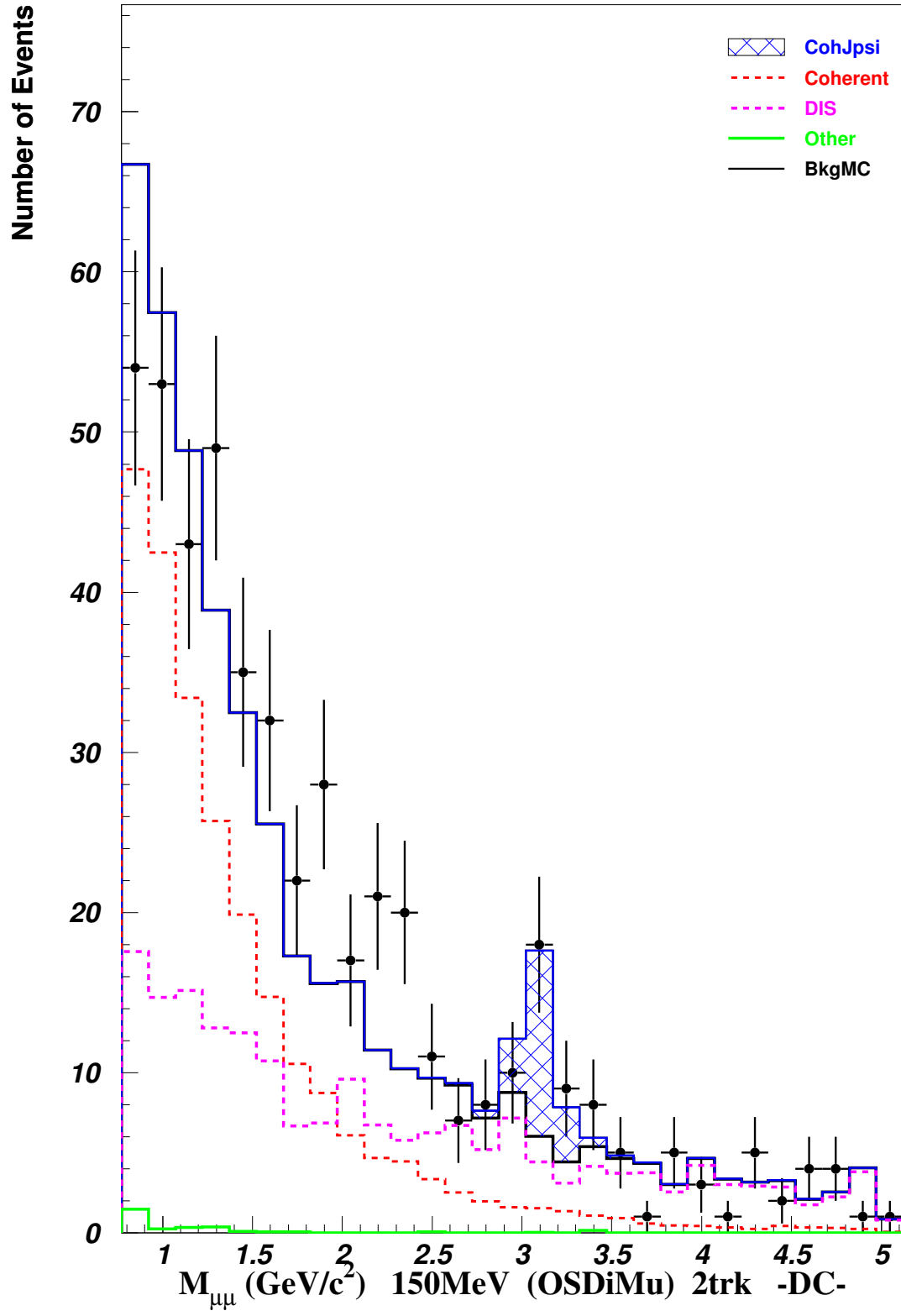


Figure 9: (./figs/mass-0.9to5-150mev.pdf)

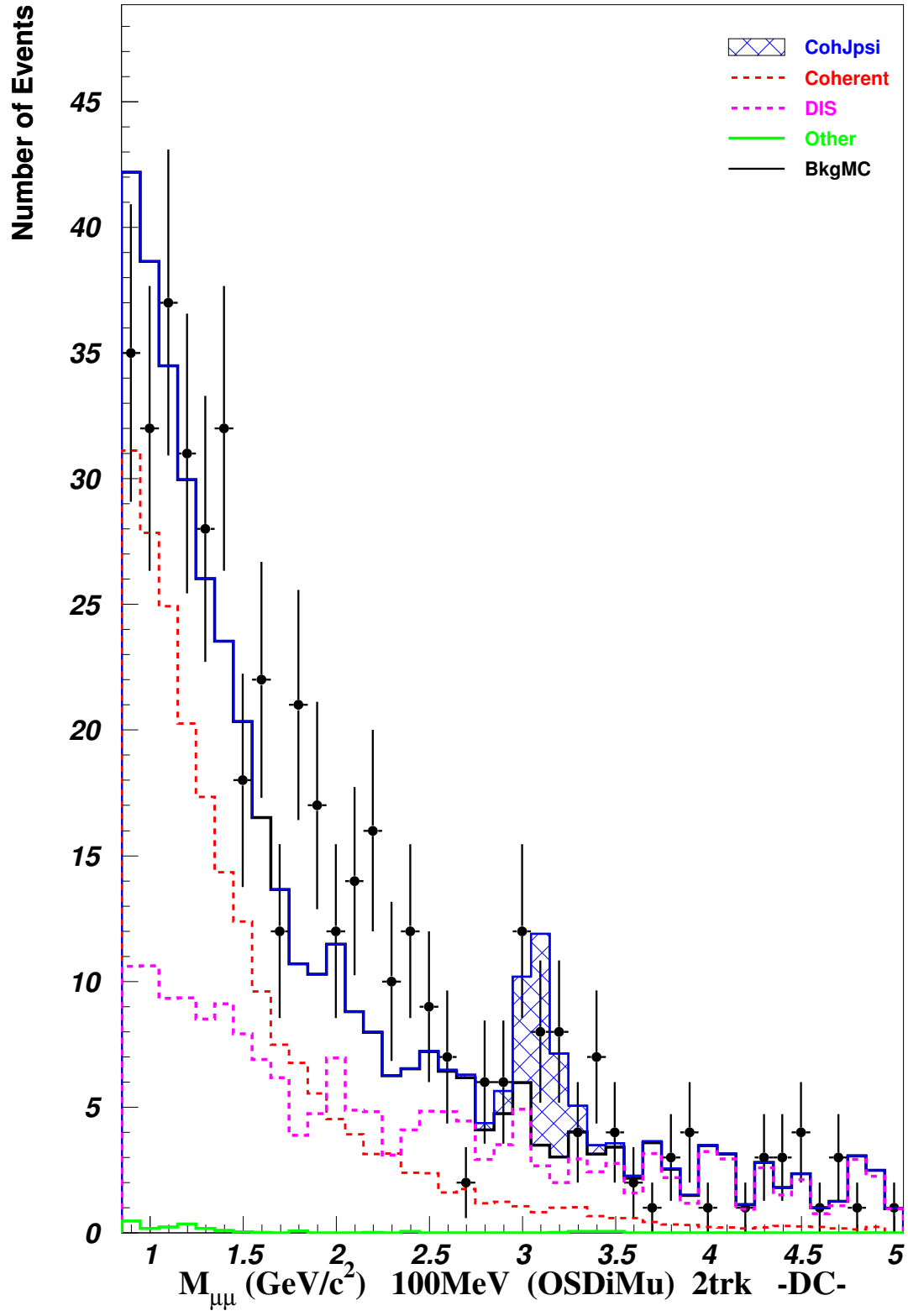


Figure 10: (./figs/mass-0.9to5-100mev.pdf)

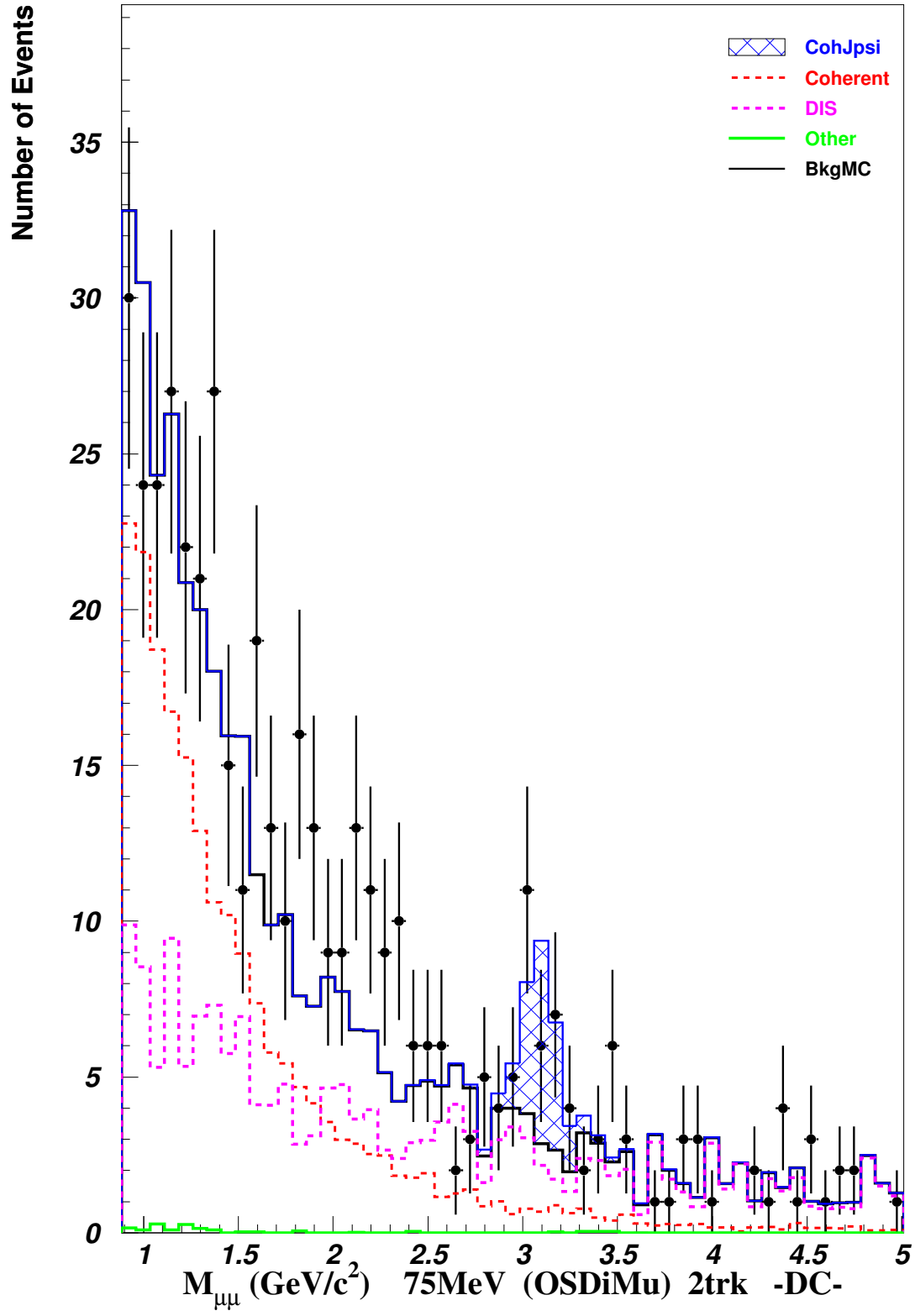


Figure 11: (./figs/mass-0.9to5-75mev.pdf)



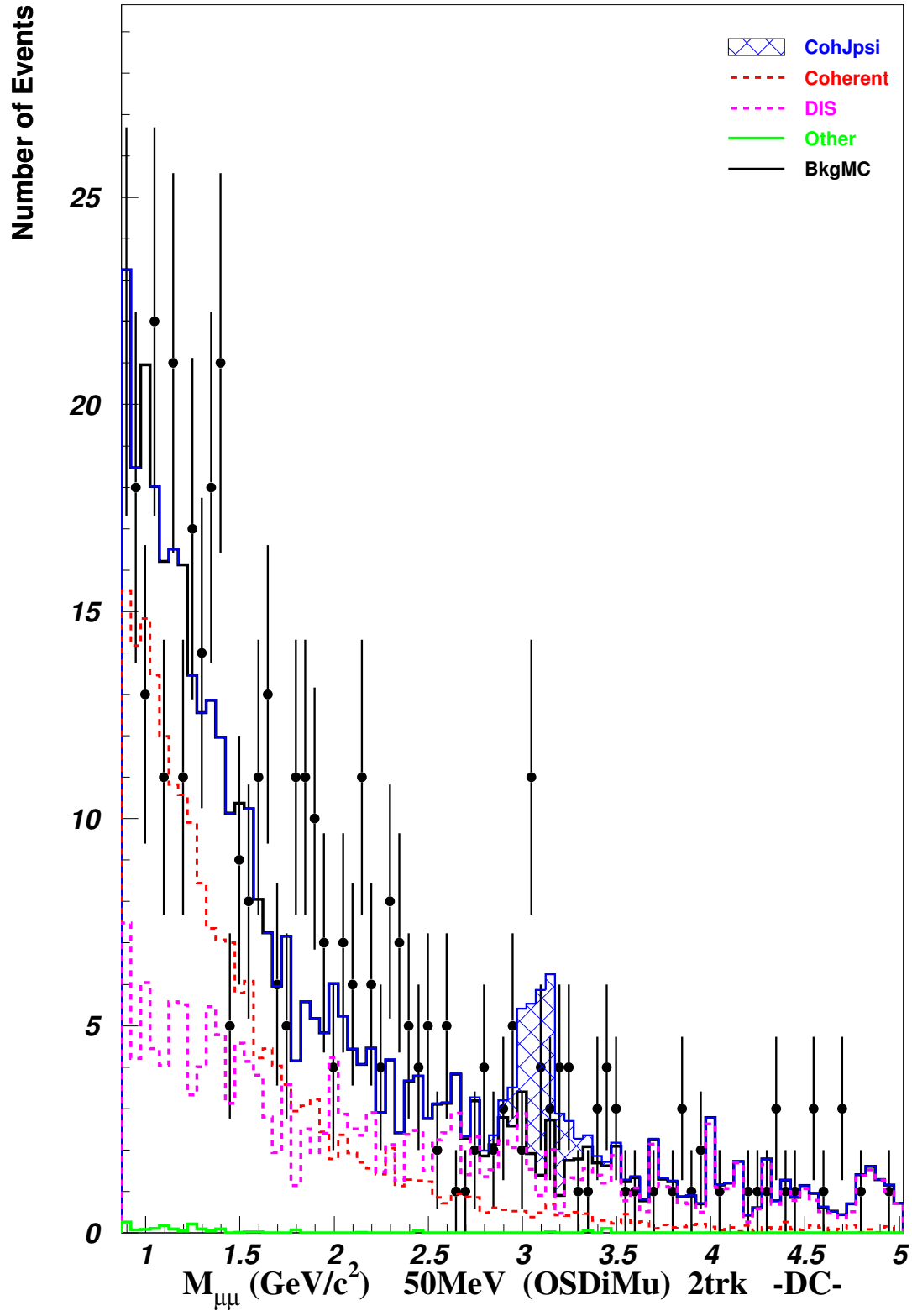


Figure 12: (./figs/mass-0.9to5-50mev.pdf)

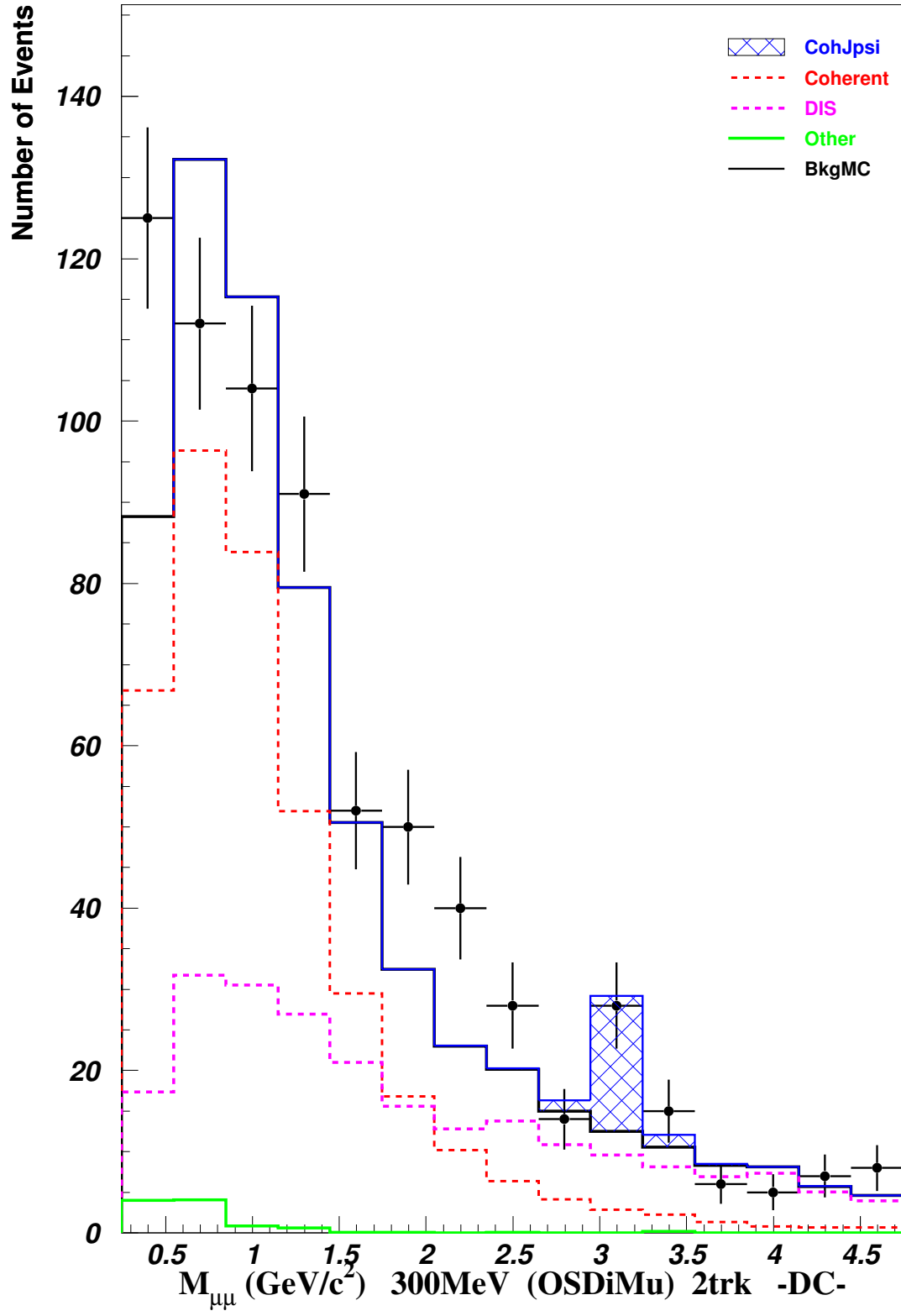


Figure 13: (./figs/mass-0to5-300mev.pdf)

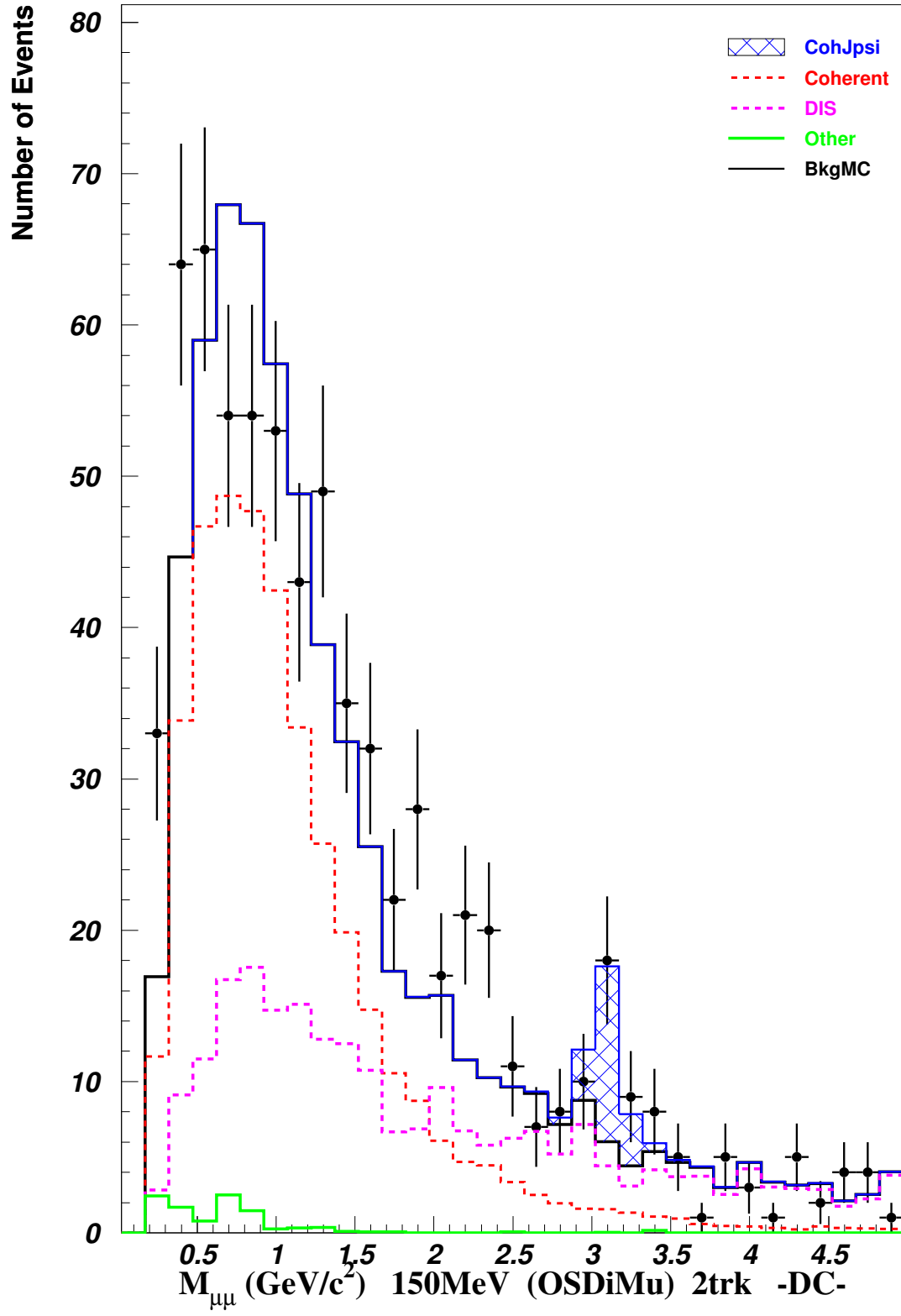


Figure 14: (./figs/mass-0to5-150mev.pdf)

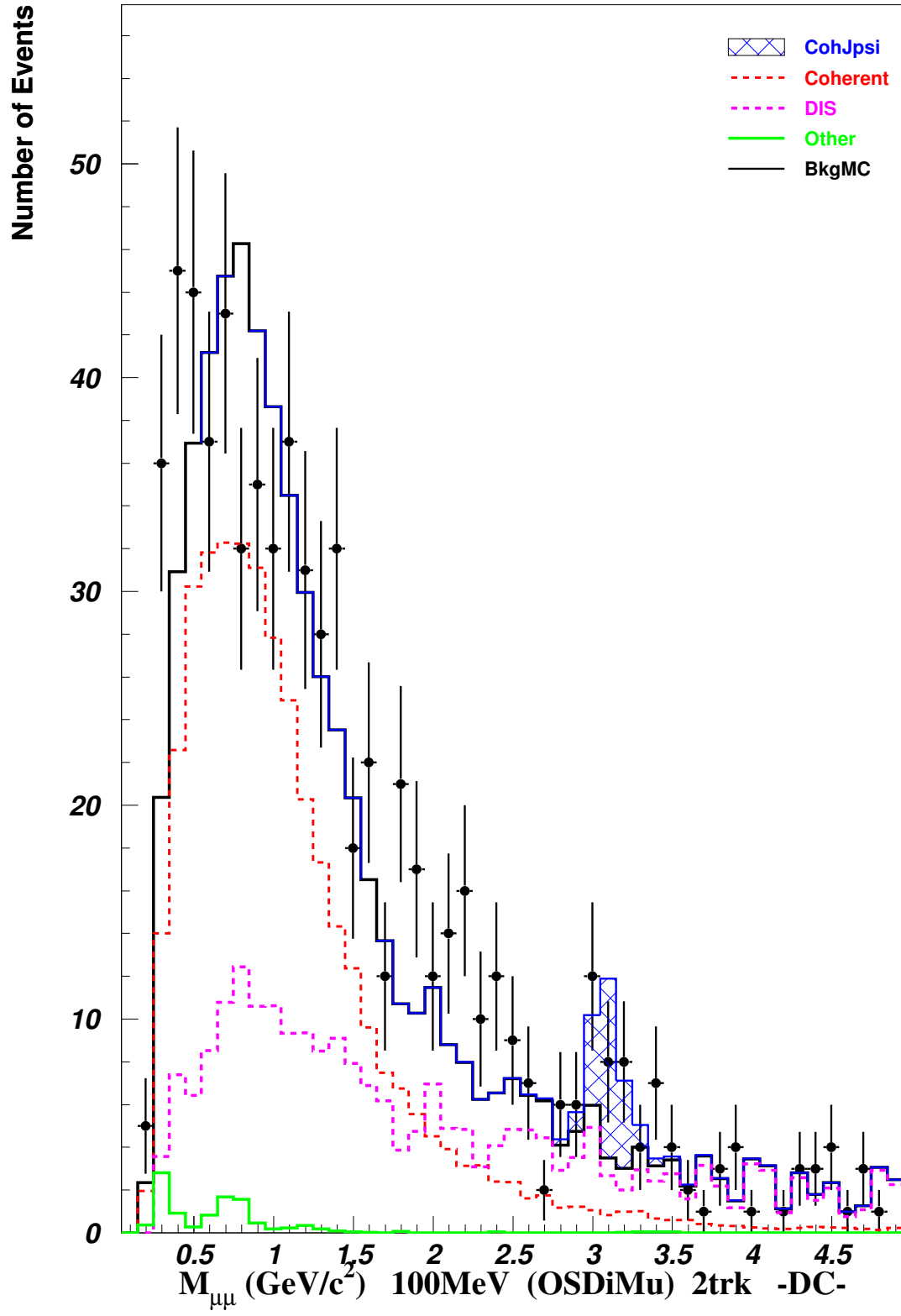


Figure 15: (./figs/mass-0to5-100mev.pdf)

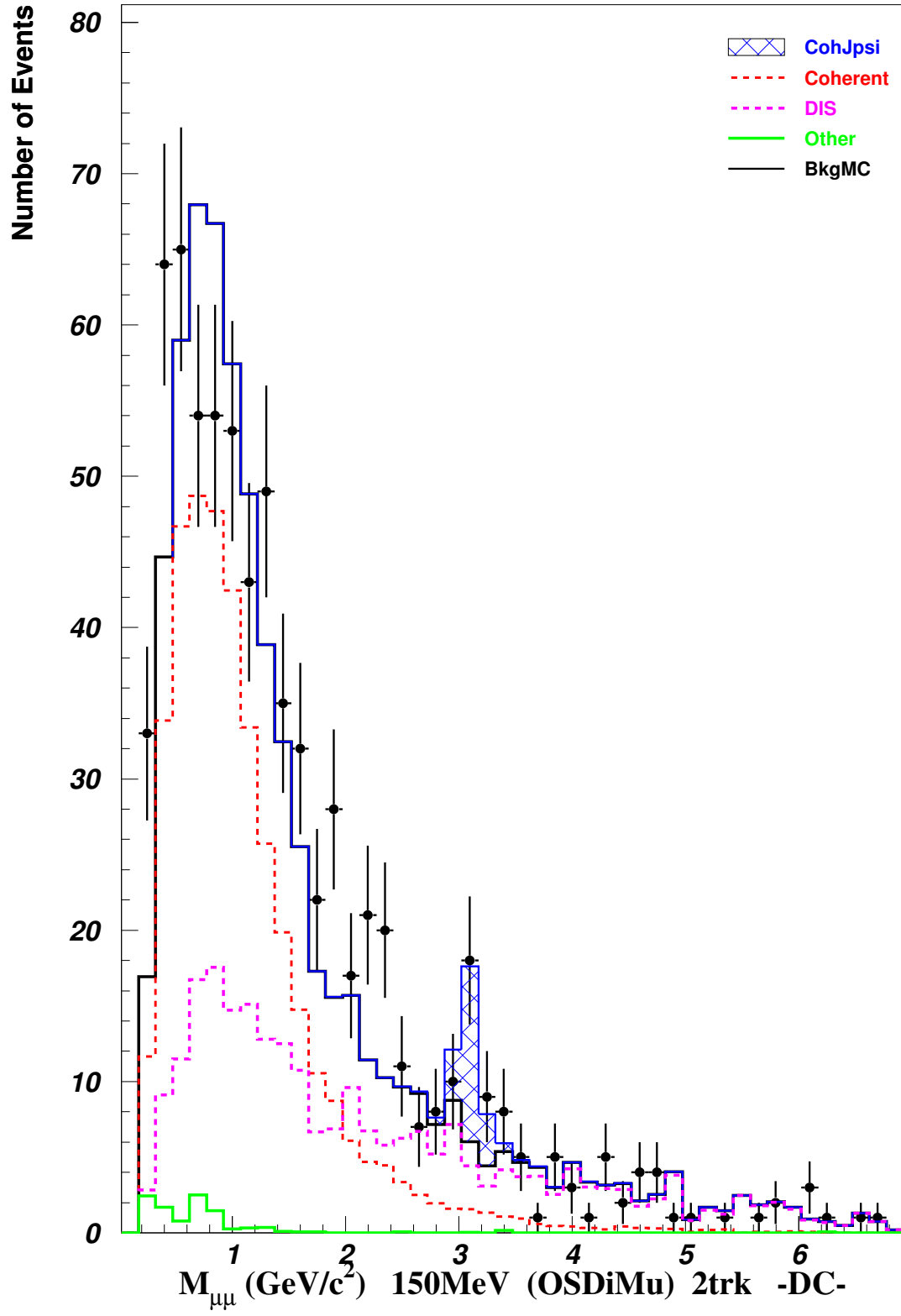


Figure 16: (./figs/mass-0to7-150mev.pdf)

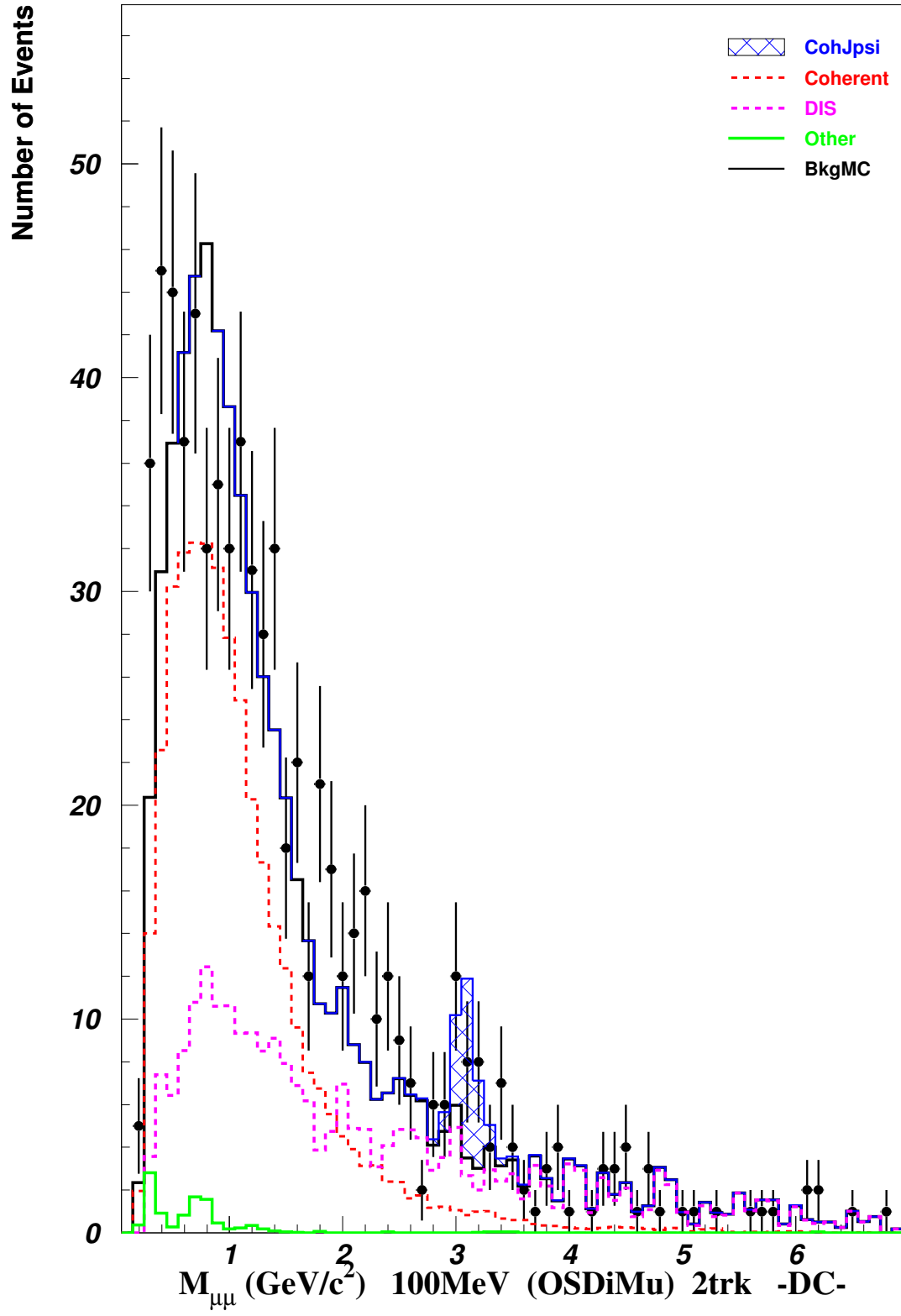


Figure 17: (./figs/mass-0to7-100mev.pdf)

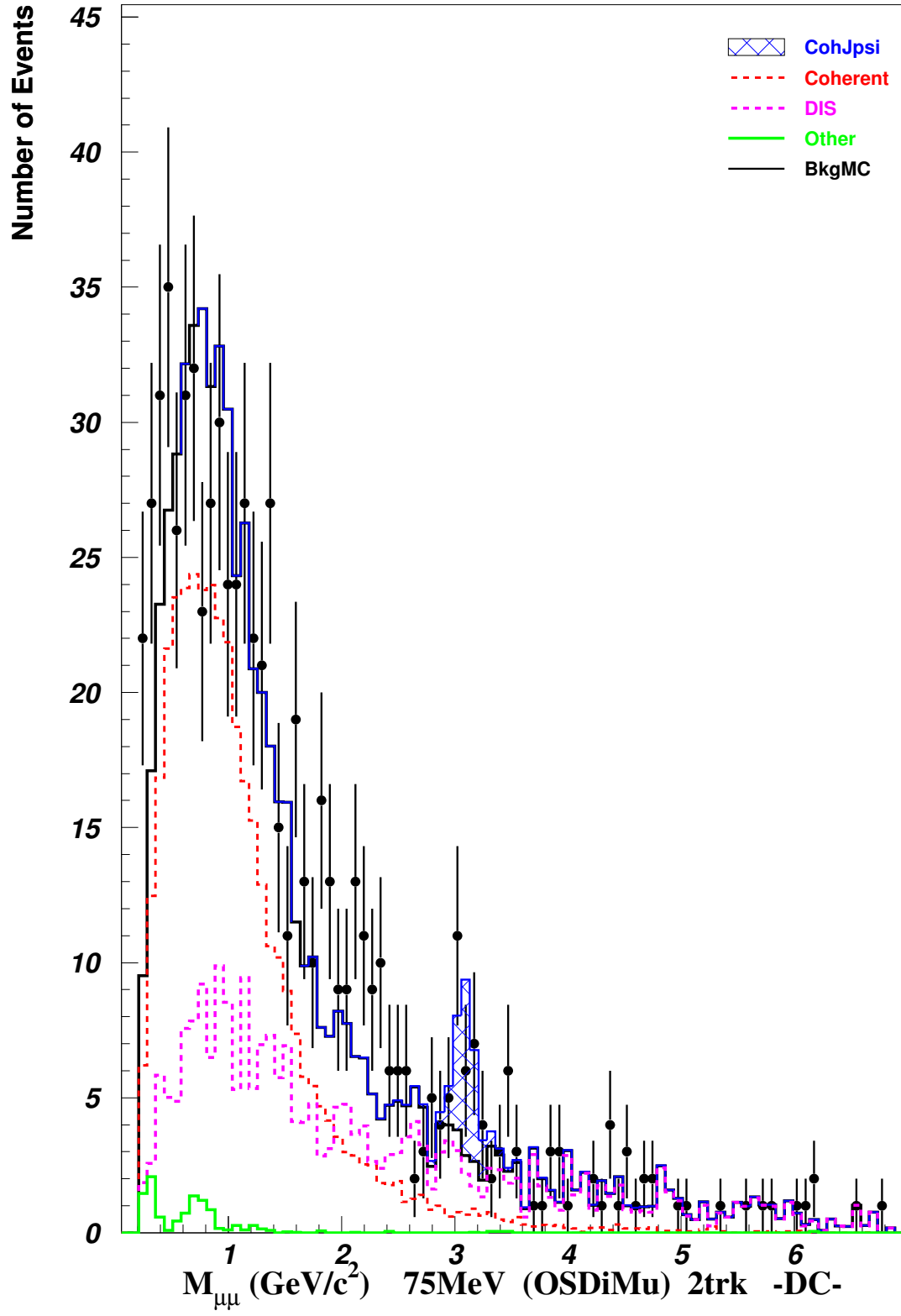


Figure 18: (./figs/mass-0to7-75mev.pdf)

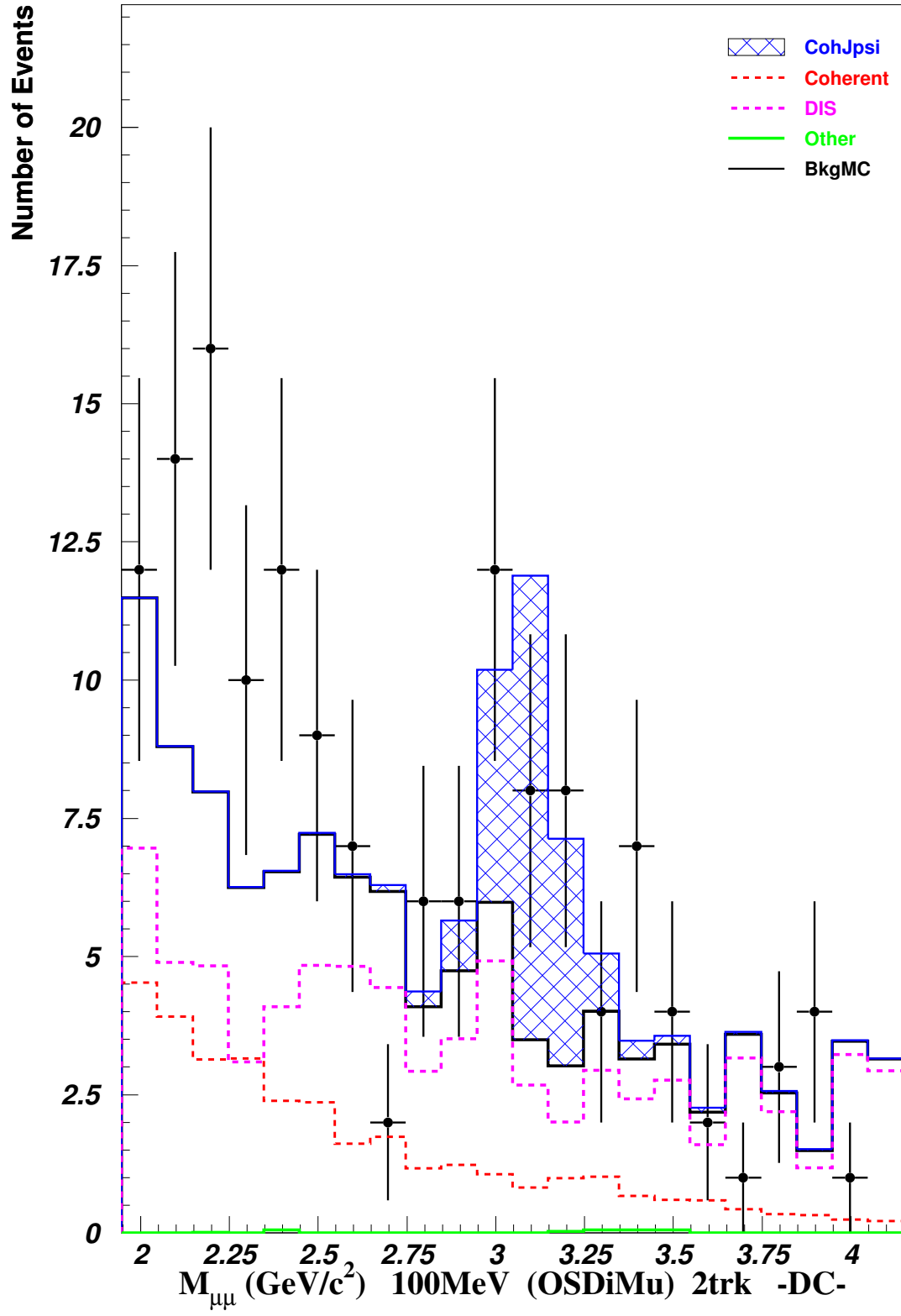


Figure 19: (./figs/mass-2to4-100mev.pdf)



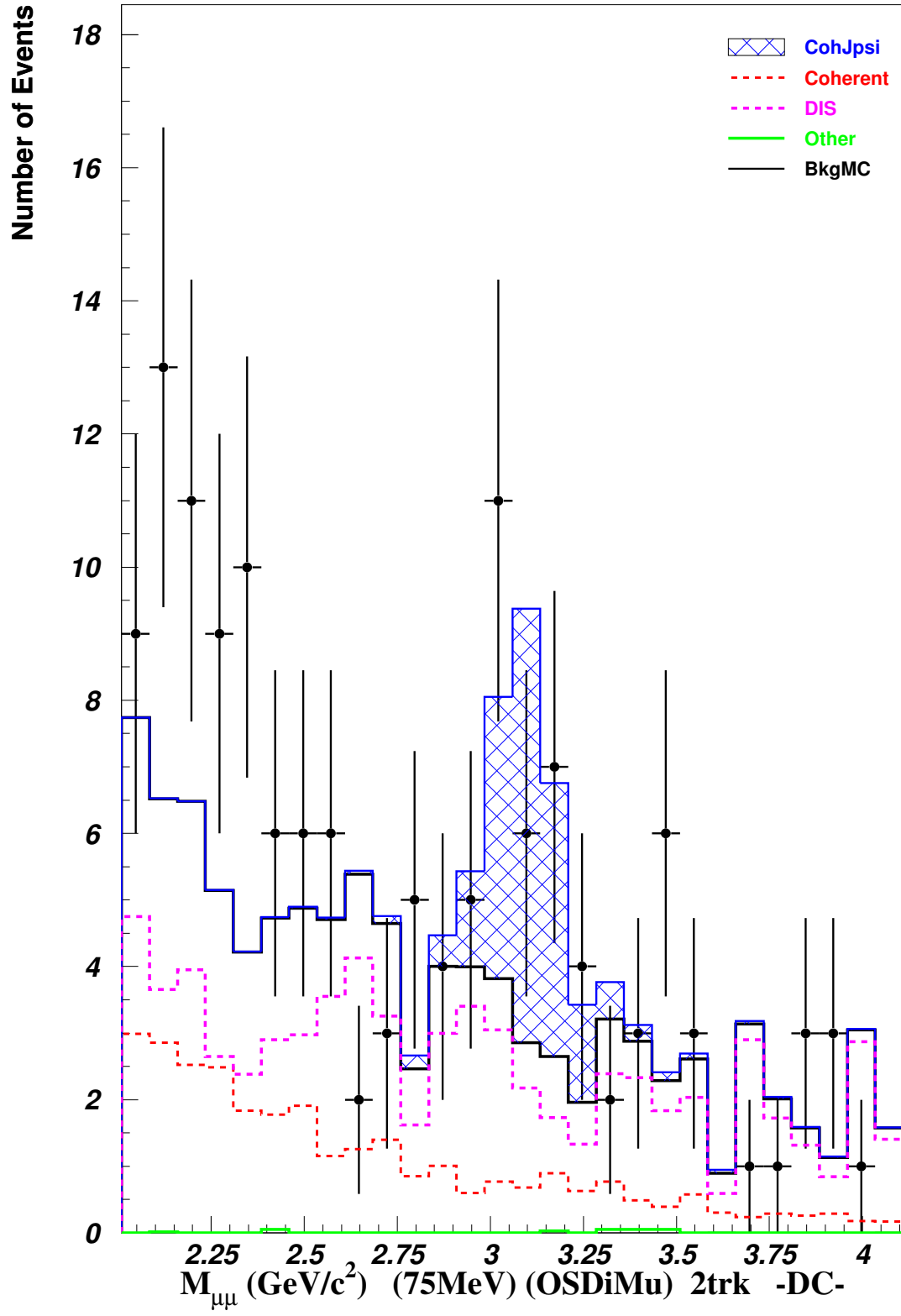


Figure 20: (./figs/mass-2to4-75mev.pdf)

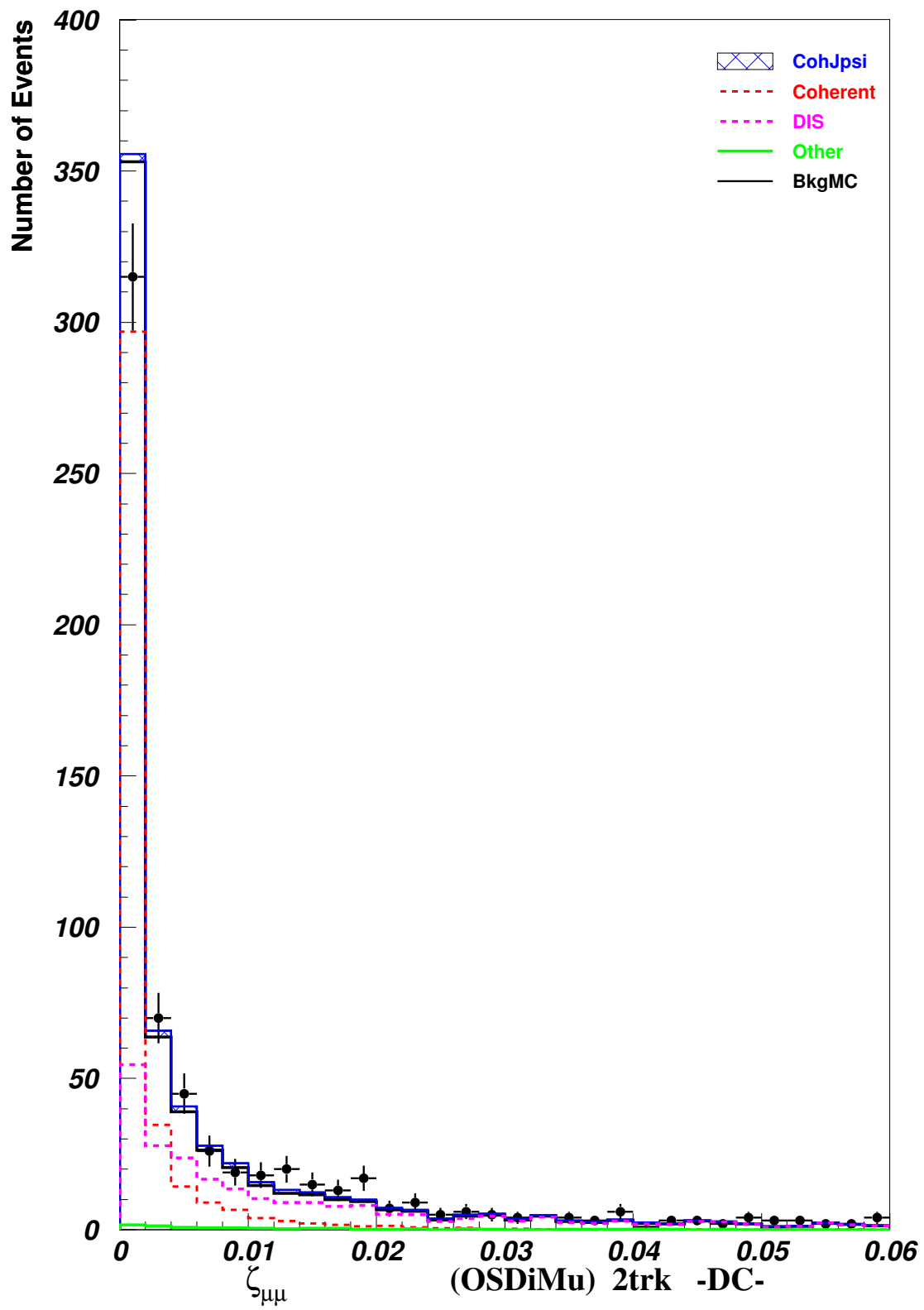


Figure 21: (./figs/zetamumu.pdf)

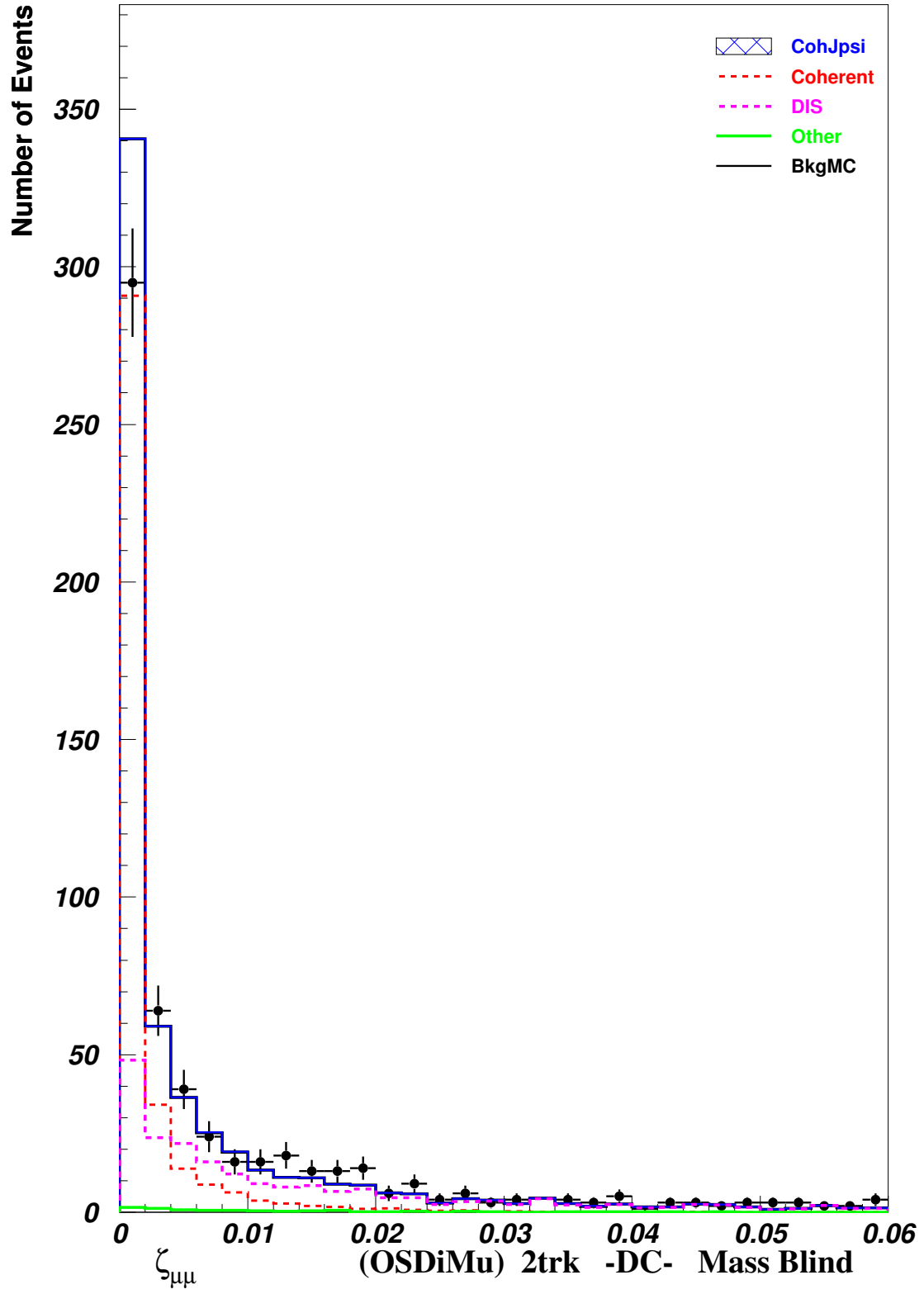


Figure 22: (./figs/zetamumu-mb.pdf)

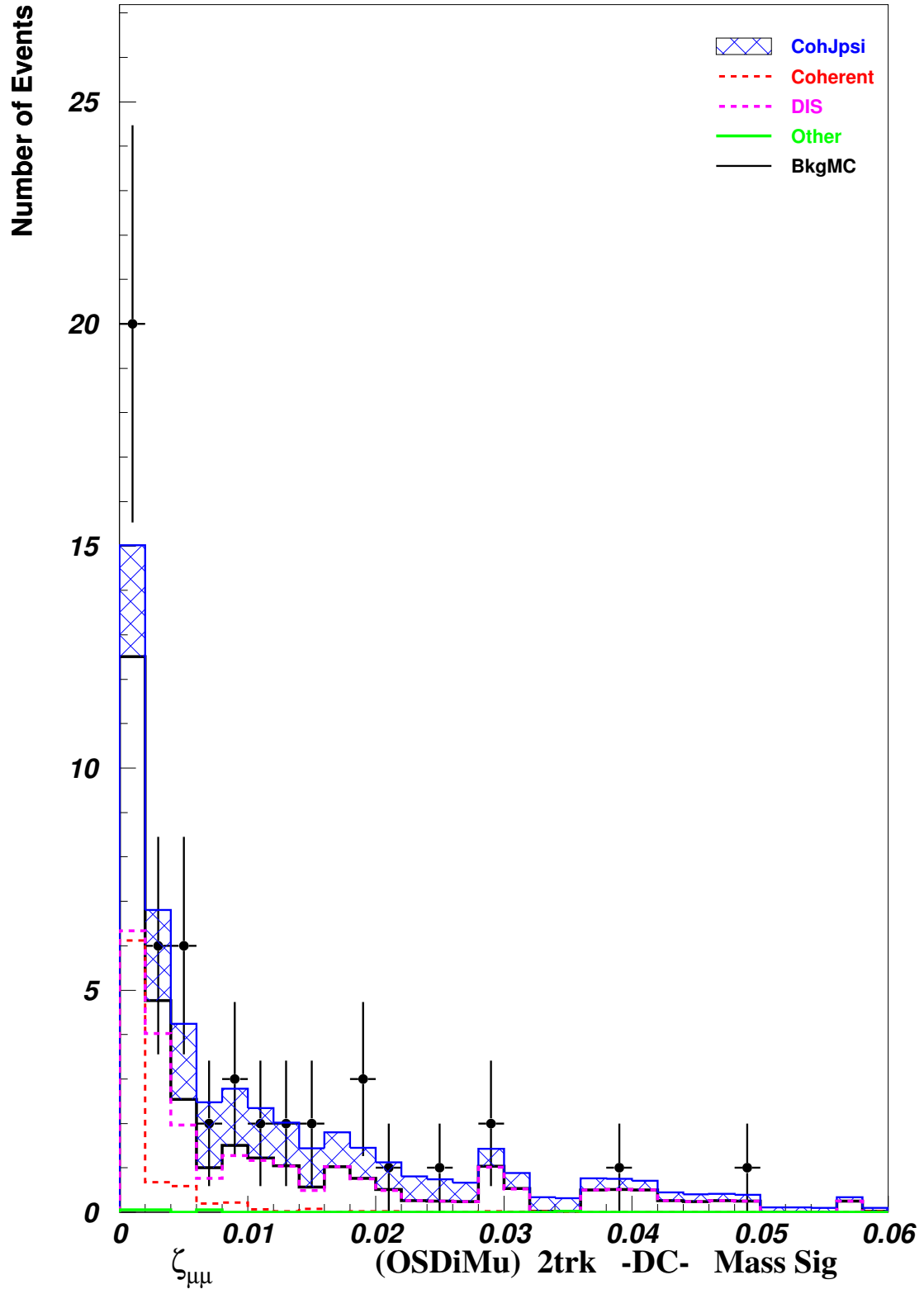


Figure 23: (./figs/zetamumu-msig.pdf)

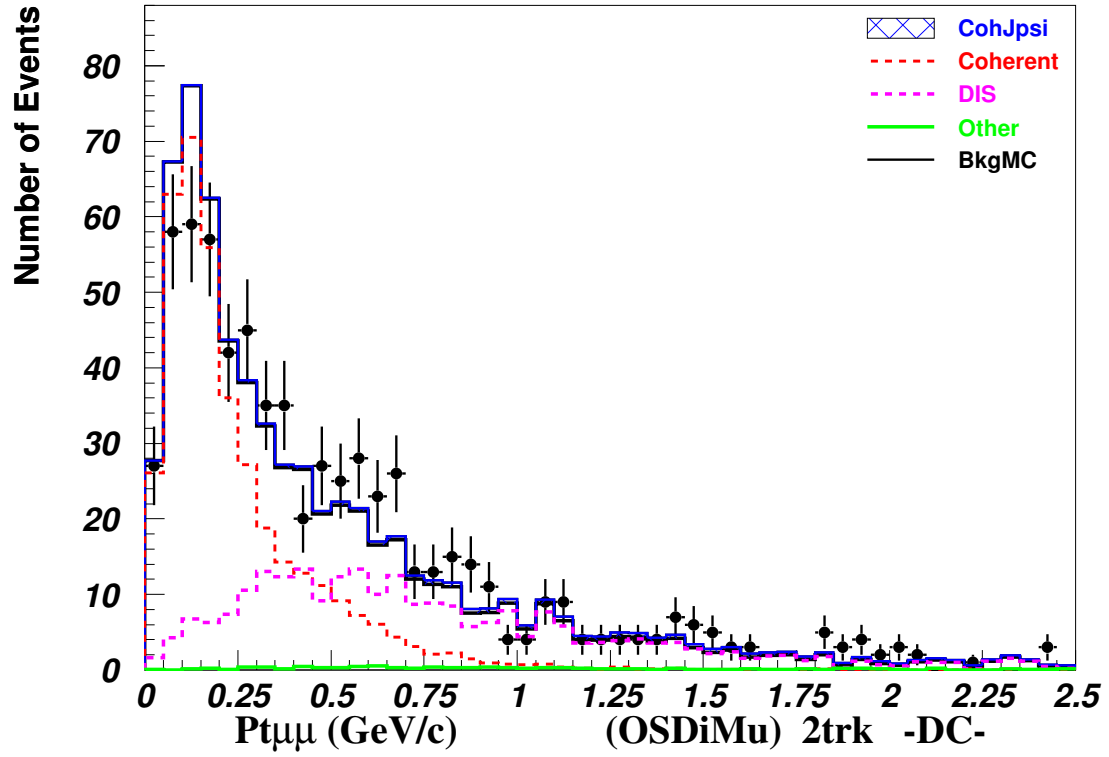
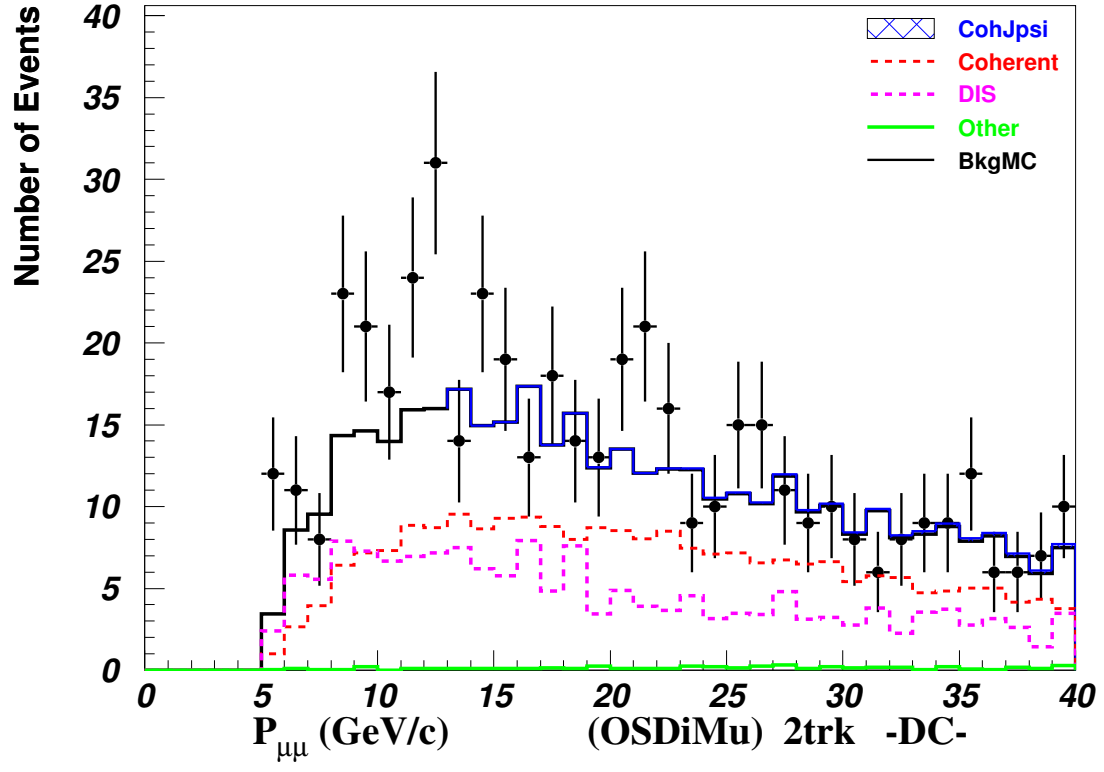


Figure 24: (./figs/p-pt-mumu.pdf)

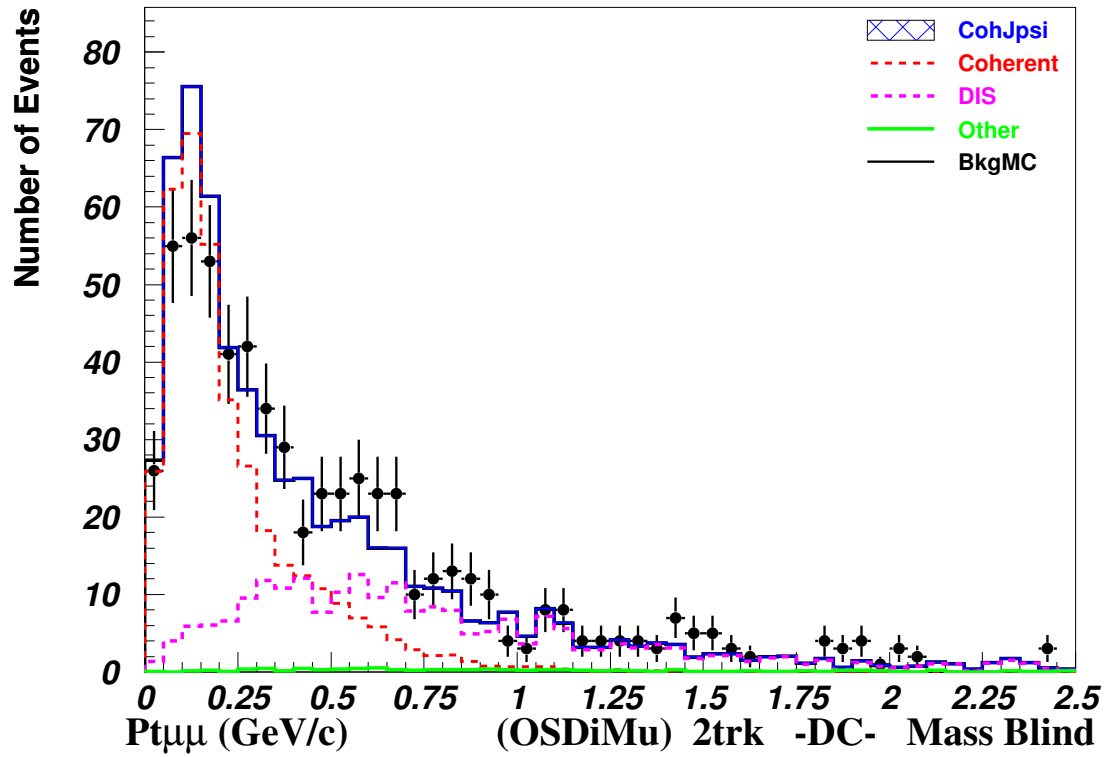
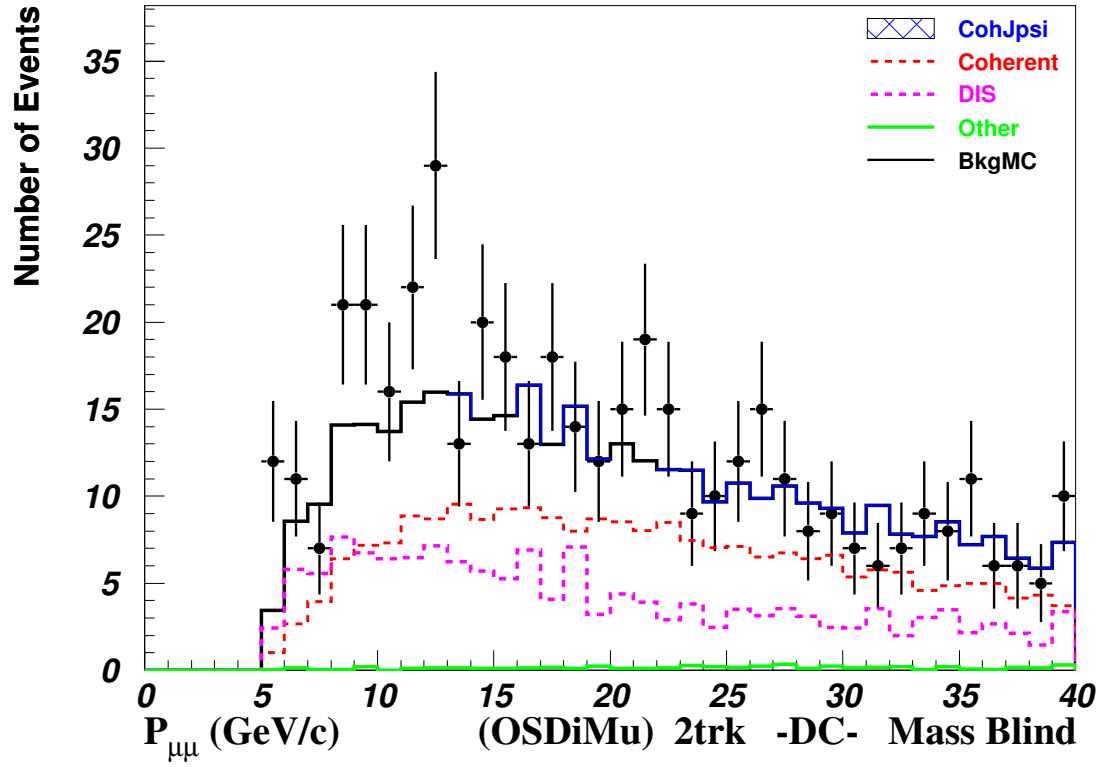


Figure 25: (./figs/p-pt-mumu-mb.pdf)

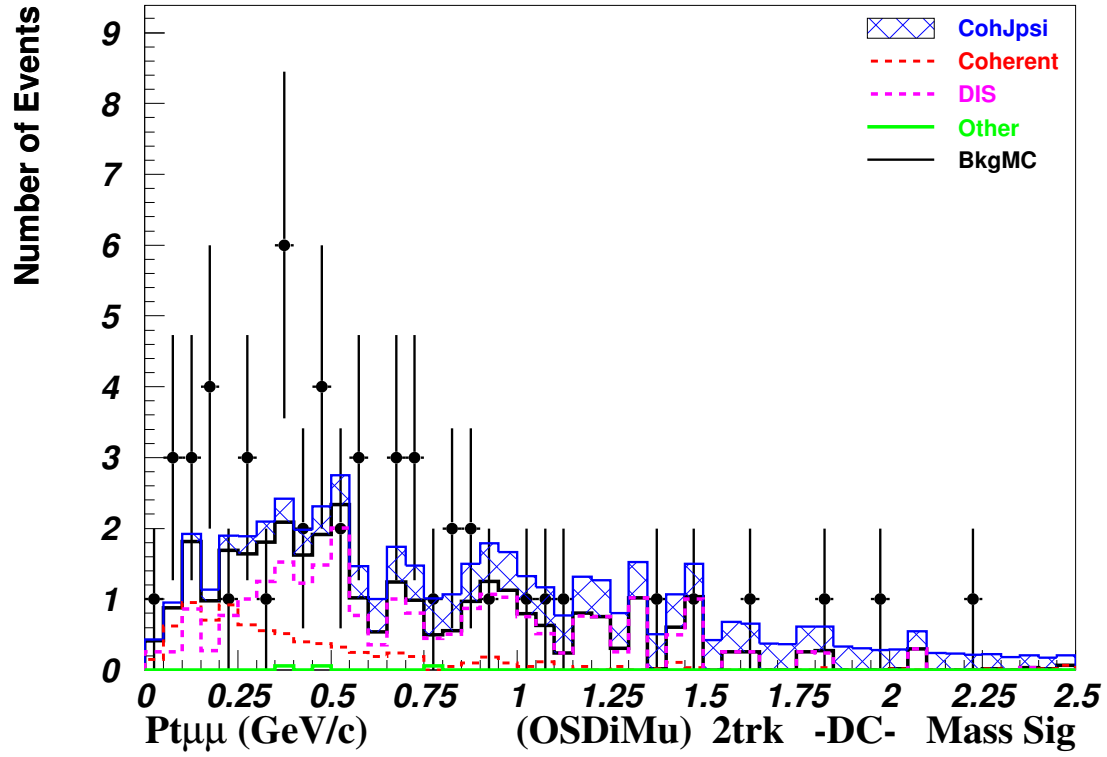
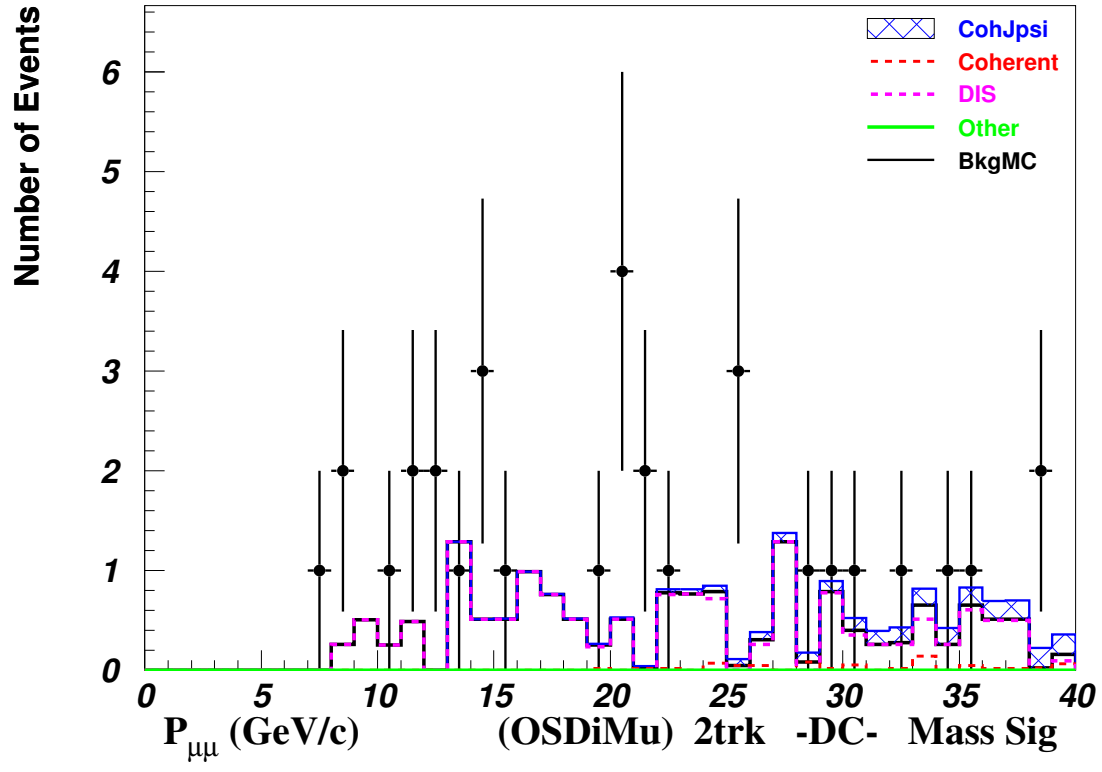


Figure 26: (./figs/p-pt-mumu-msig.pdf)

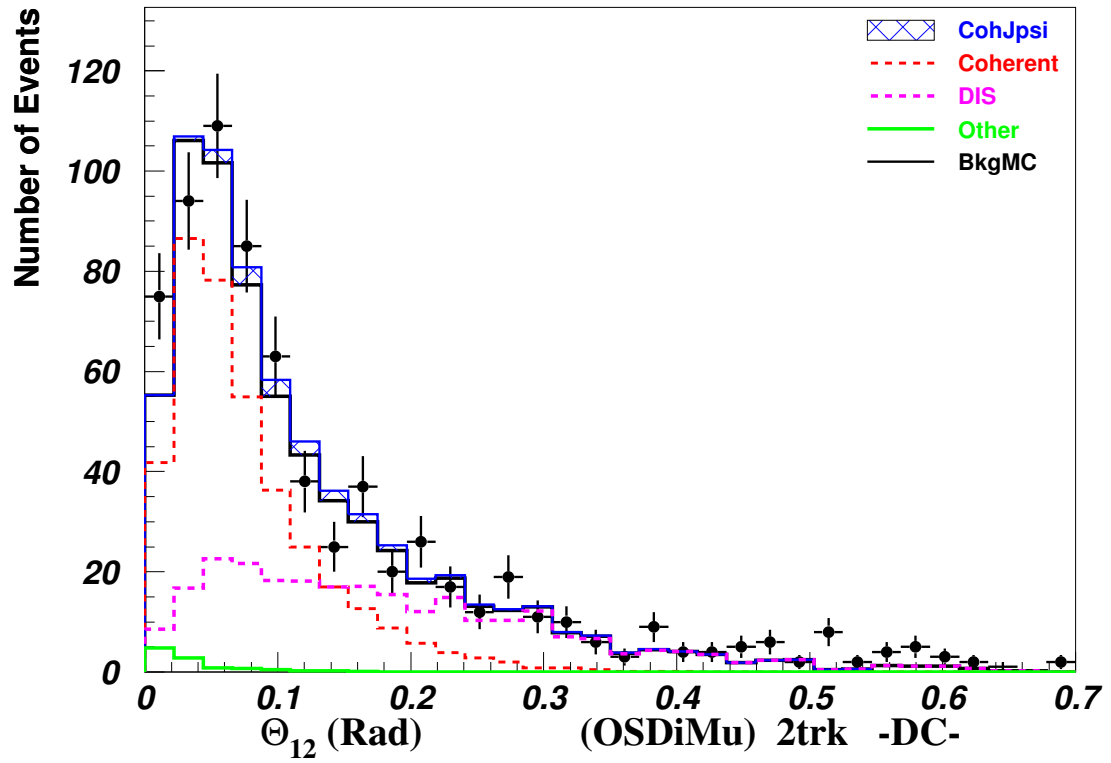
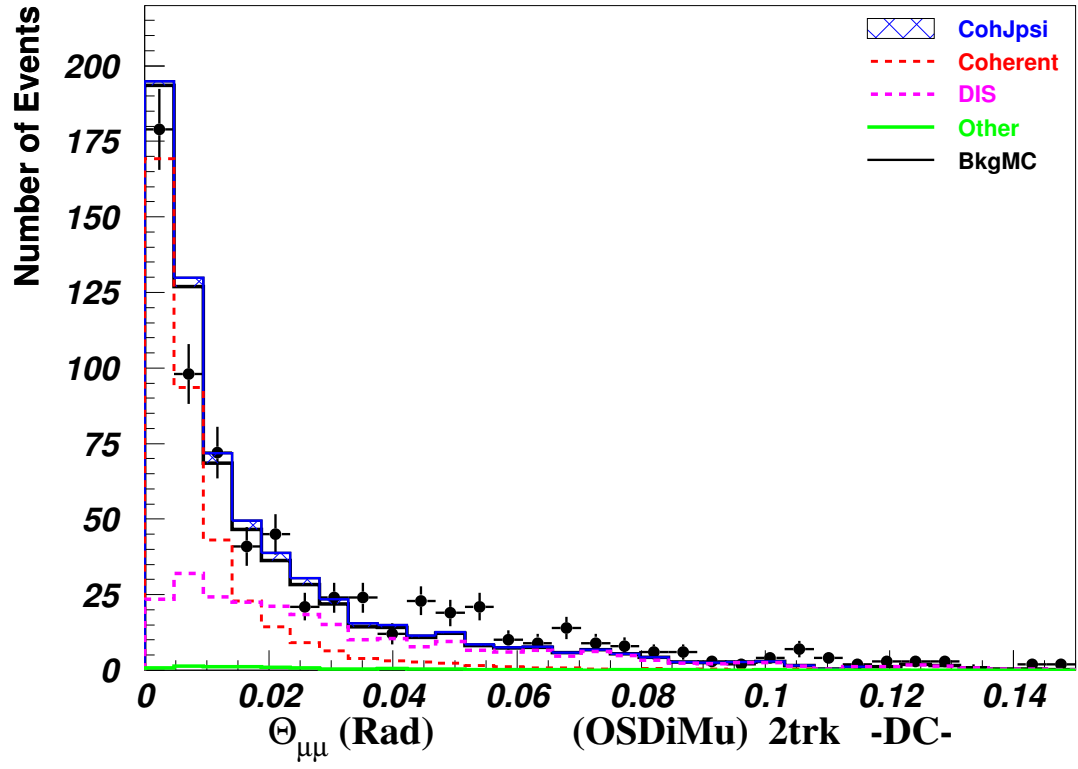


Figure 27: (./figs/thetamumu-theta12.pdf)



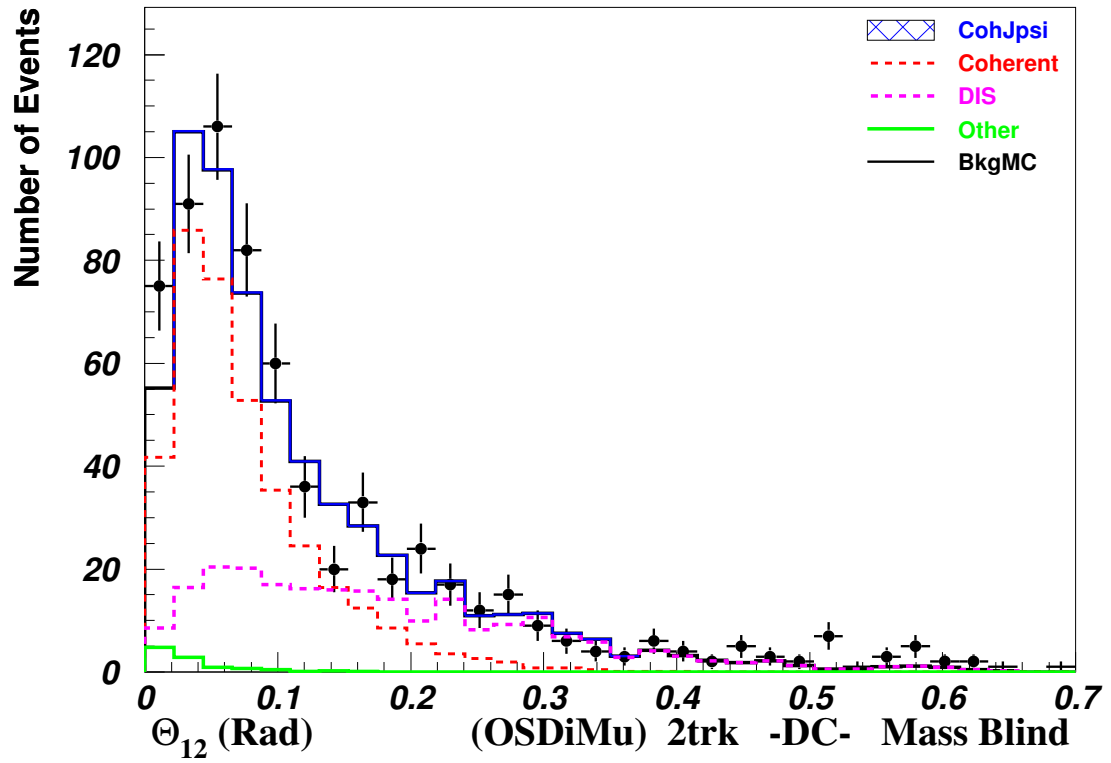
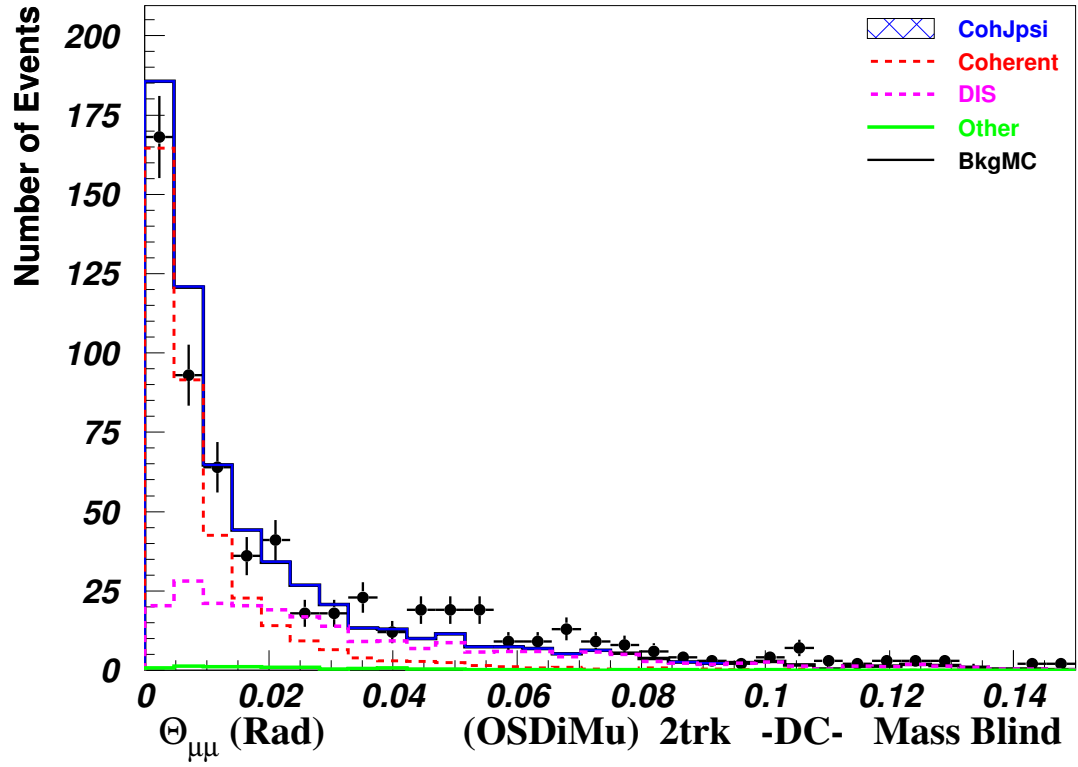


Figure 28: (./figs/thetamumu-theta12-mb.pdf)

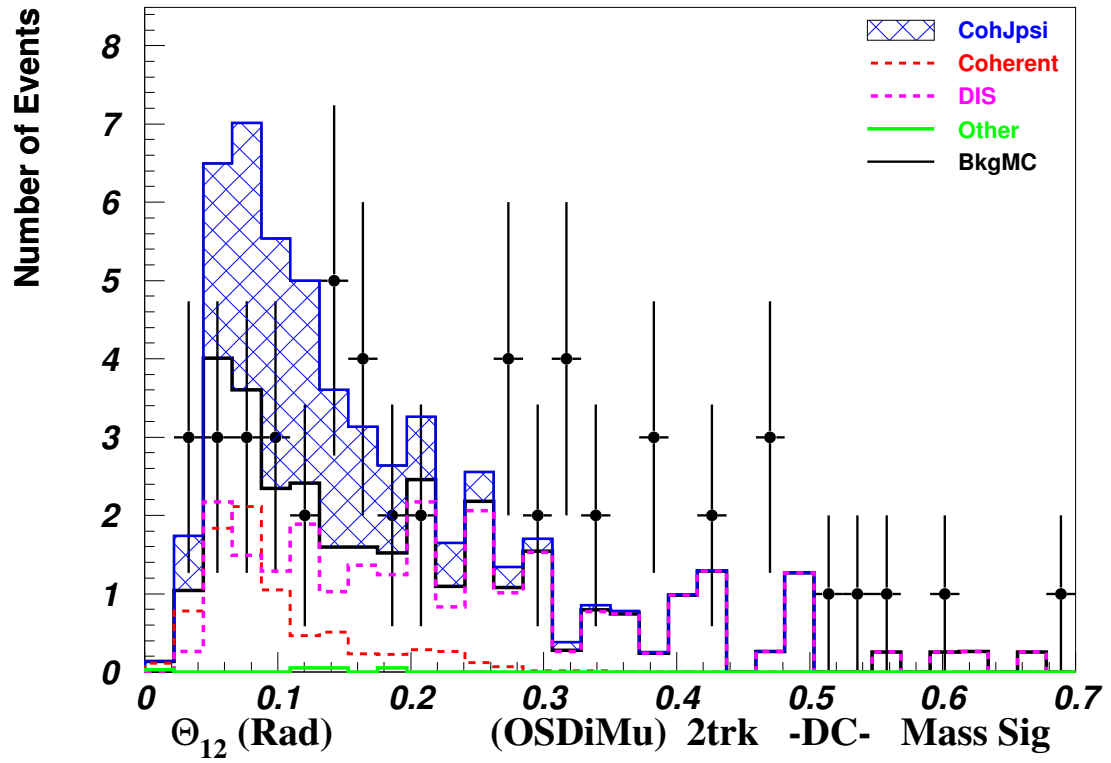
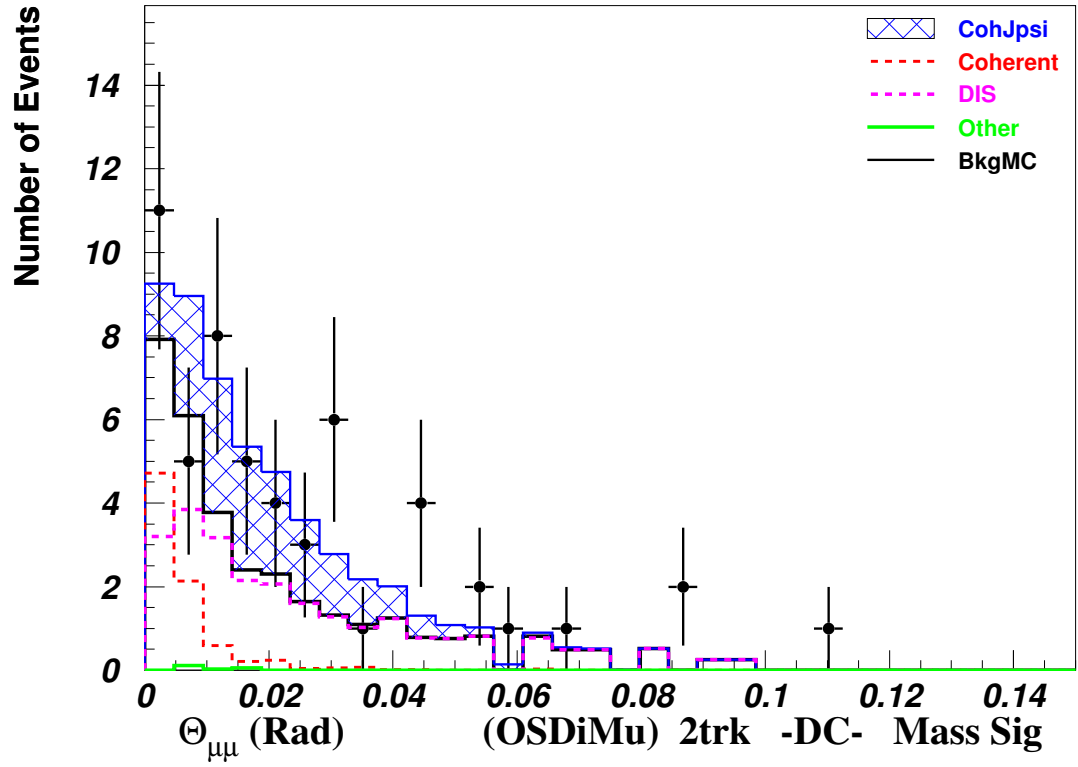


Figure 29: (./figs/thetamumu-theta12-msig.pdf)

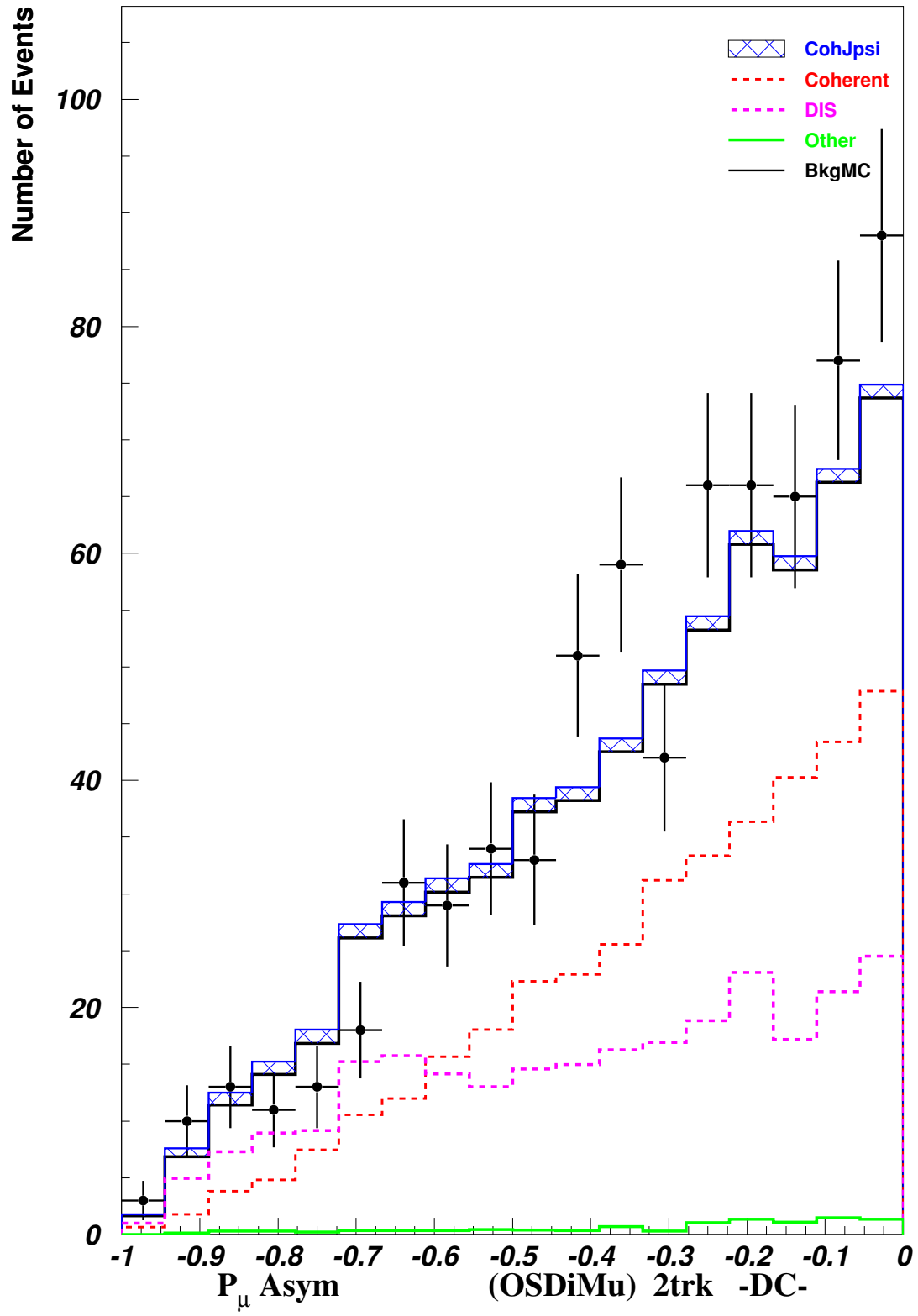


Figure 30: (./figs/pasym.pdf)

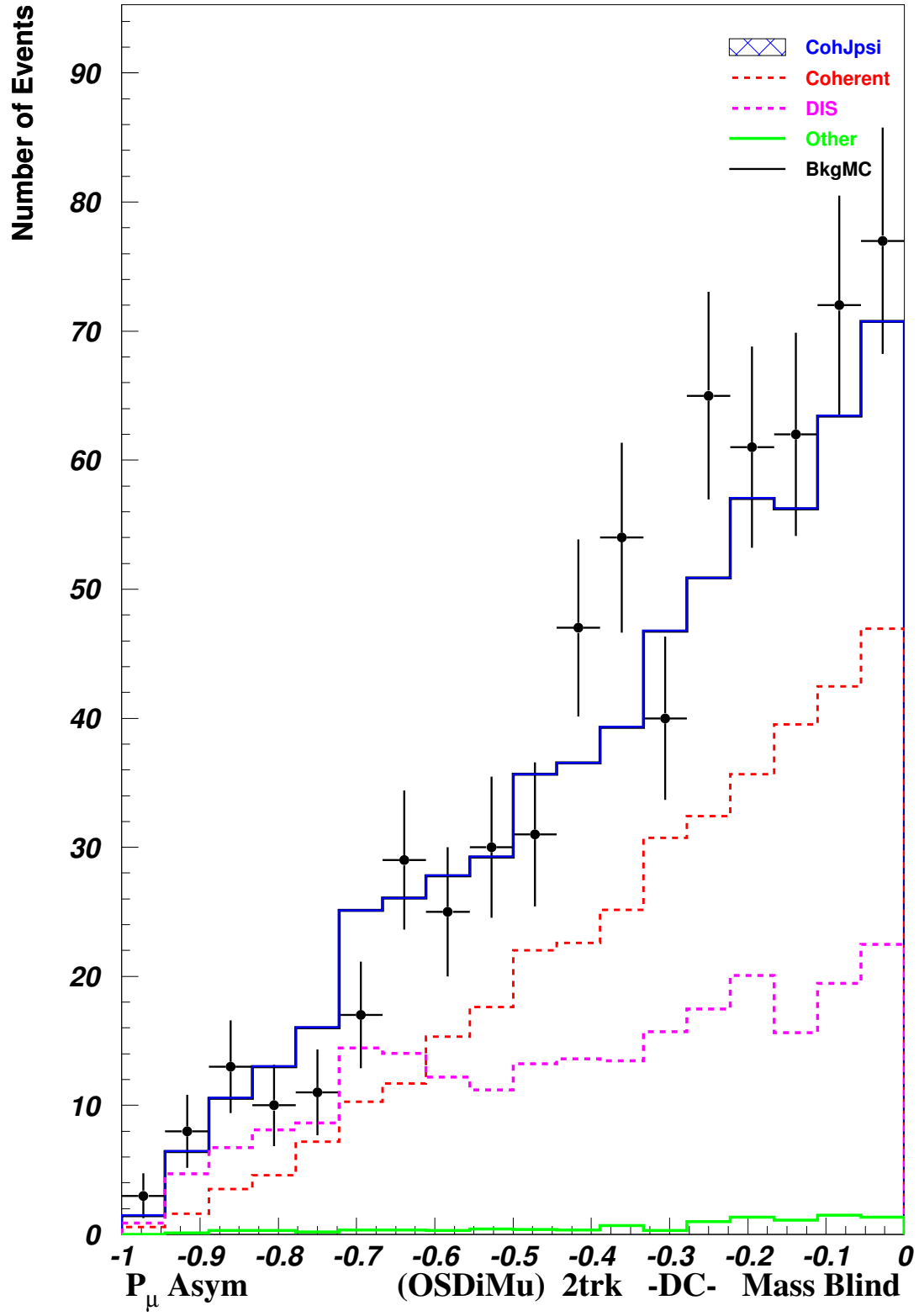


Figure 31: (./figs/pasym-mb.pdf)

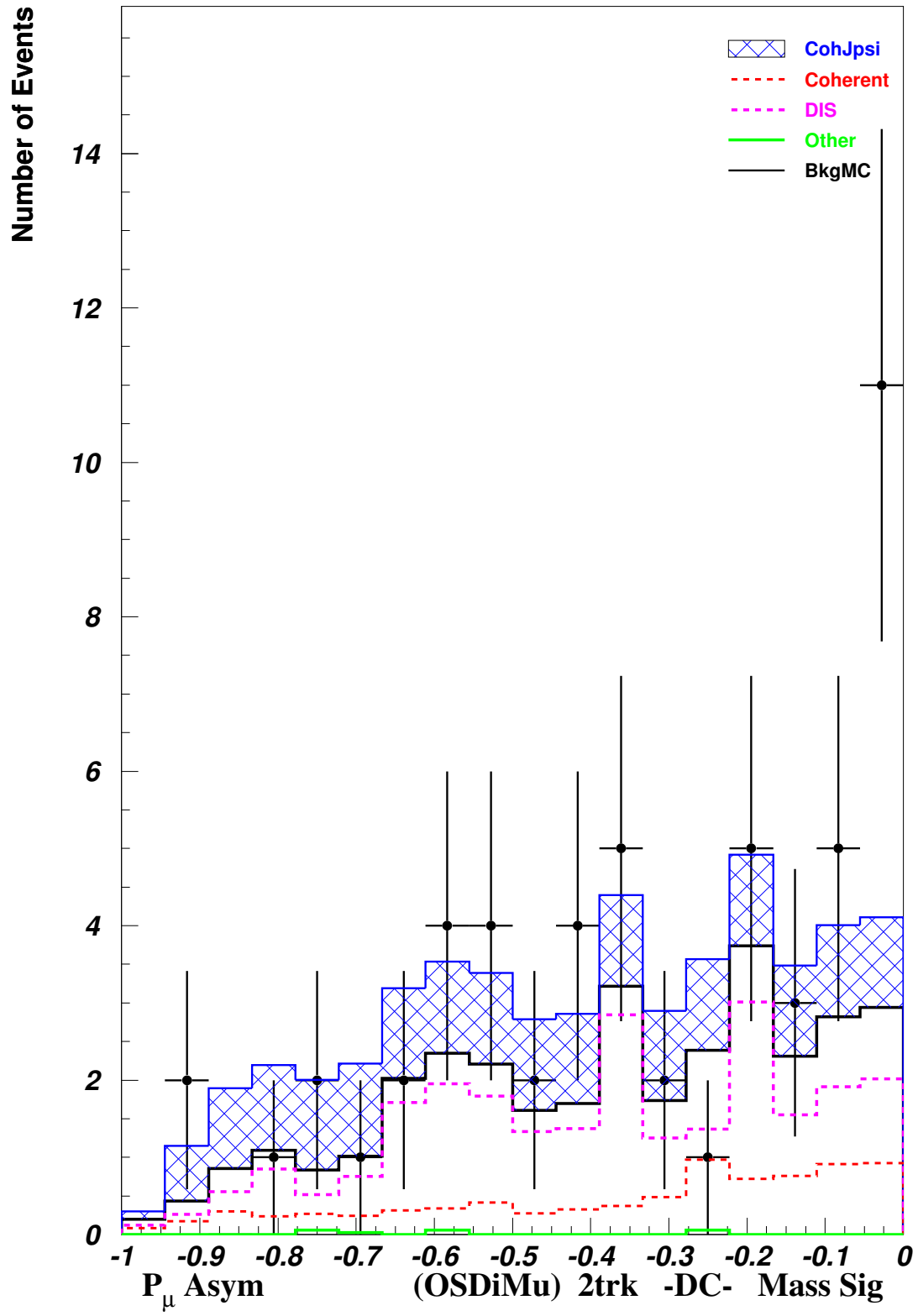


Figure 32: (./figs/pasym-msig.pdf)

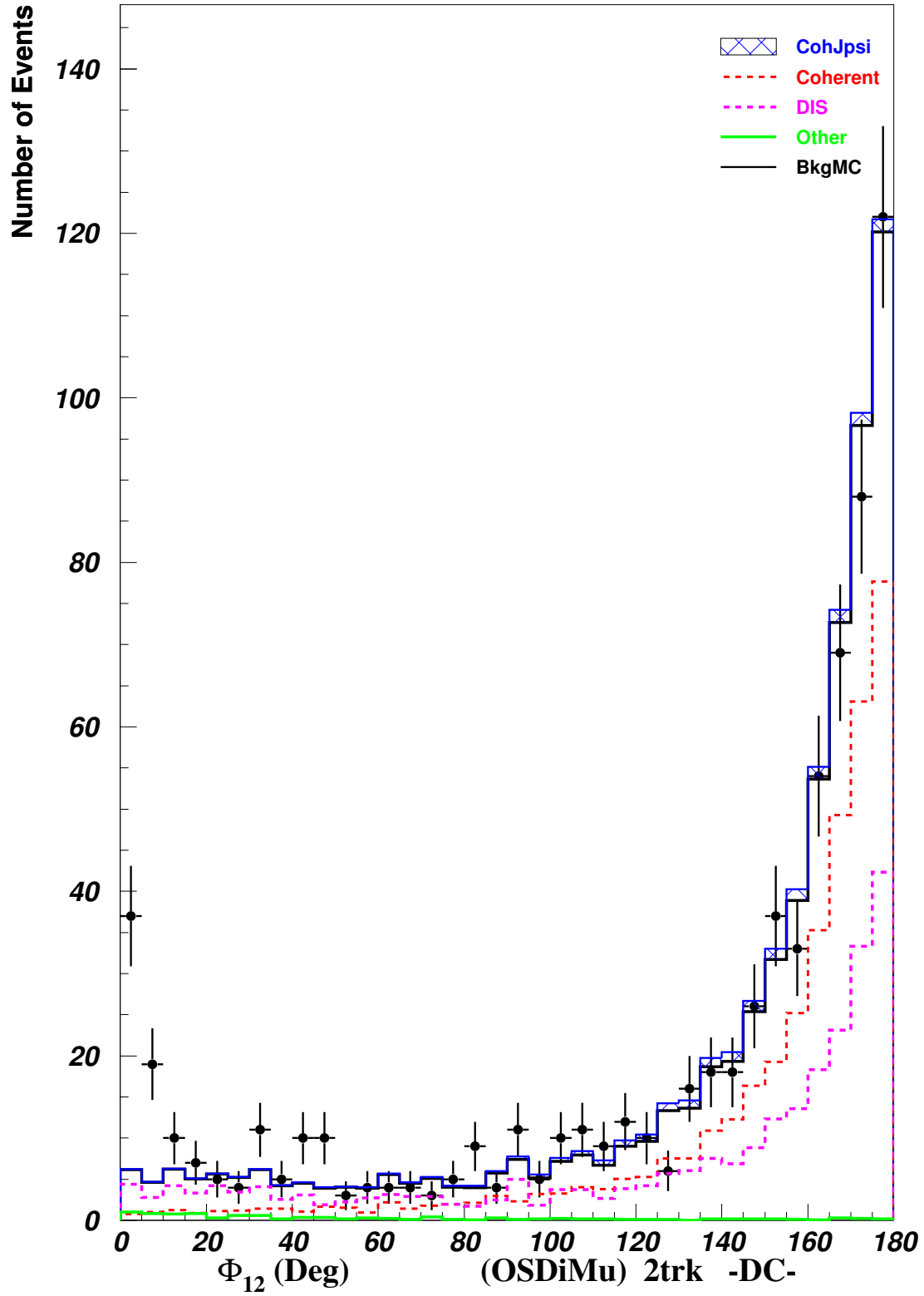


Figure 33: (./figs/phi12.pdf)

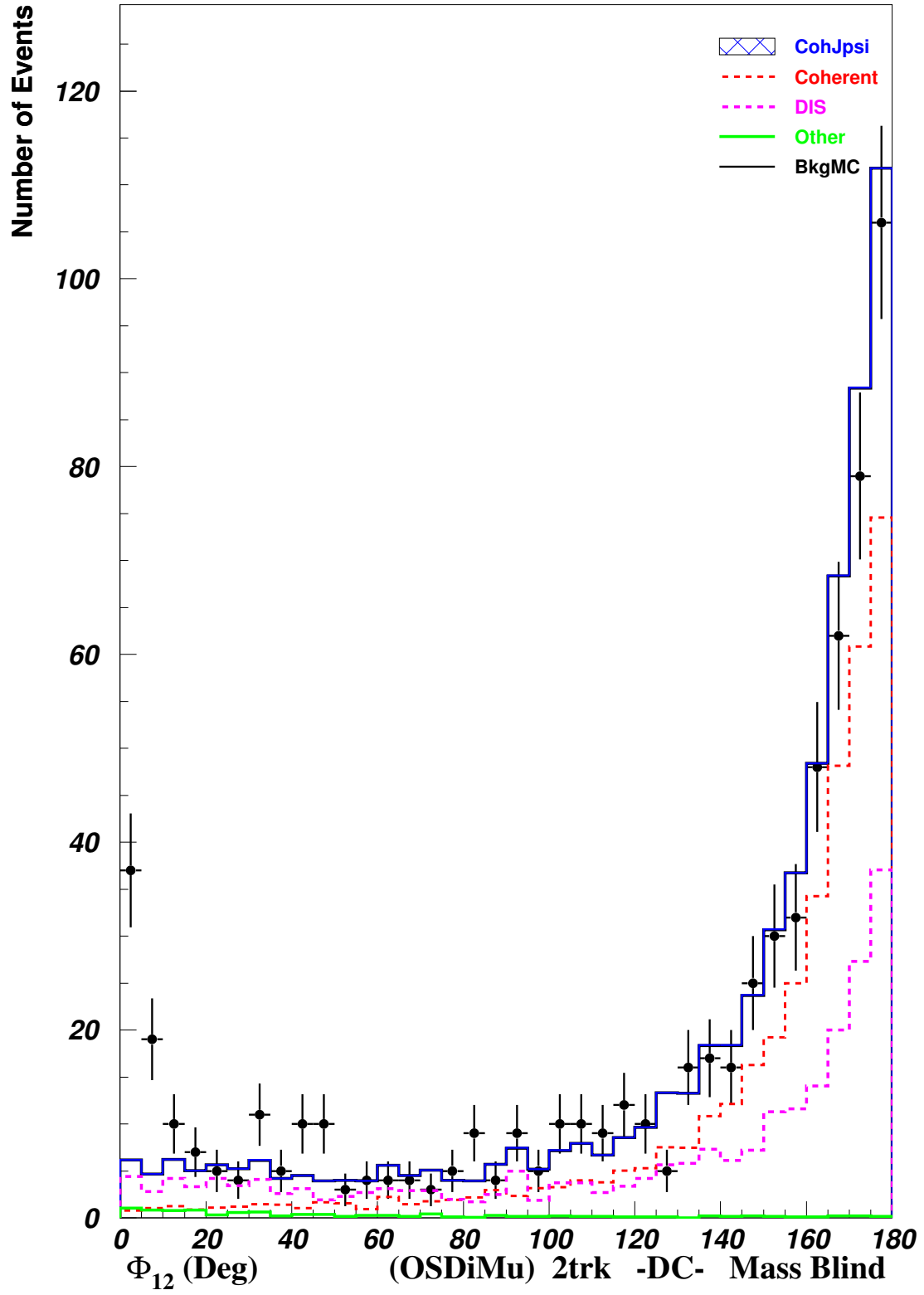


Figure 34: (./figs/phi12-mb.pdf)

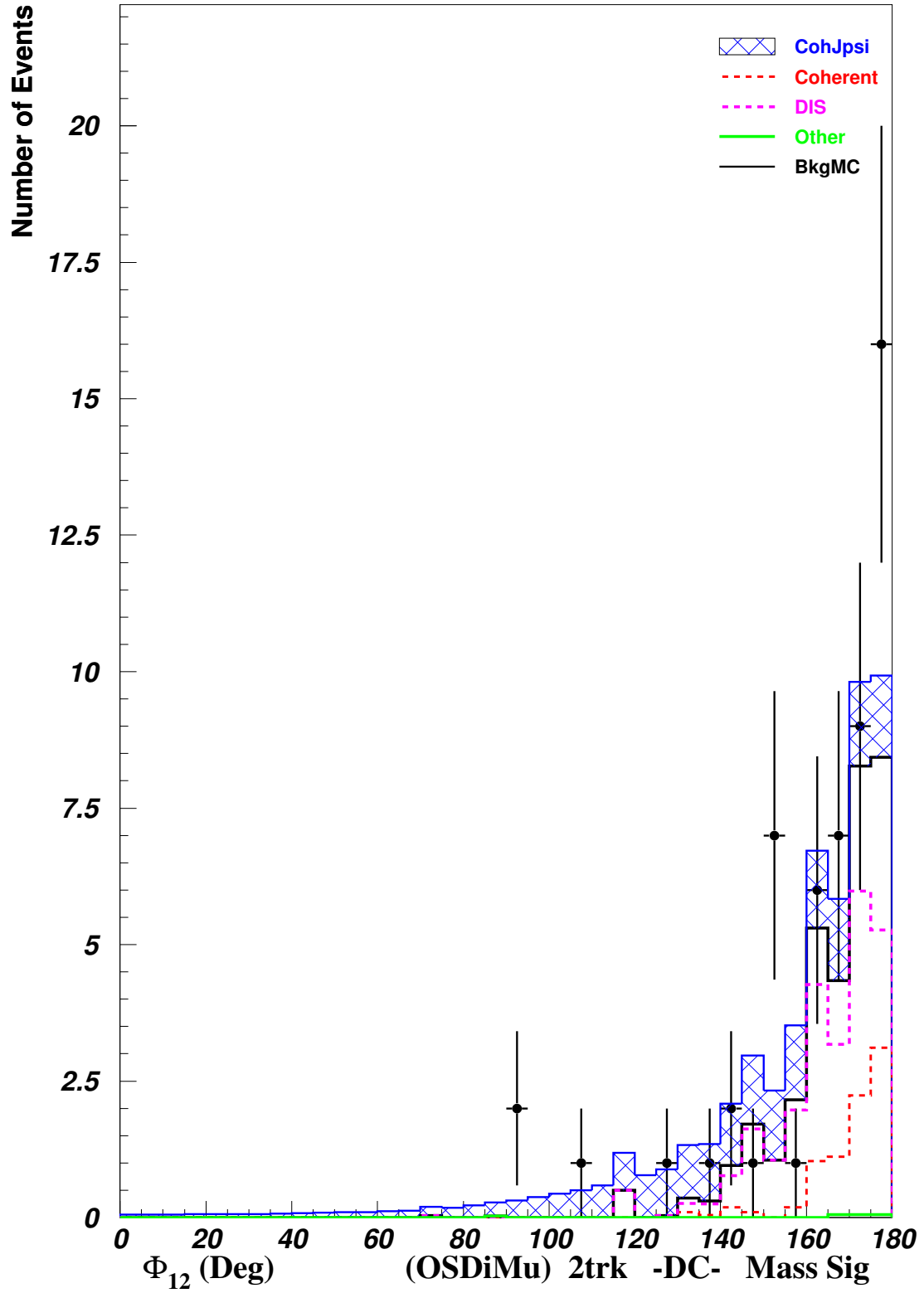


Figure 35: (./figs/phi12-msig.pdf)



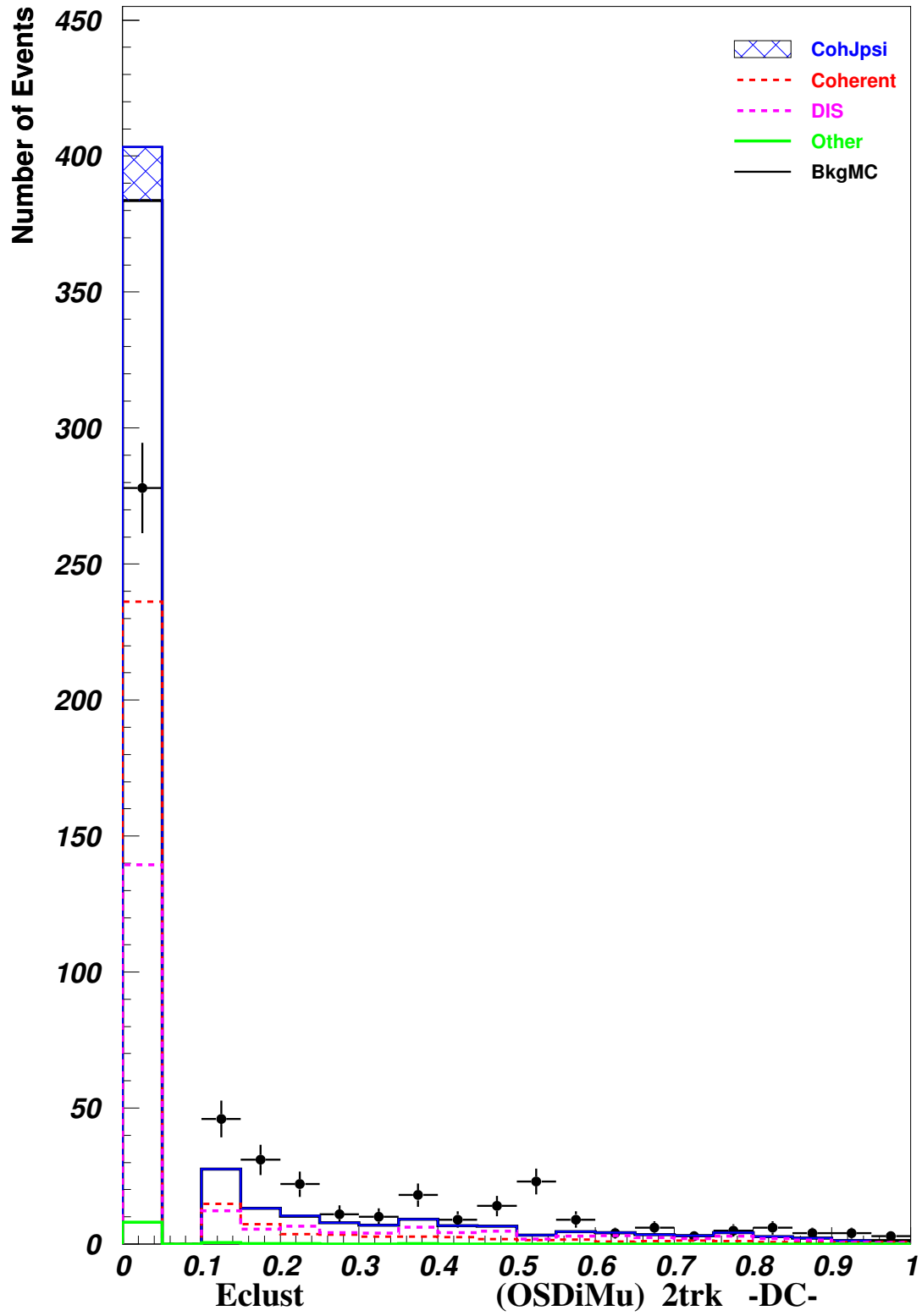


Figure 36: (./figs/eneut.pdf)

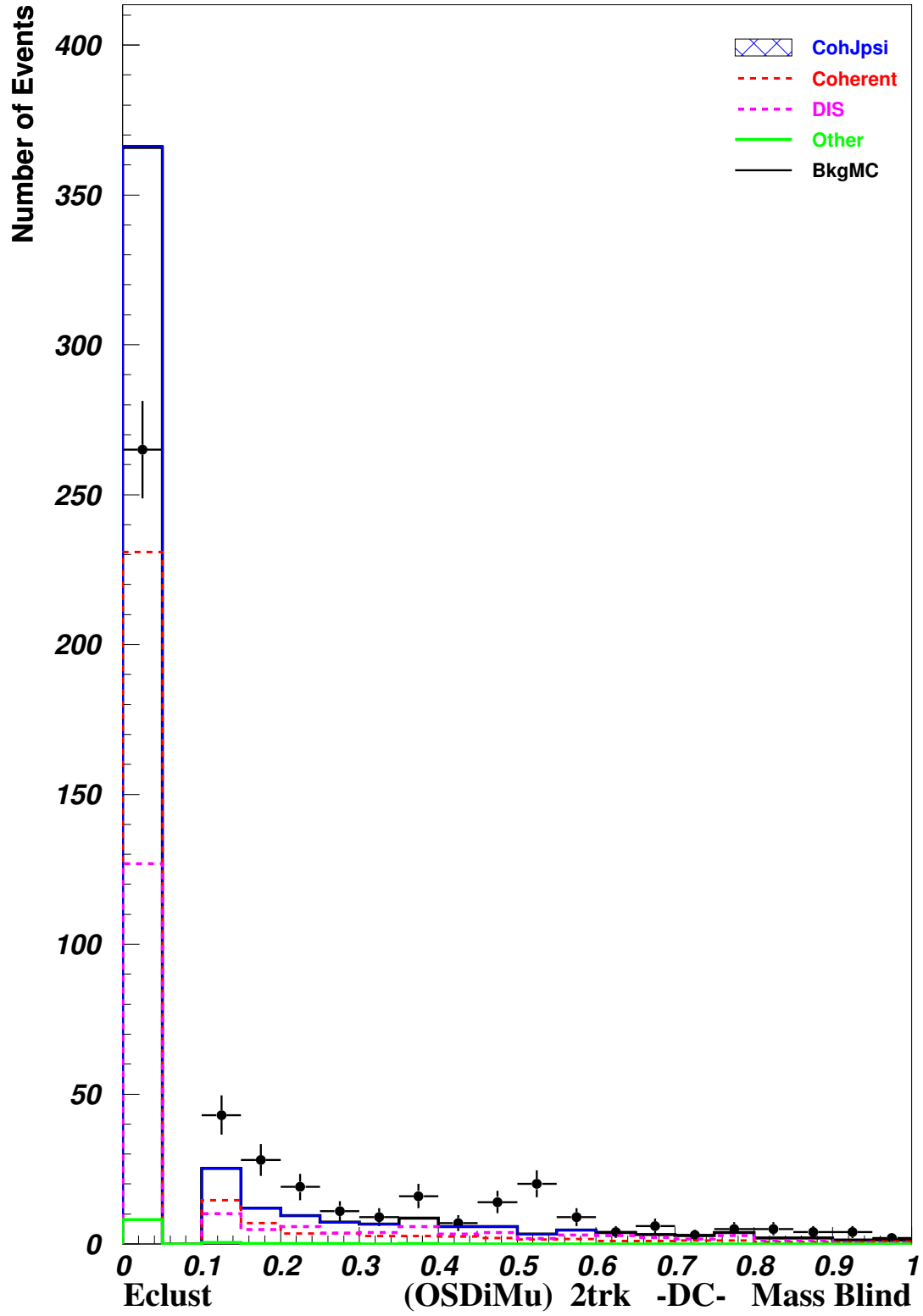


Figure 37: (./figs/eneut-mb.pdf)

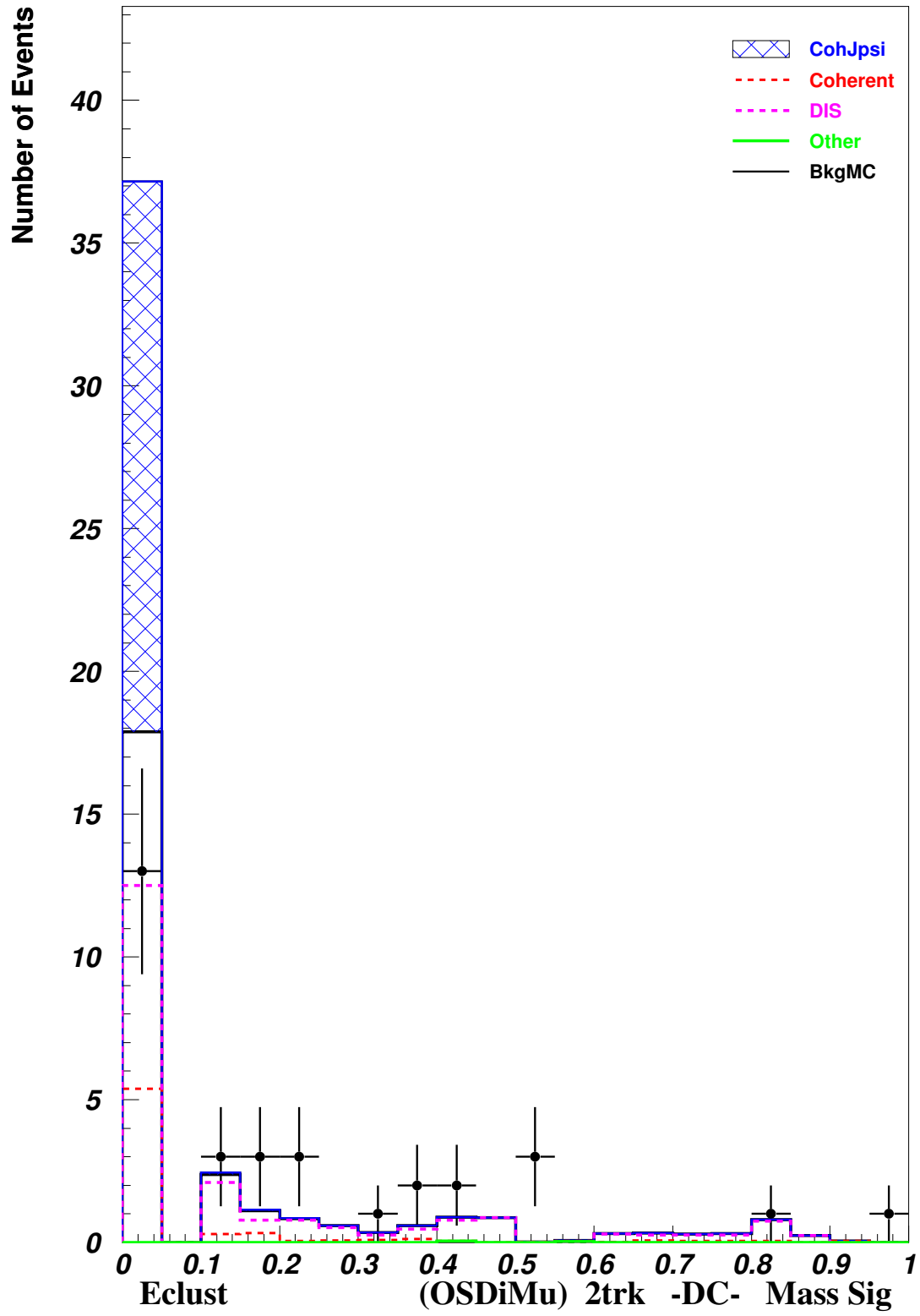


Figure 38: (./figs/eneut-msig.pdf)

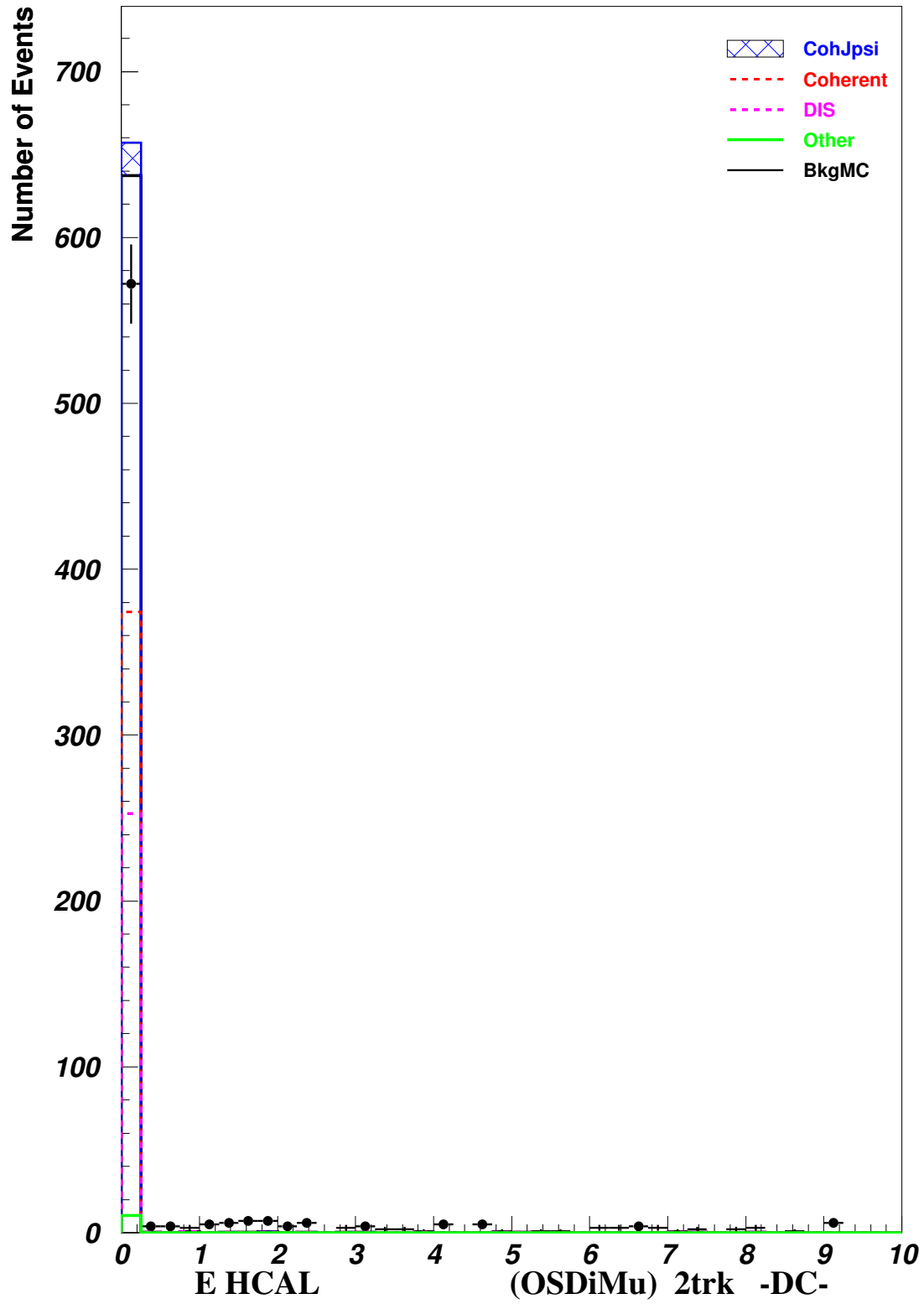


Figure 39: (./figs/ehcal.pdf)

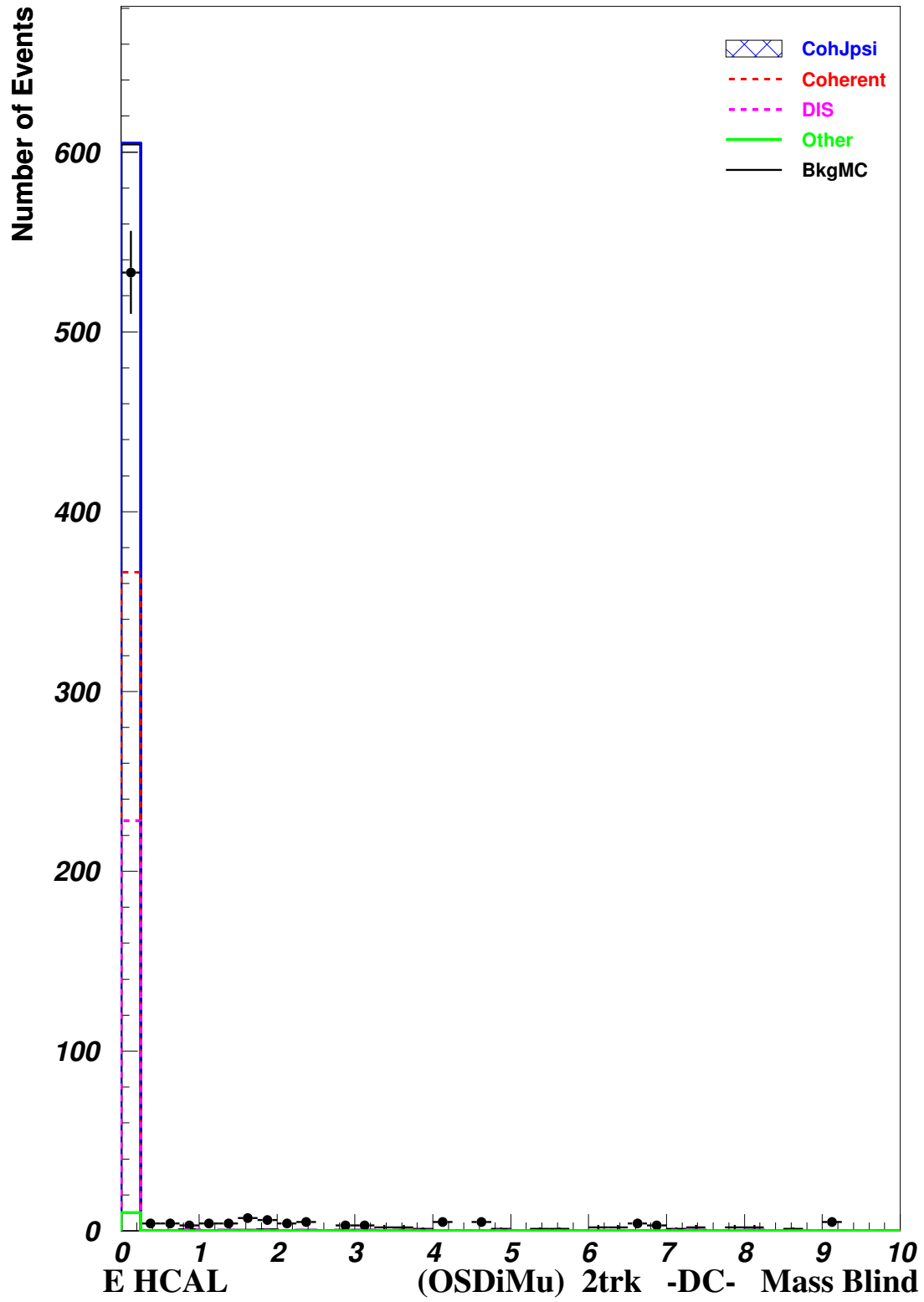


Figure 40: (./figs/ehcal-mb.pdf)

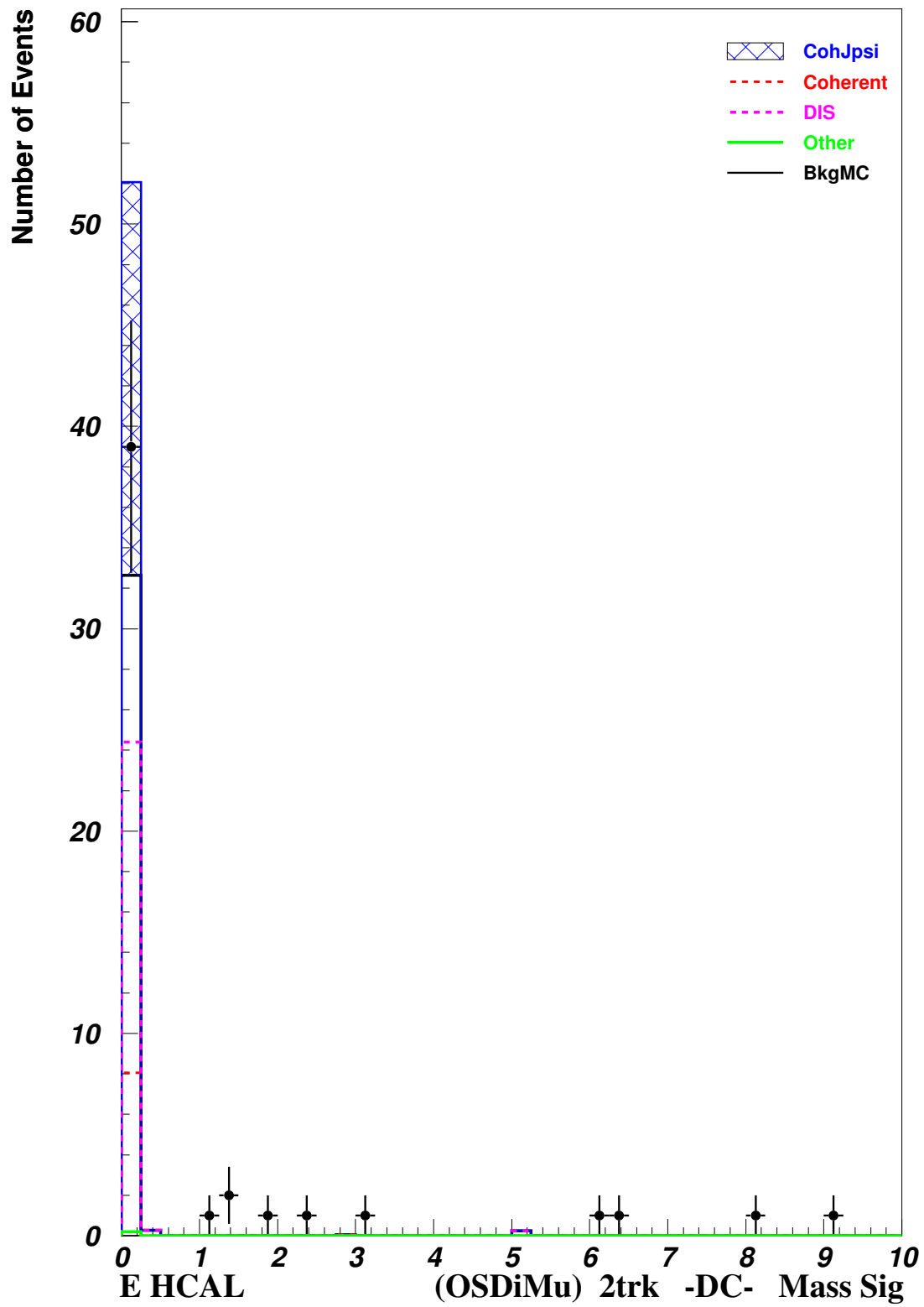


Figure 41: (./figs/ehcal-msig.pdf)

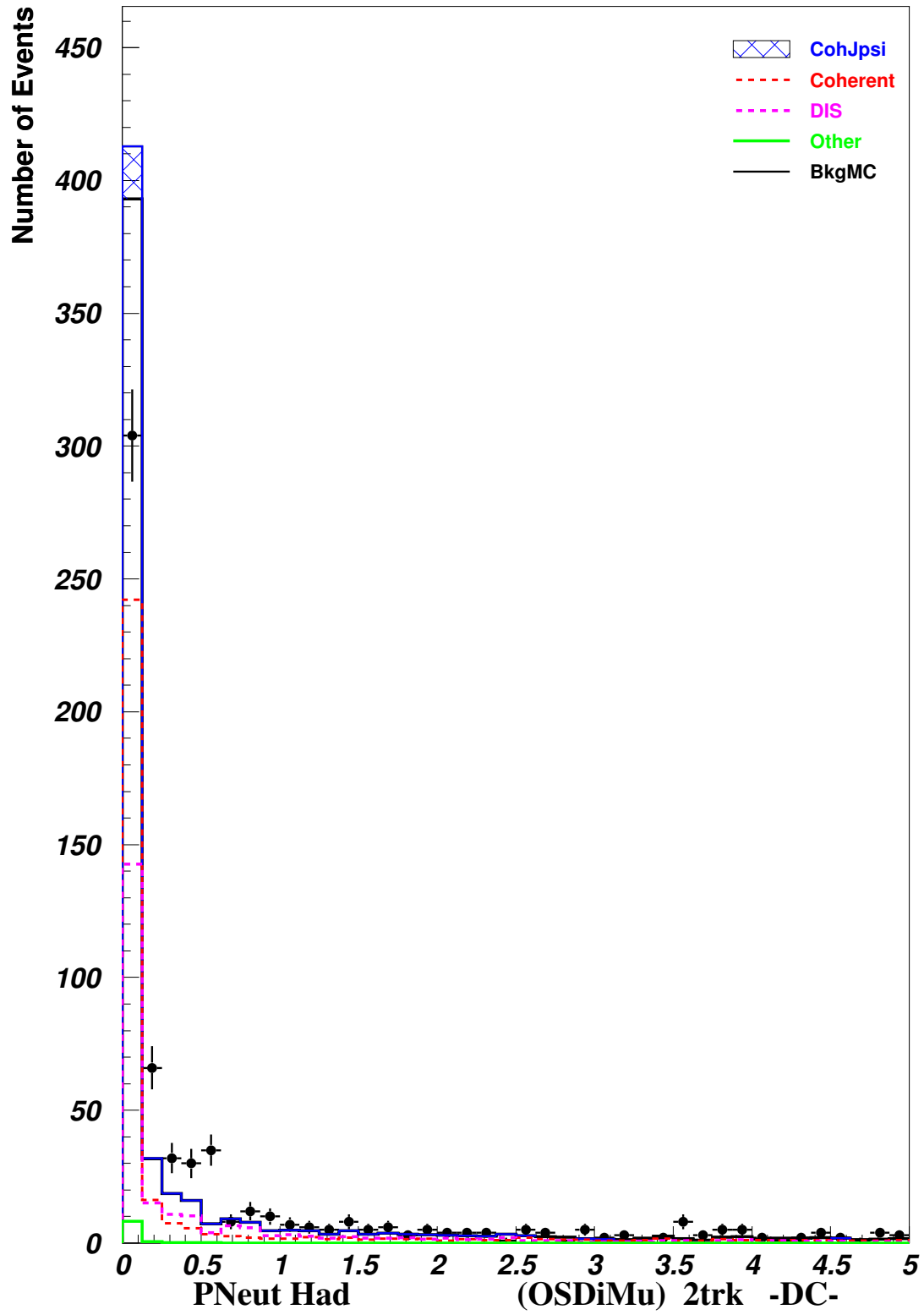


Figure 42: (./figs/pneuth.pdf)

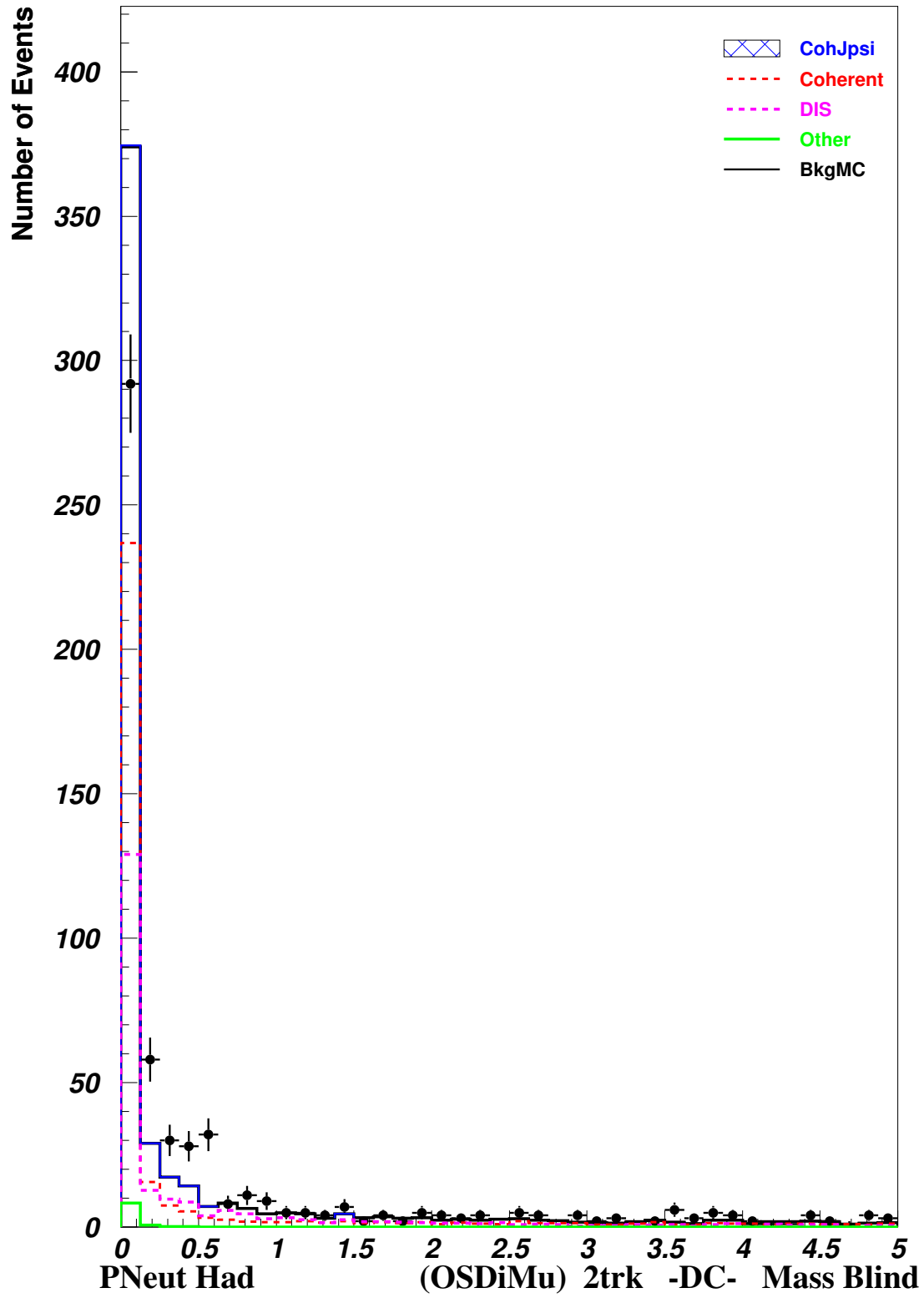


Figure 43: (./figs/pneuth-mb.pdf)



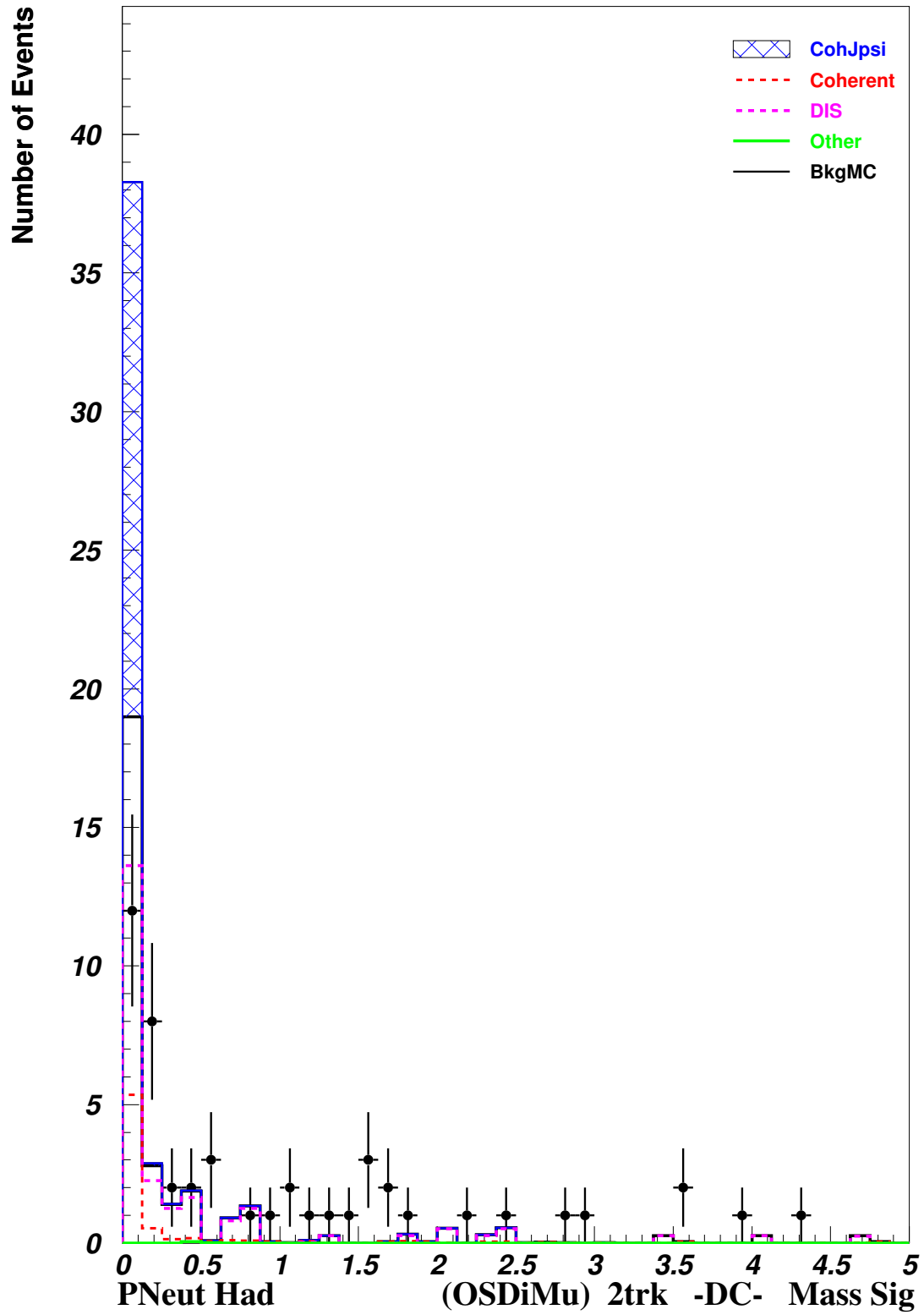


Figure 44: (./figs/pneuth-msig.pdf)

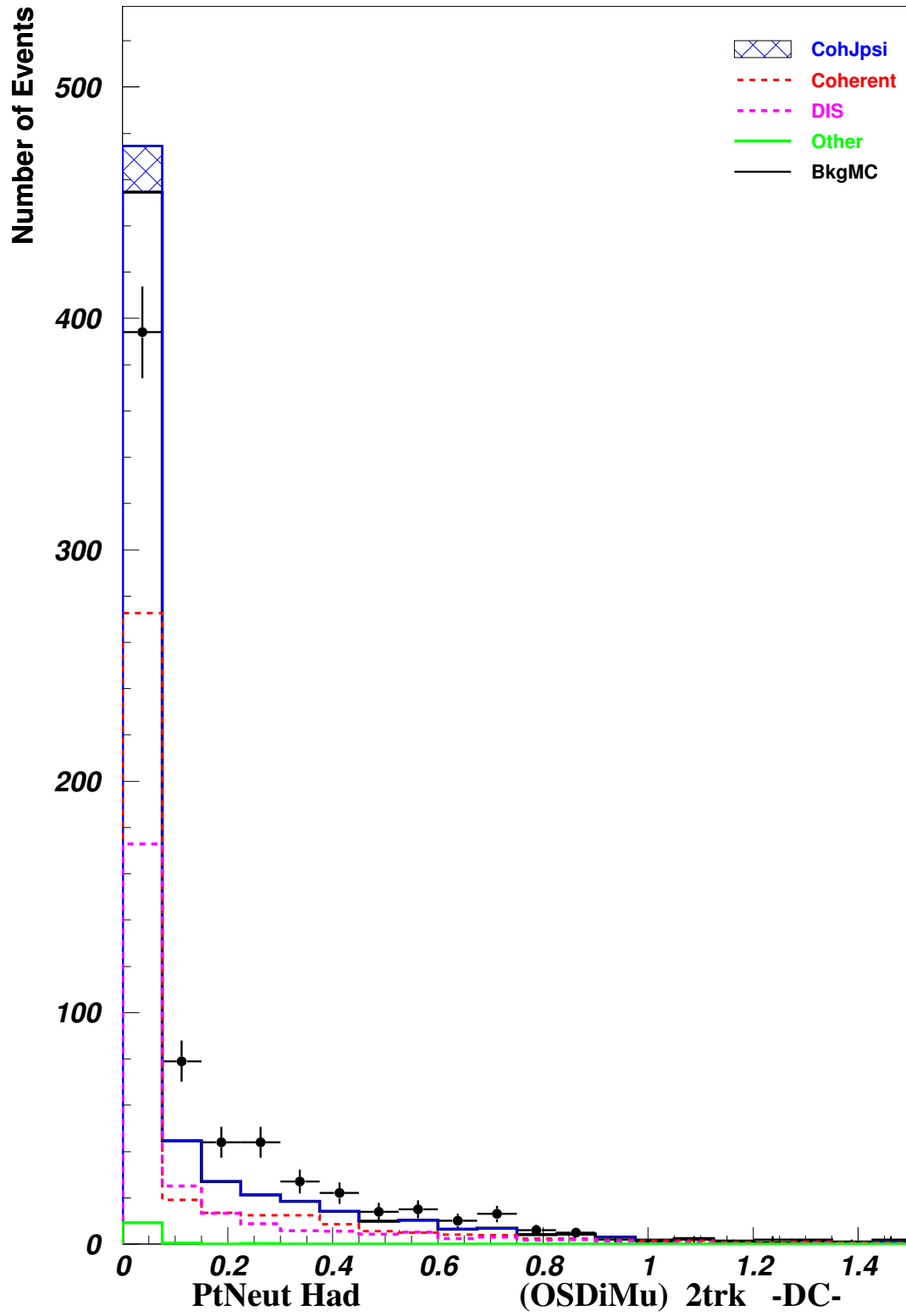


Figure 45: (./figs/ptneuth.pdf)

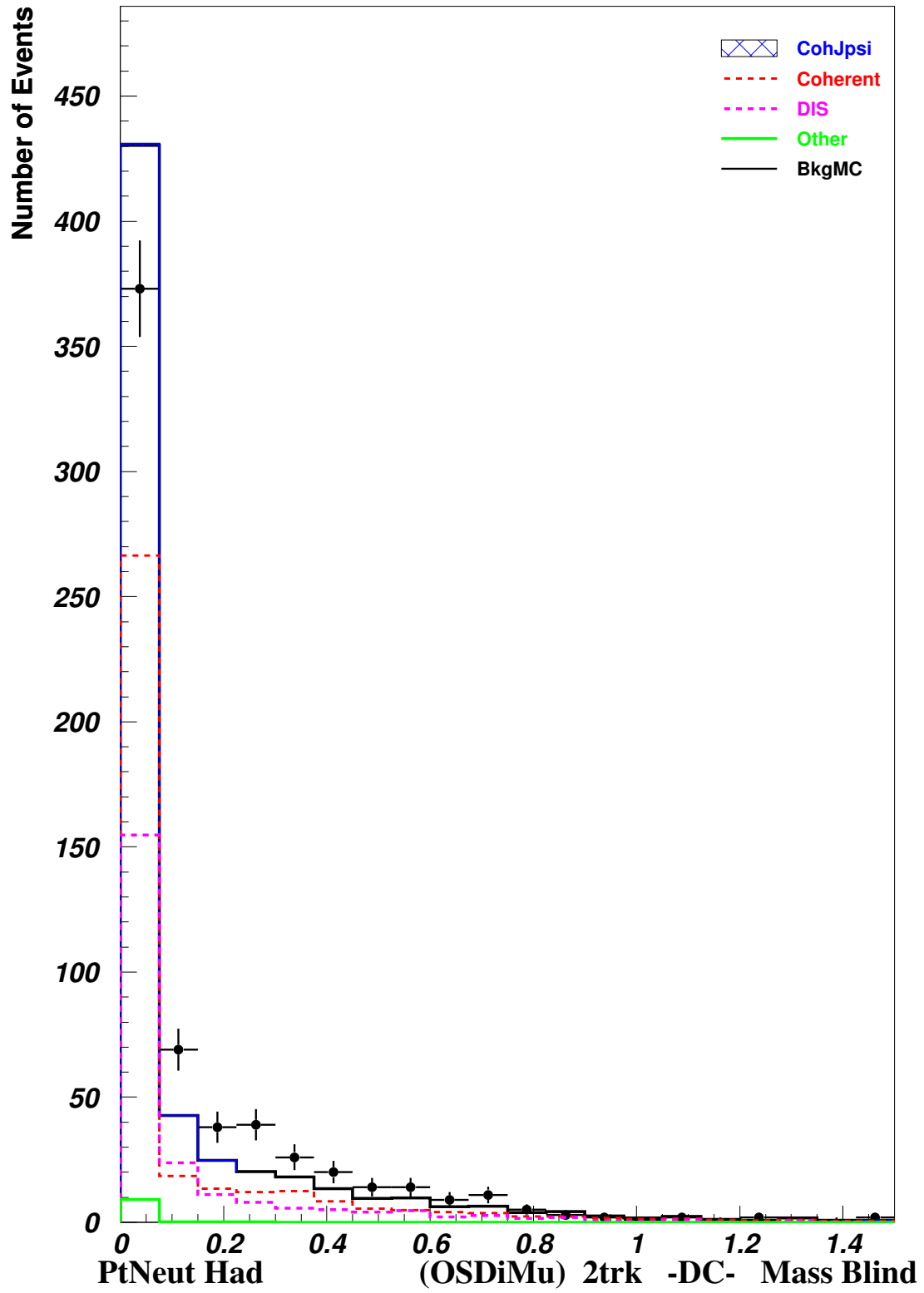


Figure 46: (./figs/ptneuth-mb.pdf)

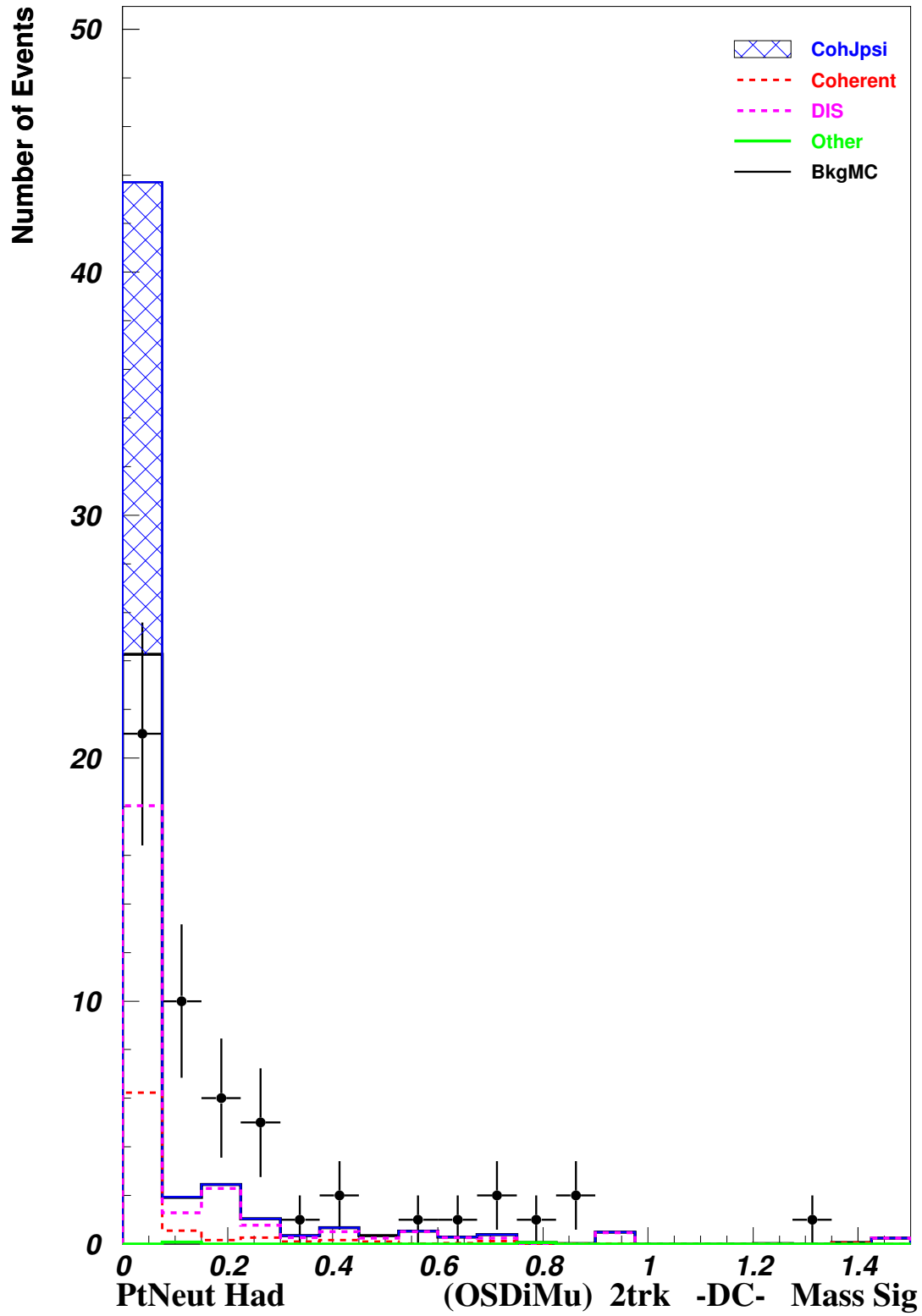


Figure 47: (./figs/ptneuth-msig.pdf)

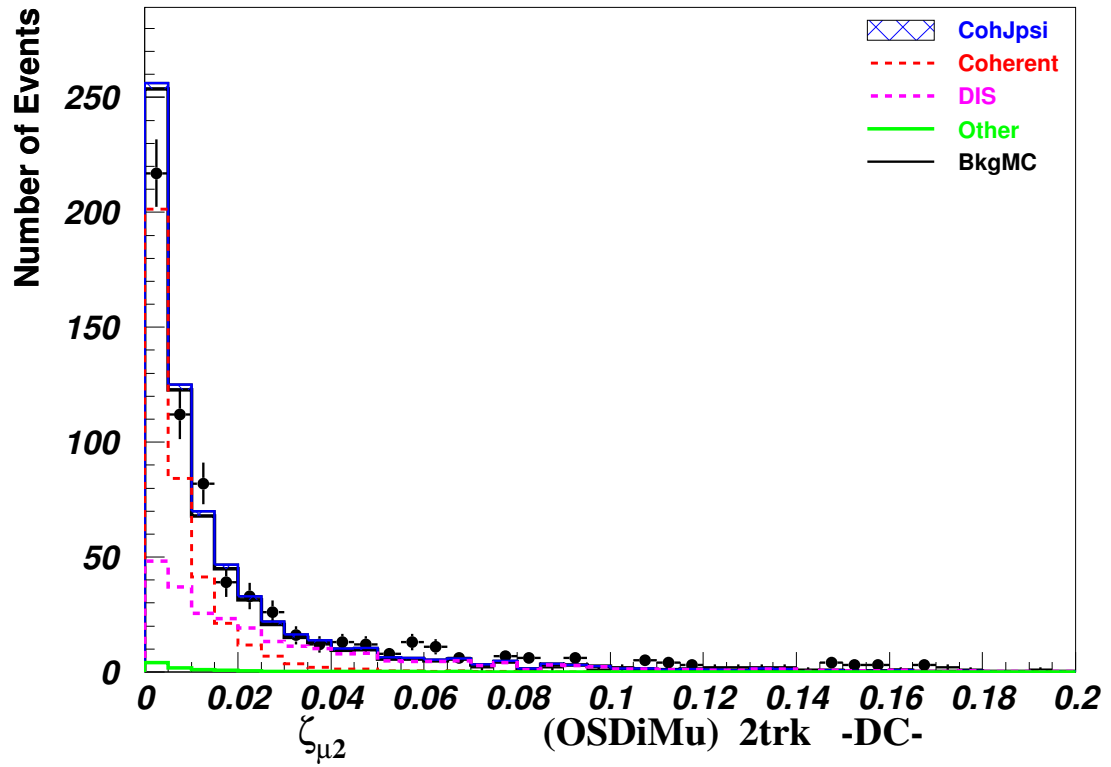
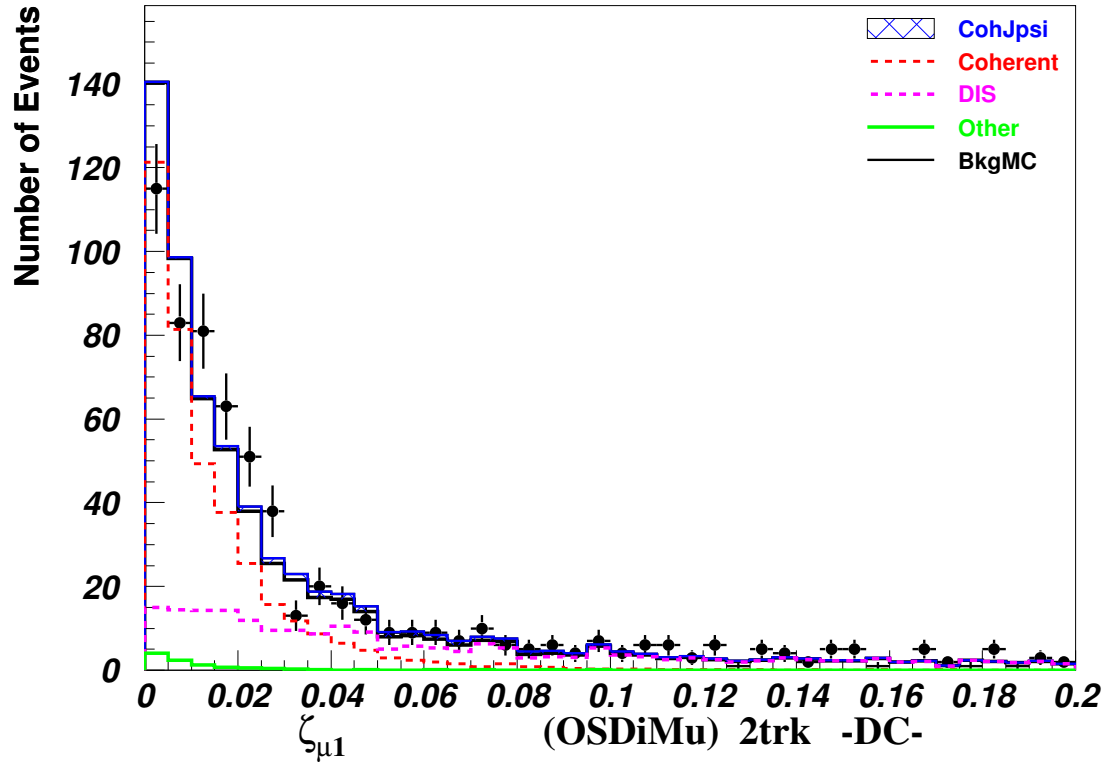


Figure 48: (./figs/zeta1+2.pdf)

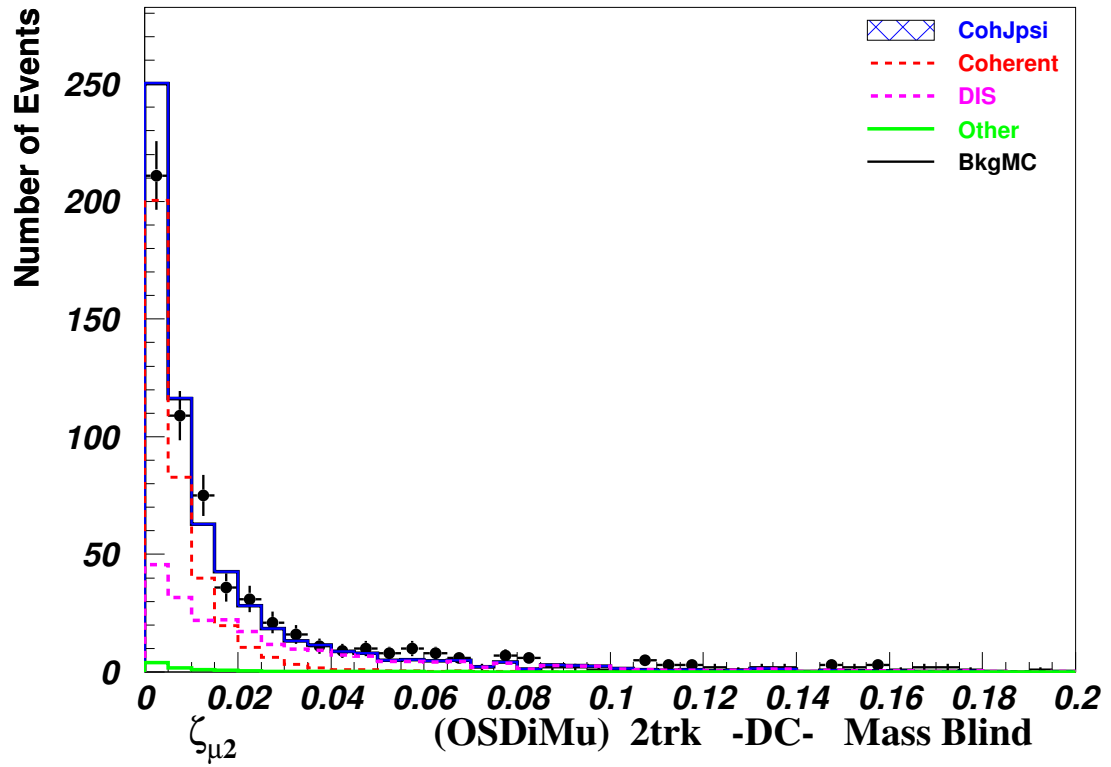
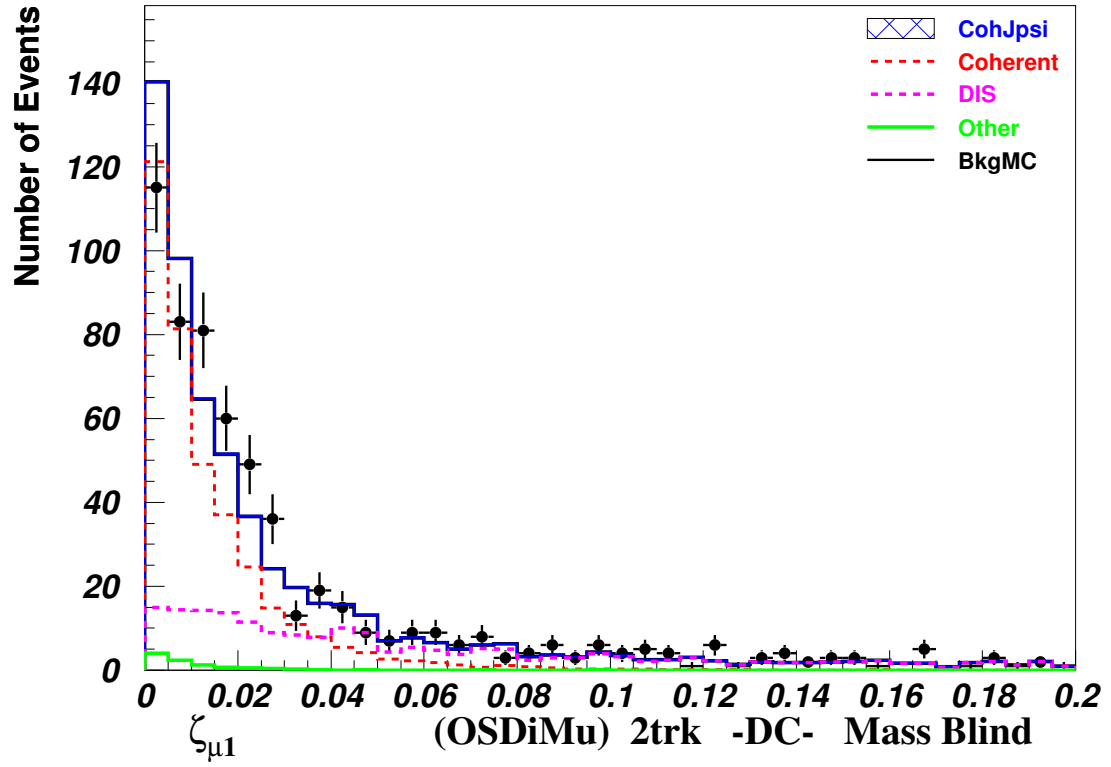


Figure 49: (./figs/zeta1+2-mb.pdf)

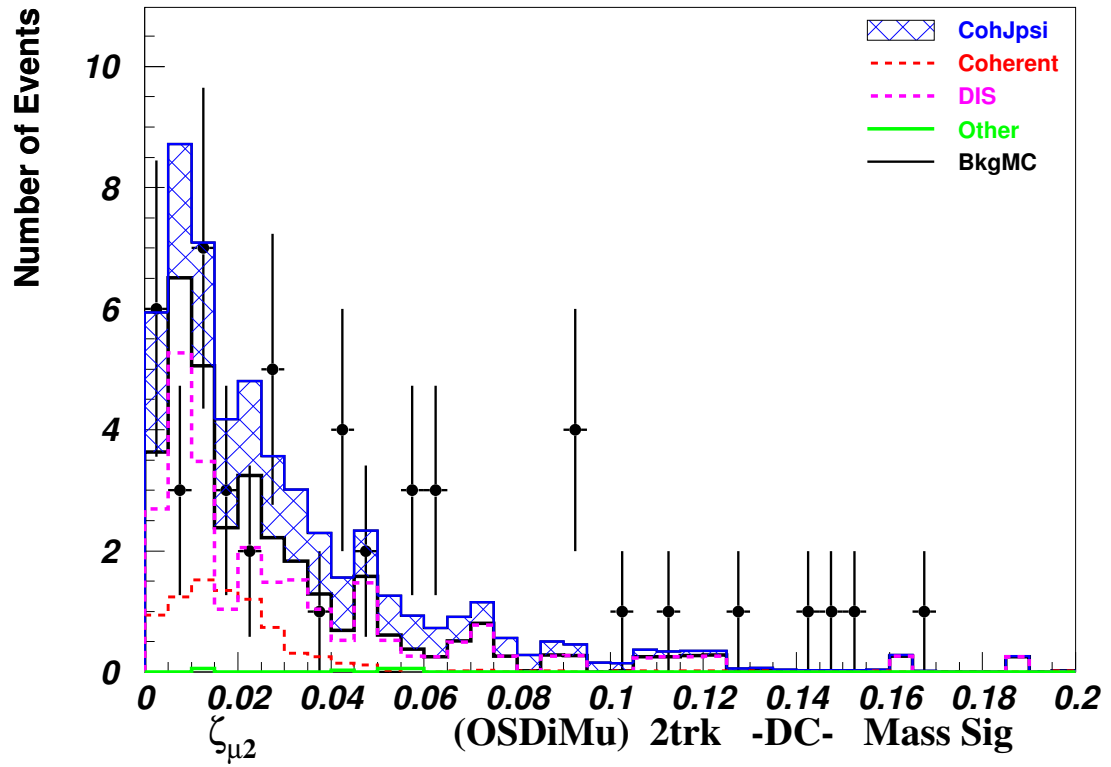
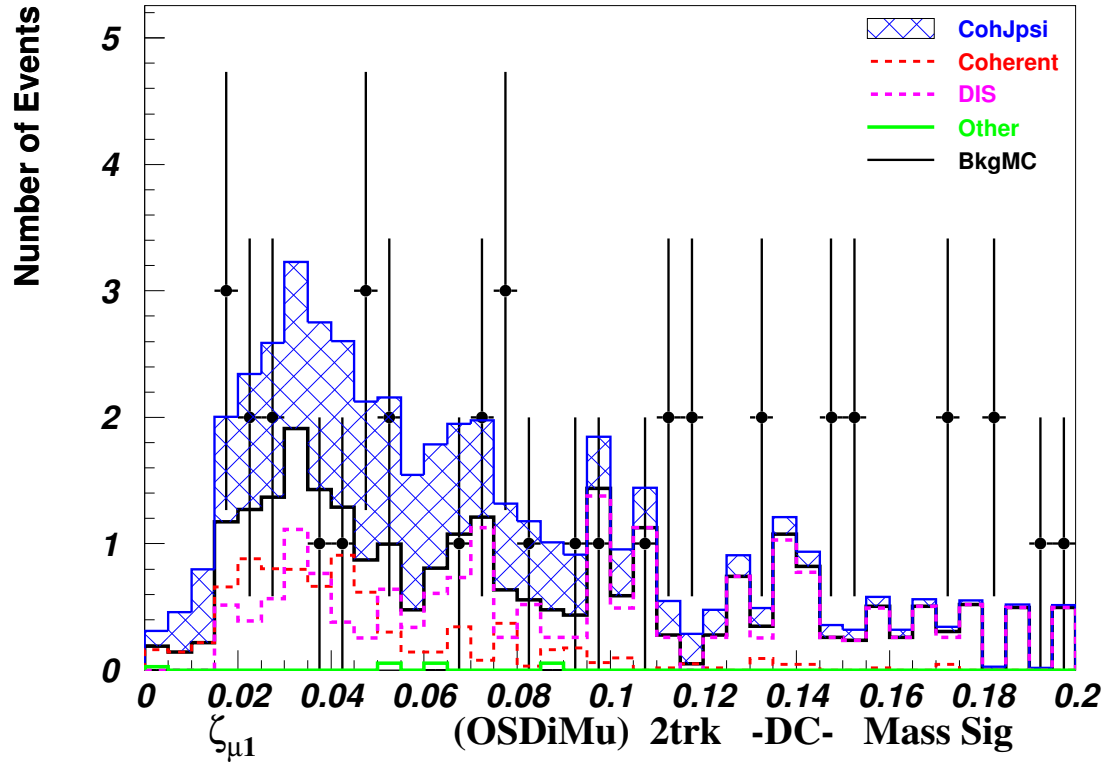


Figure 50: (./figs/zeta1+2-msig.pdf)

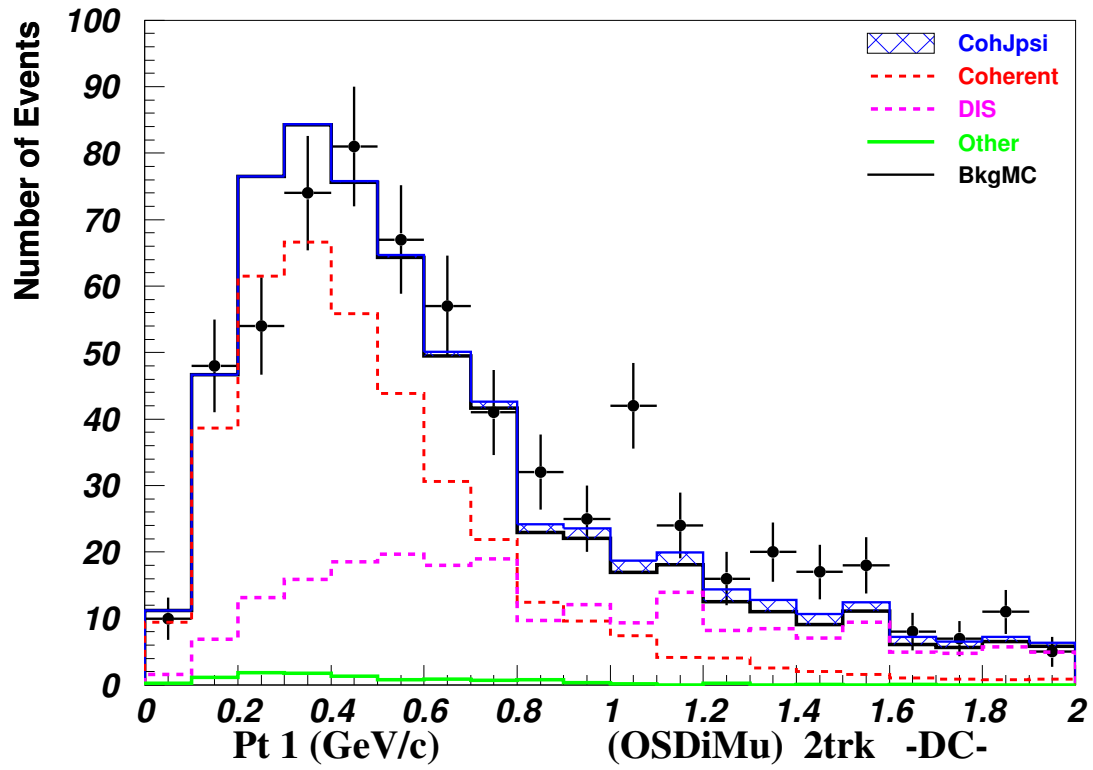
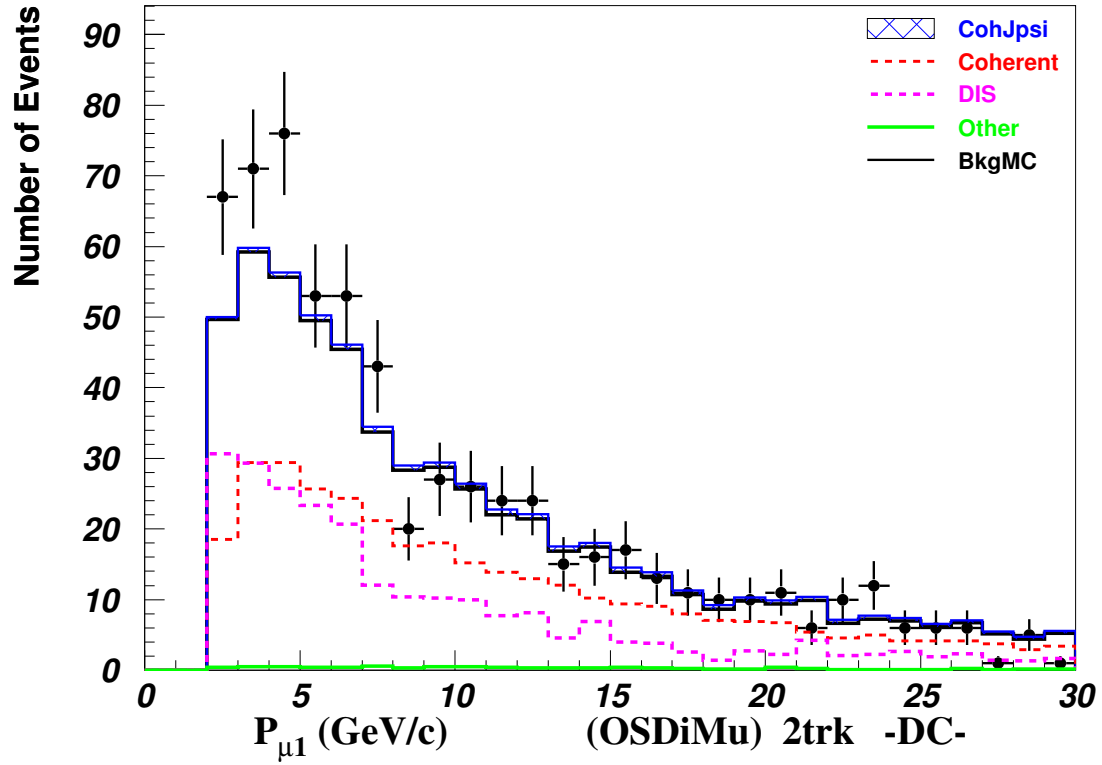


Figure 51: (./figs/p-pt-muneg.pdf)



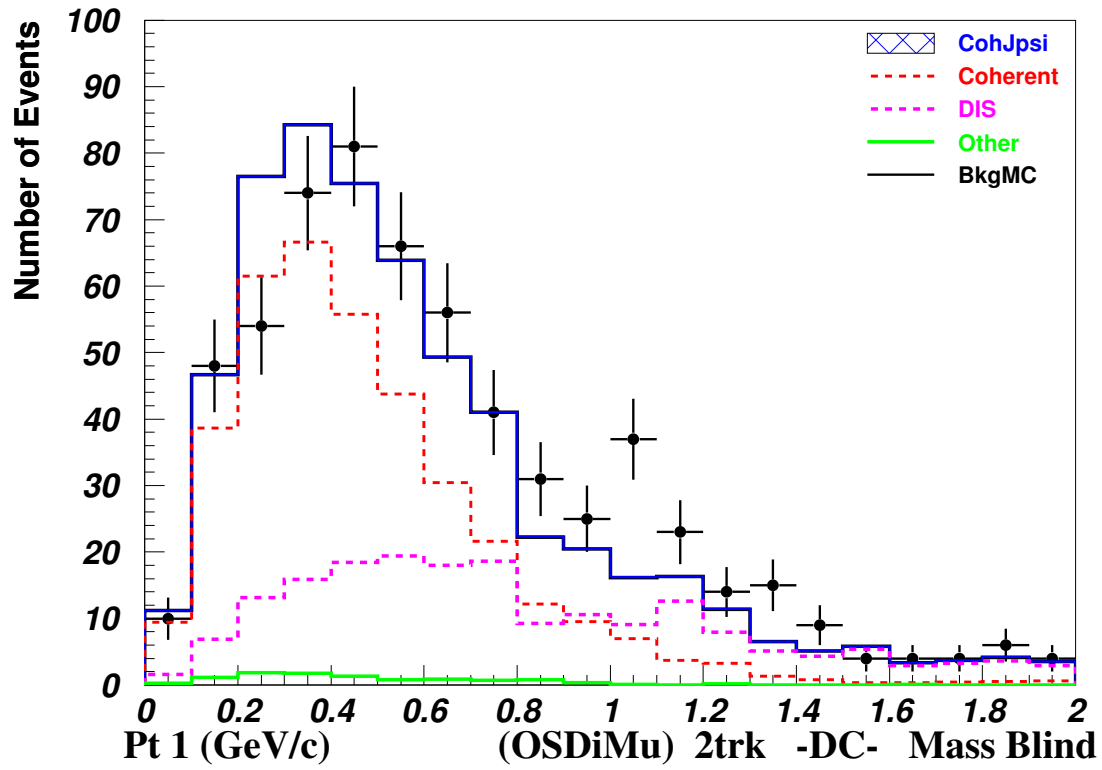
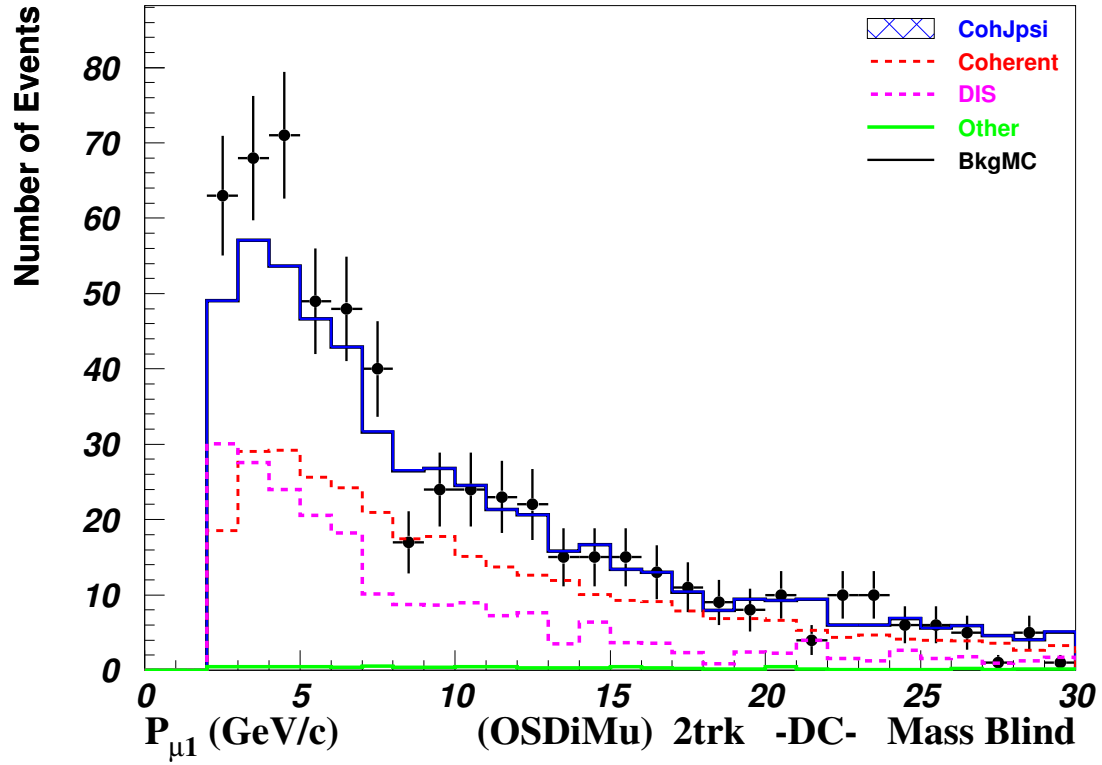


Figure 52: (./figs/p-pt-muneg-mb.pdf)

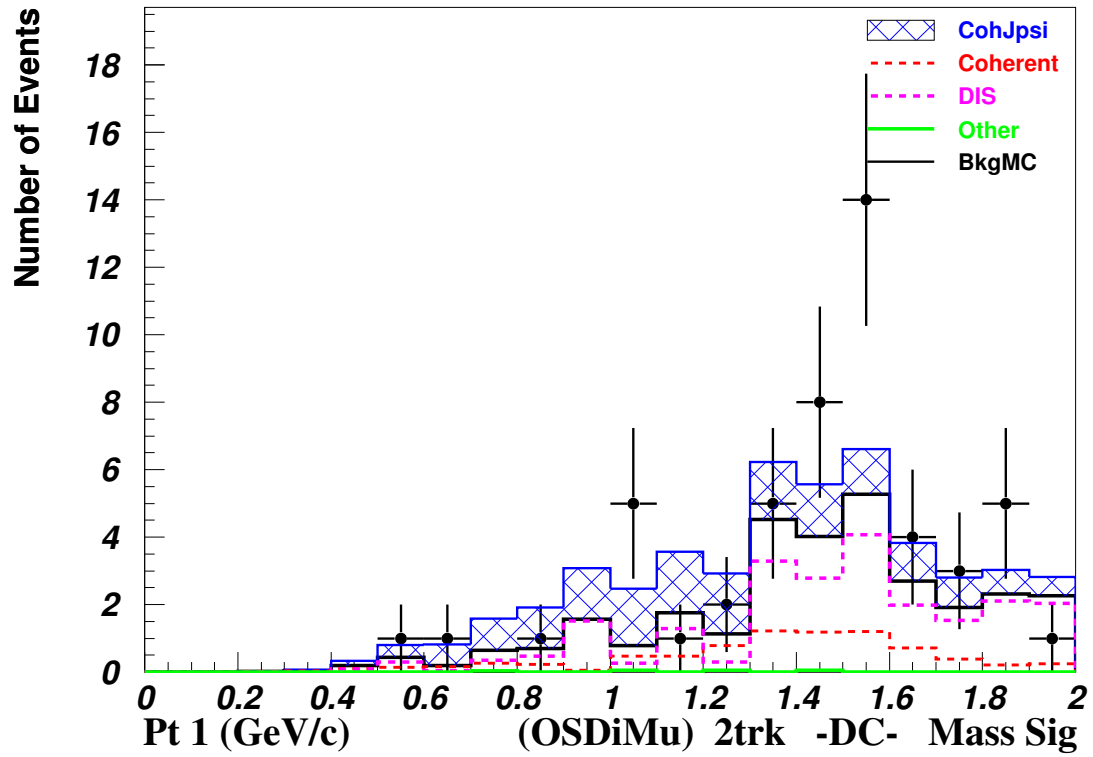
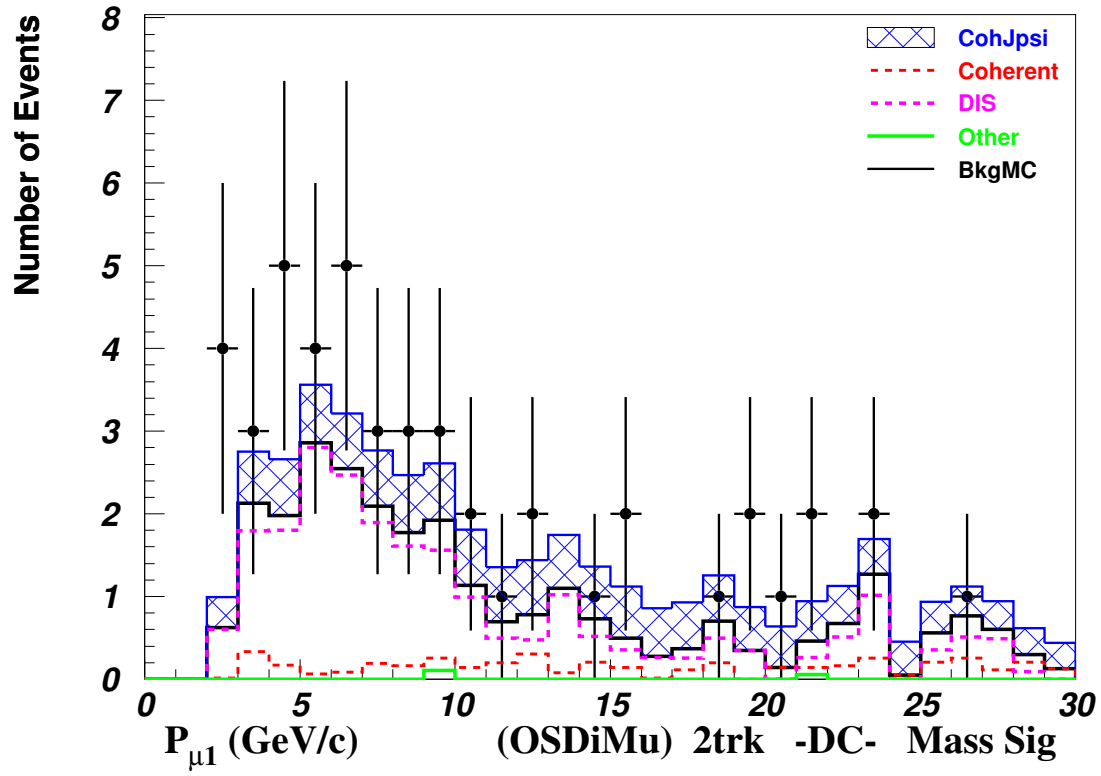


Figure 53: (./figs/p-pt-muneg-msig.pdf)

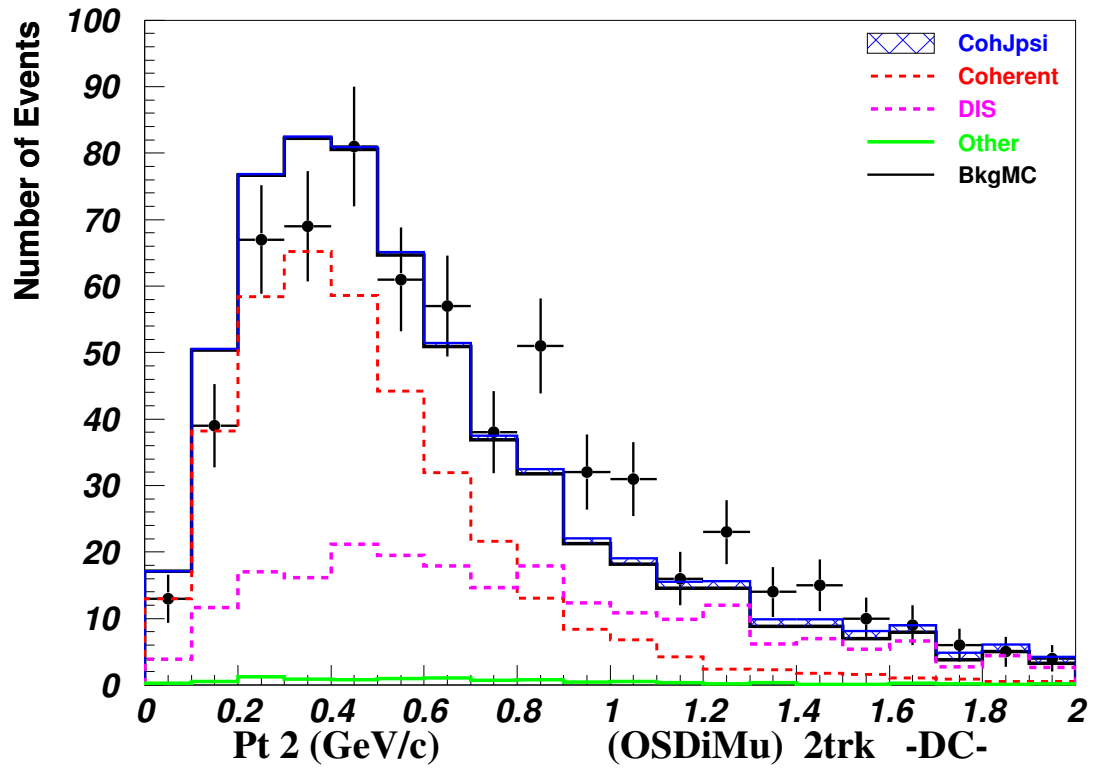
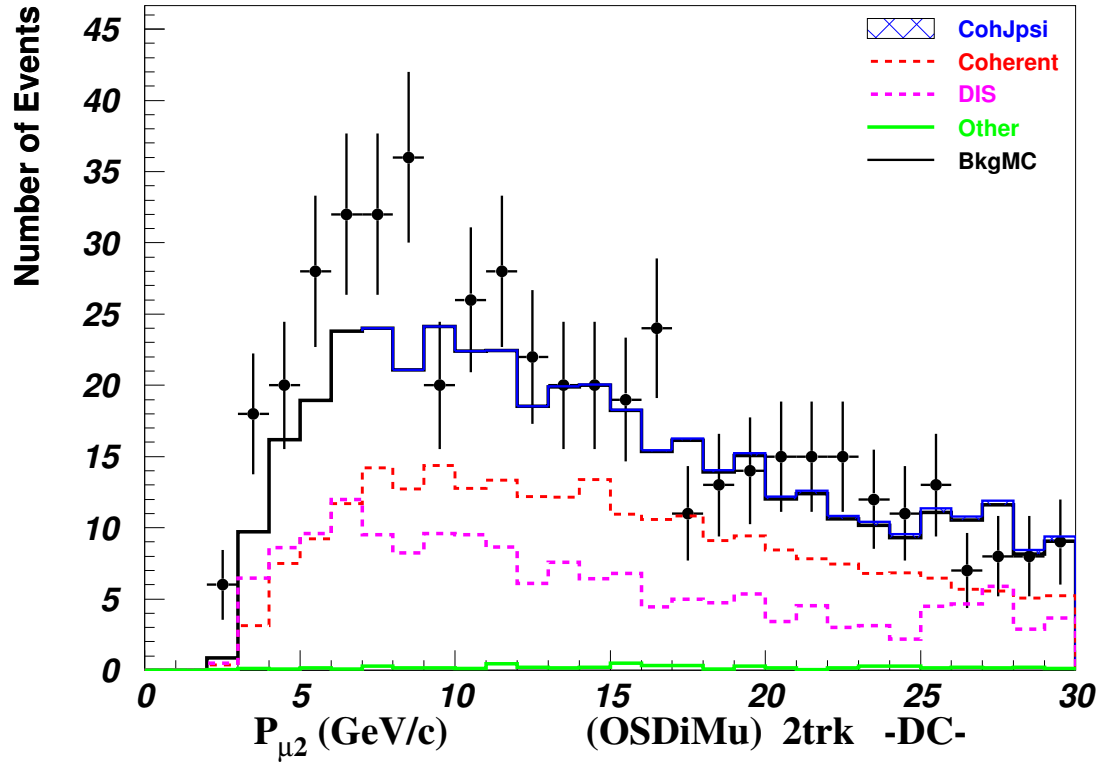


Figure 54: (./figs/p-pt-mupos.pdf)

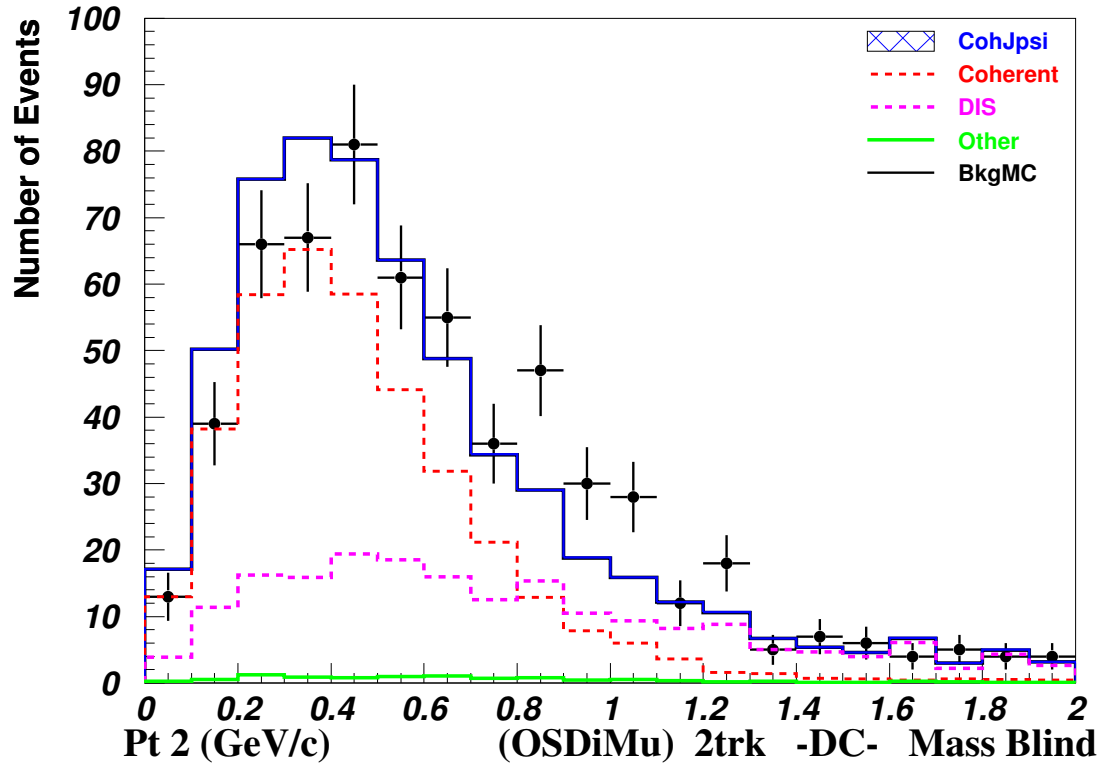
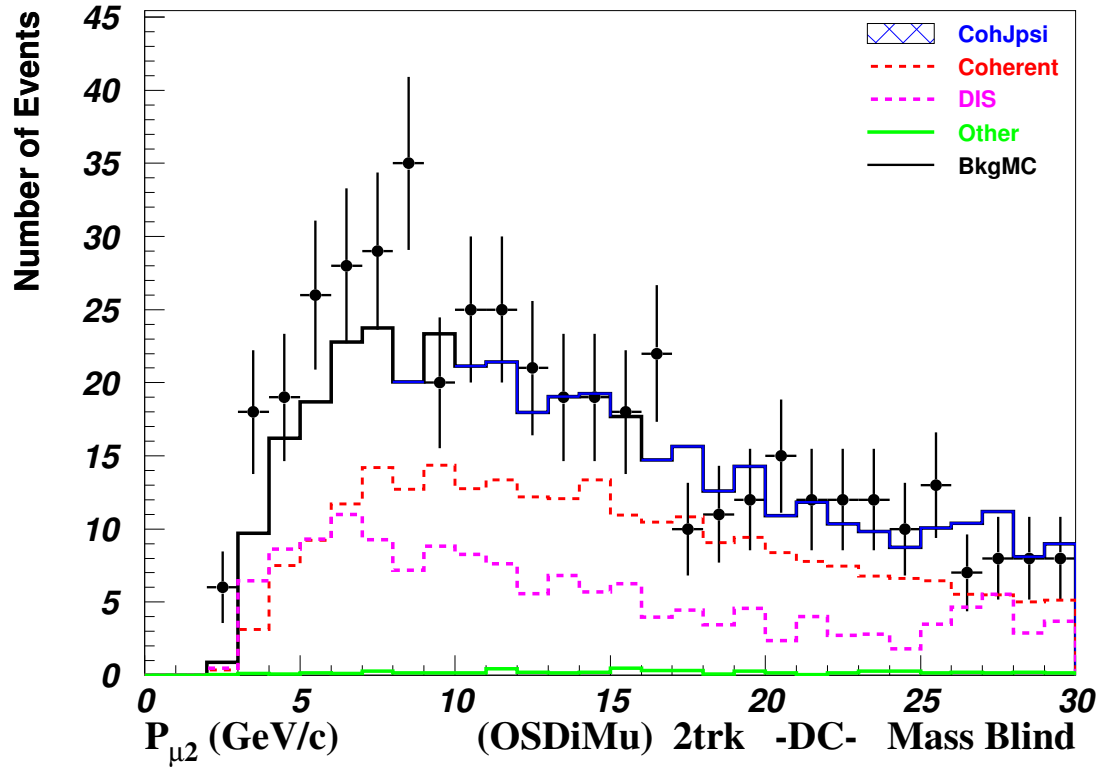


Figure 55: (./figs/p-pt-mupos-mb.pdf)

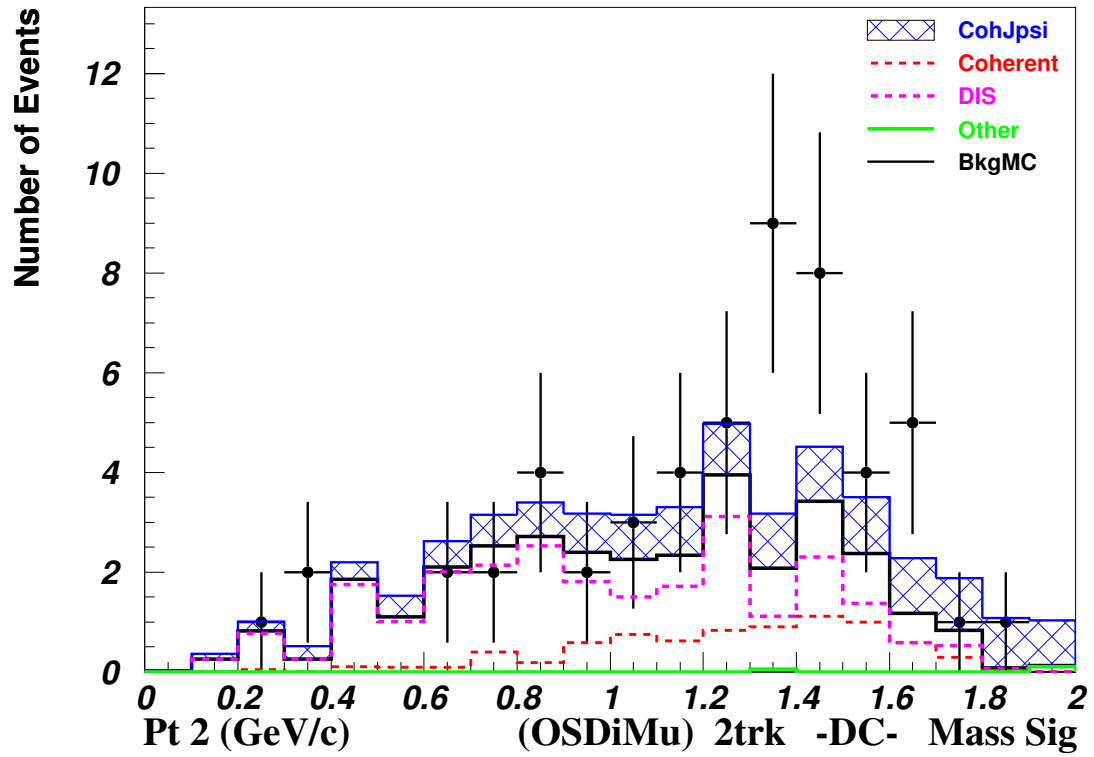
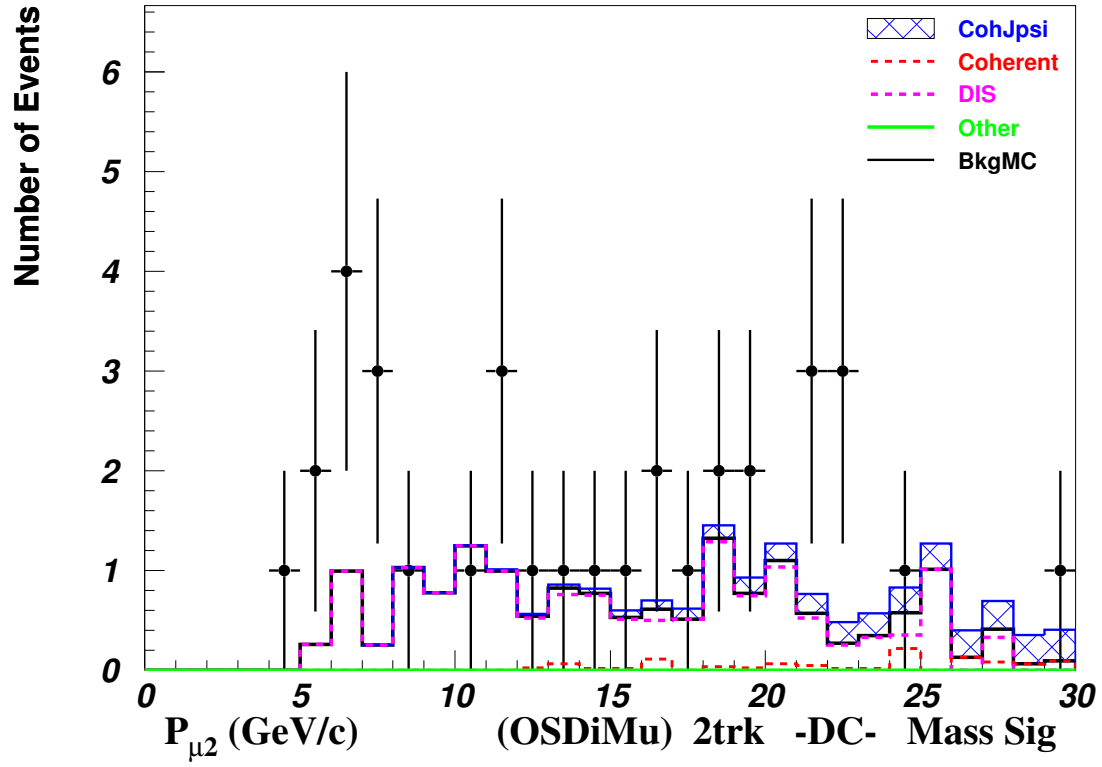


Figure 56: (./figs/p-pt-mupos-msig.pdf)

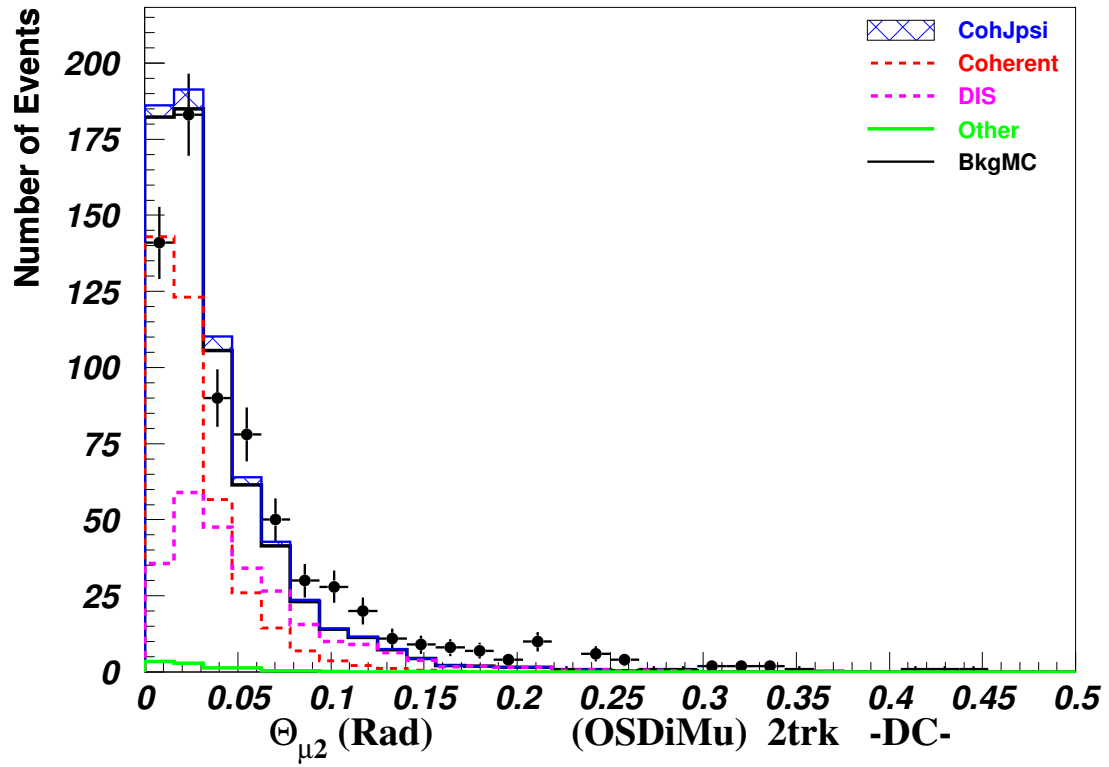
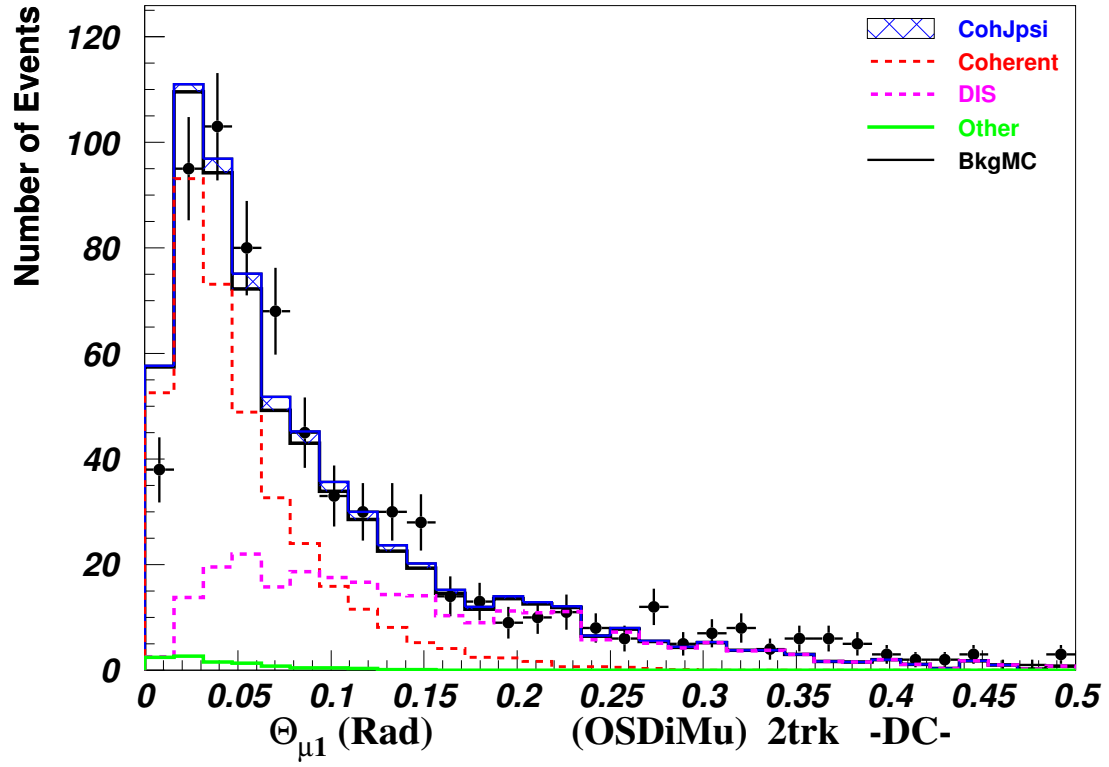


Figure 57: (./figs/theta1+2.pdf)

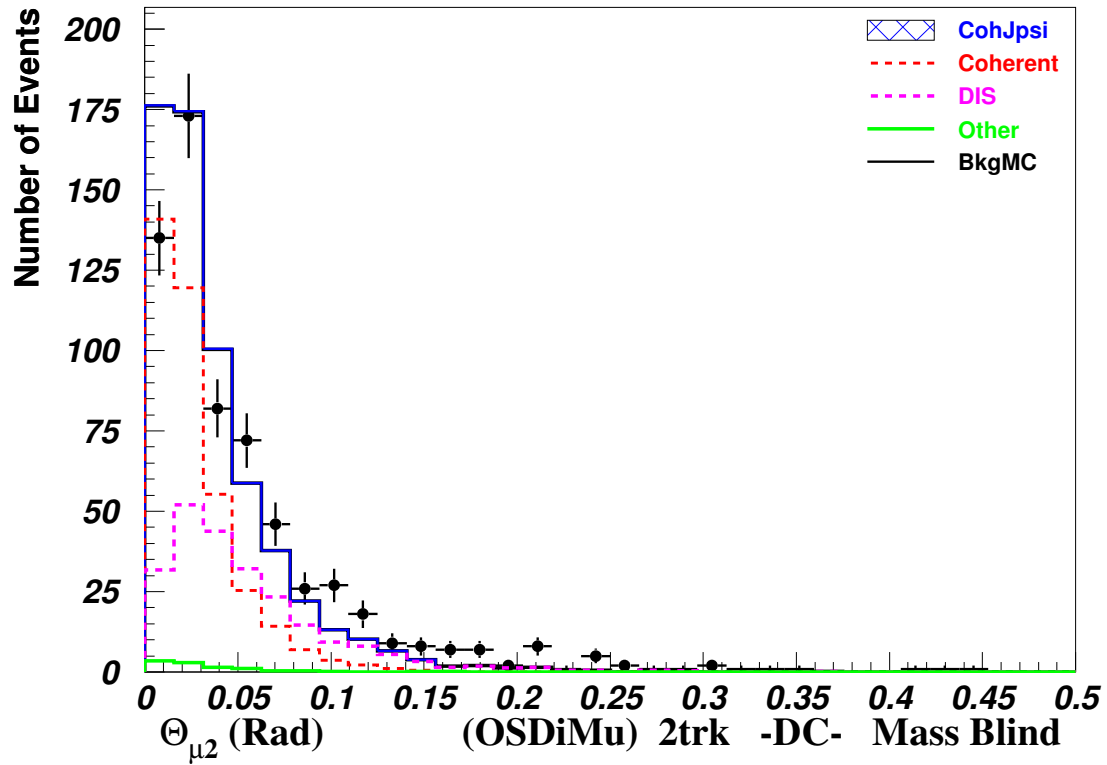
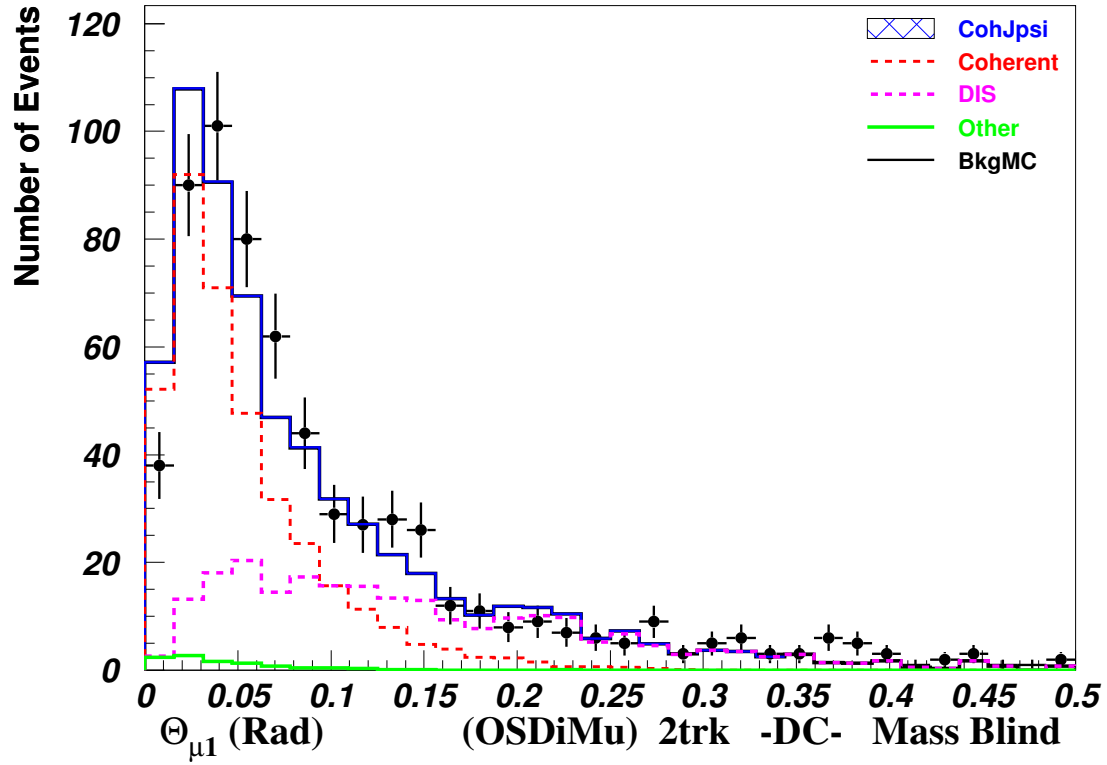


Figure 58: (./figs/theta1+2-mb.pdf)

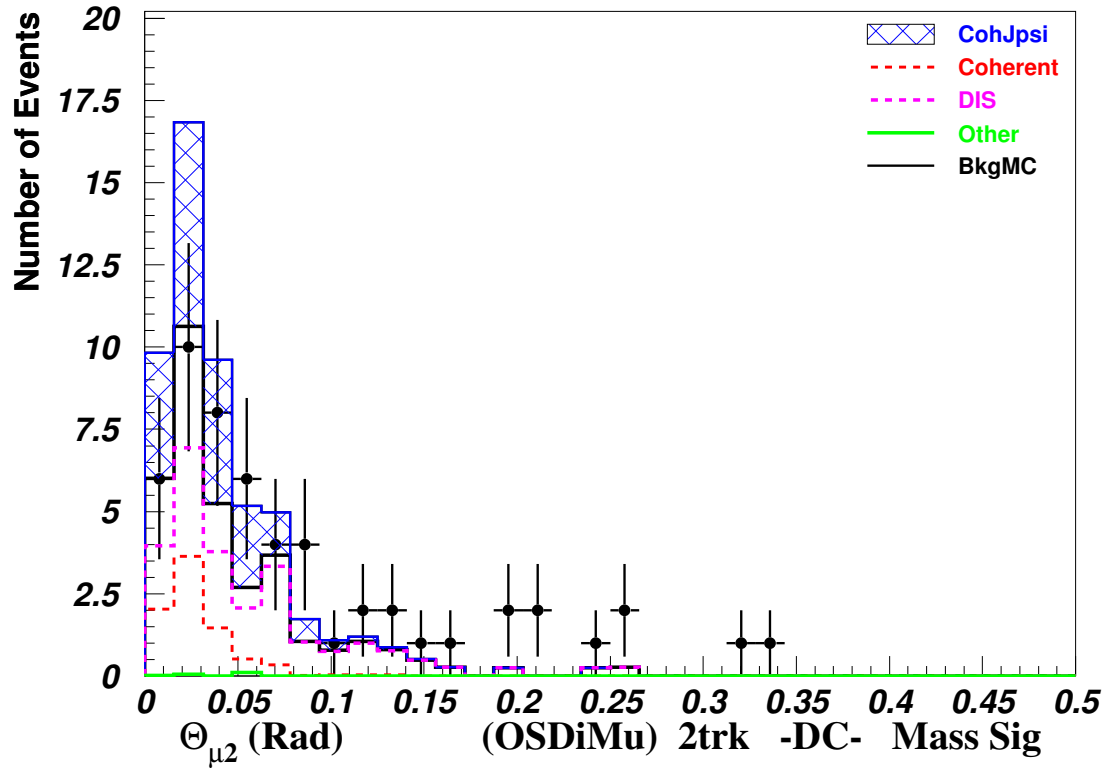
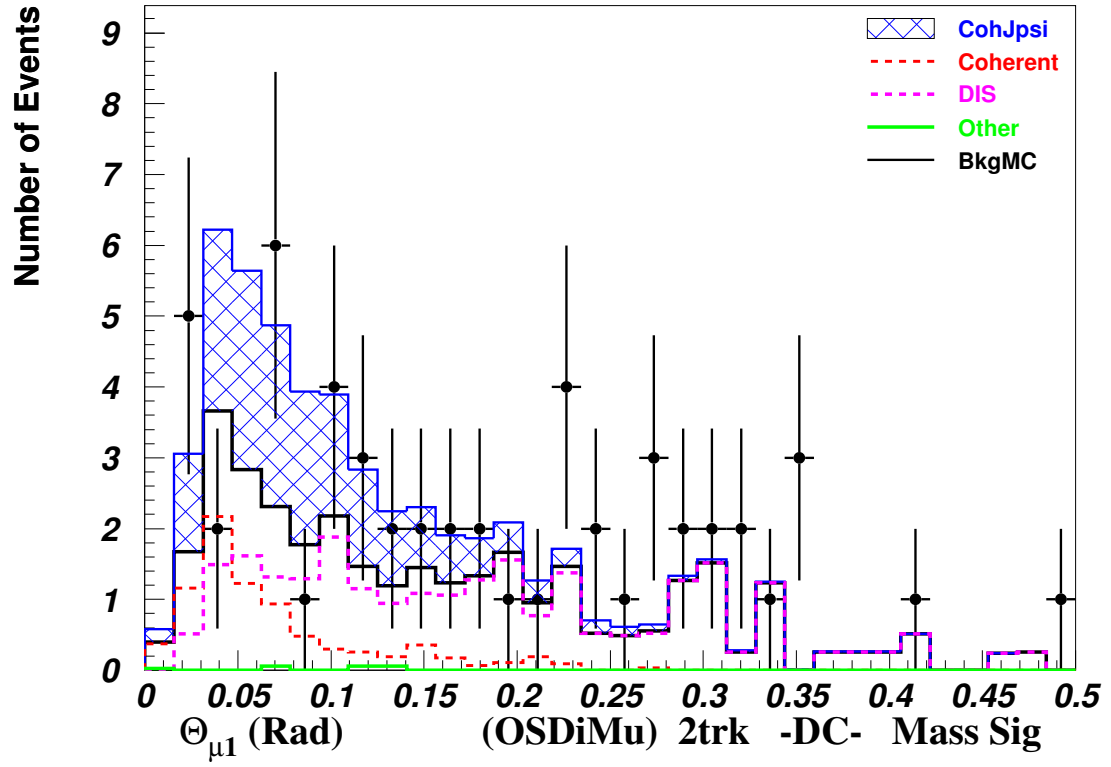


Figure 59: (./figs/theta1+2-msig.pdf)



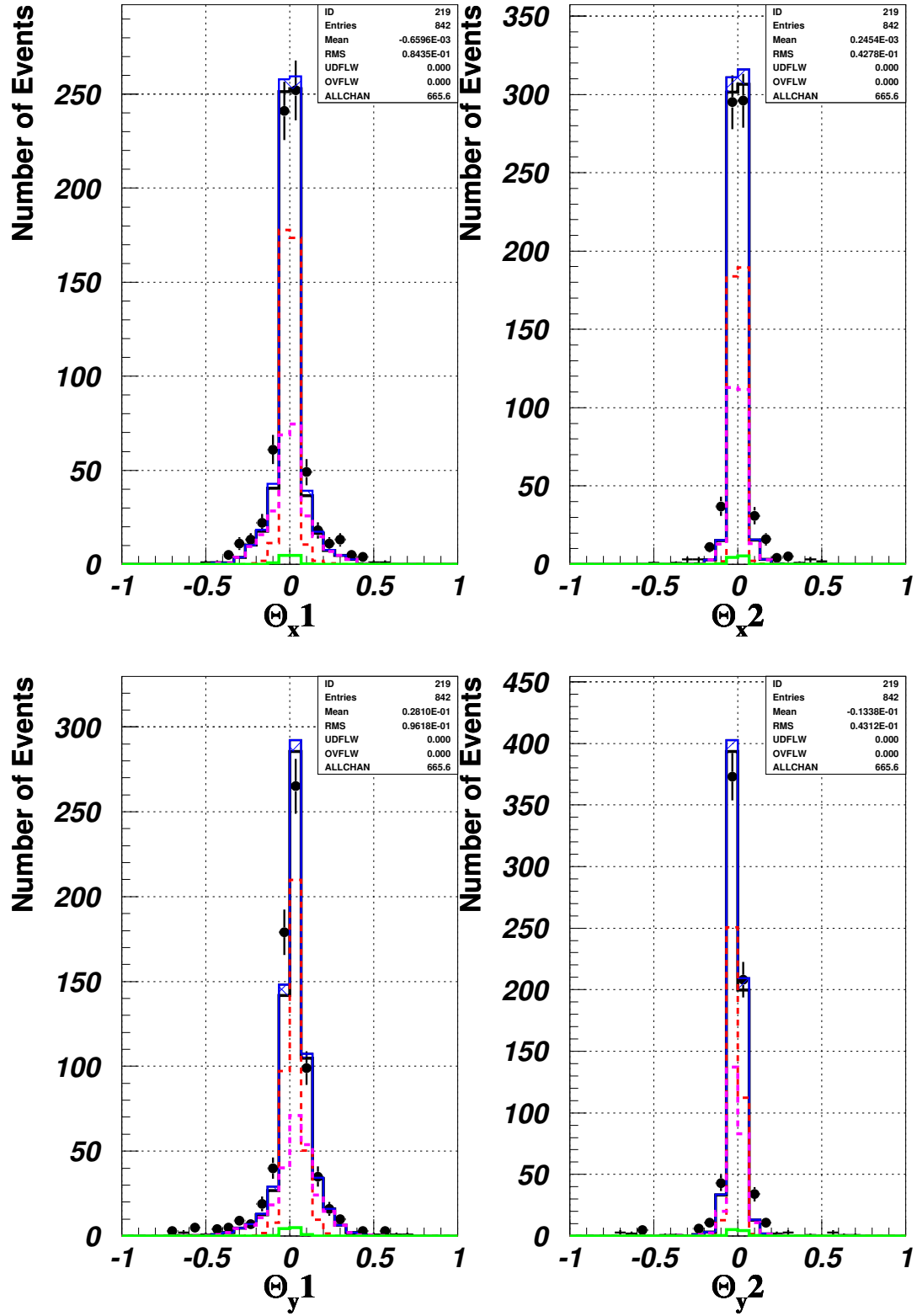


Figure 60: (./figs/thetaxy.pdf)