1 General Analysis Method

- NCDIS MC is from NEGLIB only (no nuage)
- The cut $20^0 \leq \phi_{12} \leq 160^0$ is applied.
- A 4D correction function $(P_+, P_-, P_{t+}, P_{t-})$ from ncand=34 CCDS is applied to NCDIS.
- A 2D correction function $(M_{\pi\pi}, \zeta_\rho)$ from ncand=34 CCDS is applied to NCDIS.
- A renormalization factor of 1.022 is applied to NCDIS so that the number of events do not change after application of the correction functions
- A folder is saved with $20^0 \leq \phi_{12}$ cut applied for CCDIS normalization.
- NCDIS is normalized on ϕ_{12} with: $\zeta_\rho \geq 0.075$.
- $Coh\rho^0$ is normalized on a ζ_ρ plot (range 0.0-0.1) in the Rho Mass range $(0.6 \leq M_{\pi\pi} \leq 1.0)$
- OBG is normalized by number of events with mass: $0.47 \leq M_{\pi\pi} \leq 0.530$
- The χ^2 calculation (including CCDIS, NCDIS, OBG and $Coh\rho$) is then iterated until convergence.
- Coherent ϕ^0 has been added at a normalization of 200 events (0.05 factor)

Coh$\boldsymbol{\rho^0}$ Analysis (P+,P$-$ $>$ **0.5**)

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2 Zeroth Norms

Table1 shows the generated, MC-Z-weighted number of events to pass basic cuts for the sake of Zeroth norm calculations. < See notes 2/15/11 >

The cuts include:

1) Fid |x,y-5|≤130 ; 5<zvs<405
2) Pfermi cut
3) W^2 cut (DIS only)

	Gen Number	Zroth Norm
CCDIS	4,477,786.5	1,440,000
NCDIS	2,358,388.1	437,760
Coh$\boldsymbol{\pi^0}$	156,611.6	4,925
Coh$\boldsymbol{\pi^+}$	29,596.0	10,000
Coh$\boldsymbol{\rho^0}$	25,235.8	1,000
QE	126,414.7	32,000
CohPhi0	4,075.9	204

Table 1: Generated Number of MC Events

3 Baby Ntuple Reduction

Cut Name	Raw	MC-Z-Weight
All Events	1843856.0	1719047.4
W^2 >1.96	1757271.0	1639114.9
Pfermi<1.0	1741929.0	1624875.6
zmin<zvr<405	1721363.0	1617165.0
No Muon	274784.0	258398.5
# of Tracks	82043.0	76551.3

Table 2: Baby Ntuple Reduction for **CCDIS**

Cut Name	Raw	MC-Z-Weight
All Events	2284335.0	2136933.2
W^2 >1.96	2278349.0	2131031.5
Pfermi<1.0	2259398.0	2113269.0
zmin<zvr<405	2138682.0	2012505.8
No Muon	2063056.0	1941480.8
# of Tracks	756128.0	708934.8

Table 3: Baby Ntuple Reduction for **NCDIS (neglib)**

Cut Name	Raw
All Events	12451135.0
zmin<zvr<405	12451135.0
No Muon	8761231.0
# of Tracks	956271.0

Table 4: Baby Ntuple Reduction for **Data**

Cut Name	Raw
All Events	16777216.0
At least 1 v0	1783028.0
zvr<zmin	1127859.0
ncand≤4	662049.0

Table 5: Baby Ntuple Reduction for **OBG**

4 General Information

4.1 Summary Cut Table

Cut Name	CohRho	NC	CC	OBG	Other	Total	Data
1) Raw Events	569.9	135687.6	42390.9	141220.4	42091.3	361960.0	956271.0
2) OBGfid,Trig+CohGenTh	569.9	135687.6	42390.9	23857.4	42091.3	244597.1	956271.0
3) Pfermi & W2	569.9	135687.6	42390.9	23857.4	41919.8	244425.6	956271.0
4) Fid. Vol. -X	545.7	128587.9	39565.9	23021.9	40120.6	231842.0	675744.0
5) Fid. Vol. -Y	523.7	121155.5	35195.0	22356.6	38578.5	217809.3	431245.0
6) Fid. Vol. -Z	523.7	121155.5	35195.0	15207.8	38578.4	210660.4	431245.0
7) No Ph2Mu	498.6	121155.5	35195.0	6459.6	2003.8	165312.5	431245.0
8) ncand=2	452.5	44756.4	14135.4	4229.3	1312.0	64885.6	291330.0
9) tnchgd=2	439.3	38235.0	12107.2	4229.3	1220.5	56231.3	212144.0
10) +/- Tracks (V0)	433.1	30957.3	9422.5	4227.1	1202.0	46242.0	156174.0
11) Epipi>2	431.2	22845.3	5362.6	2345.1	825.7	31809.9	48662.0
12) P+,P->0.5	412.3	18542.4	4626.8	1773.9	634.9	25990.3	39503.0
13) Tube/Veto Cut	412.3	18542.4	4626.8	1773.9	634.9	25990.3	39503.0
14) Theta12<2.62 rad	412.1	18371.1	4592.2	1754.9	631.8	25762.0	29958.0
15) Upstream Hanger cut	409.4	17294.7	4358.4	1754.9	622.3	24439.7	26881.0
16) nsecond<4	404.0	16758.9	4162.4	1754.9	614.5	23694.6	25260.0
17) Fid. Vol. Hanger cut	377.2	14733.2	3588.2	1754.9	576.0	21029.5	21602.0
18) No Hangers fromPVert	372.8	13177.4	3232.8	1754.9	572.1	19110.0	19915.0
19) Pz>0 for pions	372.8	13161.1	3227.4	1754.5	572.1	19087.8	19706.0
20) Thprimord<0.4	360.4	10393.3	2322.8	1450.5	512.8	15039.7	16106.0
21) Nunh*fracunh<200	360.3	10389.4	2321.6	1450.5	512.5	15034.3	15850.0
22) Pt+wrt (-) > 0.05	359.5	10225.5	2299.4	576.1	285.5	13746.0	14889.0
23) Mee > 0.10	359.2	10138.9	2292.1	443.0	250.6	13483.8	14626.0
24) PneutAsym>0.5	355.2	7157.8	1442.9	348.5	248.7	9553.1	10150.0
25) PpiAsym>-0.8	335.6	6930.1	1405.5	343.0	235.1	9249.2	9490.0
26) 20<Phi12<160deg	277.5	5382.9	812.6	243.0	88.0	6803.9	6852.0
27) LH38>0.5 (OFF)	277.5	5382.9	812.6	243.0	88.0	6803.9	6852.0
28) P+,P->1.0	254.3	3524.8	606.6	182.6	79.3	4647.6	4911.0

Table 6: Summary Cut Table

4.2 Cohρ^0 Cut Table

Cut	Raw	Z-weight	Norm0	Final
1) Raw Events	25790.0	24250.9	961.0	569.9
2) OBGfid,Trig+CohGenTh	25790.0	24250.9	961.0	569.9
3) Pfermi & W2	25790.0	24250.9	961.0	569.9
4) Fid. Vol. -X	24698.0	23225.0	920.3	545.7
5) Fid. Vol. -Y	23699.0	22287.3	883.2	523.7
6) Fid. Vol. -Z	23699.0	22287.3	883.2	523.7
7) No Ph2Mu	22561.0	21217.8	840.8	498.6
8) ncand=2	20419.0	19258.7	763.1	452.5
9) tnchgd=2	19812.0	18695.5	740.8	439.3
10) +/- Tracks (V0)	19536.0	18429.6	730.3	433.1
11) Epipi>2	19453.0	18348.5	727.1	431.2
12) P+,P->0.5	18605.0	17547.5	695.3	412.3
13) Tube/Veto Cut	18605.0	17547.5	695.3	412.3
14) Theta12<2.62 rad	18594.0	17537.4	694.9	412.1
15) Upstream Hanger cut	18477.0	17421.9	690.4	409.4
16) nsecond<4	18211.0	17191.9	681.2	404.0
17) Fid. Vol. Hanger cut	16964.0	16051.6	636.1	377.2
18) No Hangers fromPVert	16765.0	15863.1	628.6	372.8
19) Pz>0 for pions	16764.0	15862.1	628.6	372.8
20) Thprimord<0.4	16174.0	15336.0	607.7	360.4
21) Nunh*fracunh<200	16171.0	15333.7	607.6	360.3
22) Pt+wrt (-) > 0.05	16134.0	15298.4	606.2	359.5
23) Mee > 0.10	16123.0	15287.6	605.8	359.2
24) PneutAsym>0.5	15936.0	15116.7	599.0	355.2
25) PpiAsym>-0.8	15057.0	14281.6	565.9	335.6
26) 20<Phi12<160deg	12447.0	11808.1	467.9	277.5
27) LH38>0.5 (OFF)	12447.0	11808.1	467.9	277.5
28) P+,P->1.0	11412.0	10822.7	428.9	254.3

Table 7: Cut Table Cohρ^0

4.3 NCDIS Cut Table

Cut	Raw	Z-weight	Norm0	Final
1) Raw Events	756128.0	696578.5	129297.2	135687.6
2) OBGfid,Trig+CohGenTh	756128.0	696578.5	129297.2	135687.6
3) Pfermi & W2	756128.0	696578.5	129297.2	135687.6
4) Fid. Vol. -X	716533.0	660131.2	122531.9	128587.9
5) Fid. Vol. -Y	675006.0	621975.2	115449.5	121155.5
6) Fid. Vol. -Z	675006.0	621975.2	115449.5	121155.5
7) No Ph2Mu	675006.0	621975.2	115449.5	121155.5
8) ncand=2	257783.0	229766.1	42648.6	44756.4
9) tnchgd=2	220494.0	196286.7	36434.2	38235.0
10) +/- Tracks (V0)	178245.0	158925.3	29499.3	30957.3
11) Epipi>2	128328.0	117281.1	21769.4	22845.3
12) P+,P->0.5	102086.0	95191.5	17669.2	18542.4
13) Tube/Veto Cut	102086.0	95191.5	17669.2	18542.4
14) Theta12<2.62 rad	101218.0	94311.4	17505.9	18371.1
15) Upstream Hanger cut	95436.0	88785.3	16480.1	17294.7
16) nsecond<4	92271.0	86034.8	15969.6	16758.9
17) Fid. Vol. Hanger cut	81130.0	75635.9	14039.3	14733.2
18) No Hangers fromPVert	72709.0	67649.1	12556.8	13177.4
19) Pz>0 for pions	72602.0	67564.8	12541.2	13161.1
20) Thprimord<0.4	56964.0	53355.9	9903.8	10393.3
21) Nunh*fracunh<200	56939.0	53336.1	9900.1	10389.4
22) Pt+wrt (-) > 0.05	56052.0	52494.8	9744.0	10225.5
23) Mee > 0.10	55591.0	52049.6	9661.3	10138.9
24) PneutAsym>0.5	39703.0	36745.6	6820.6	7157.8
25) PpiAsym>-0.8	38147.0	35577.0	6603.7	6930.1
26) 20<Phi12<160deg	29615.0	27634.3	5129.4	5382.9
27) LH38>0.5 (OFF)	29615.0	27634.3	5129.4	5382.9
28) P+,P->1.0	18499.0	18095.1	3358.8	3524.8

Table 8: Cut Table NCDIS

4.4 CCDIS Cut Table

Cut	Raw	Z-weight	Norm0	Final
1) Raw Events	141725.0	131817.8	42390.9	42390.9
2) OBGfid,Trig+CohGenTh	141725.0	131817.8	42390.9	42390.9
3) Pfermi & W2	141725.0	131817.8	42390.9	42390.9
4) Fid. Vol. -X	132260.0	123033.0	39565.9	39565.9
5) Fid. Vol. -Y	117578.0	109441.5	35195.0	35195.0
6) Fid. Vol. -Z	117578.0	109441.5	35195.0	35195.0
7) No Ph2Mu	117578.0	109441.5	35195.0	35195.0
8) ncand=2	46635.0	43954.9	14135.4	14135.4
9) tnchgd=2	40101.0	37648.4	12107.2	12107.2
10) +/- Tracks (V0)	31025.0	29300.0	9422.5	9422.5
11) Epipi>2	17917.0	16675.4	5362.6	5362.6
12) P+,P->0.5	15436.0	14387.5	4626.8	4626.8
13) Tube/Veto Cut	15436.0	14387.5	4626.8	4626.8
14) Theta12<2.62 rad	15323.0	14279.9	4592.2	4592.2
15) Upstream Hanger cut	14560.0	13552.8	4358.4	4358.4
16) nsecond<4	13862.0	12943.4	4162.4	4162.4
17) Fid. Vol. Hanger cut	11941.0	11157.9	3588.2	3588.2
18) No Hangers fromPVert	10771.0	10052.7	3232.8	3232.8
19) Pz>0 for pions	10754.0	10035.9	3227.4	3227.4
20) Thprimord<0.4	7632.0	7222.9	2322.8	2322.8
21) Nunh*fracunh<200	7627.0	7219.2	2321.6	2321.6
22) Pt+wrt (-) > 0.05	7550.0	7150.2	2299.4	2299.4
23) Mee > 0.10	7527.0	7127.4	2292.1	2292.1
24) PneutAsym>0.5	4803.0	4486.9	1442.9	1442.9
25) PpiAsym>-0.8	4668.0	4370.6	1405.5	1405.5
26) 20<Phi12<160deg	2703.0	2527.0	812.6	812.6
27) LH38>0.5 (OFF)	2703.0	2527.0	812.6	812.6
28) P+,P->1.0	2023.0	1886.2	606.6	606.6

Table 9: Cut Table CCDIS

4.5 OBG Cut Table

Cut	Raw	Z-weight	Norm0	Final
1) Raw Events	662049.0	662049.0	662049.0	141220.4
2) OBGfid,Trig+CohGenTh	111845.0	111845.0	111845.0	23857.4
3) Pfermi & W2	111845.0	111845.0	111845.0	23857.4
4) Fid. Vol. -X	107928.0	107928.0	107928.0	23021.9
5) Fid. Vol. -Y	104809.0	104809.0	104809.0	22356.6
6) Fid. Vol. -Z	71295.0	71295.0	71295.0	15207.8
7) No Ph2Mu	30283.0	30283.0	30283.0	6459.6
8) ncand=2	19827.0	19827.0	19827.0	4229.3
9) tnchgd=2	19827.0	19827.0	19827.0	4229.3
10) +/- Tracks (V0)	19817.0	19817.0	19817.0	4227.1
11) Epipi>2	10994.0	10994.0	10994.0	2345.1
12) P+,P->0.5	8316.0	8316.0	8316.0	1773.9
13) Tube/Veto Cut	8316.0	8316.0	8316.0	1773.9
14) Theta12<2.62 rad	8227.0	8227.0	8227.0	1754.9
15) Upstream Hanger cut	8227.0	8227.0	8227.0	1754.9
16) nsecond<4	8227.0	8227.0	8227.0	1754.9
17) Fid. Vol. Hanger cut	8227.0	8227.0	8227.0	1754.9
18) No Hangers fromPVert	8227.0	8227.0	8227.0	1754.9
19) Pz>0 for pions	8225.0	8225.0	8225.0	1754.5
20) Thprimord<0.4	6800.0	6800.0	6800.0	1450.5
21) Nunh*fracunh<200	6800.0	6800.0	6800.0	1450.5
22) Pt+wrt (-) > 0.05	2701.0	2701.0	2701.0	576.1
23) Mee > 0.10	2077.0	2077.0	2077.0	443.0
24) PneutAsym>0.5	1634.0	1634.0	1634.0	348.5
25) PpiAsym>-0.8	1608.0	1608.0	1608.0	343.0
26) 20<Phi12<160deg	1139.0	1139.0	1139.0	243.0
27) LH38>0.5 (OFF)	1139.0	1139.0	1139.0	243.0
28) P+,P->1.0	856.0	856.0	856.0	182.6

Table 10: Cut Table OBG

4.6 QE Cut Table

Cut	Raw	Z-weight	Norm0	Final
1) Raw Events	129561.0	121151.6	30667.7	30667.7
2) OBGfid,Trig+CohGenTh	129561.0	121151.6	30667.7	30667.7
3) Pfermi & W2	128836.0	120474.1	30496.2	30496.2
4) Fid. Vol. -X	123323.0	115272.8	29179.6	29179.6
5) Fid. Vol. -Y	118713.0	110939.6	28082.7	28082.7
6) Fid. Vol. -Z	118713.0	110939.6	28082.7	28082.7
7) No Ph2Mu	1722.0	1603.2	405.8	405.8
8) ncand=2	527.0	504.3	127.7	127.7
9) tnchgd=2	508.0	486.2	123.1	123.1
10) +/- Tracks (V0)	484.0	464.3	117.5	117.5
11) Epipi>2	405.0	387.0	98.0	98.0
12) P+,P->0.5	357.0	340.3	86.1	86.1
13) Tube/Veto Cut	357.0	340.3	86.1	86.1
14) Theta12<2.62 rad	353.0	336.4	85.1	85.1
15) Upstream Hanger cut	353.0	336.4	85.1	85.1
16) nsecond<4	353.0	336.4	85.1	85.1
17) Fid. Vol. Hanger cut	346.0	329.5	83.4	83.4
18) No Hangers fromPVert	346.0	329.5	83.4	83.4
19) Pz>0 for pions	346.0	329.5	83.4	83.4
20) Thprimord<0.4	343.0	327.2	82.8	82.8
21) Nunh*fracunh<200	343.0	327.2	82.8	82.8
22) Pt+wrt (-) > 0.05	343.0	327.2	82.8	82.8
23) Mee > 0.10	343.0	327.2	82.8	82.8
24) PneutAsym>0.5	343.0	327.2	82.8	82.8
25) PpiAsym>-0.8	295.0	284.3	72.0	72.0
26) 20<Phi12<160deg	19.0	18.7	4.7	4.7
27) LH38>0.5 (OFF)	19.0	18.7	4.7	4.7
28) P+,P->1.0	7.0	6.9	1.8	1.8

Table 11: Cut Table QE

4.7 Cohπ^+ Cut Table

Cut	Raw	Z-weight	Norm0	Final
1) Raw Events	30945.0	28999.0	9798.3	9798.3
2) OBGfid,Trig+CohGenTh	30945.0	28999.0	9798.3	9798.3
3) Pfermi & W2	30945.0	28999.0	9798.3	9798.3
4) Fid. Vol. -X	29688.0	27808.0	9395.9	9395.9
5) Fid. Vol. -Y	28524.0	26721.6	9028.8	9028.8
6) Fid. Vol. -Z	28524.0	26721.6	9028.8	9028.8
7) No Ph2Mu	472.0	442.9	149.7	149.7
8) ncand=2	324.0	308.1	104.1	104.1
9) tnchgd=2	316.0	300.3	101.5	101.5
10) +/- Tracks (V0)	307.0	292.6	98.9	98.9
11) Epipi>2	247.0	233.5	78.9	78.9
12) P+,P->0.5	196.0	186.1	62.9	62.9
13) Tube/Veto Cut	196.0	186.1	62.9	62.9
14) Theta12<2.62 rad	195.0	185.1	62.6	62.6
15) Upstream Hanger cut	195.0	185.1	62.6	62.6
16) nsecond<4	193.0	183.8	62.1	62.1
17) Fid. Vol. Hanger cut	188.0	178.9	60.4	60.4
18) No Hangers fromPVert	187.0	177.9	60.1	60.1
19) Pz>0 for pions	187.0	177.9	60.1	60.1
20) Thprimord<0.4	185.0	175.9	59.4	59.4
21) Nunh*fracunh<200	185.0	175.9	59.4	59.4
22) Pt+wrt (-) > 0.05	185.0	175.9	59.4	59.4
23) Mee > 0.10	184.0	174.9	59.1	59.1
24) PneutAsym>0.5	182.0	172.9	58.4	58.4
25) PpiAsym>-0.8	174.0	165.1	55.8	55.8
26) 20<Phi12<160deg	89.0	84.2	28.4	28.4
27) LH38>0.5 (OFF)	89.0	84.2	28.4	28.4
28) P+,P->1.0	72.0	67.4	22.8	22.8

Table 12: Cut Table Cohπ^+

4.8 Cohπ^0 Cut Table

Cut	Raw	Z-weight	Norm0	Final
1) Raw Events	49972.0	45440.0	1450.7	1429.0
2) OBGfid,Trig+CohGenTh	49972.0	45440.0	1450.7	1429.0
3) Pfermi & W2	49972.0	45440.0	1450.7	1429.0
4) Fid. Vol. -X	47459.0	43133.4	1377.1	1356.4
5) Fid. Vol. -Y	44979.0	40906.1	1306.0	1286.4
6) Fid. Vol. -Z	44972.0	40903.4	1305.9	1286.3
7) No Ph2Mu	44972.0	40903.4	1305.9	1286.3
8) ncand=2	32665.0	29802.7	951.5	937.2
9) tnchgd=2	30025.0	27389.3	874.4	861.3
10) +/- Tracks (V0)	29719.0	27115.9	865.7	852.7
11) Epipi>2	18087.0	16412.6	524.0	516.1
12) P+,P->0.5	12379.0	11250.1	359.2	353.8
13) Tube/Veto Cut	12379.0	11250.1	359.2	353.8
14) Theta12<2.62 rad	12319.0	11192.3	357.3	352.0
15) Upstream Hanger cut	11999.0	10910.9	348.3	343.1
16) nsecond<4	11765.0	10724.0	342.4	337.2
17) Fid. Vol. Hanger cut	10786.0	9864.6	314.9	310.2
18) No Hangers fromPVert	10702.0	9787.5	312.5	307.8
19) Pz>0 for pions	10702.0	9787.5	312.5	307.8
20) Thprimord<0.4	8737.0	8107.1	258.8	254.9
21) Nunh*fracunh<200	8724.0	8097.5	258.5	254.6
22) Pt+wrt (-) > 0.05	1016.0	951.3	30.4	29.9
23) Mee > 0.10	56.0	52.7	1.7	1.7
24) PneutAsym>0.5	29.0	27.8	0.9	0.9
25) PpiAsym>-0.8	28.0	26.8	0.9	0.8
26) 20<Phi12<160deg	14.0	13.0	0.4	0.4
27) LH38>0.5 (OFF)	14.0	13.0	0.4	0.4
28) P+,P->1.0	10.0	9.8	0.3	0.3

Table 13: Cut Table Coh$\boldsymbol{\pi^0}$

4.9 CohPhi0 Cut Table

Cut	Raw	Z-weight	Norm0	Final
1) Raw Events	4171.0	3926.1	3926.1	196.3
2) OBGfid,Trig+CohGenTh	4171.0	3926.1	3926.1	196.3
3) Pfermi & W2	4171.0	3926.1	3926.1	196.3
4) Fid. Vol. -X	4008.0	3773.9	3773.9	188.7
5) Fid. Vol. -Y	3836.0	3612.2	3612.2	180.6
6) Fid. Vol. -Z	3836.0	3612.2	3612.2	180.6
7) No Ph2Mu	3446.0	3239.5	3239.5	162.0
8) ncand=2	3041.0	2859.5	2859.5	143.0
9) tnchgd=2	2866.0	2693.0	2693.0	134.6
10) +/- Tracks (V0)	2830.0	2658.6	2658.6	132.9
11) Epipi>2	2826.0	2654.7	2654.7	132.7
12) P+,P->0.5	2814.0	2642.8	2642.8	132.1
13) Tube/Veto Cut	2814.0	2642.8	2642.8	132.1
14) Theta12<2.62 rad	2813.0	2641.9	2641.9	132.1
15) Upstream Hanger cut	2800.0	2629.3	2629.3	131.5
16) nsecond<4	2763.0	2602.4	2602.4	130.1
17) Fid. Vol. Hanger cut	2583.0	2440.1	2440.1	122.0
18) No Hangers fromPVert	2558.0	2416.1	2416.1	120.8
19) Pz>0 for pions	2557.0	2415.1	2415.1	120.8
20) Thprimord<0.4	2442.0	2314.8	2314.8	115.7
21) Nunh*fracunh<200	2442.0	2314.8	2314.8	115.7
22) Pt+wrt (-) > 0.05	2393.0	2267.7	2267.7	113.4
23) Mee > 0.10	2258.0	2140.1	2140.1	107.0
24) PneutAsym>0.5	2248.0	2131.5	2131.5	106.6
25) PpiAsym>-0.8	2246.0	2129.5	2129.5	106.5
26) 20<Phi12<160deg	1147.0	1090.6	1090.6	54.5
27) LH38>0.5 (OFF)	1147.0	1090.6	1090.6	54.5
28) P+,P->1.0	1144.0	1087.8	1087.8	54.4

Table 14: Cut Table CohPhi

5 Normalizations

5.1 Background Normalization

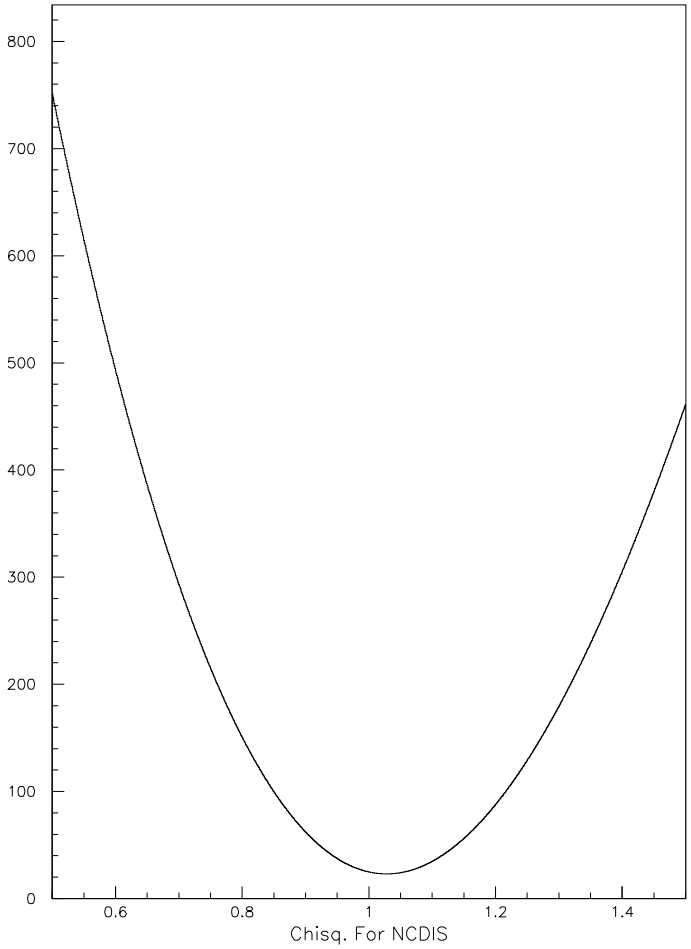


Figure 1: 1σ χ^2 plot for NCDIS

χ^2 Min 23.063 Number of bins used: 18. One σ: 1.132		
	NCDIS	
Norm at Min χ^2	1.028	
-1 σ	1.006	(2.1%)
$+1$ σ	1.050	(2.1%)

Table 15: χ^2 for NCDIS on plot:ϕ_{12} ($\boldsymbol{\zeta_{\pi\pi} > 0.075}$), $\boldsymbol{P_{\pm} \geq 0.5}$

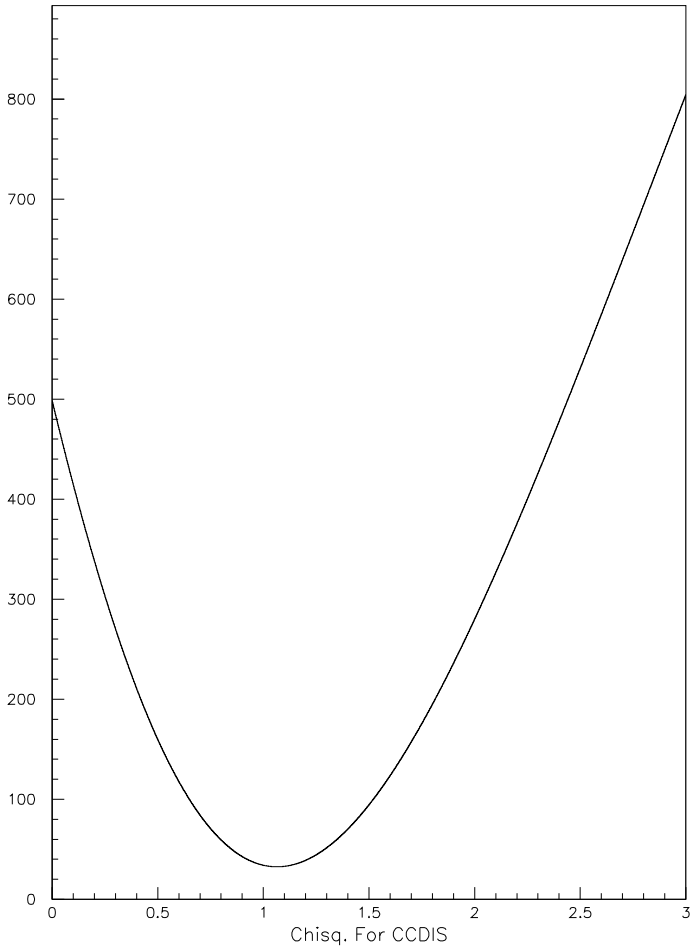


Figure 2: 1σ χ^2 plot for CCDIS

χ^2 Min 32.509 Number of bins used: 32. One σ: 1.008		
	CCDIS	
Norm at Min χ^2	1.065	
-1 σ	1.013	(4.9%)
$+1$ σ	1.117	(4.9%)

Table 16: χ^2 for CCDIS on plot:ϕ_{12}, $P_{\pm} \geq 0.5$

	OBG	
Norm at Min χ^2	0.213309	
-1 σ	0.205918	(3.5%)
$+1$ σ	0.220699	(3.5%)
Number of OBG used 833.		

Table 17: Normalization for OBG by number of events within Kaon mass range

5.2 Cohρ^0 Normalization

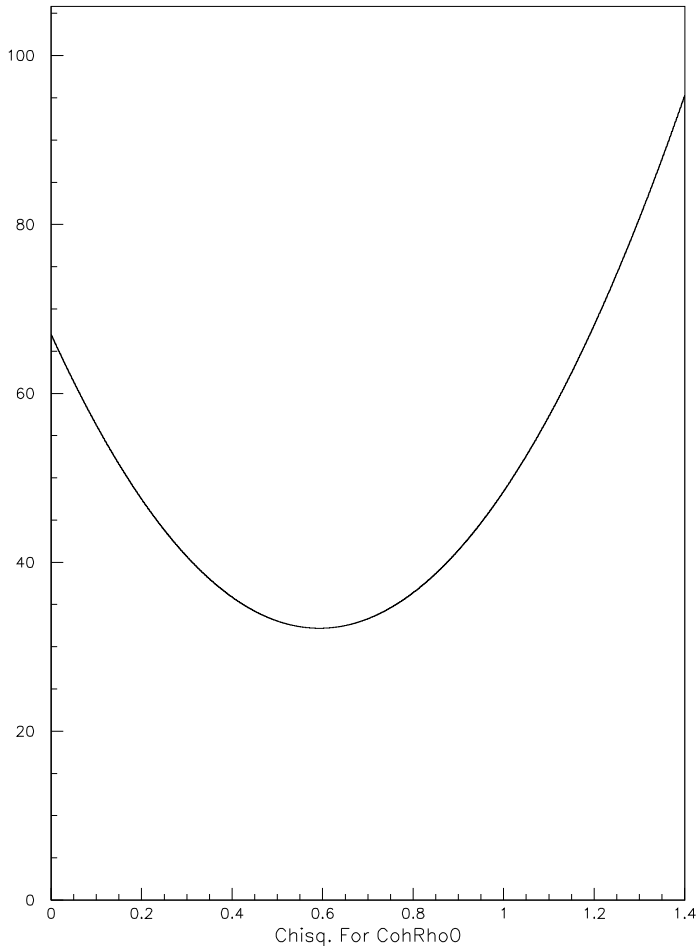


Figure 3: χ^2 plot for Coh$\boldsymbol{\rho^0}$

χ^2 Min 32.190 Number of bins used: 20. One σ: 1.269		
	Coh$\boldsymbol{\rho^0}$	
Norm at Min χ^2	0.593	
-1 σ	0.480	(19.1%)
$+1$ σ	0.706	(19.1%)

Table 18: χ^2 for Coh$\boldsymbol{\rho^0}$ on plot:$\boldsymbol{\zeta_{\pi\pi}}$(0-0.1) In $\boldsymbol{\rho}$ Mass, $\boldsymbol{P_{\pm} \geq 0.5}$

6 Systematic Variations

NCDIS Stat Var				nbins:	20
BKG Variation	$Coh\rho$ Norm	$+1\sigma$	-1σ	χ^2	σ
$+1\sigma$	0.546	+ 0.114(20.88%)	- 0.114(20.88%)	33.022	1.285
Central	0.593	+ 0.113(19.06%)	- 0.113(19.06%)	32.190	1.269
-1σ	0.640	+ 0.112(17.50%)	- 0.113(17.66%)	31.596	1.257
Effect:	0.593	+ 0.047(7.93%)	- 0.047(7.93%)		

Table 19: Systematic variations in background NCDIS with $P_{\pm} \geq 0.5$

CCDIS Stat Var				nbins:	20
BKG Variation	$Coh\rho$ Norm	$+1\sigma$	-1σ	χ^2	σ
$+1\sigma$	0.579	+ 0.113(19.52%)	- 0.114(19.69%)	32.413	1.273
Central	0.593	+ 0.113(19.06%)	- 0.113(19.06%)	32.190	1.269
-1σ	0.607	+ 0.113(18.62%)	- 0.113(18.62%)	31.974	1.264
Effect:	0.593	+ 0.014(2.36%)	- 0.014(2.36%)		

Table 20: Systematic variations in background CCDIS with $P_{\pm} \geq 0.5$

OBG Stat Var				nbins:	20
BKG Variation	$Coh\rho$ Norm	$+1\sigma$	-1σ	χ^2	σ
$+1\sigma$	0.593	+ 0.113(19.06%)	- 0.113(19.06%)	32.191	1.269
Central	0.593	+ 0.113(19.06%)	- 0.113(19.06%)	32.190	1.269
-1σ	0.593	+ 0.113(19.06%)	- 0.113(19.06%)	32.188	1.269
Effect:	0.593	+ 0.000(0.00%)	- 0.000(0.00%)		

Table 21: Systematic variations in background OBG with $P_{\pm} \geq 0.5$

7 MC Shape Plots

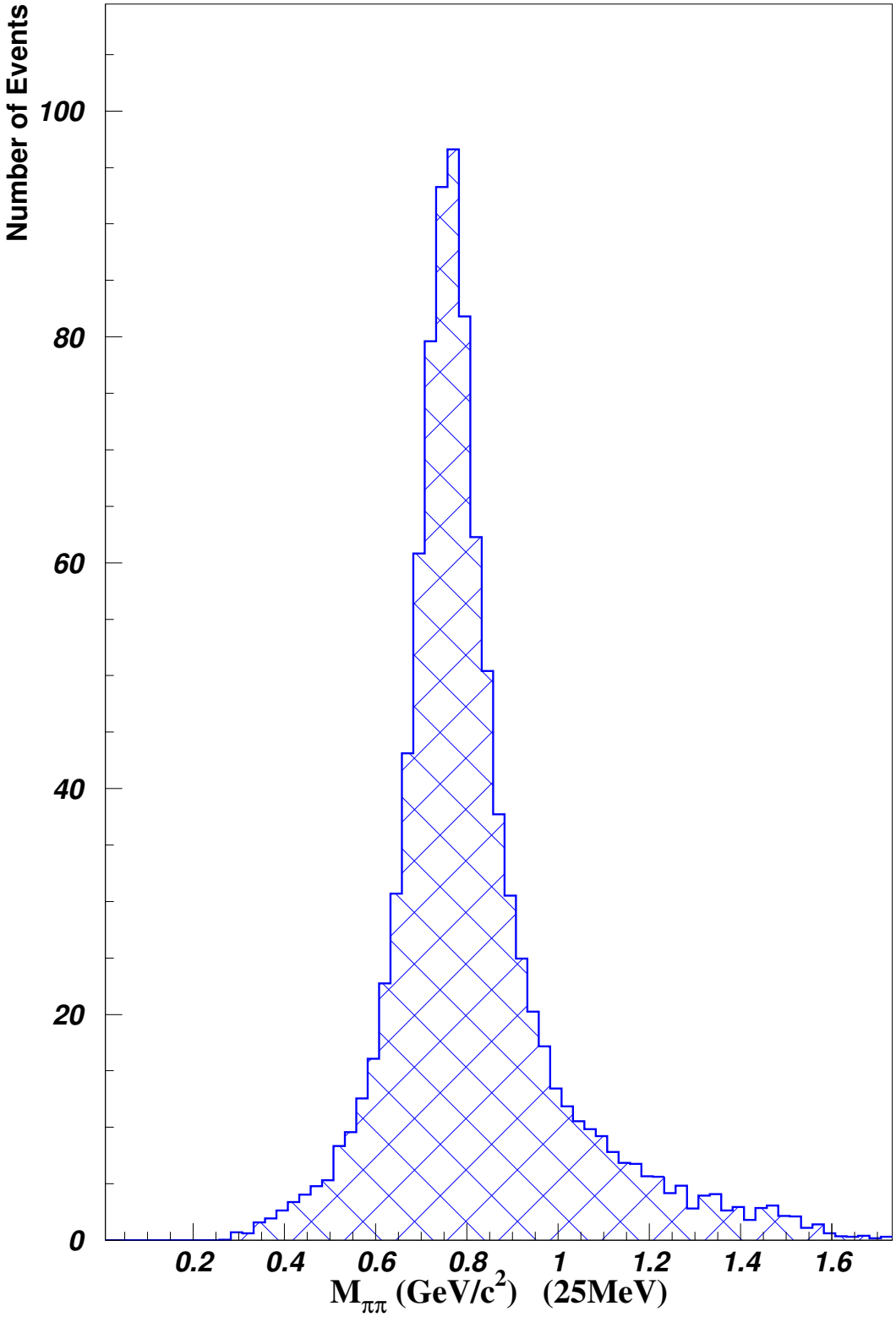


Figure 4: $M_{\pi\pi}$ For Full Cohρ^0 MC (25MeV)

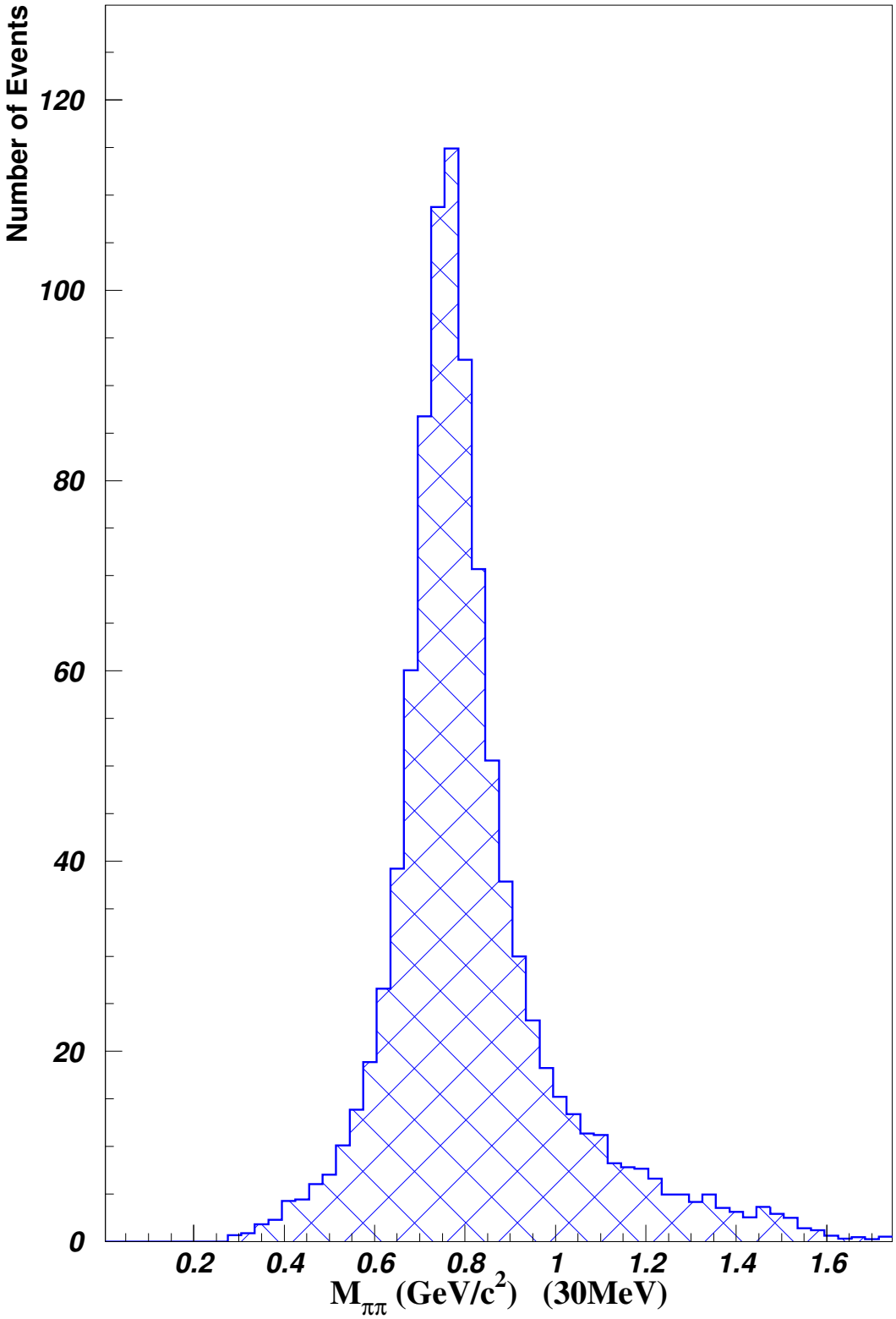


Figure 5: $M_{\pi\pi}$ For Full Cohρ^0 MC (30MeV)

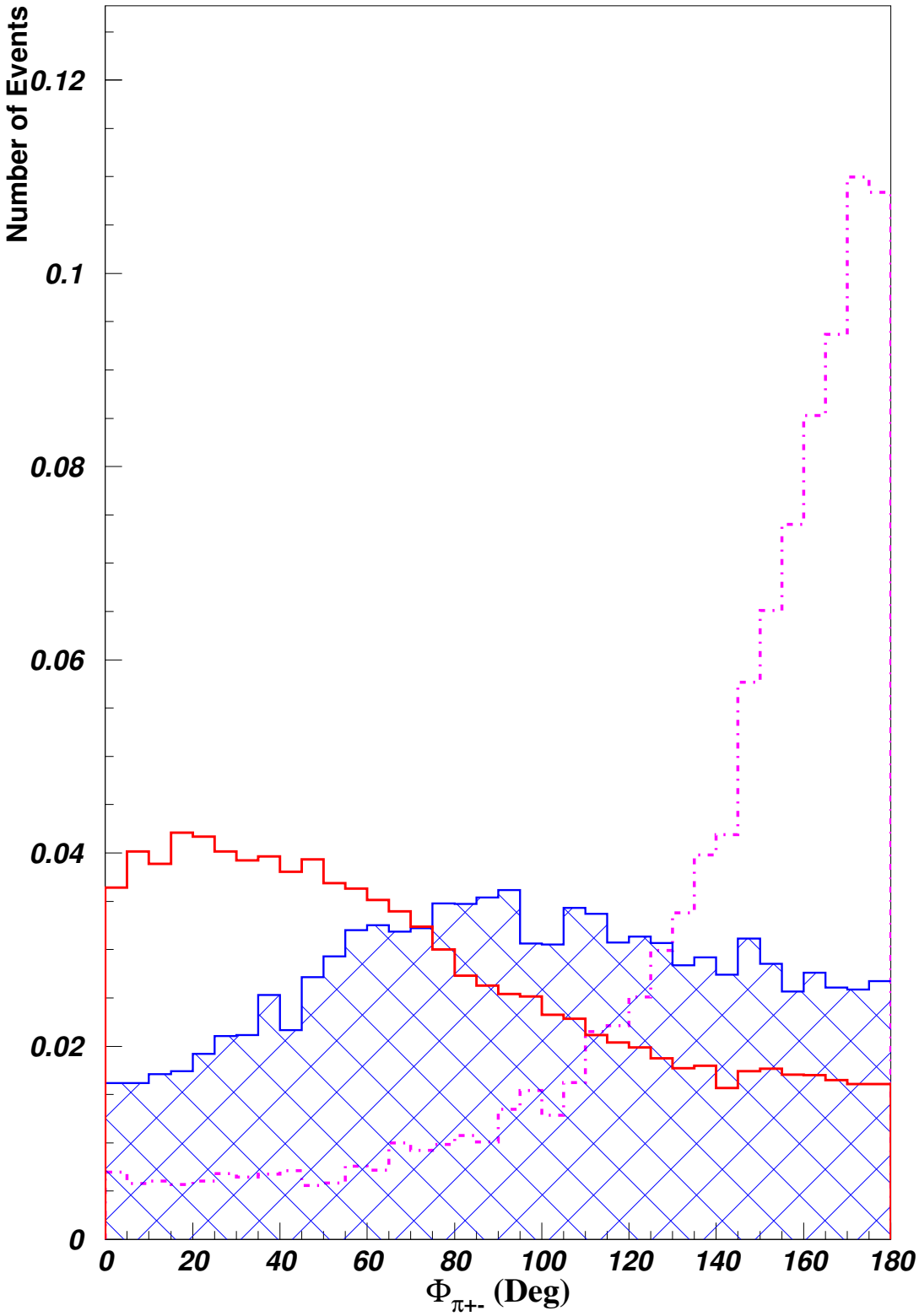


Figure 6: ϕ_{12} MC Shape Comparison

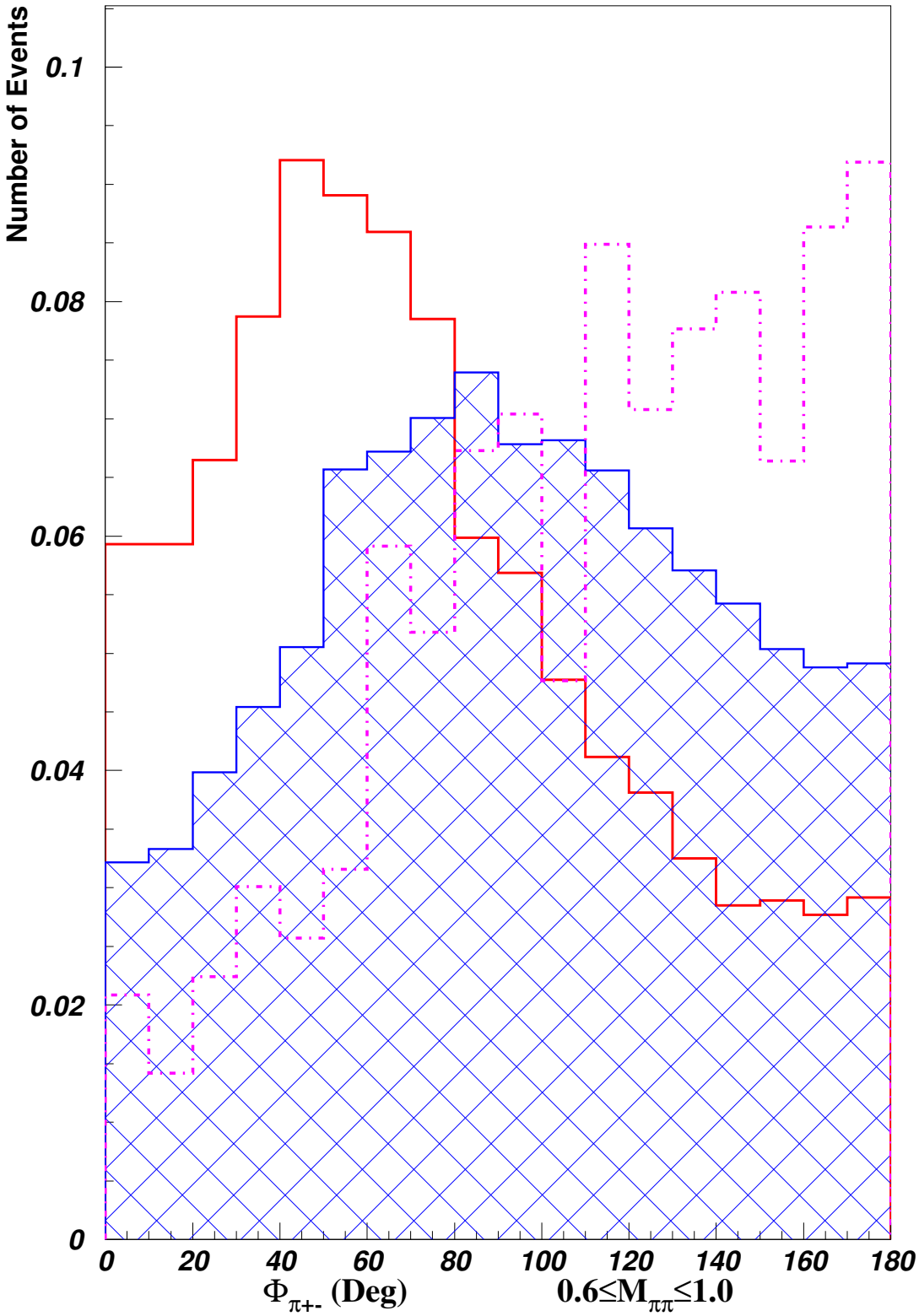


Figure 7: ϕ_{12} in Rho Mass Range MC Shape Comparison

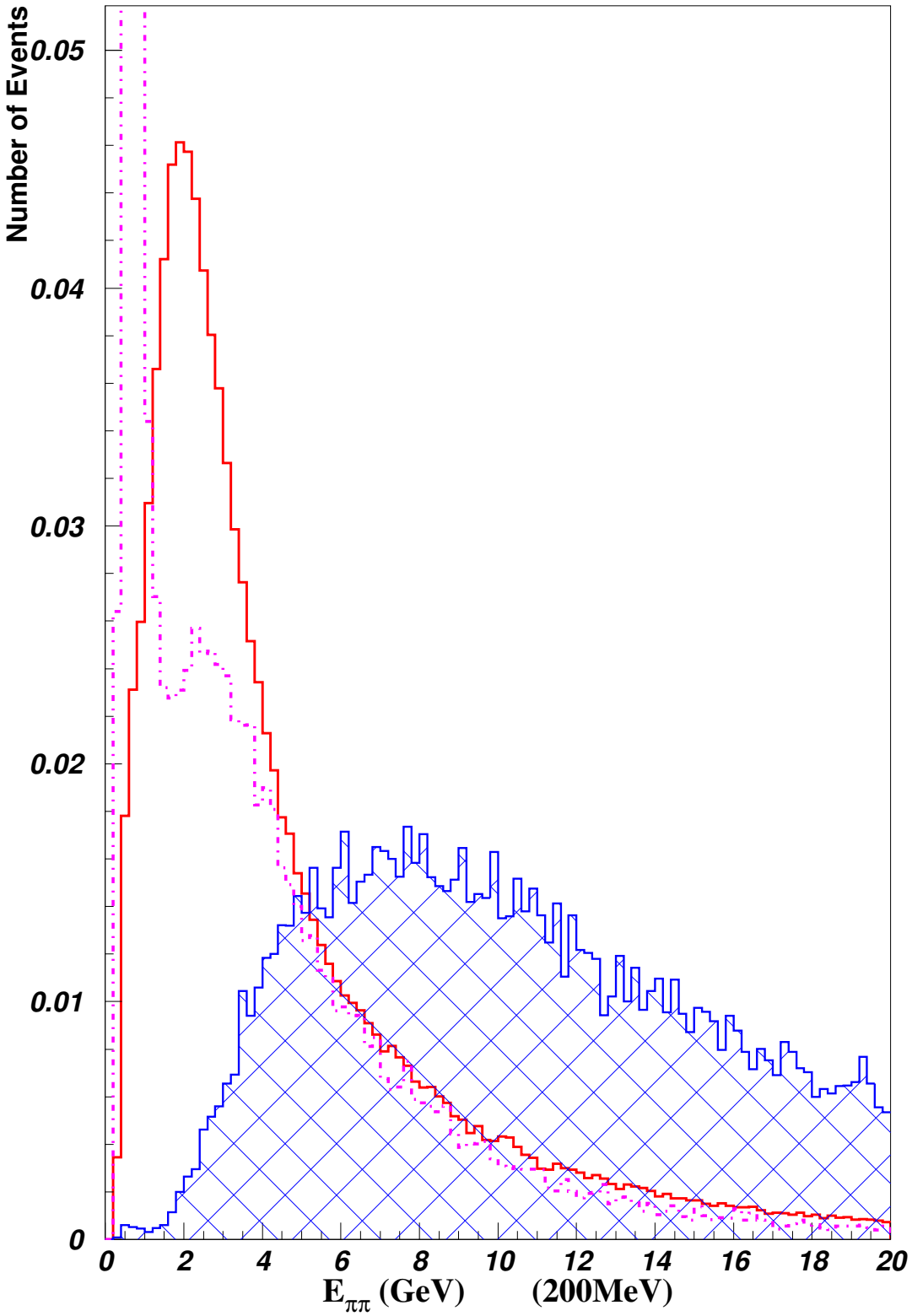


Figure 8: $E_{\pi\pi}$ MC Shape Comparison

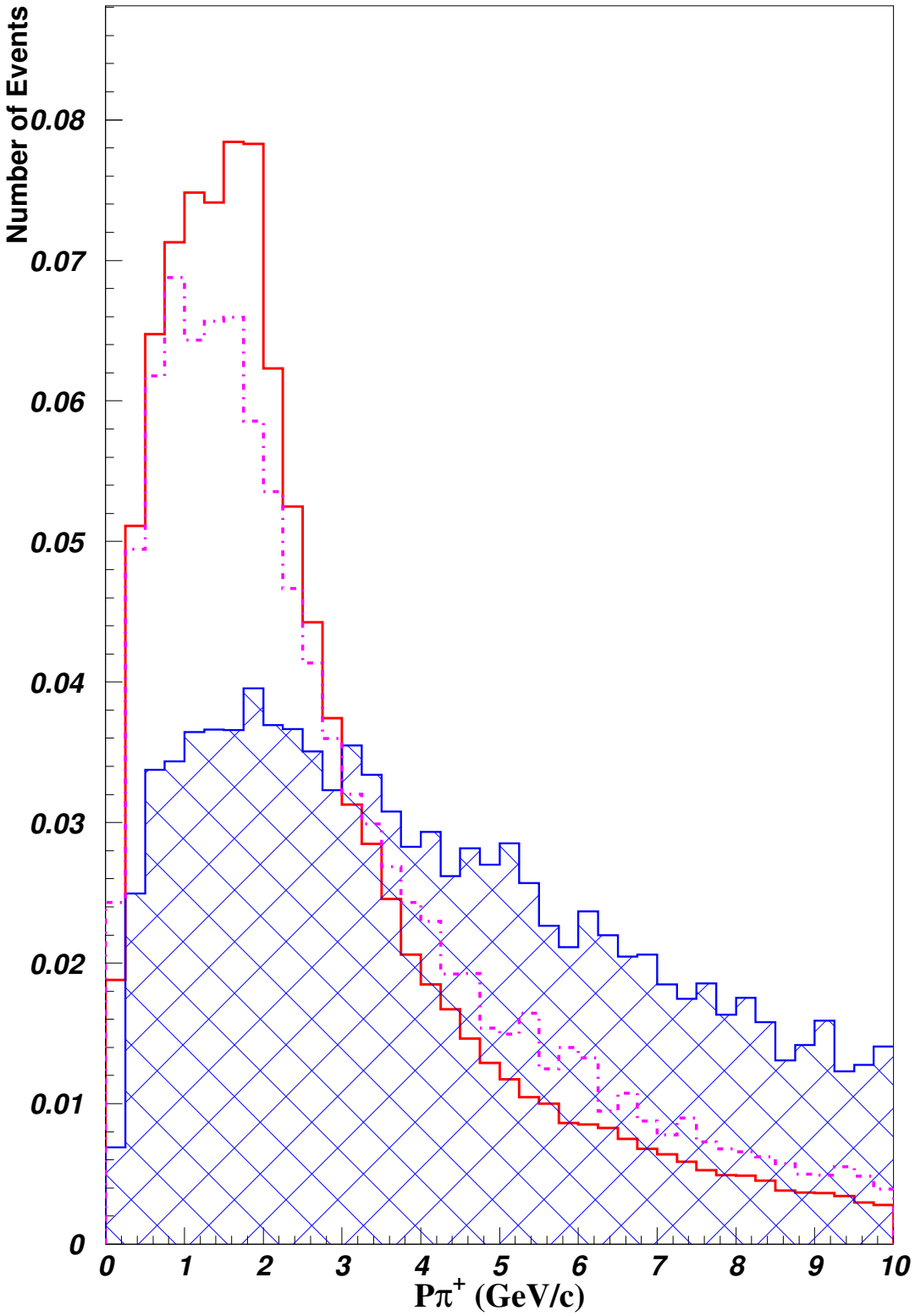


Figure 9: π^+ MC Shape Comparison

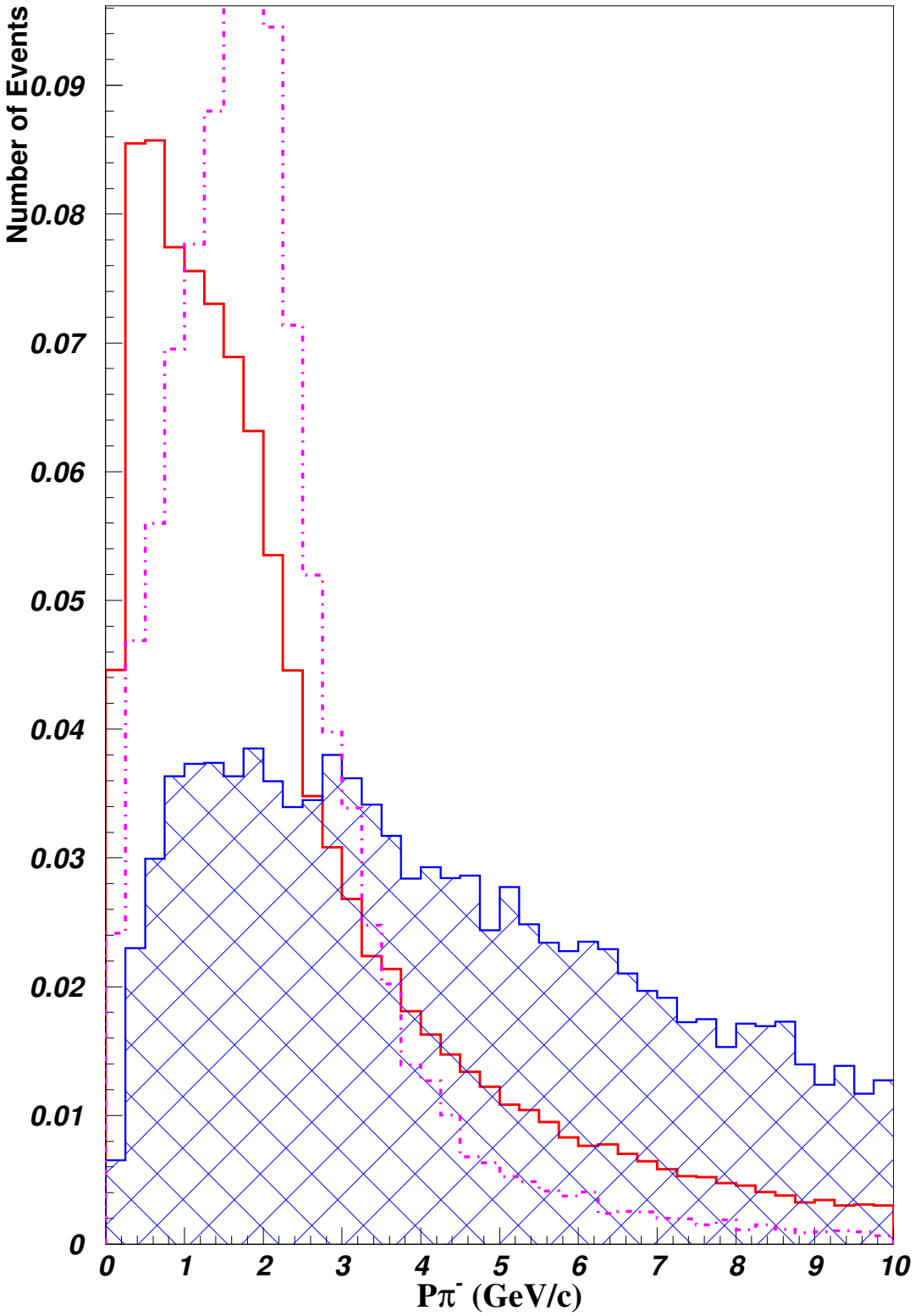


Figure 10: π^- MC Shape Comparison

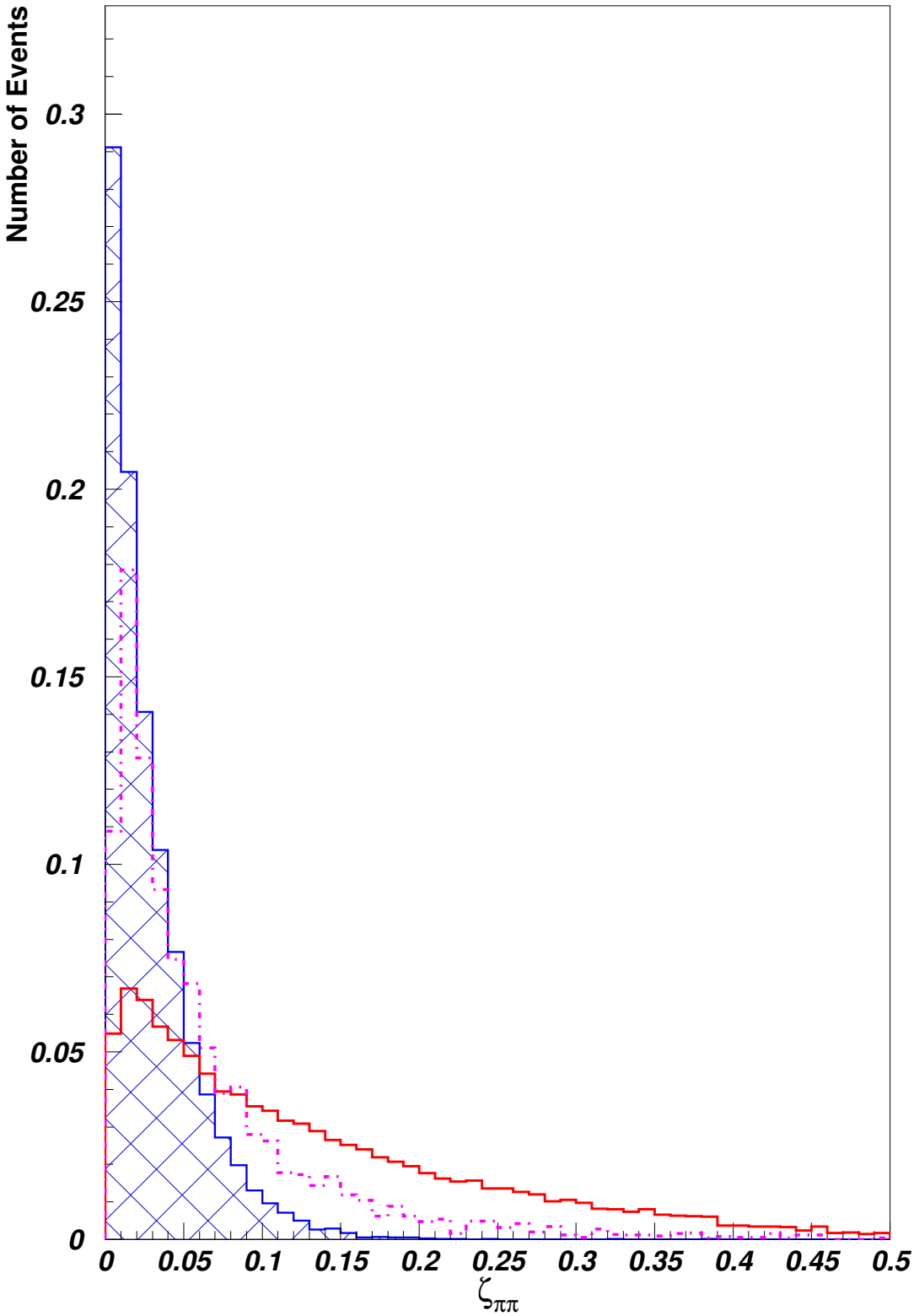


Figure 11: $\zeta_{\pi\pi}$ MC Shape Comparison

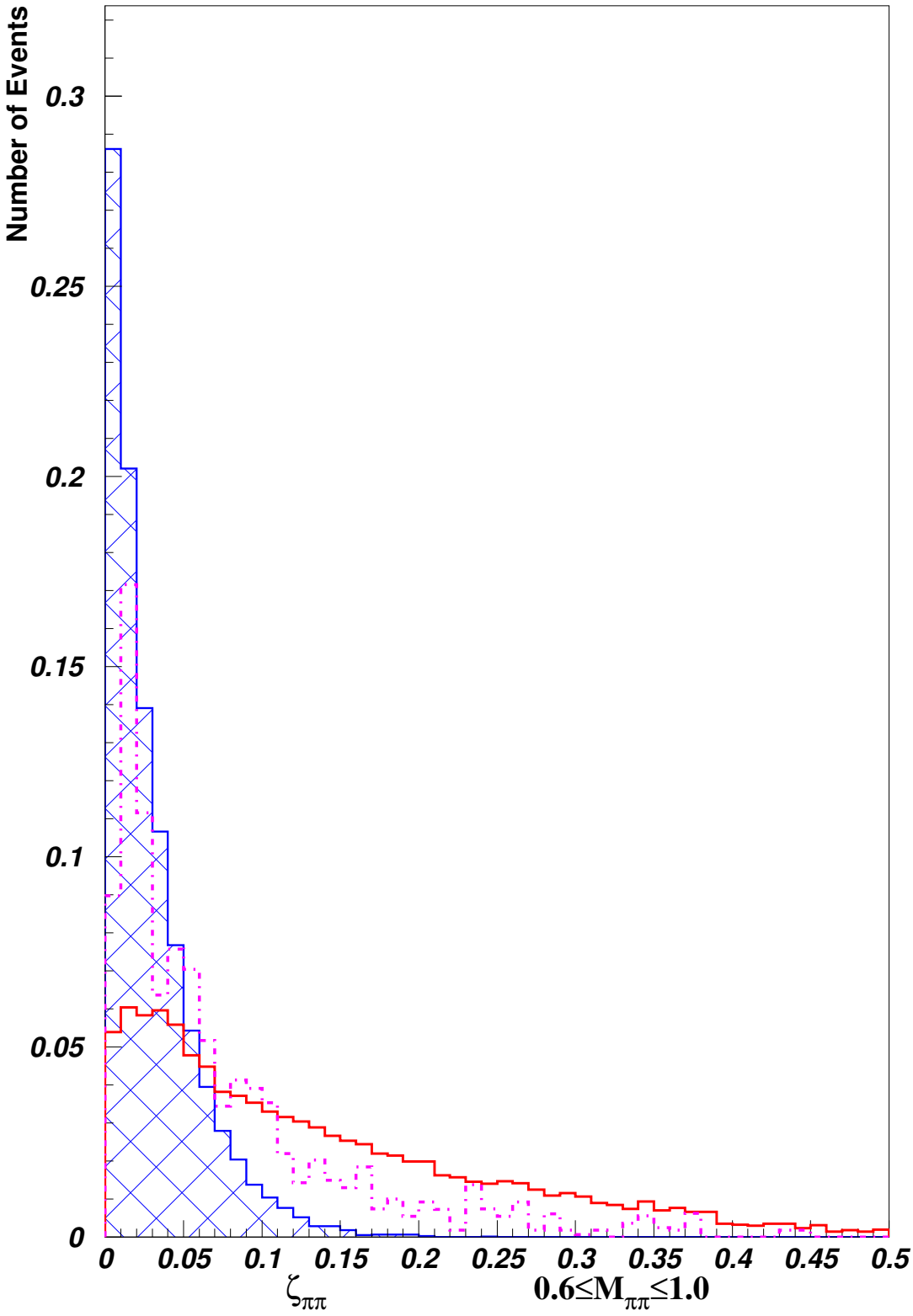


Figure 12: $\zeta_{\pi\pi}$ in Rho Mass Range MC Shape Comparison

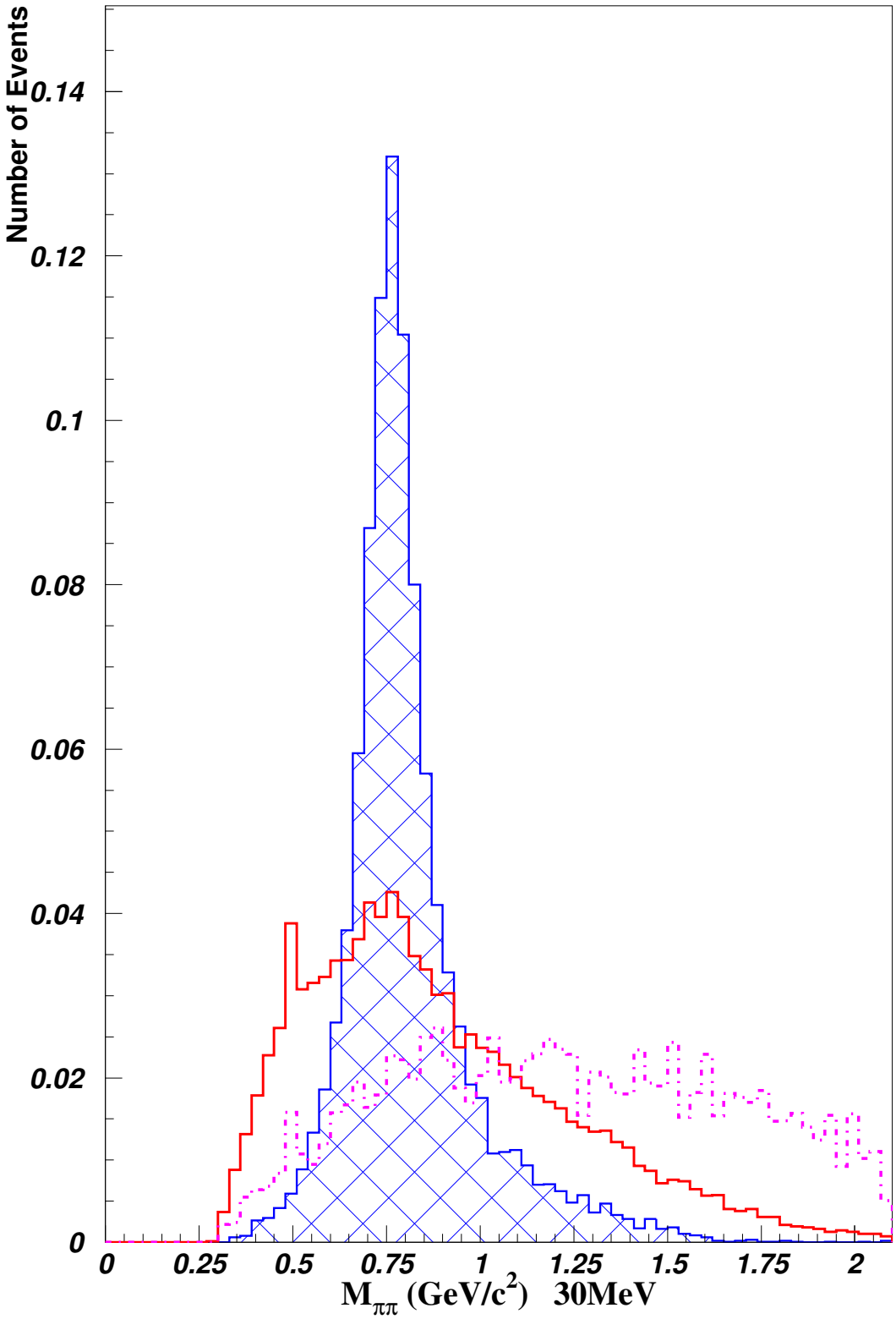


Figure 13: $M_{\pi\pi}$ MC Shape Comparison

8 Plots

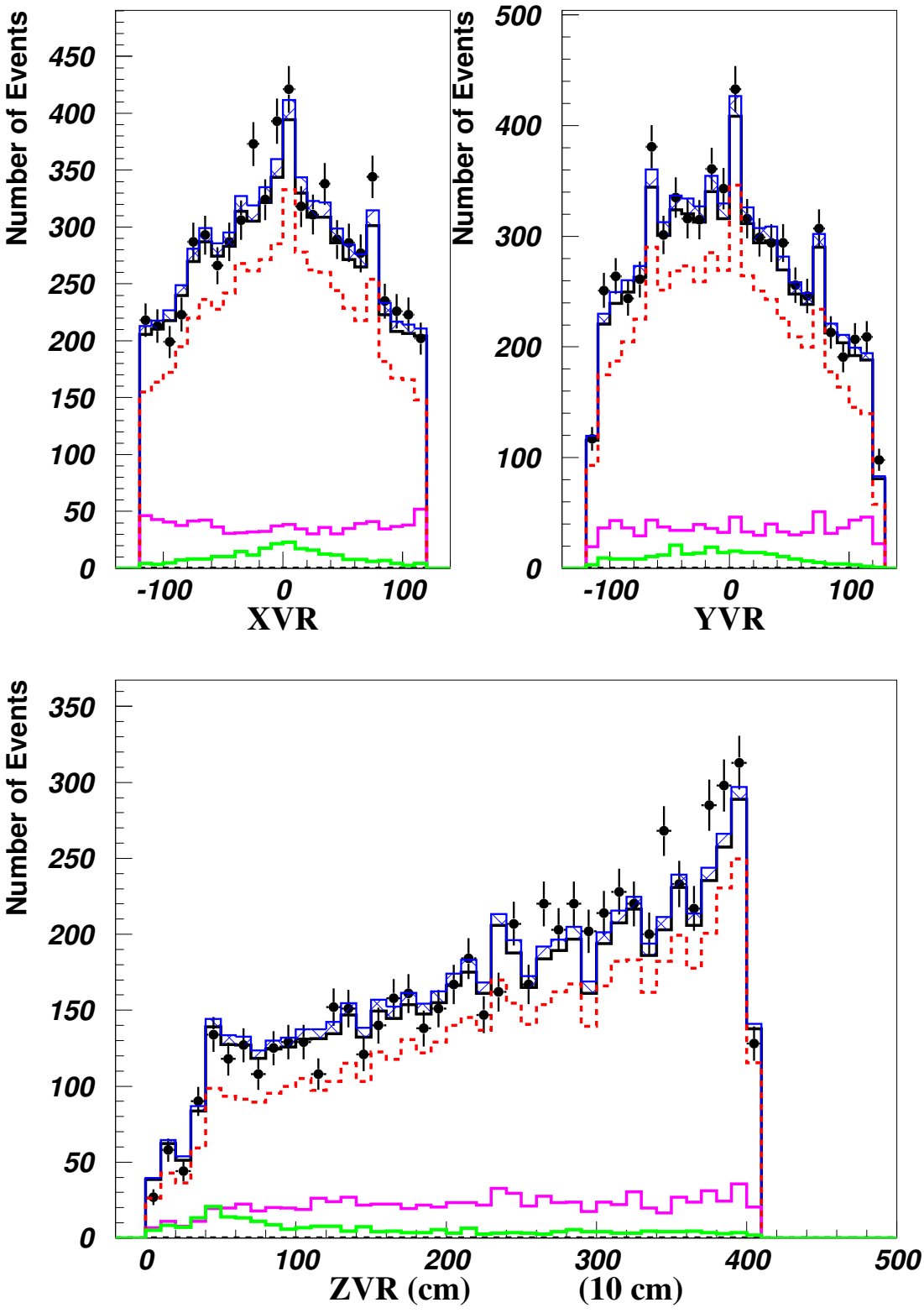


Figure 14: Vertex Position

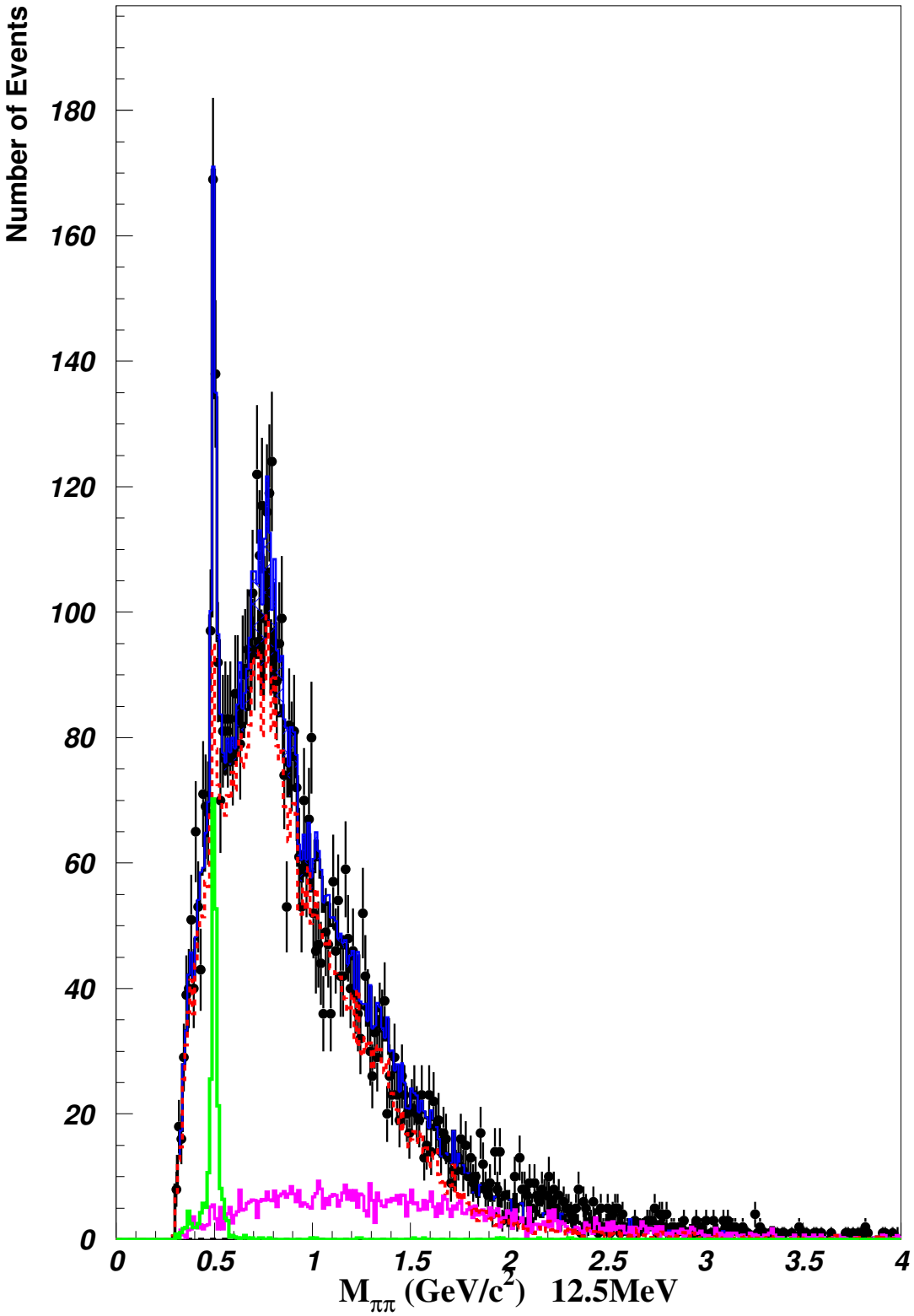


Figure 15: $M_{\pi\pi}$ 12.5MeV

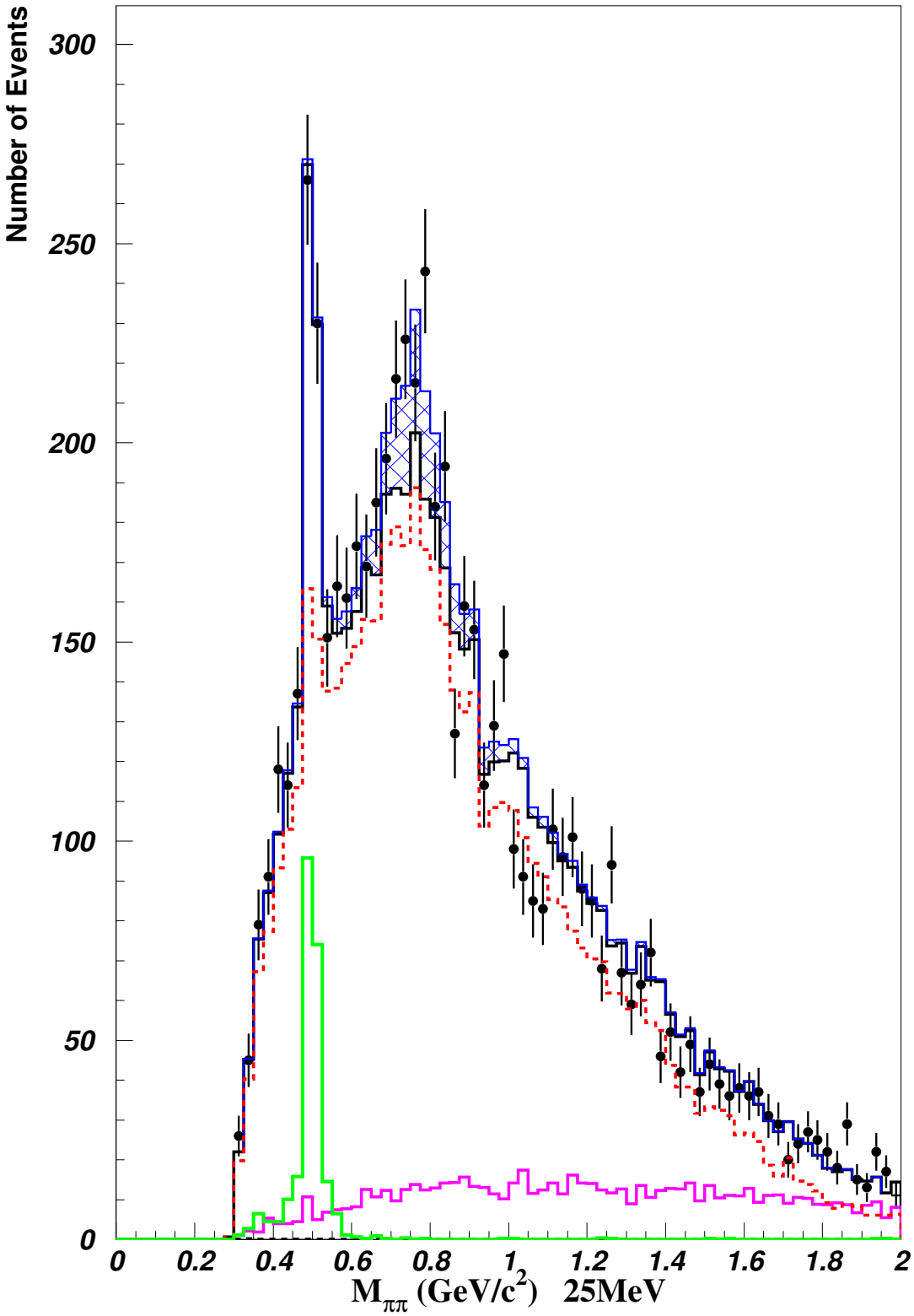


Figure 16: $M_{\pi\pi}$ 25MeV

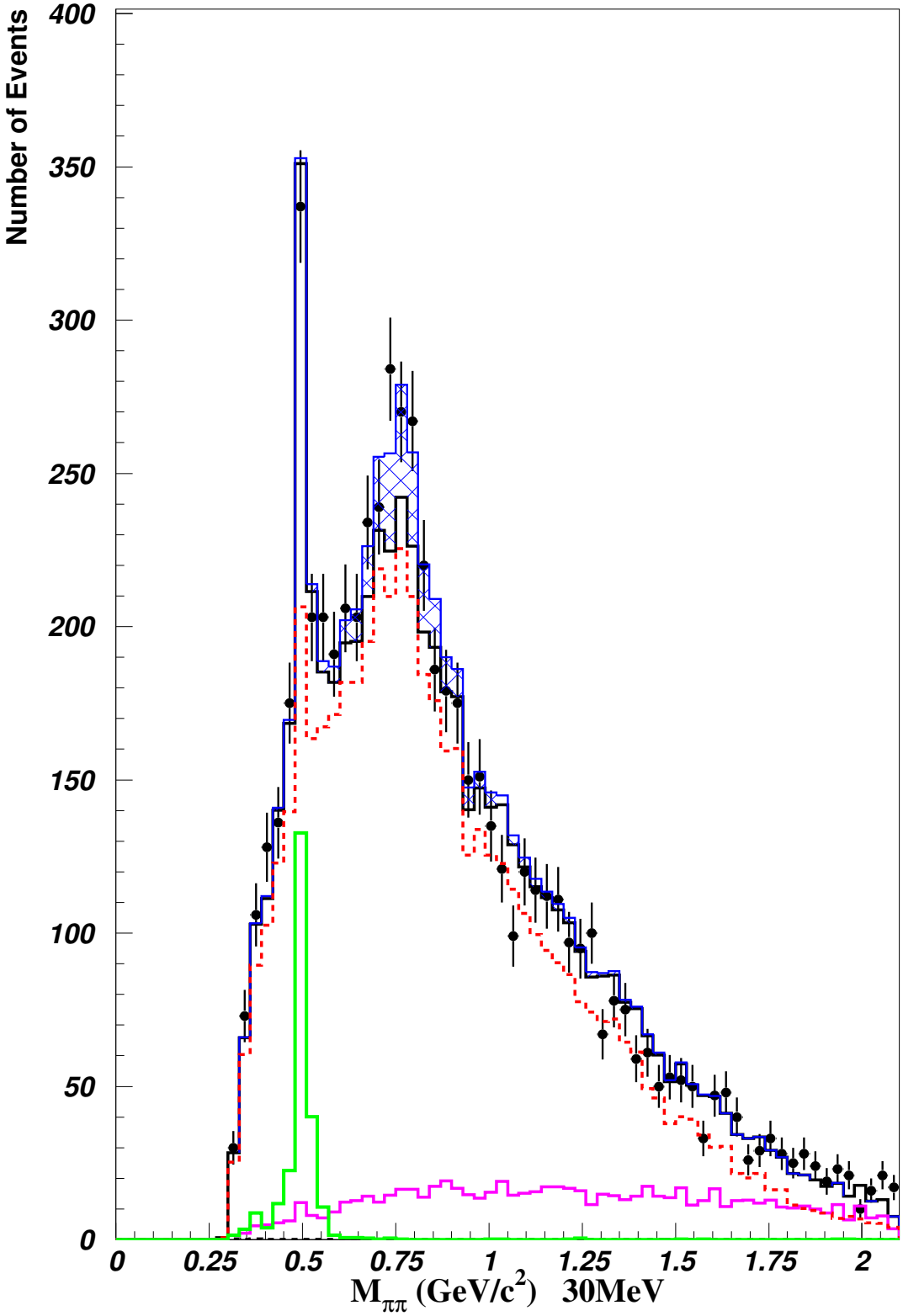


Figure 17: $M_{\pi\pi}$ 30MeV

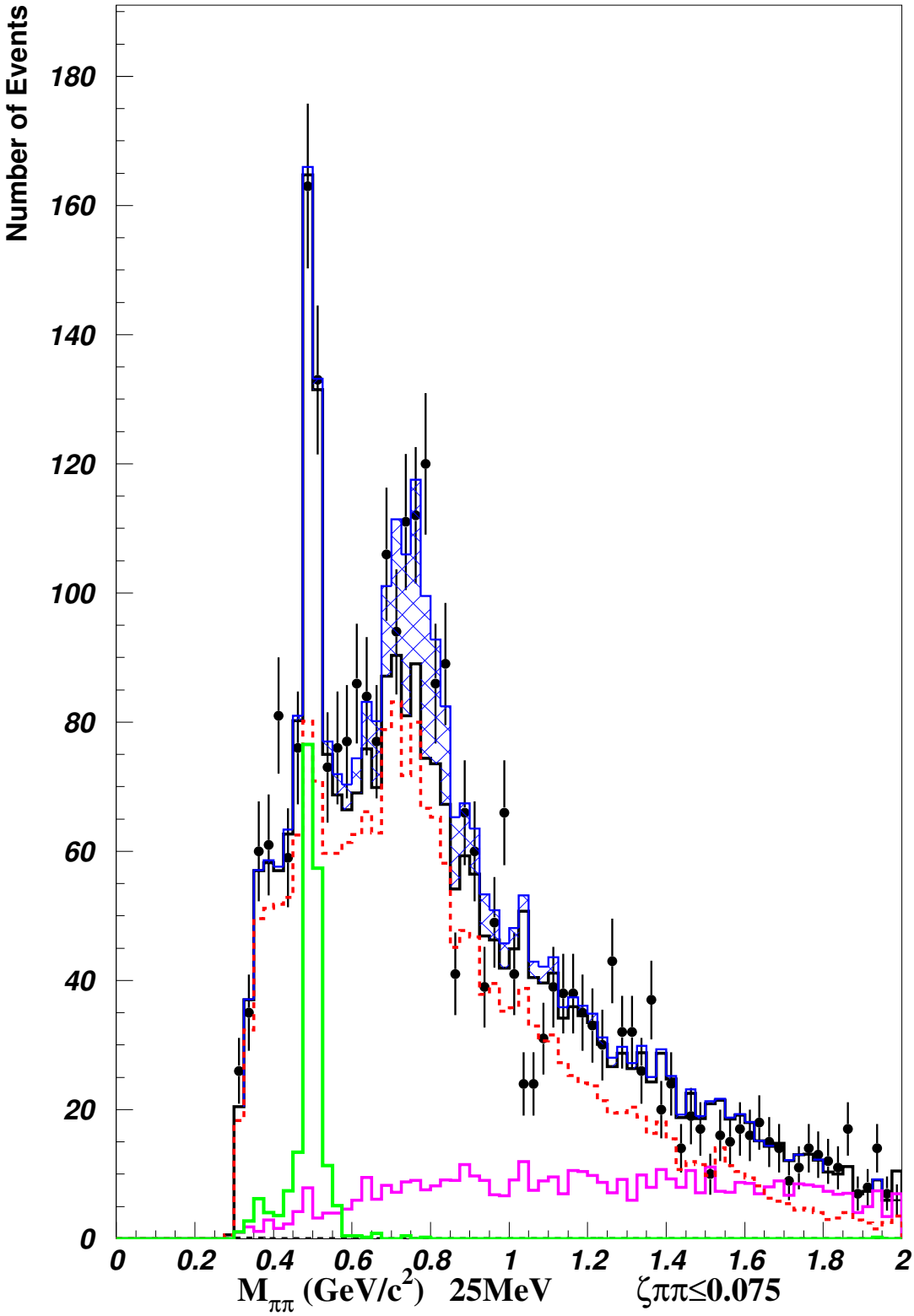


Figure 18: $M_{\pi\pi}$ 25MeV (Signal Region)

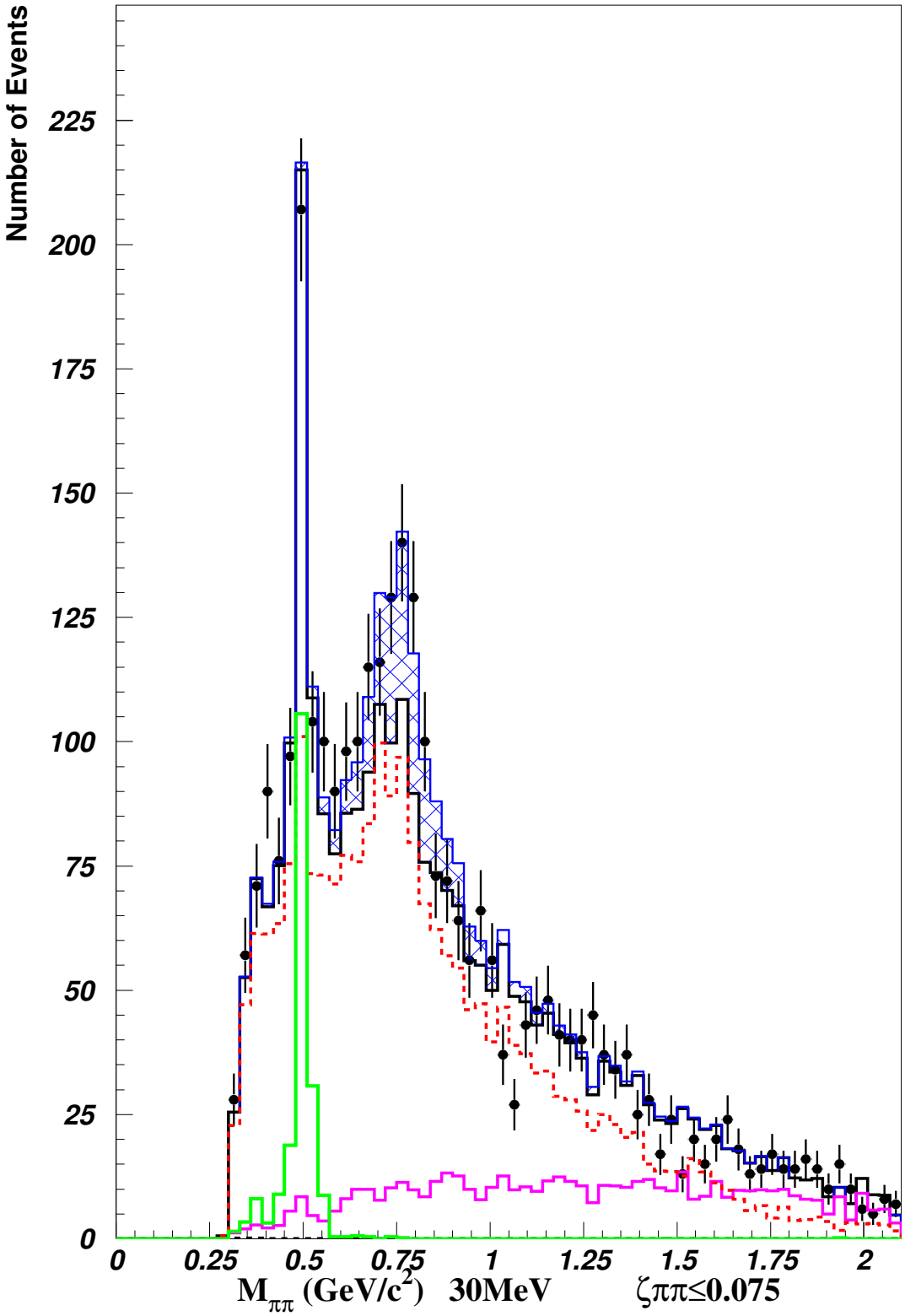


Figure 19: $M_{\pi\pi}$ 30MeV (Signal Region)

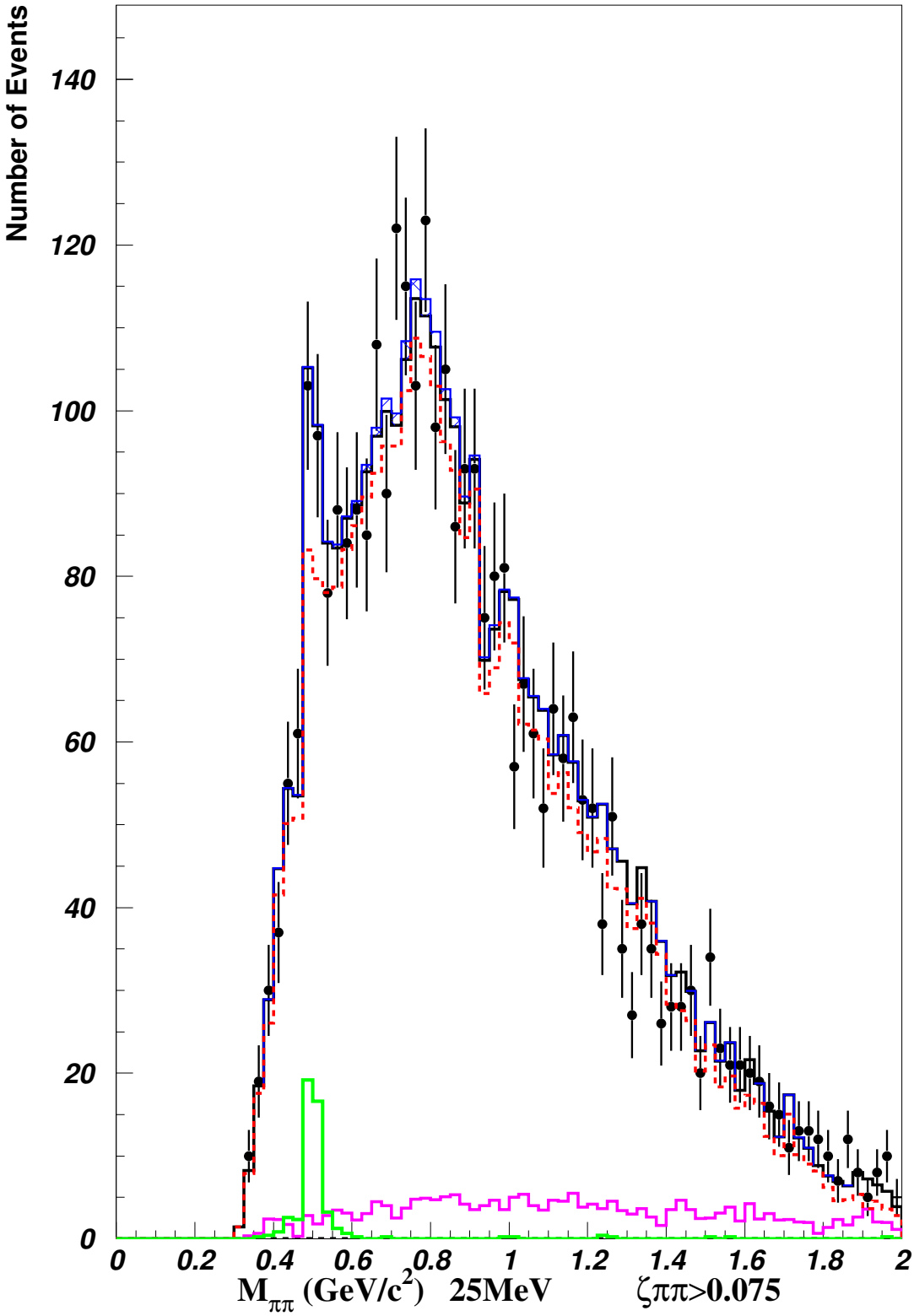


Figure 20: $M_{\pi\pi}$ 25MeV (Background Region)

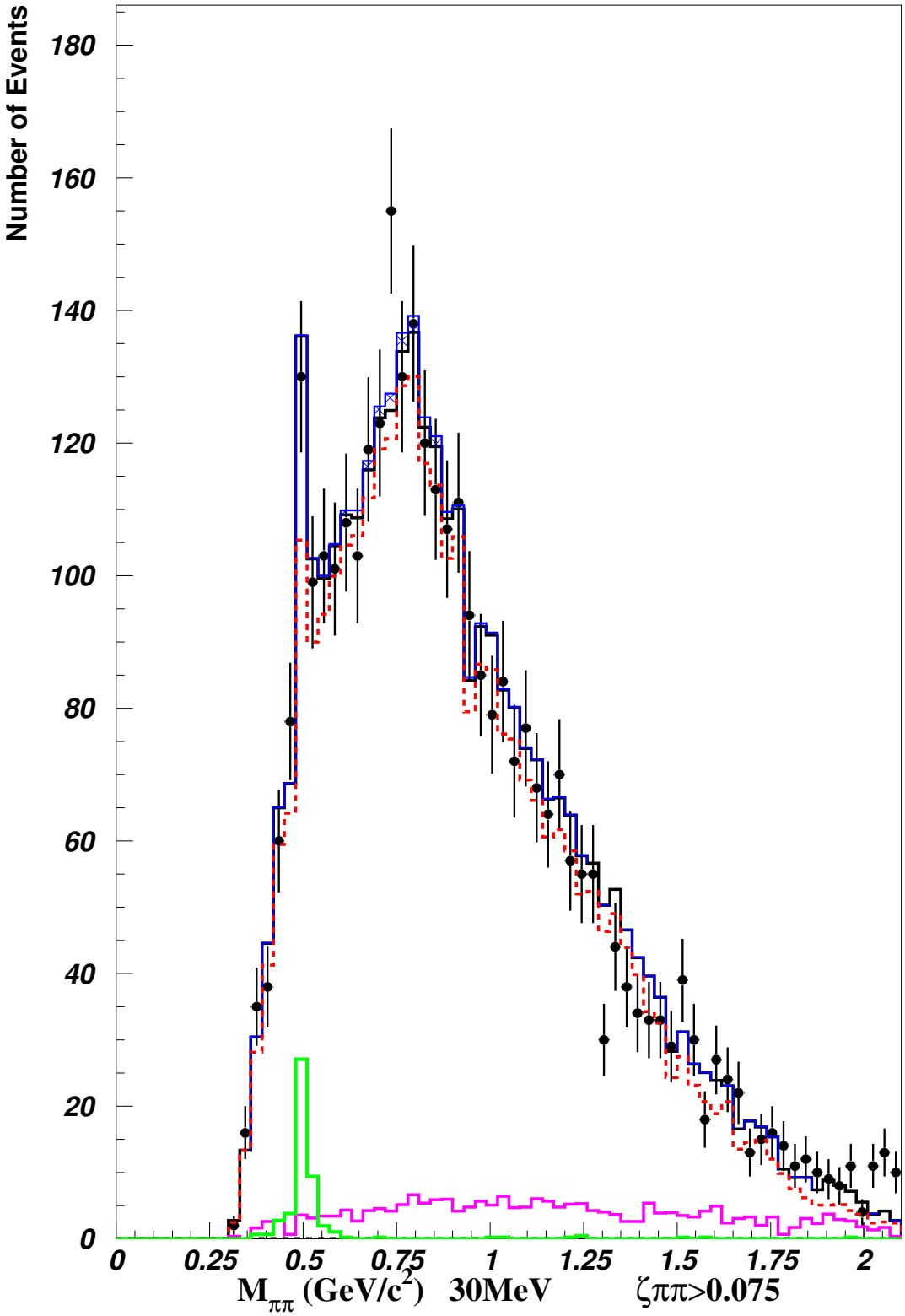


Figure 21: $M_{\pi\pi}$ 30MeV (Background Region)

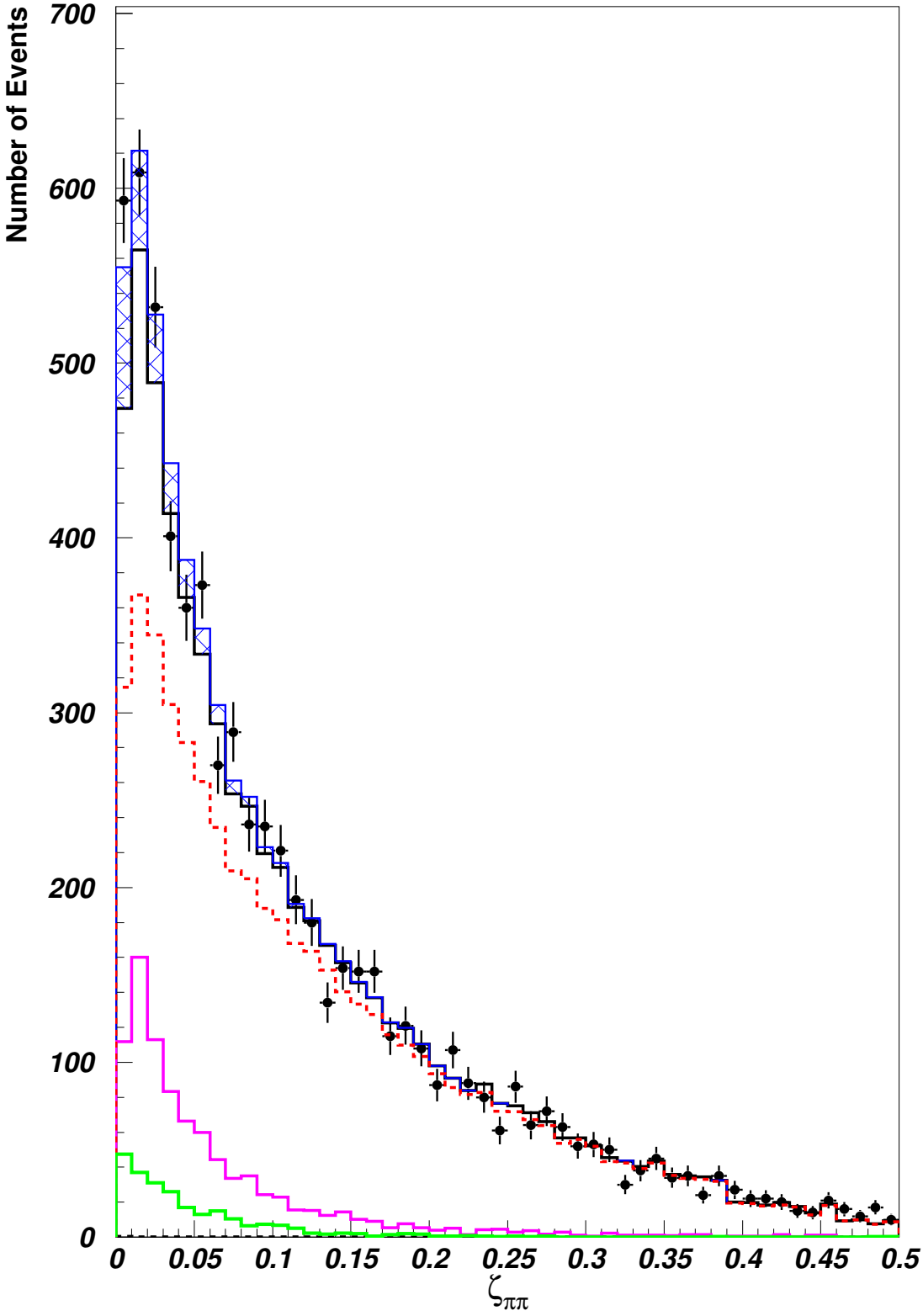


Figure 22: $\zeta_{\pi\pi}$

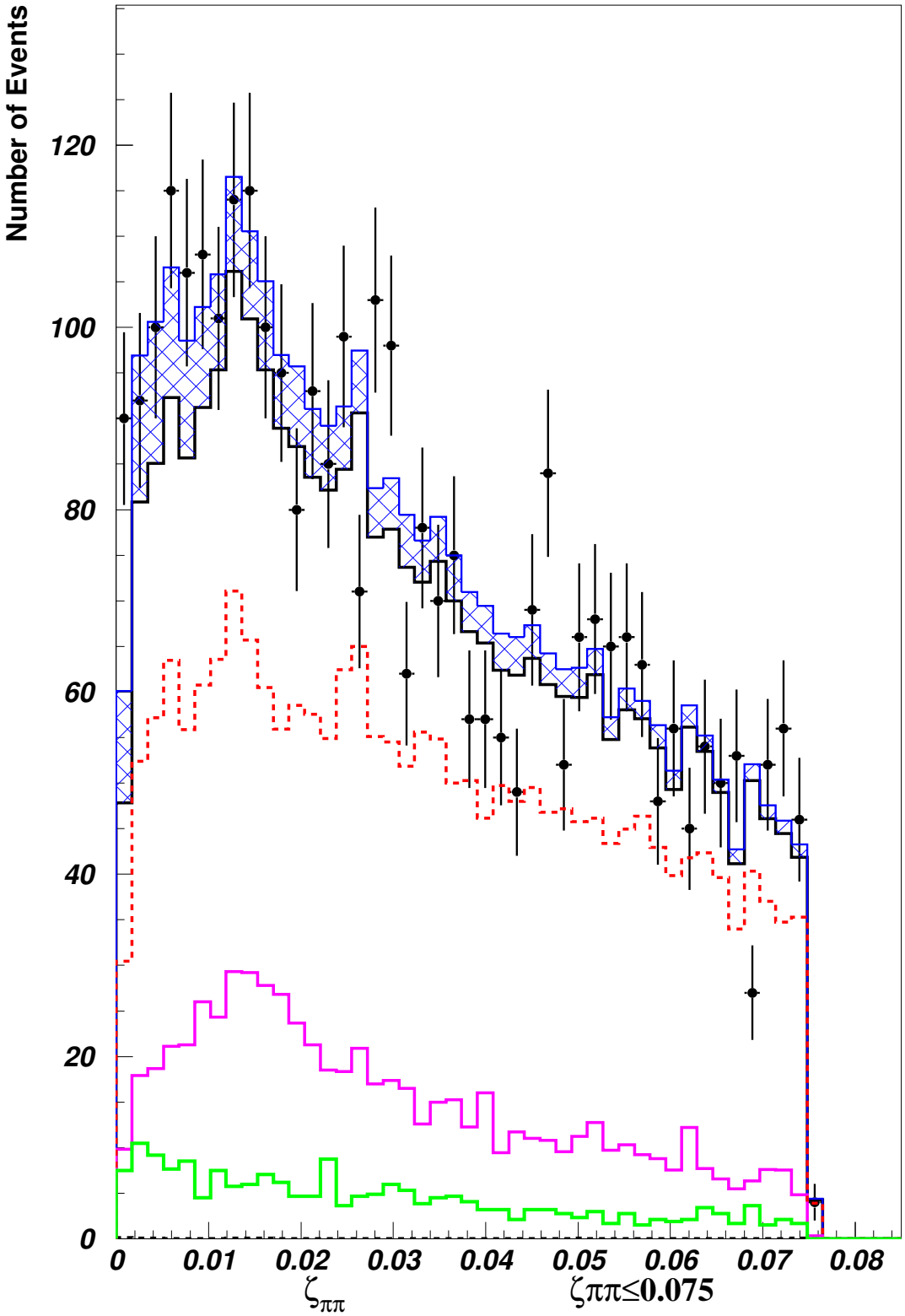


Figure 23: $\zeta_{\pi\pi}$ (Signal Region)

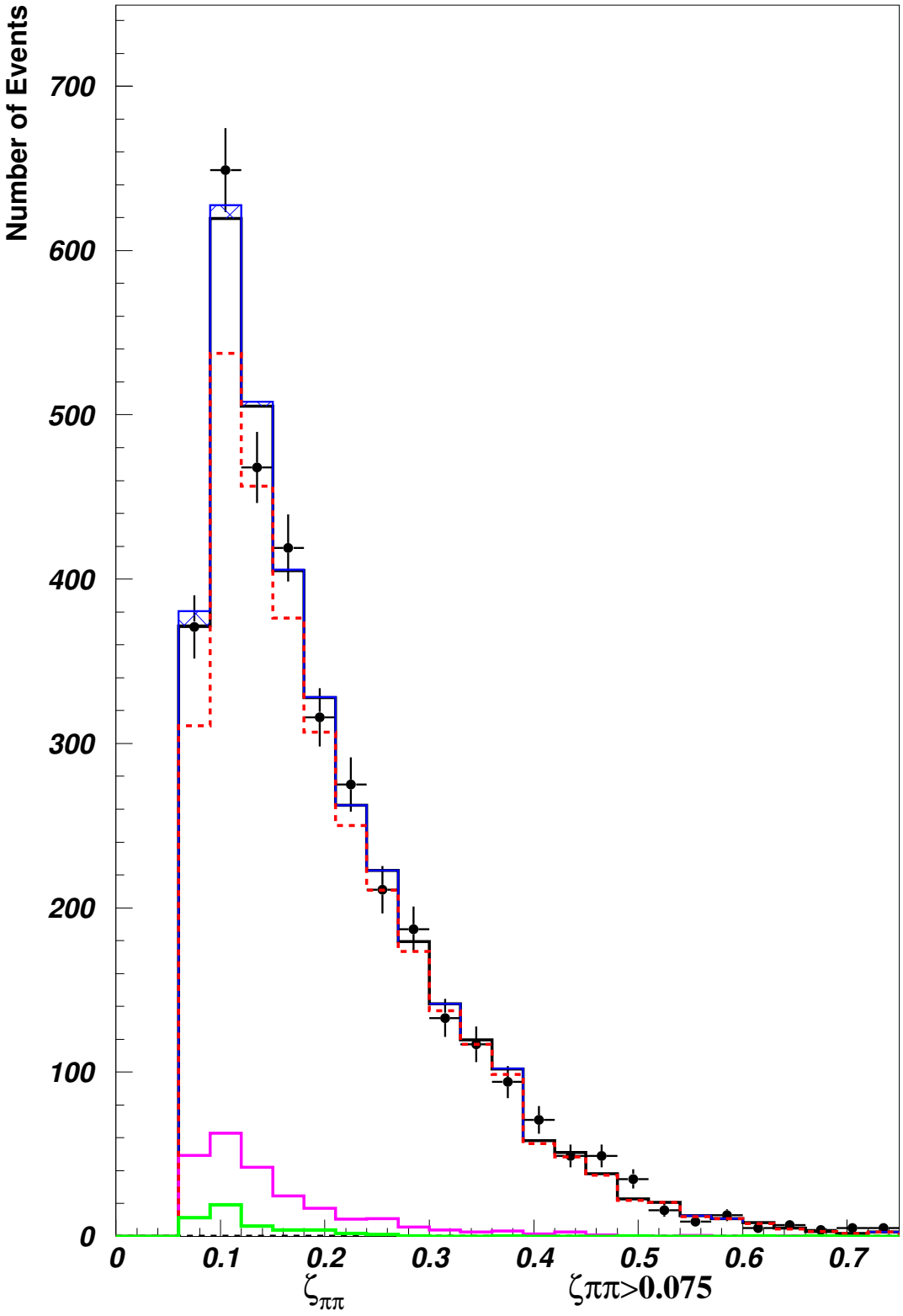


Figure 24: $\zeta_{\pi\pi}$ (Background Region)

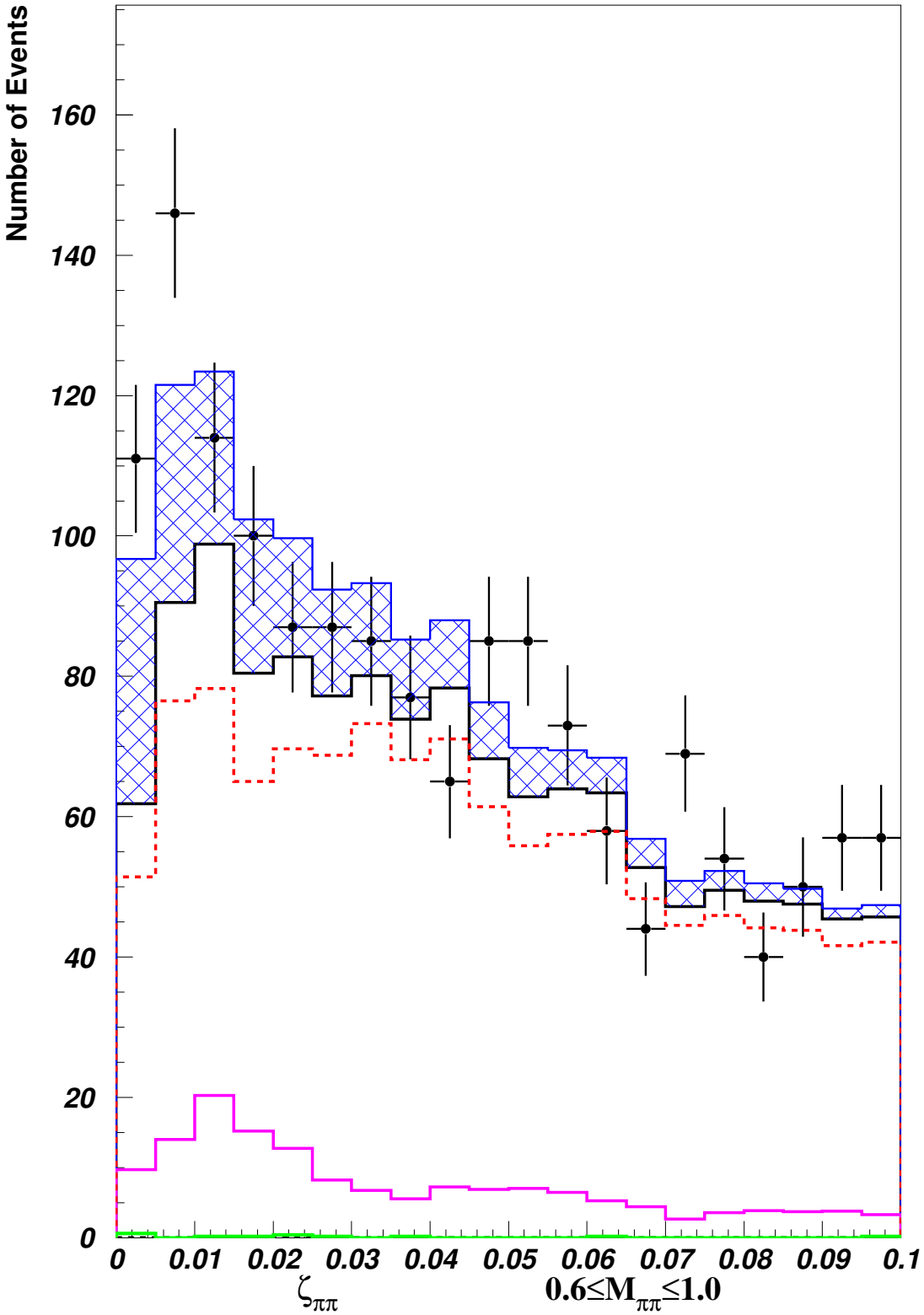


Figure 25: $\zeta_{\pi\pi}$ (Used for χ^2)

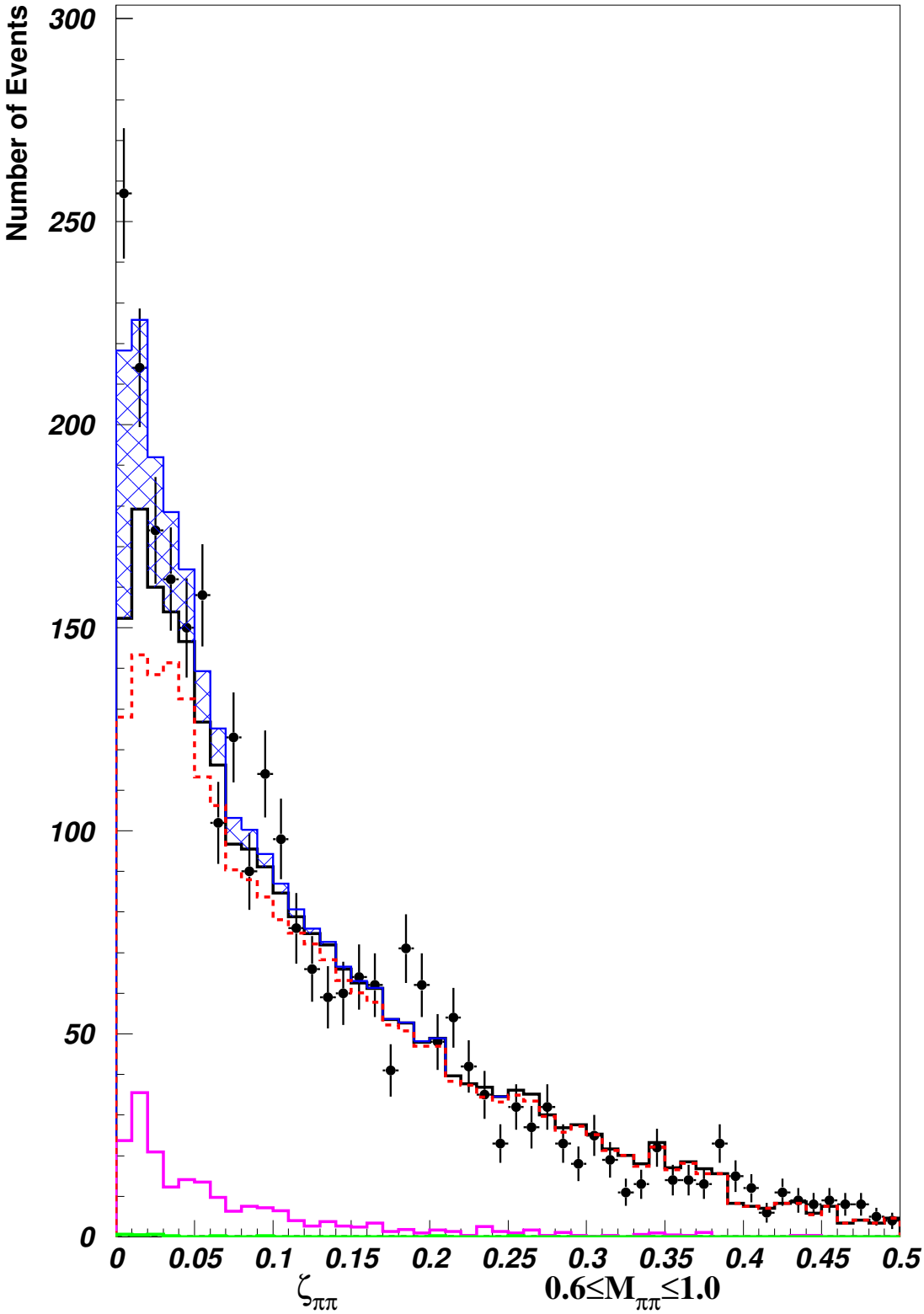


Figure 26: $\zeta_{\pi\pi}$ (Rho Mass Region)

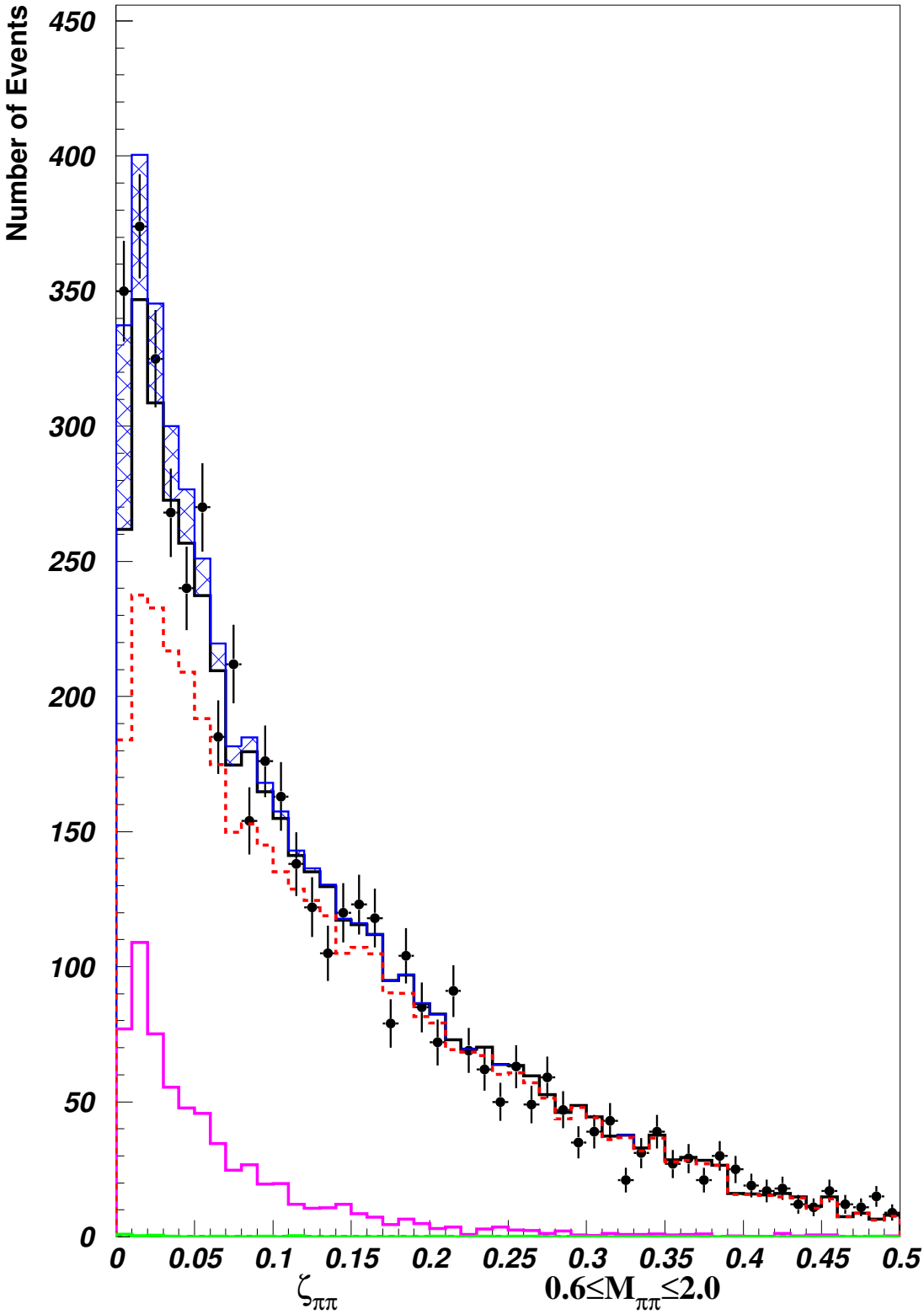


Figure 27: $\zeta_{\pi\pi}$ (Rho+Tail Mass Region)

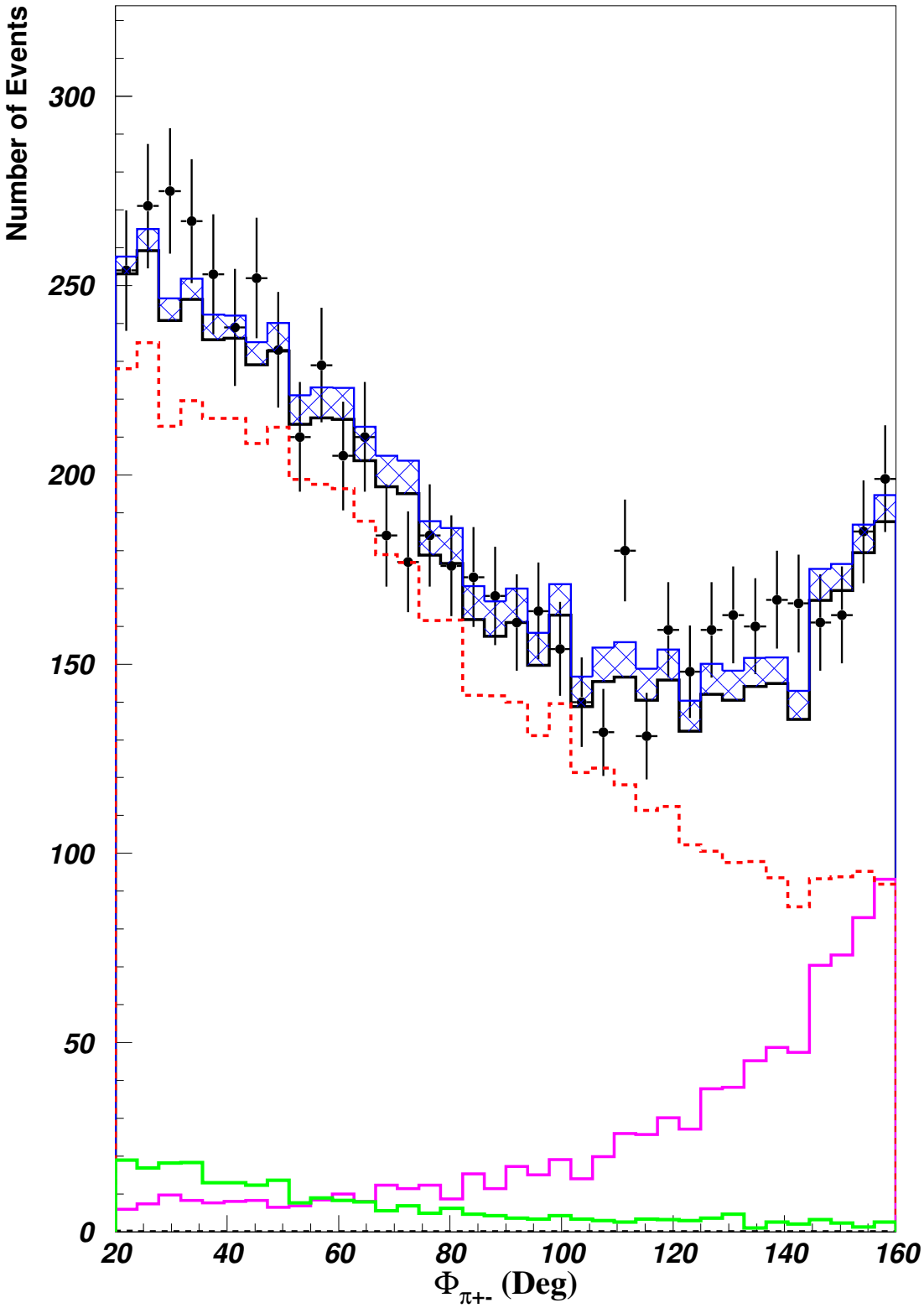


Figure 28: ϕ_{12}

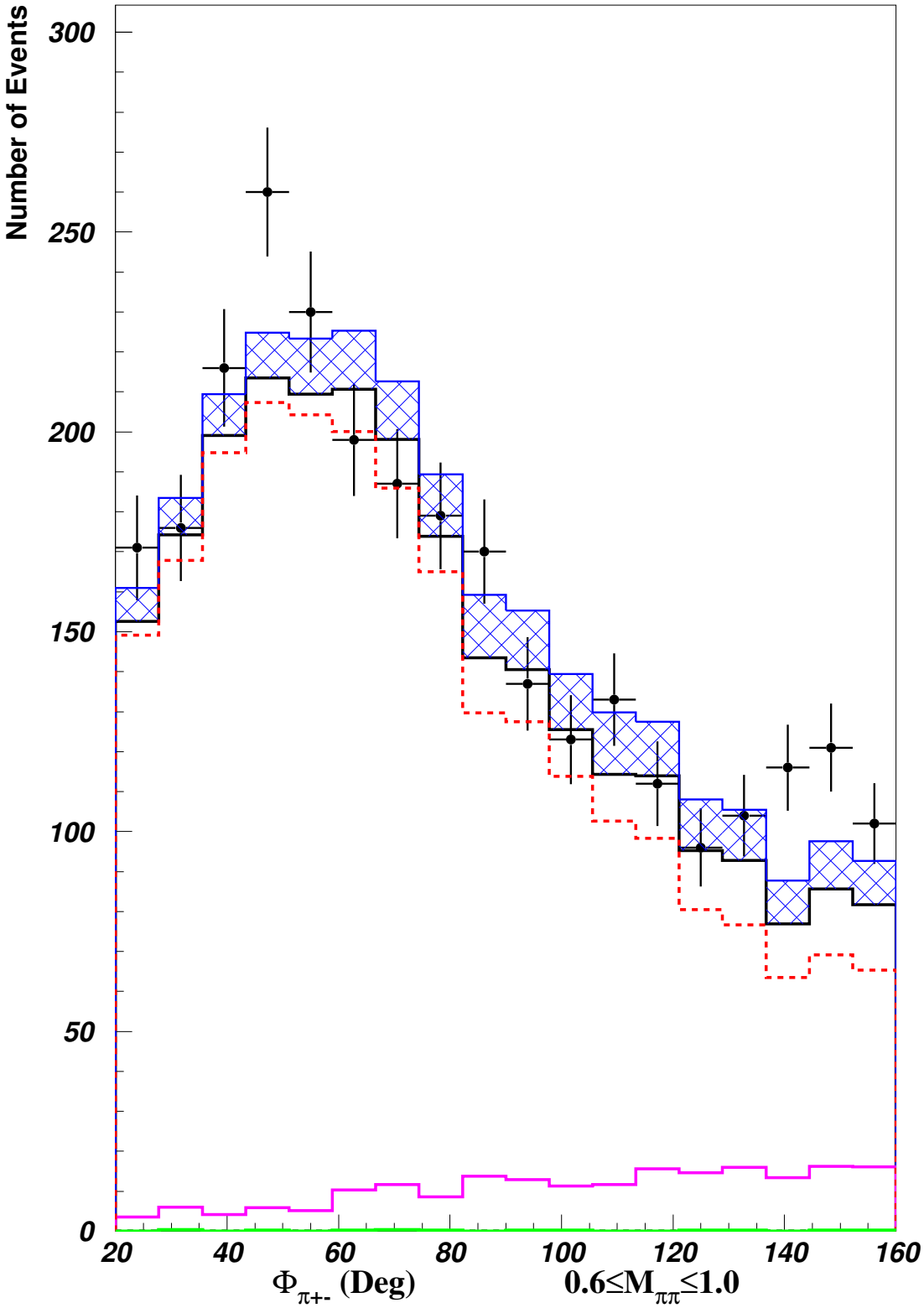


Figure 29: ϕ_{12} (In Rho Mass range)

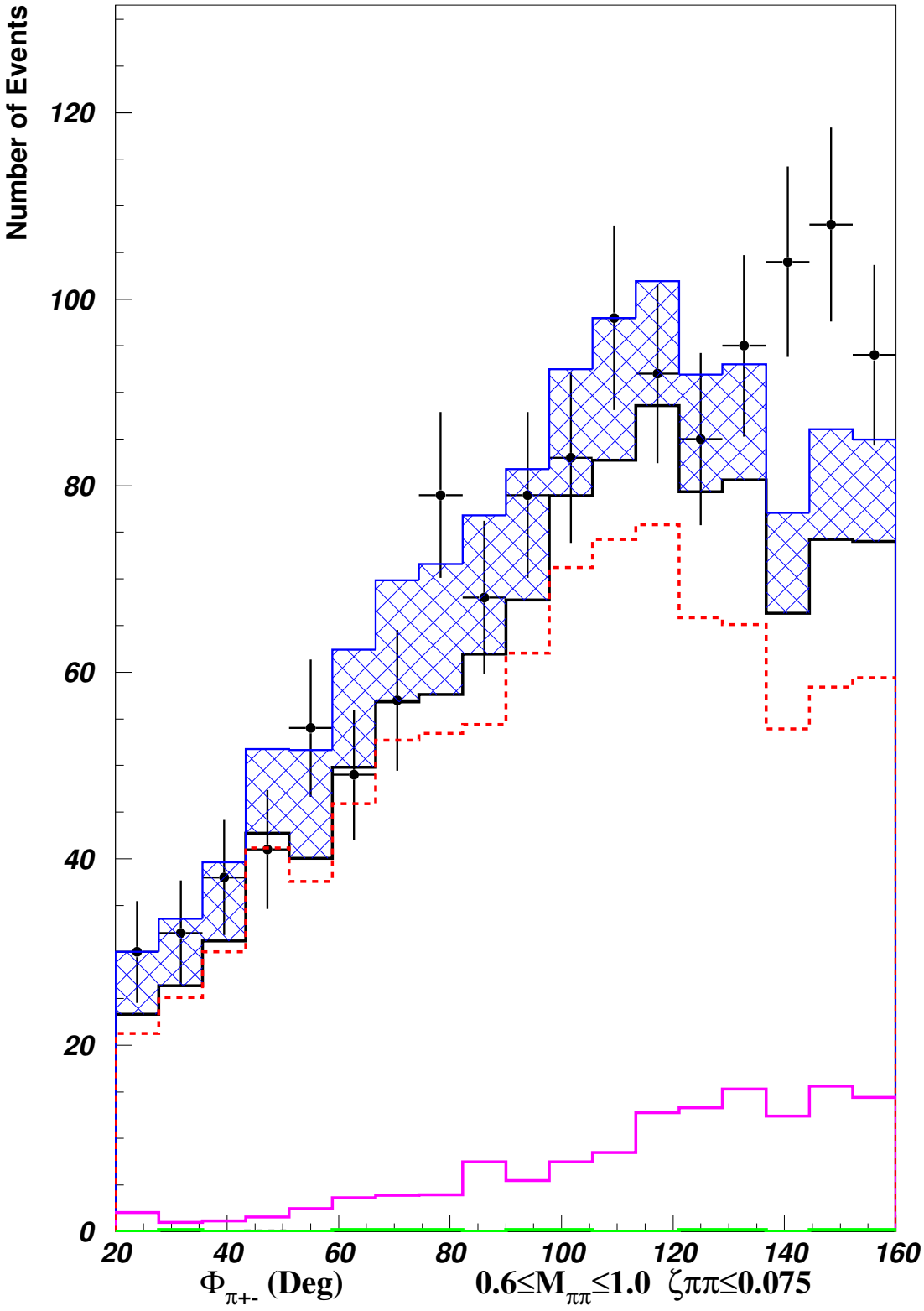


Figure 30: ϕ_{12} (Signal Region in Rho Mass)

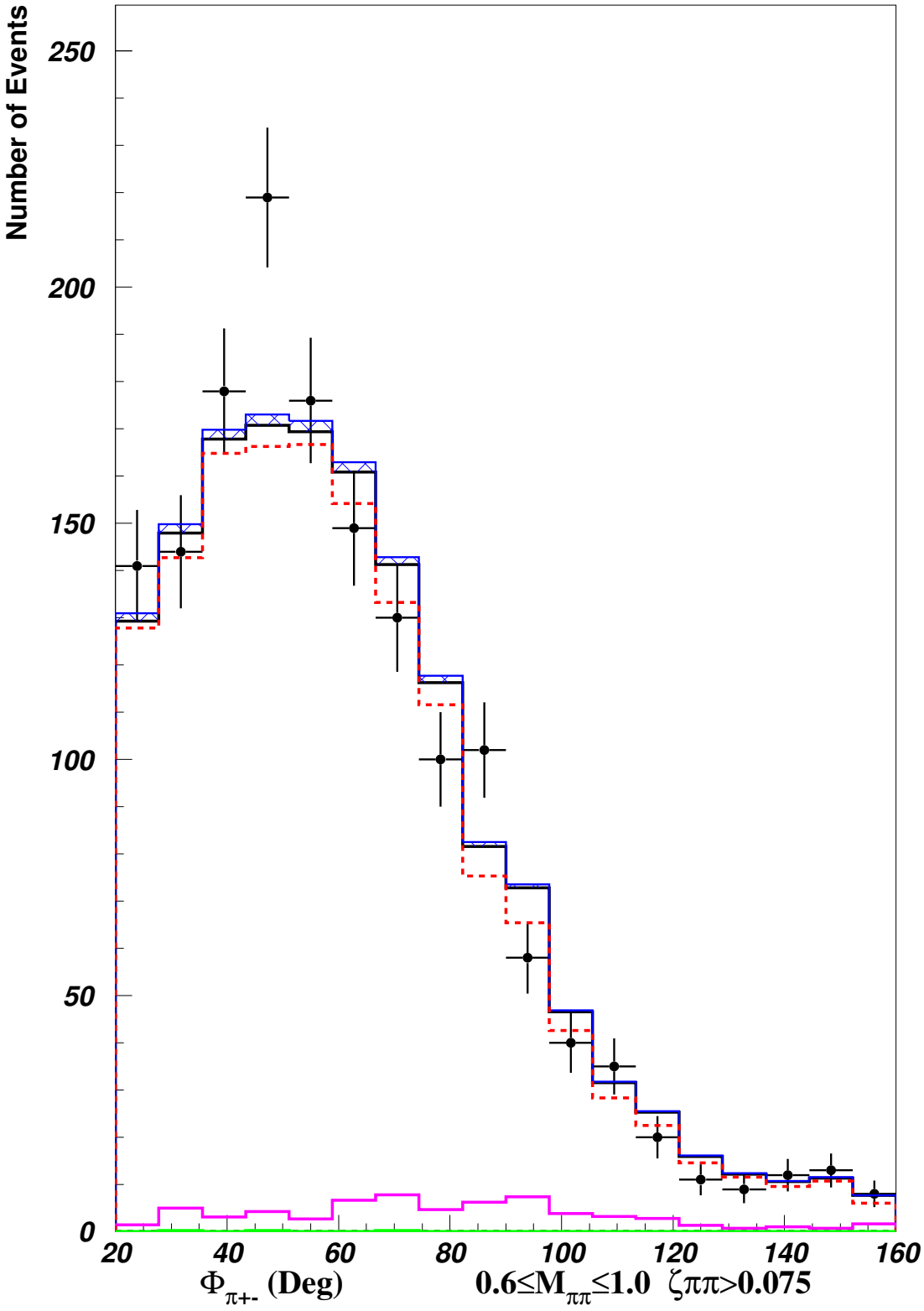


Figure 31: ϕ_{12} (Background Region in Rho Mass)

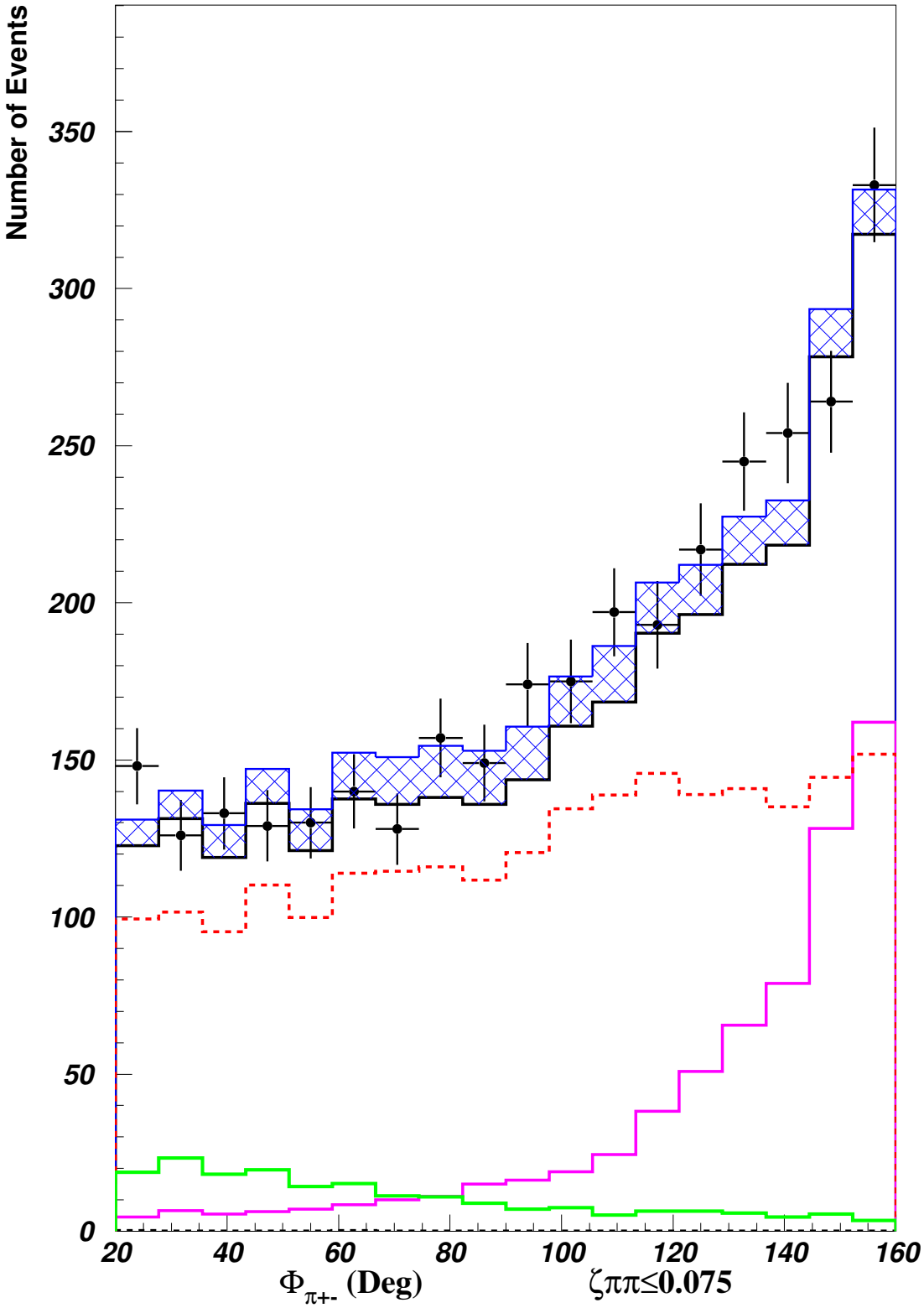


Figure 32: ϕ_{12} (Signal Region)

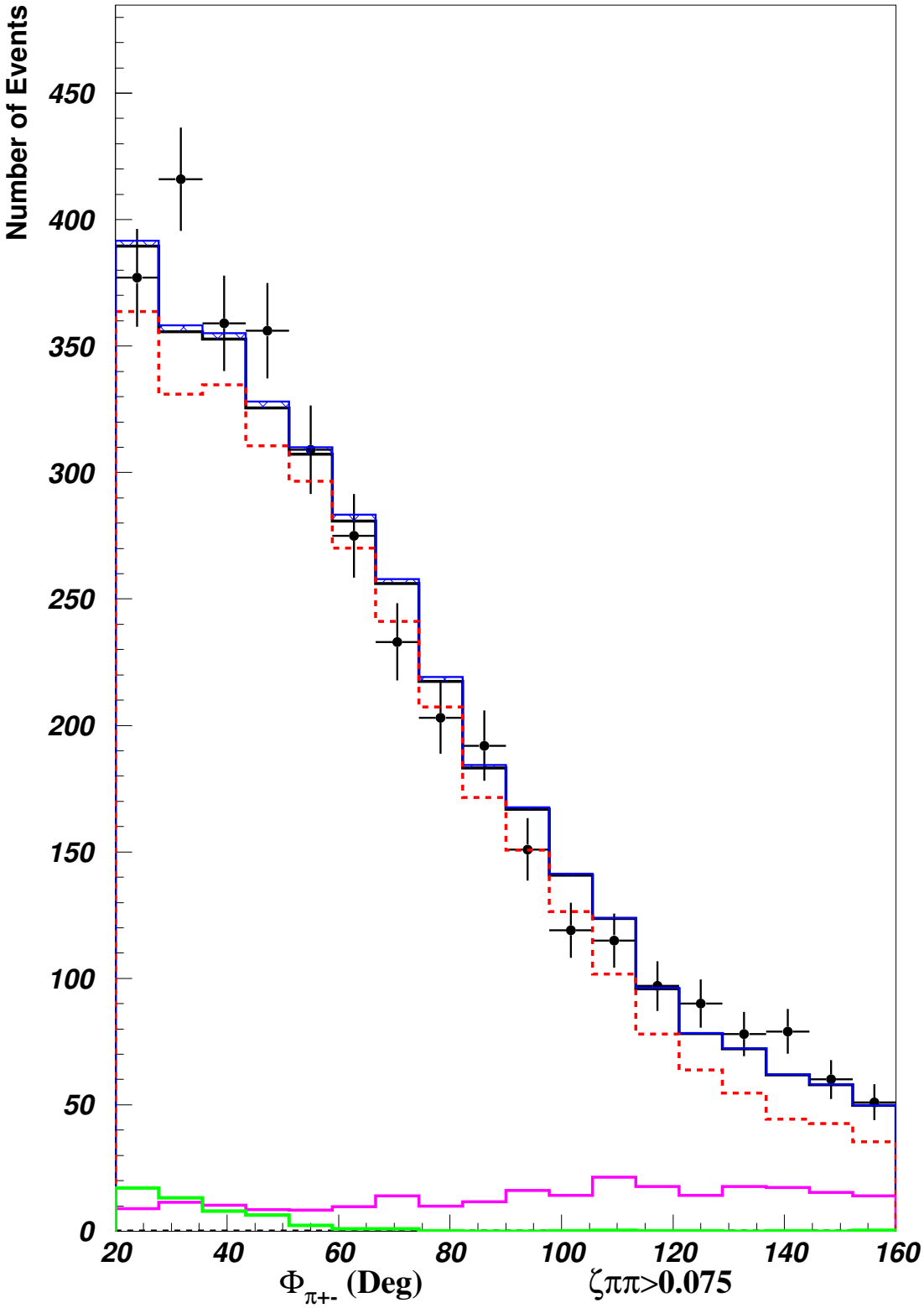
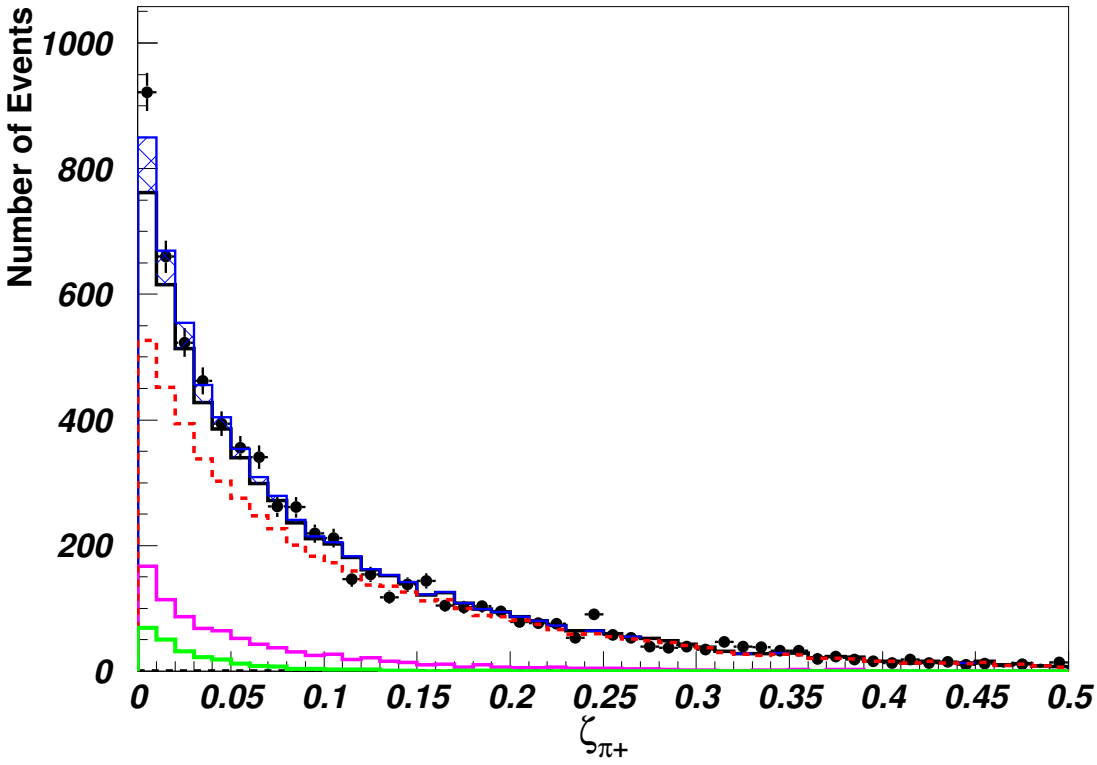


Figure 33: ϕ_{12} (Background Region)



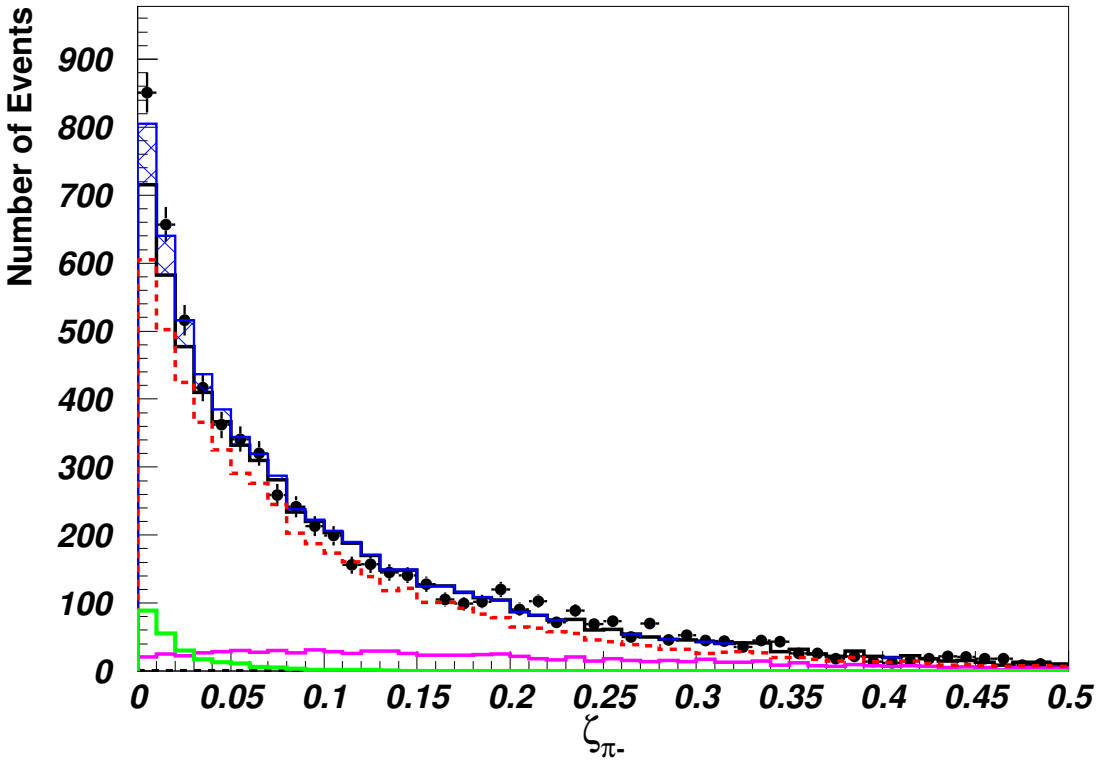


Figure 34: $\zeta_{\pi+}$ and $\zeta_{\pi-}$

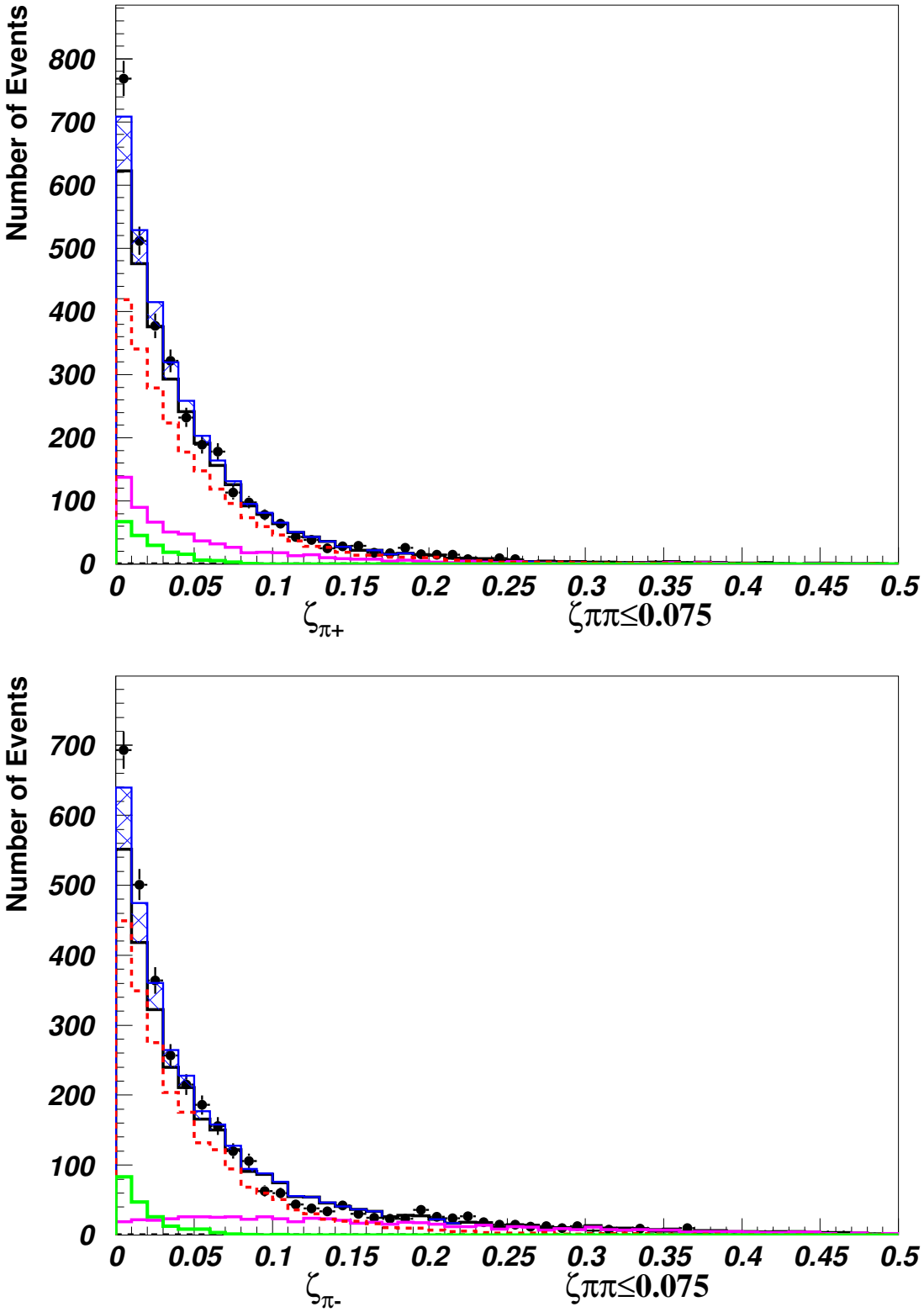


Figure 35: ζ_{π^+} and ζ_{π^-} (Signal Region)

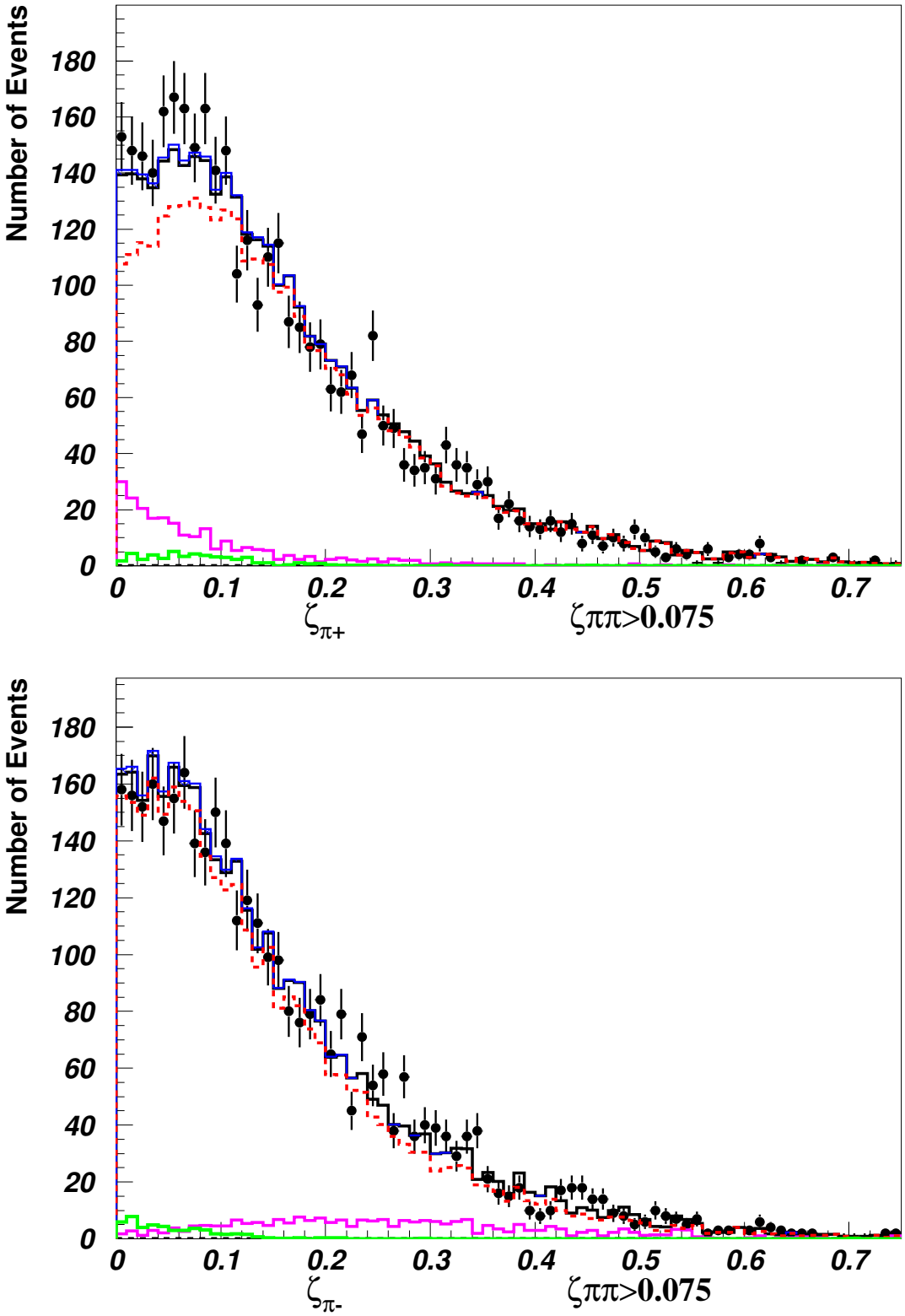


Figure 36: ζ_{π^+} and ζ_{π^-} (Background Region)

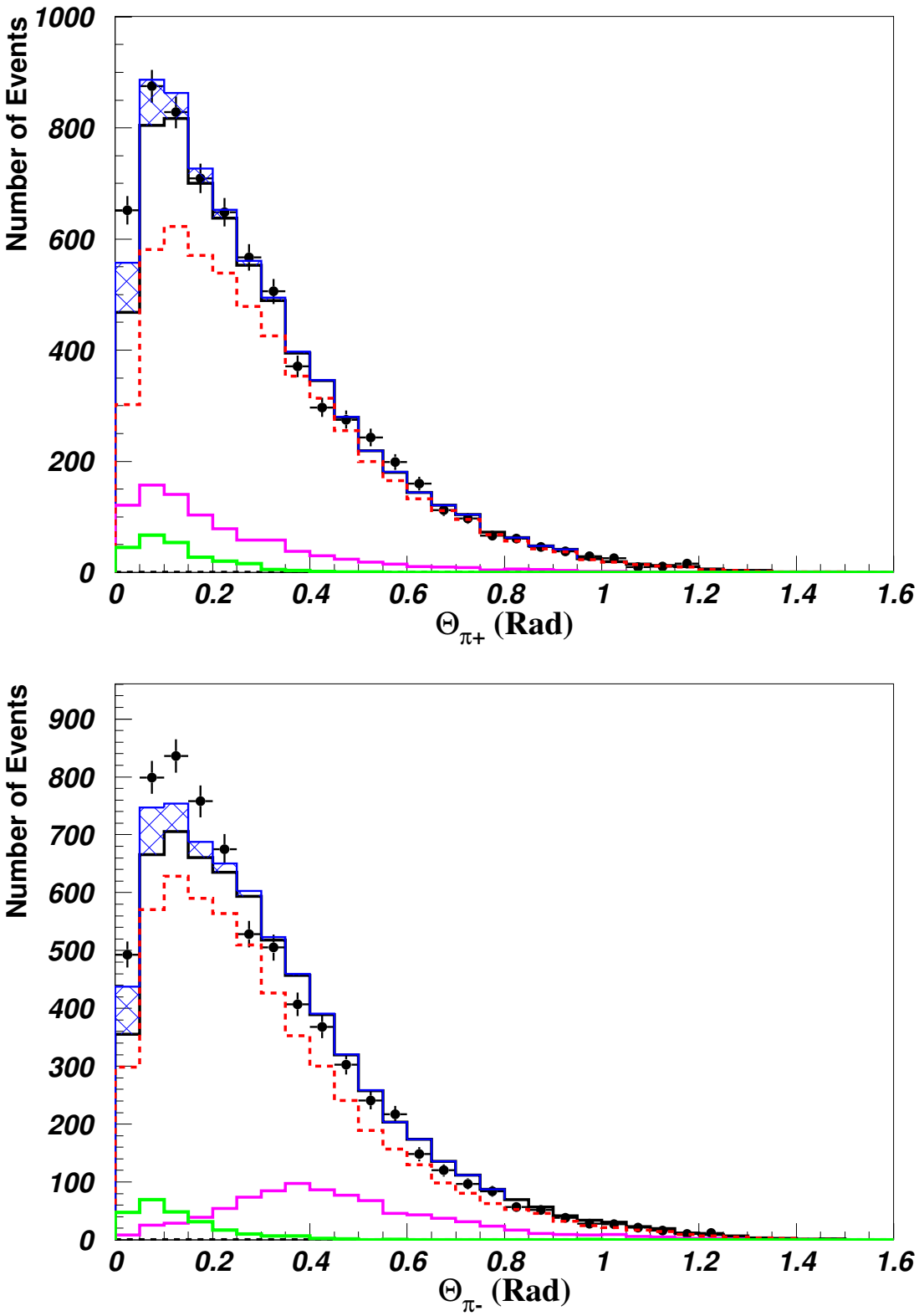


Figure 37: $\theta_{\pi+}$ and $\theta_{\pi-}$

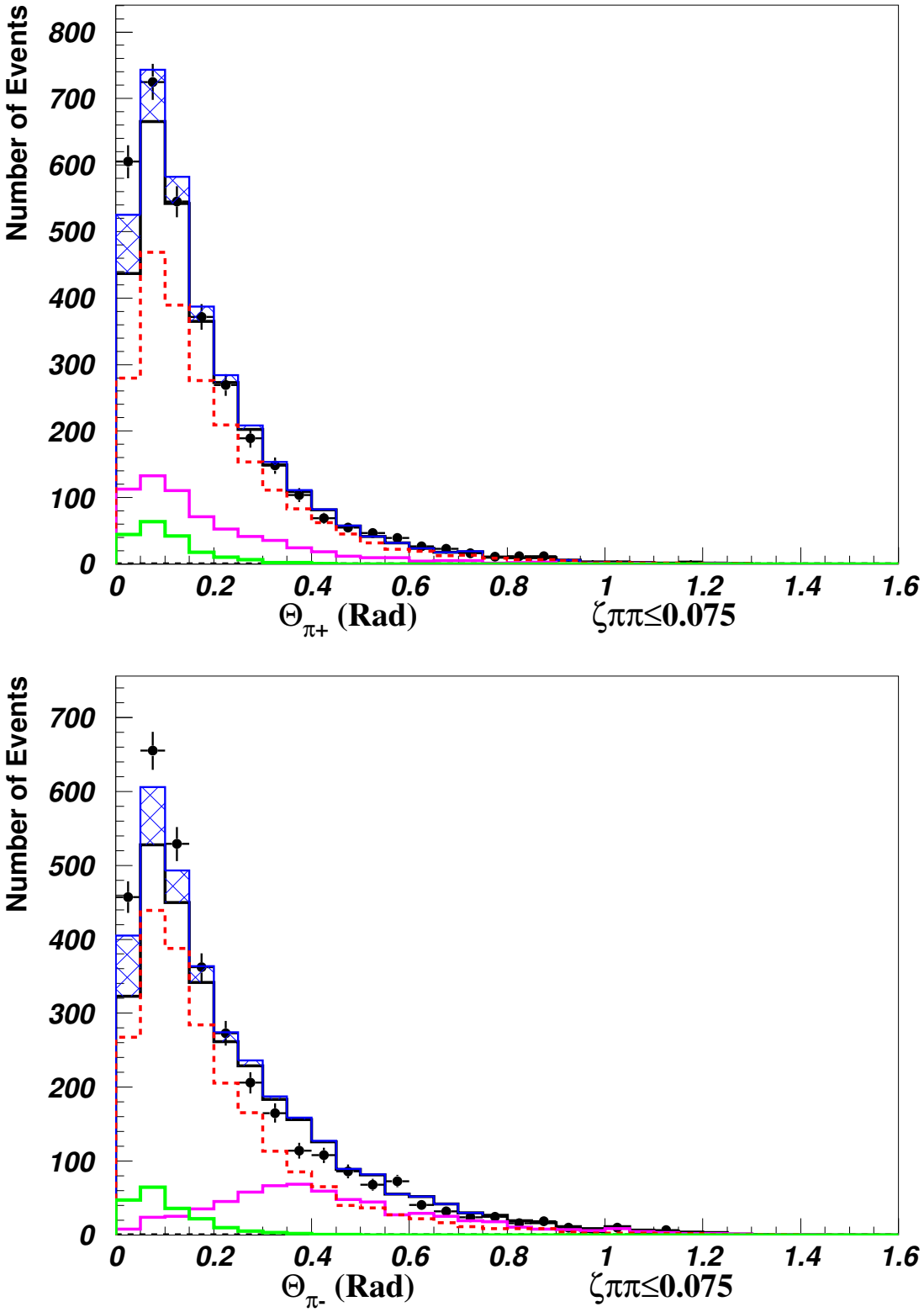


Figure 38: θ_{π^+} and θ_{π^-} (Signal Region)

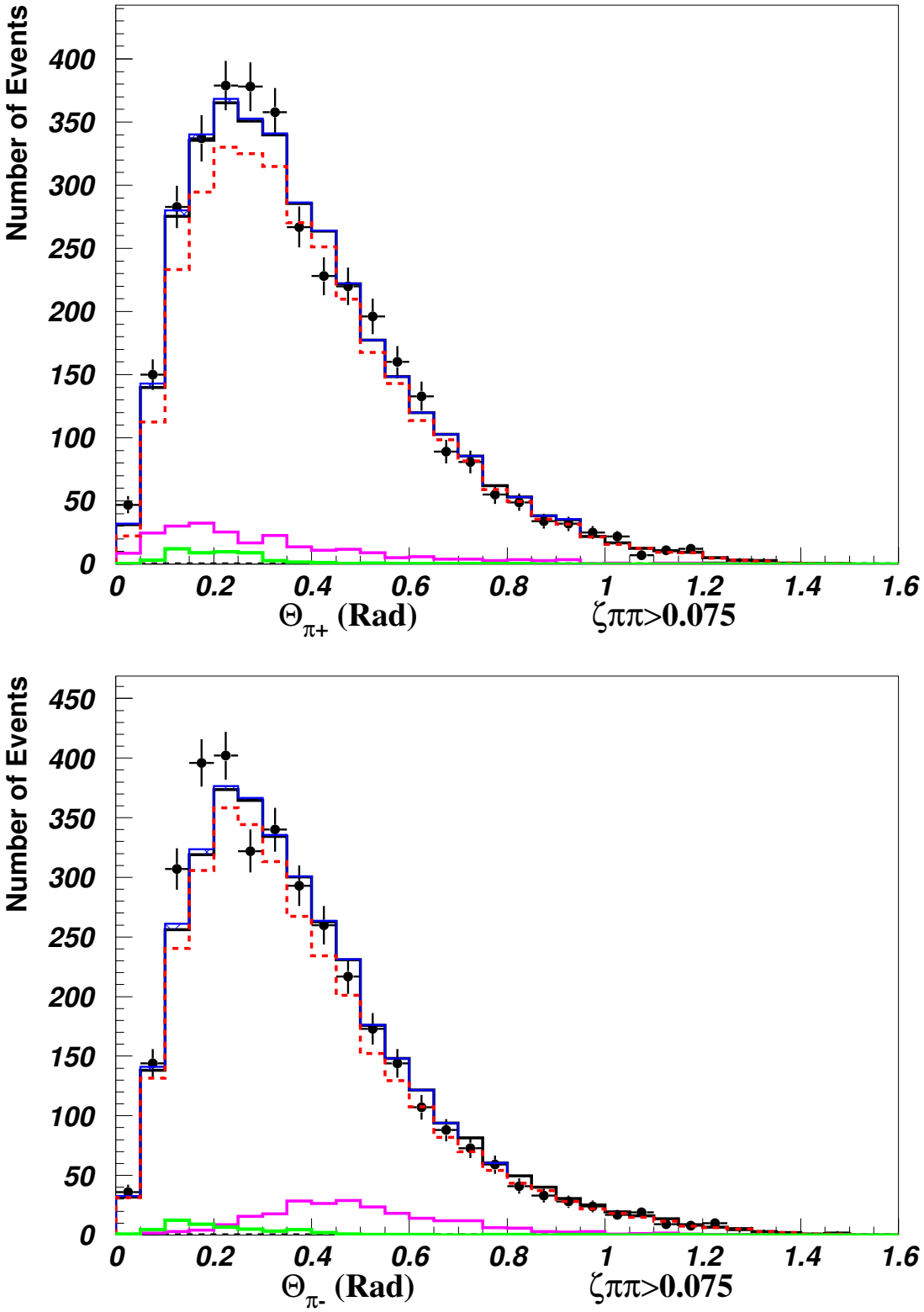


Figure 39: $\theta_{\pi+}$ and $\theta_{\pi-}$ (Background Region)

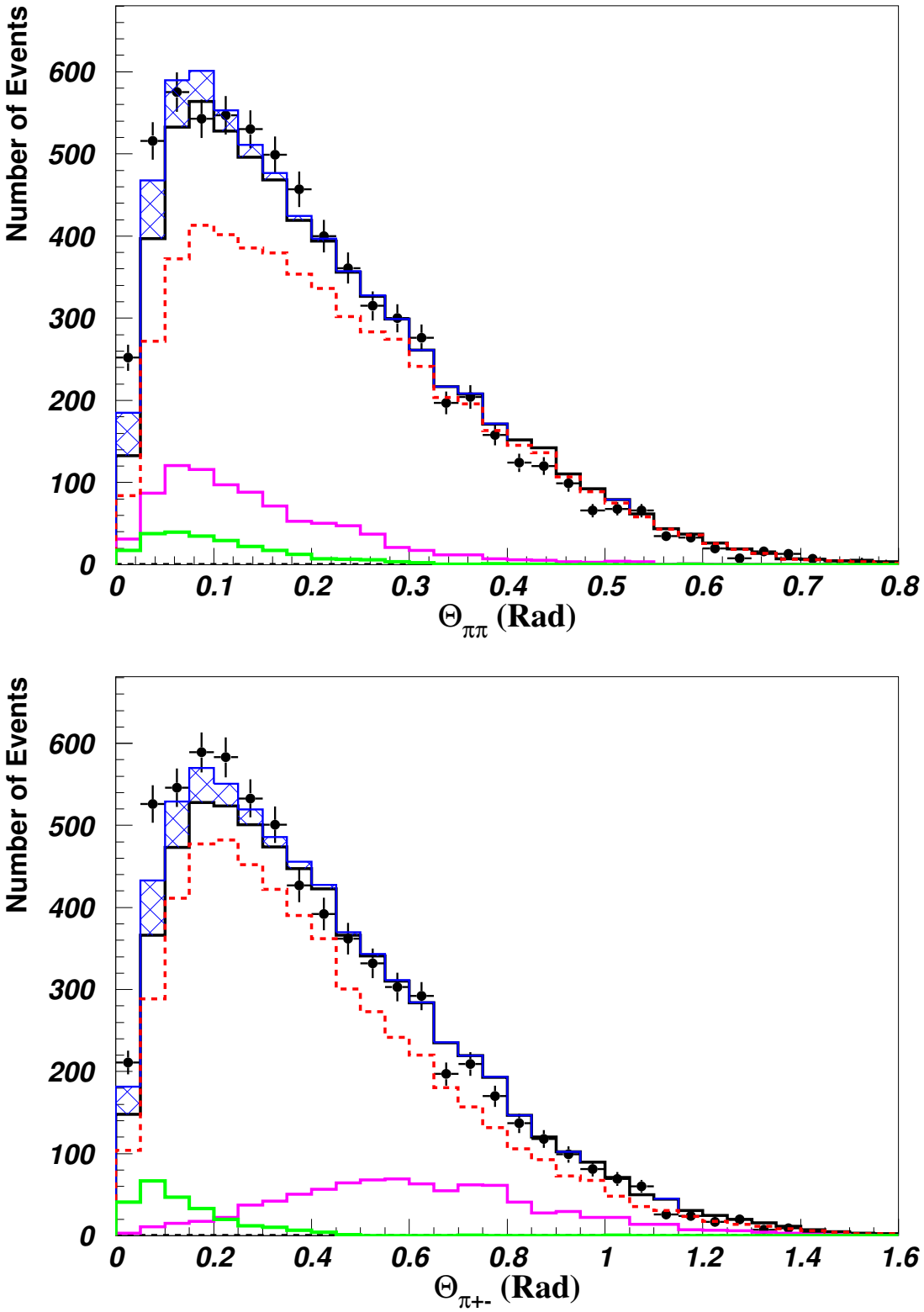


Figure 40: $\theta_{\pi\pi}$

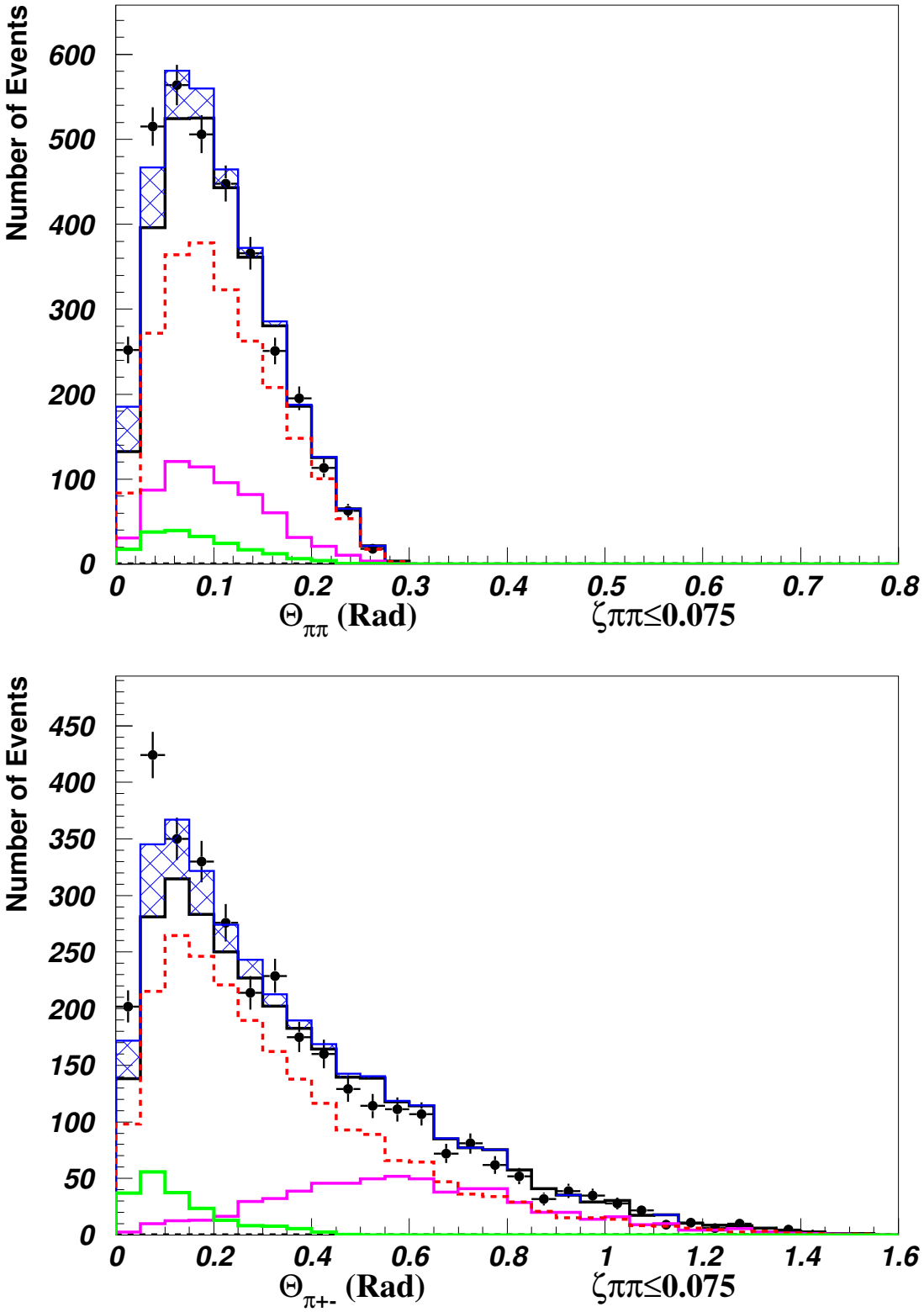


Figure 41: $\boldsymbol{\theta_{\pi\pi}}$ and $\boldsymbol{\theta_{12}}$ (Signal Region)

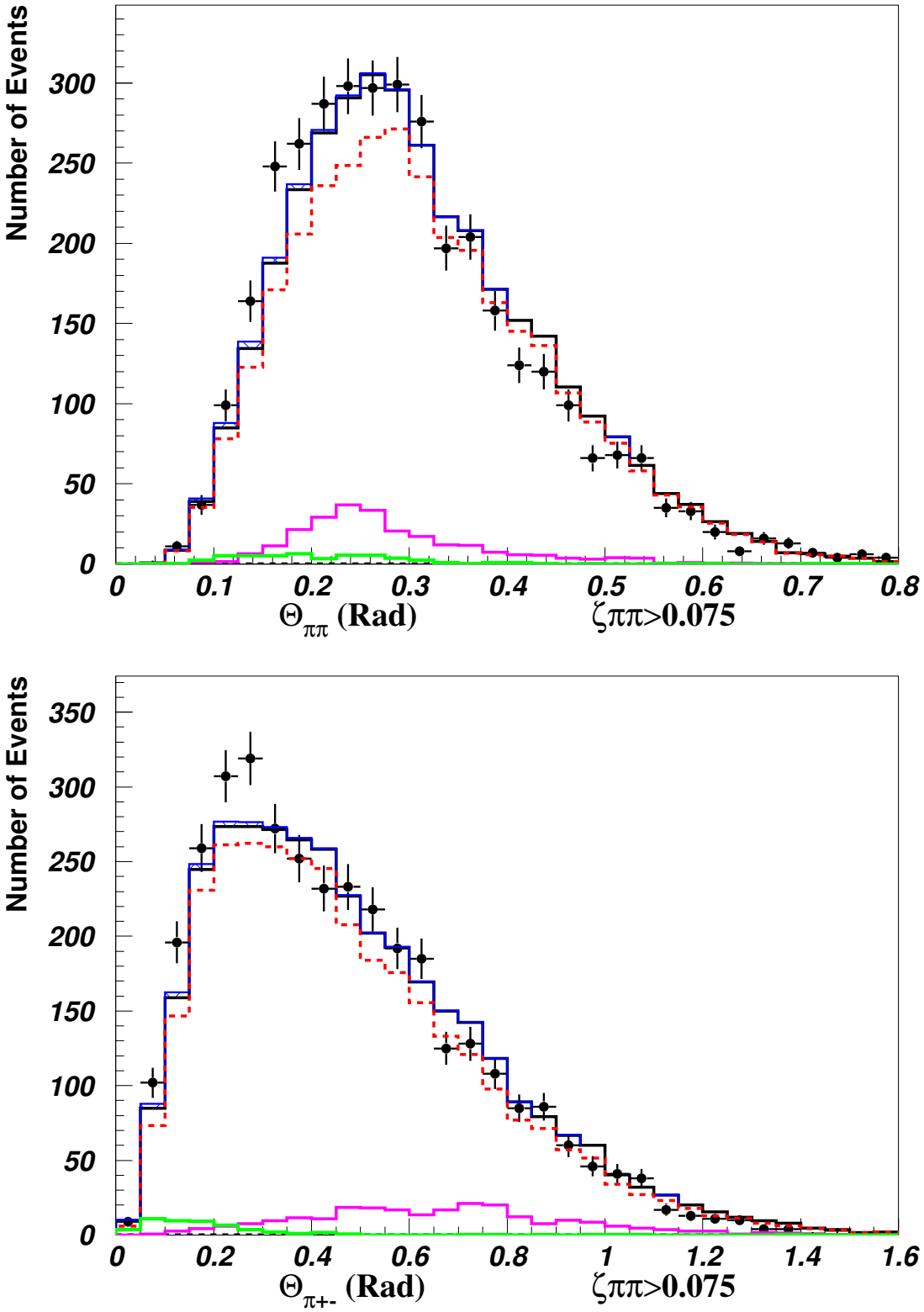


Figure 42: $\boldsymbol{\theta_{\pi\pi}}$ and $\boldsymbol{\theta_{12}}$ (Background Region)

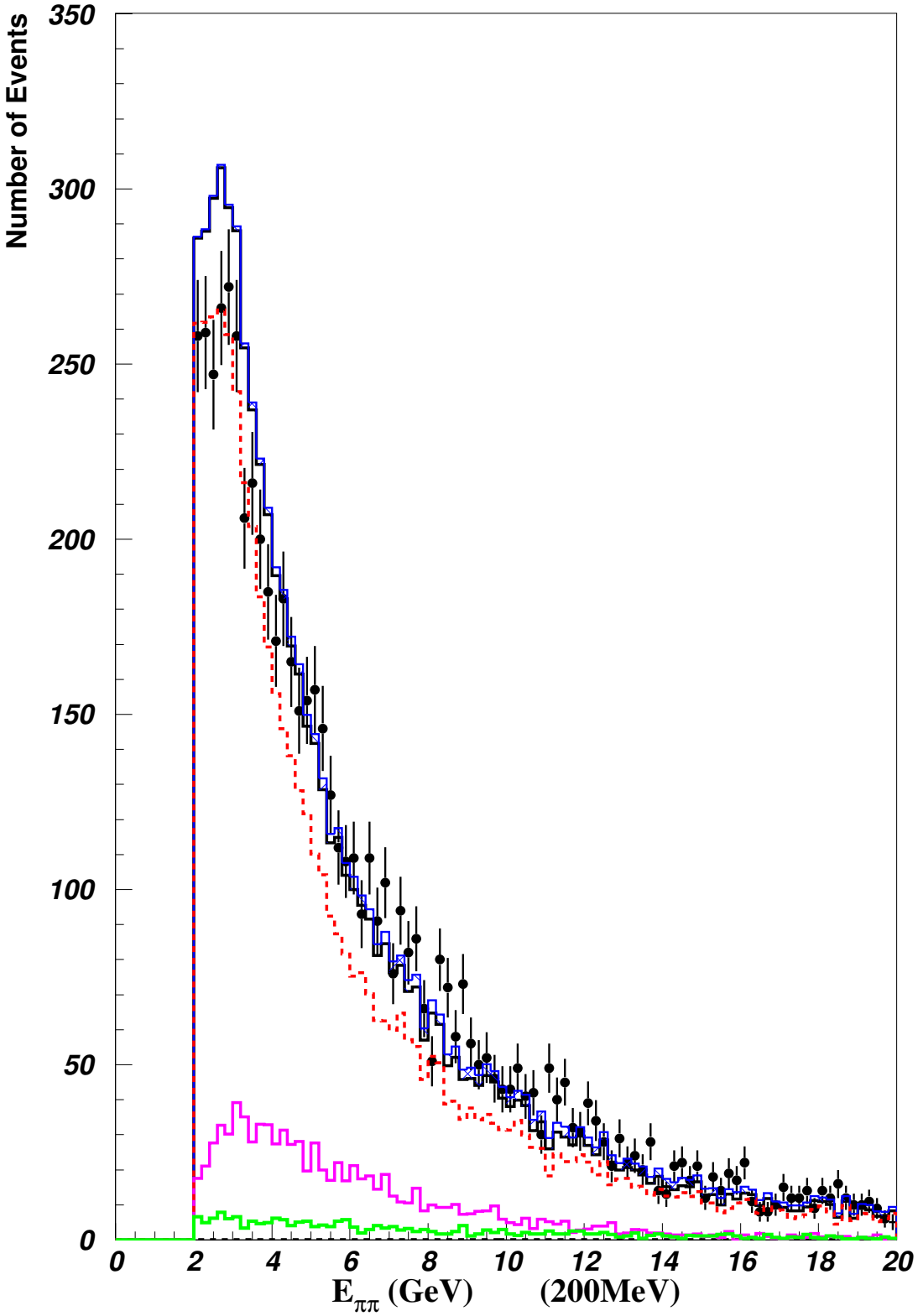


Figure 43: $E_{\pi\pi}$

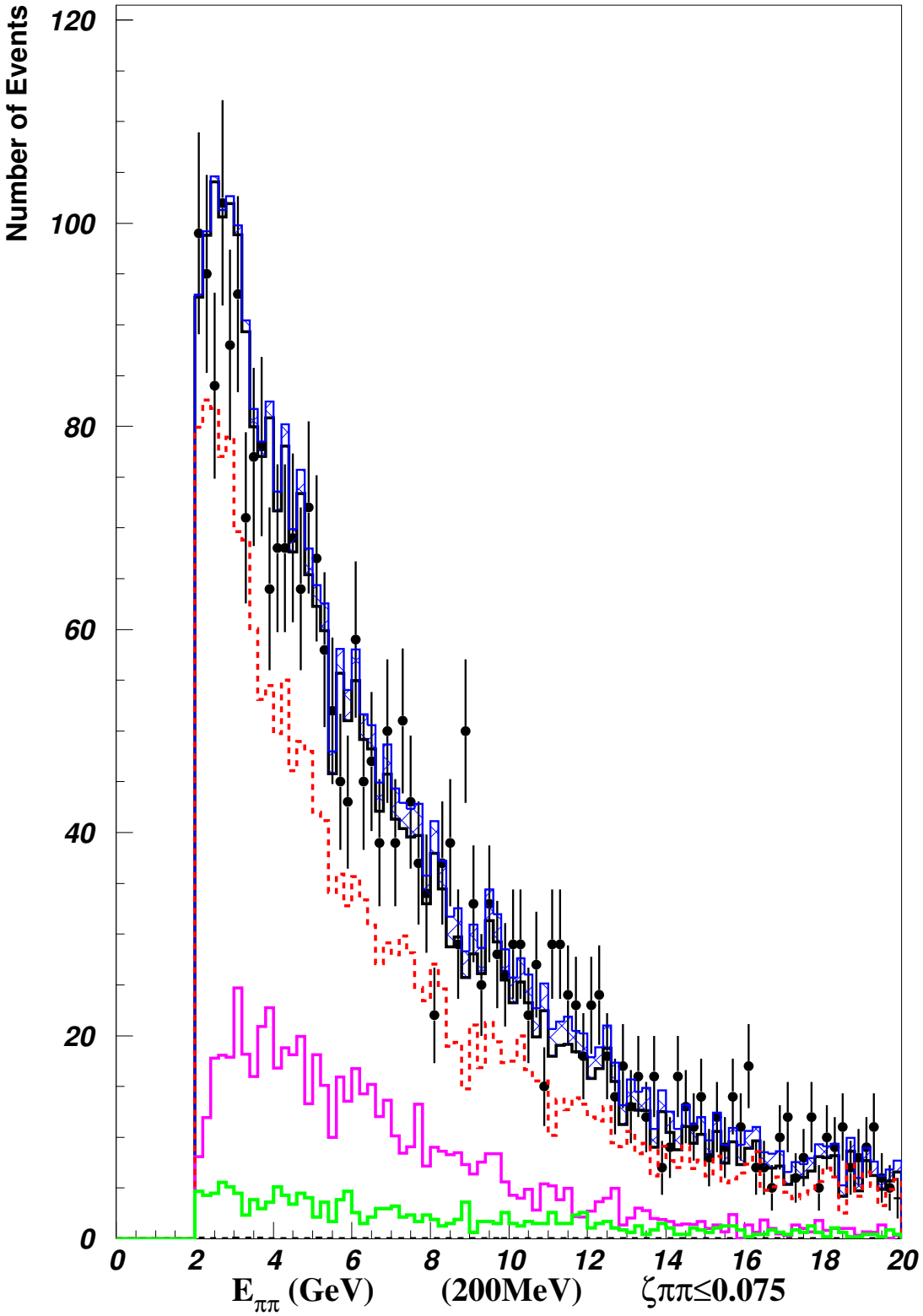


Figure 44: $E_{\pi\pi}$ (Signal Region)

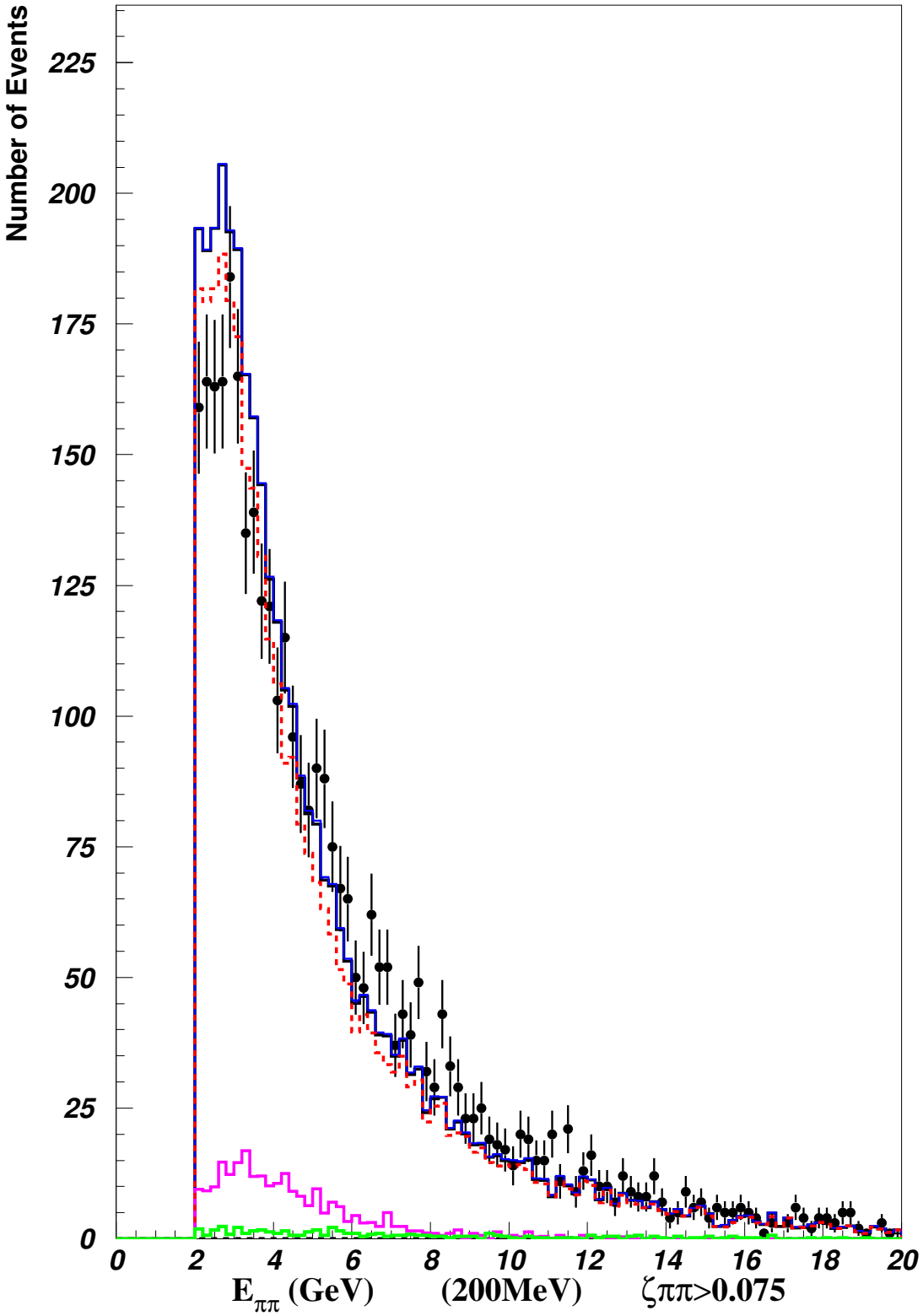


Figure 45: $E_{\pi\pi}$ (Background Region)

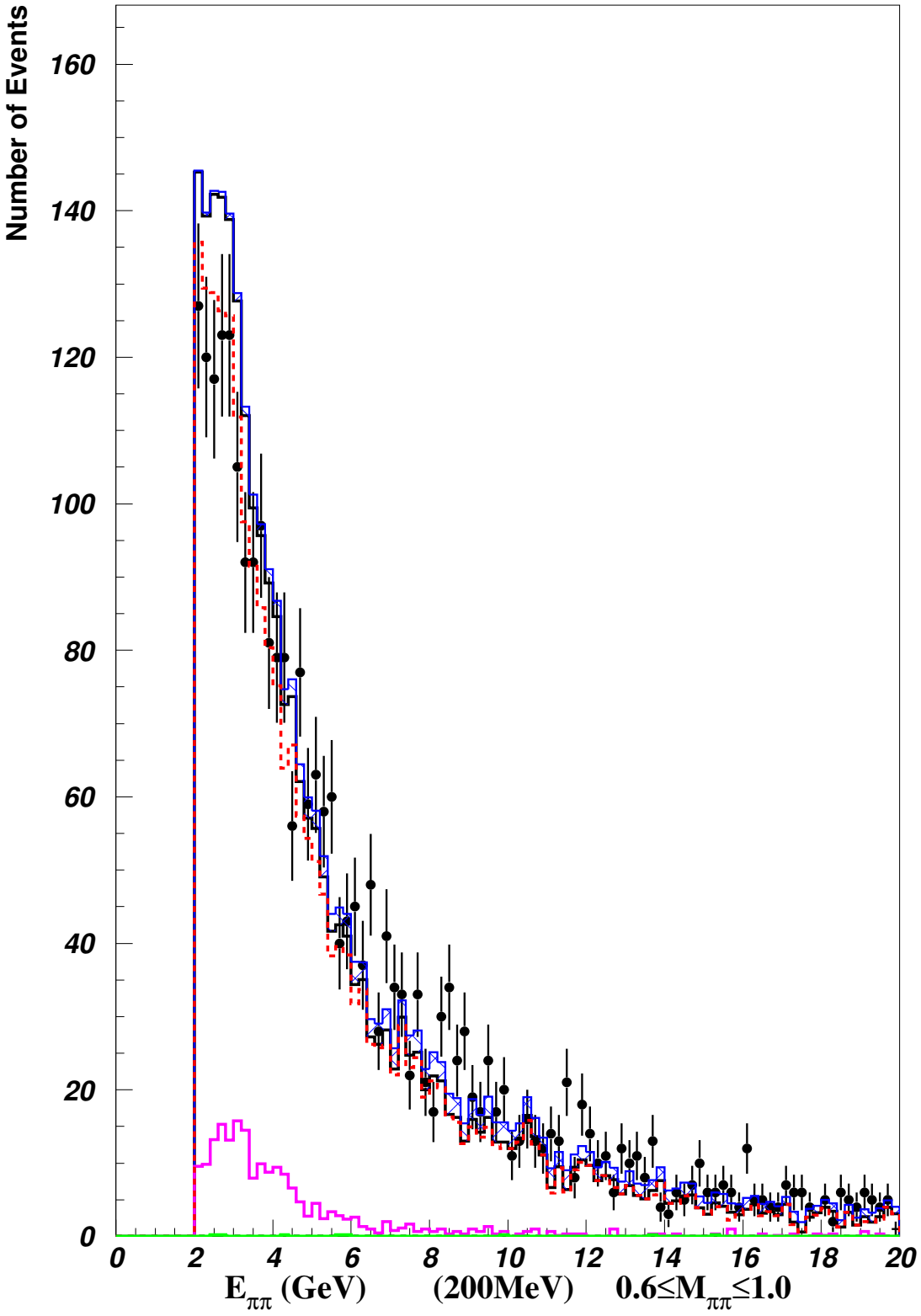


Figure 46: $E_{\pi\pi}$ (ρ Mass Range)

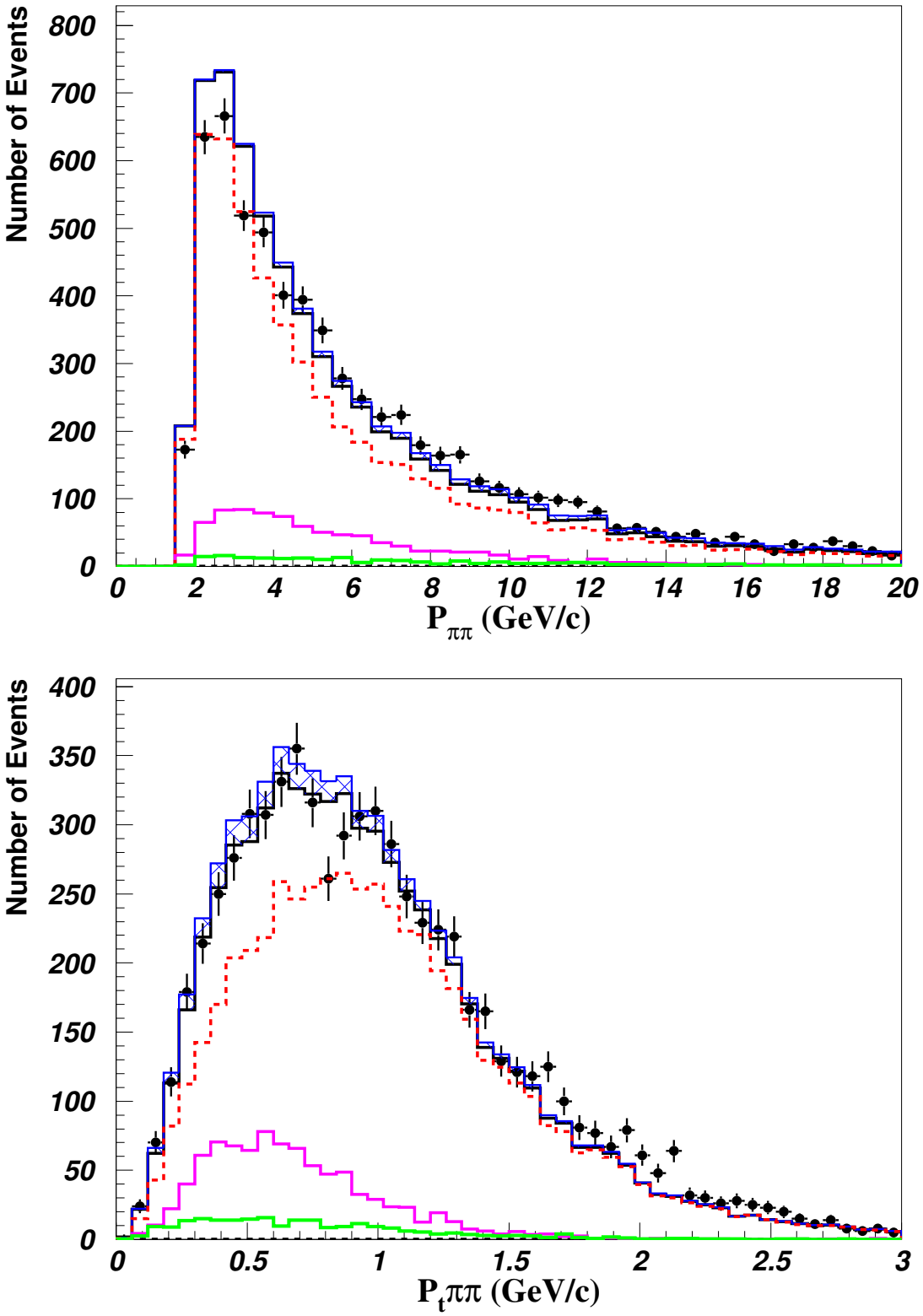


Figure 47: $P_t\pi\pi$

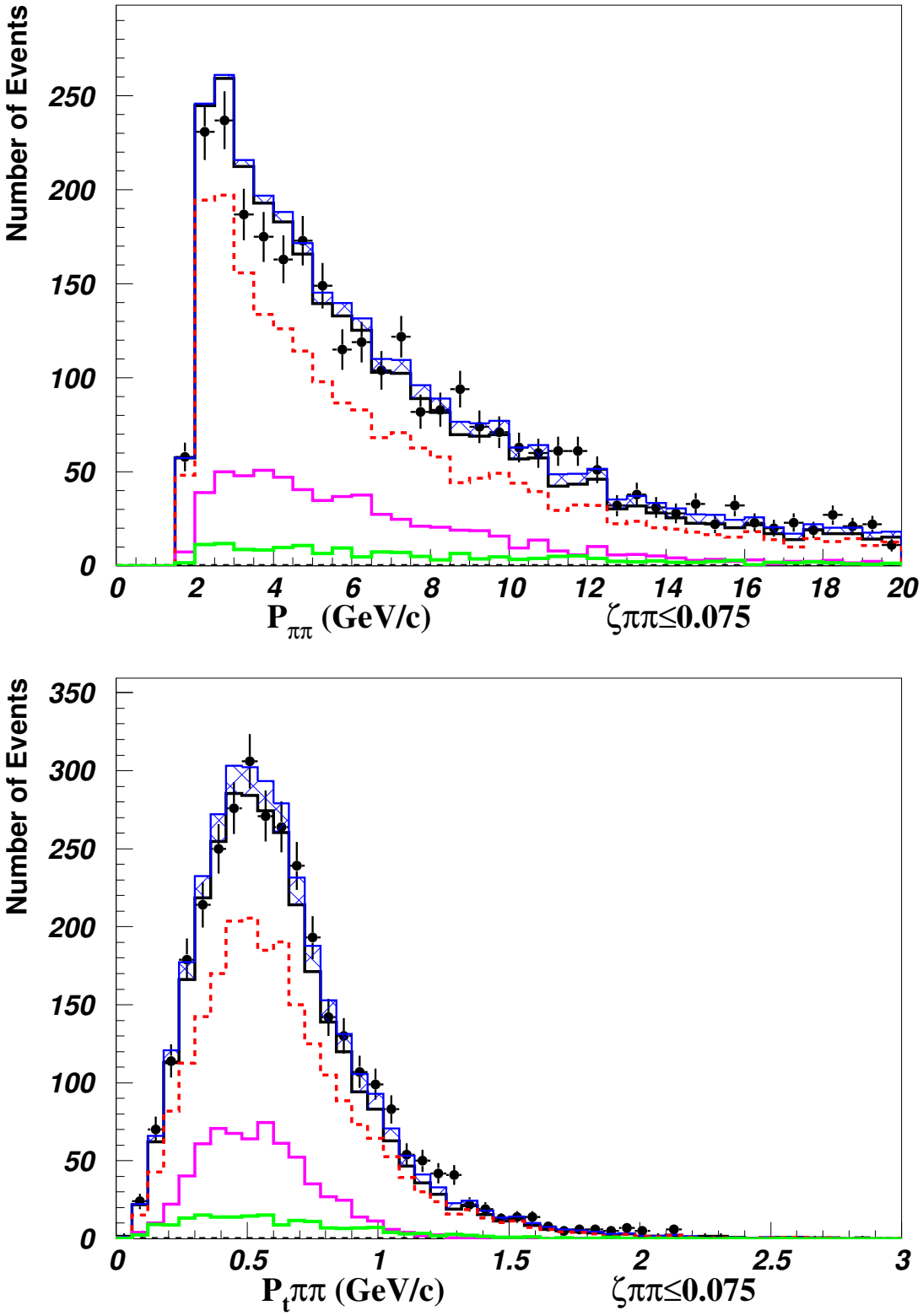


Figure 48: $P_t\pi\pi$ (Signal Region)

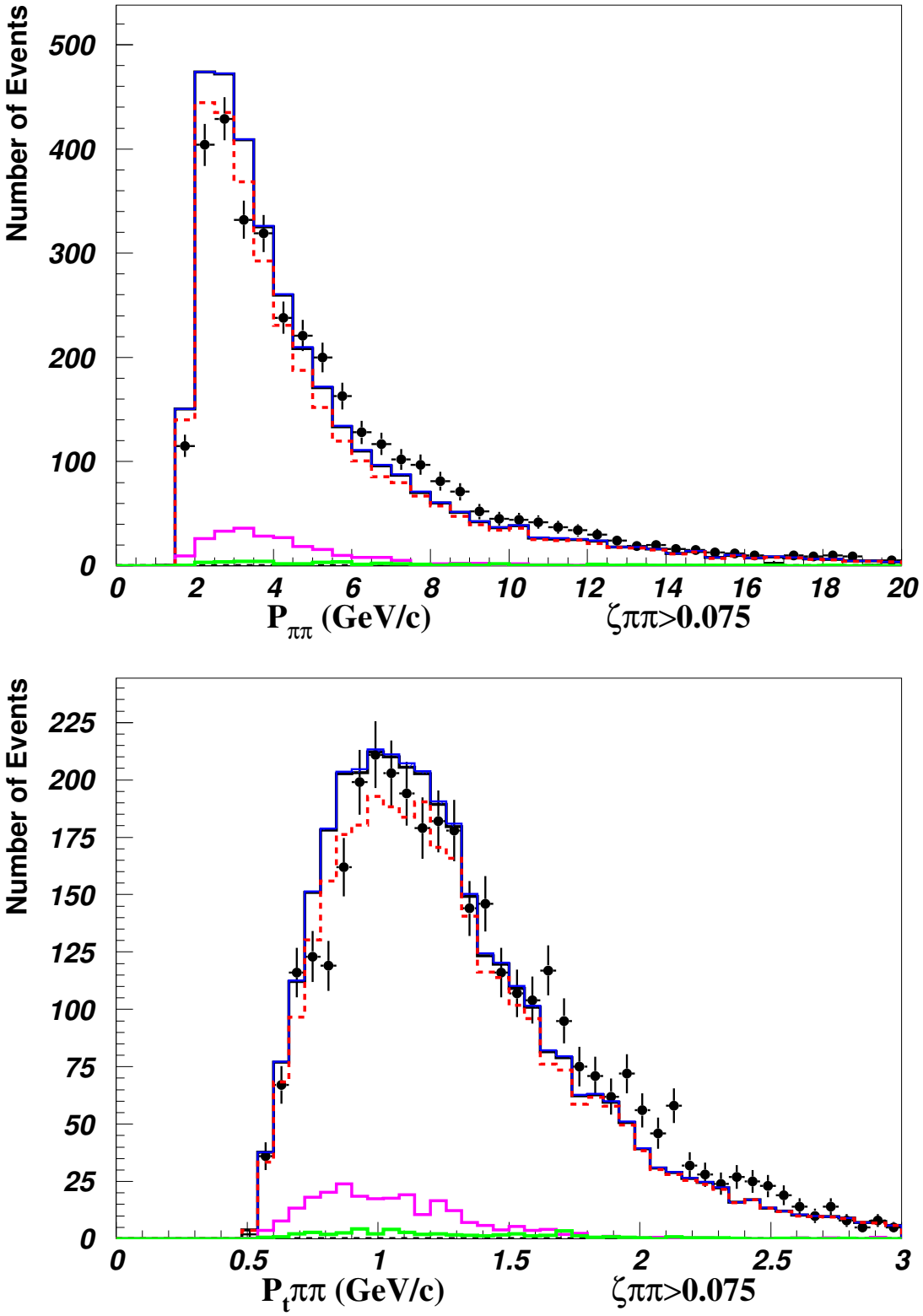


Figure 49: $P_t\pi\pi$ (Background Region)

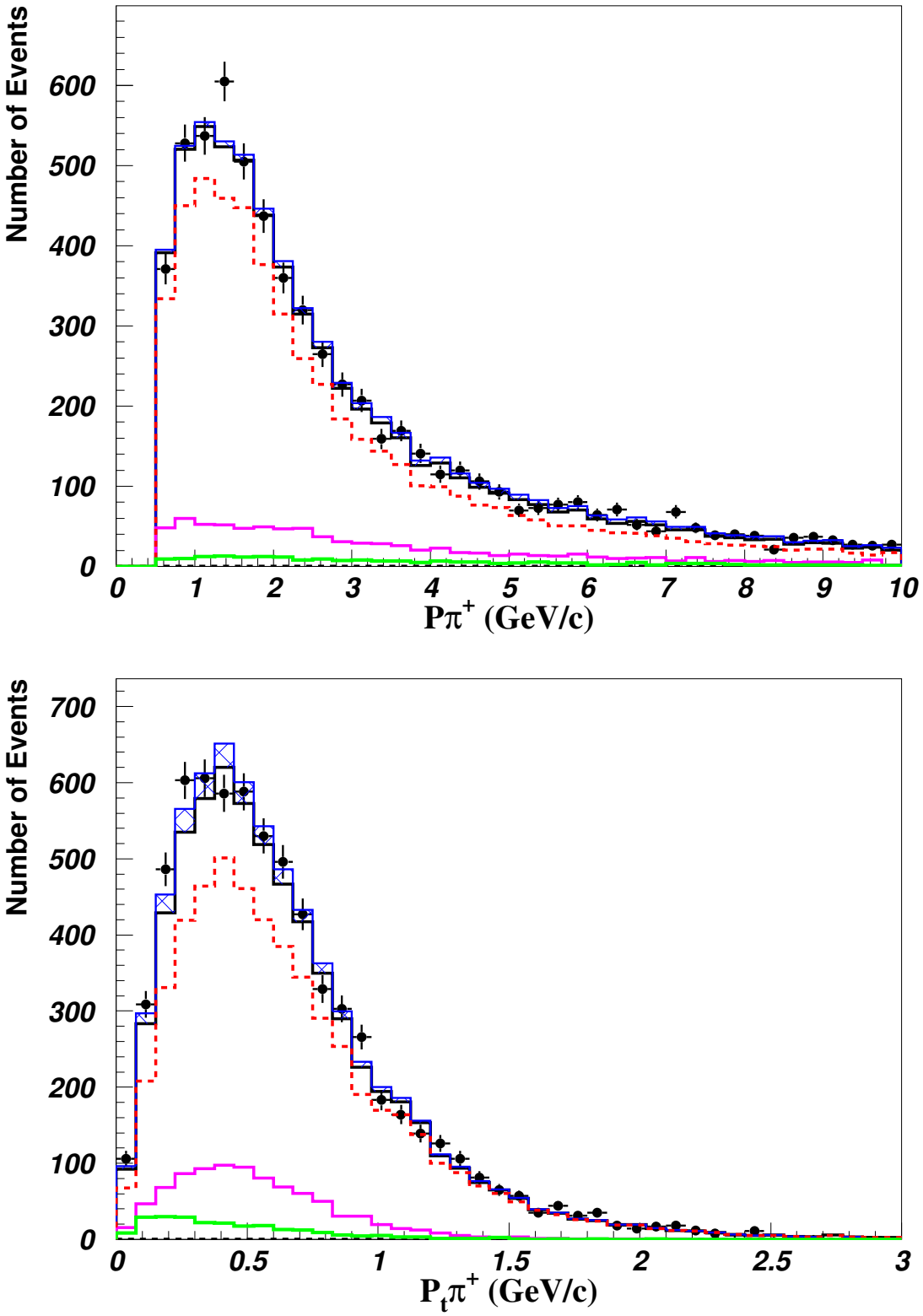


Figure 50: $P_t\pi^+$

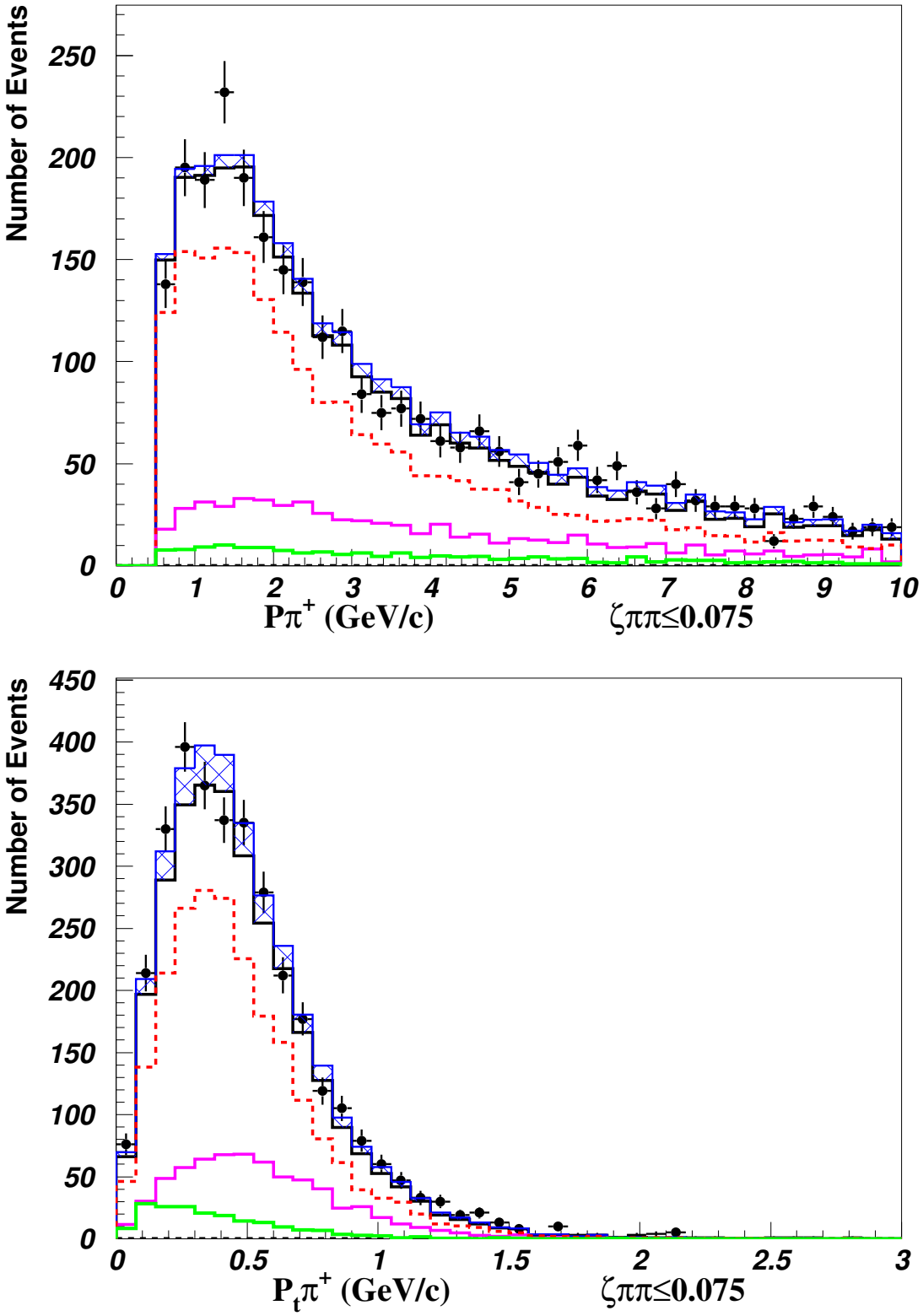


Figure 51: $P_t\pi^+$ (Signal Region)

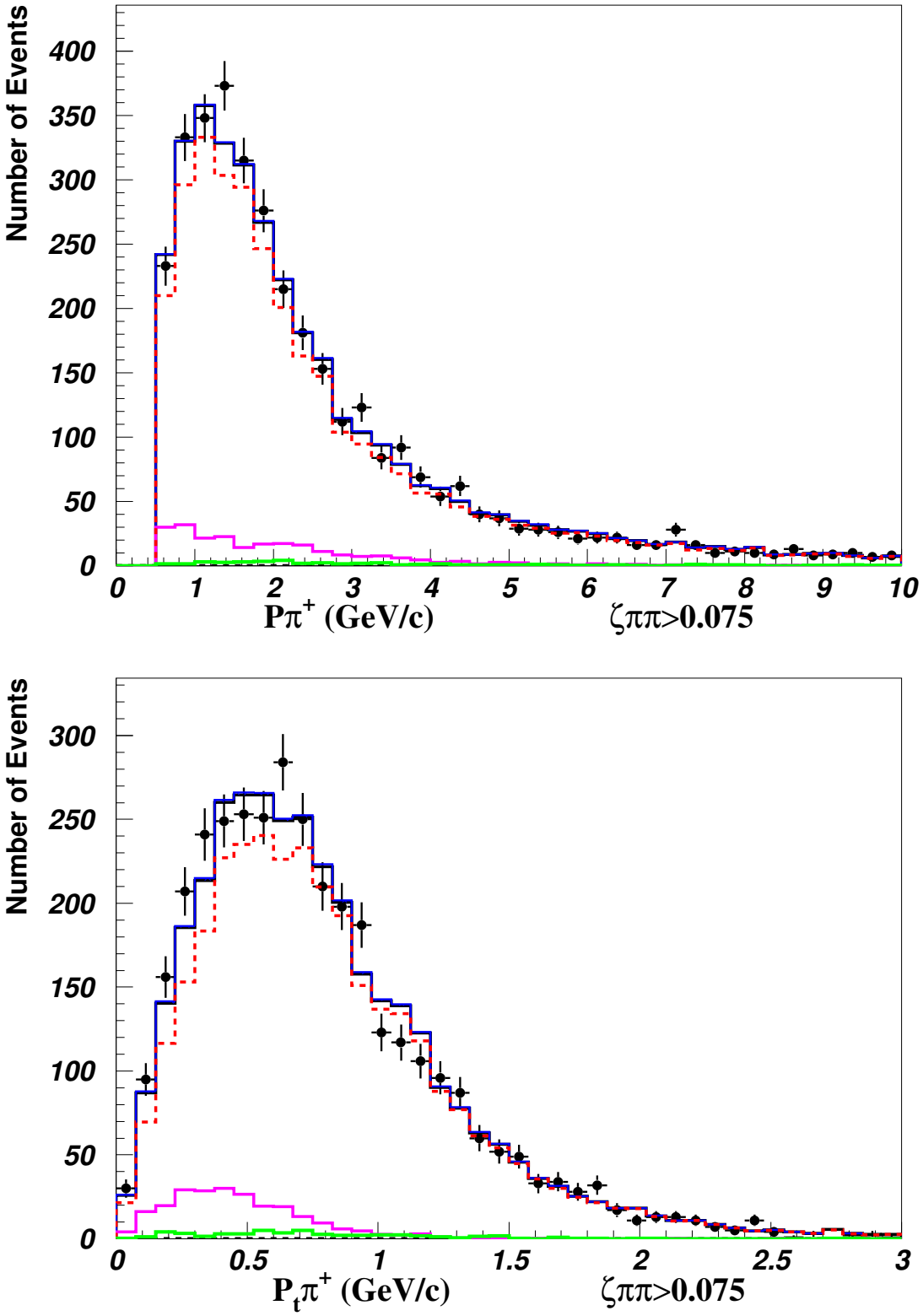


Figure 52: $P_t\pi^+$ (Background Region)

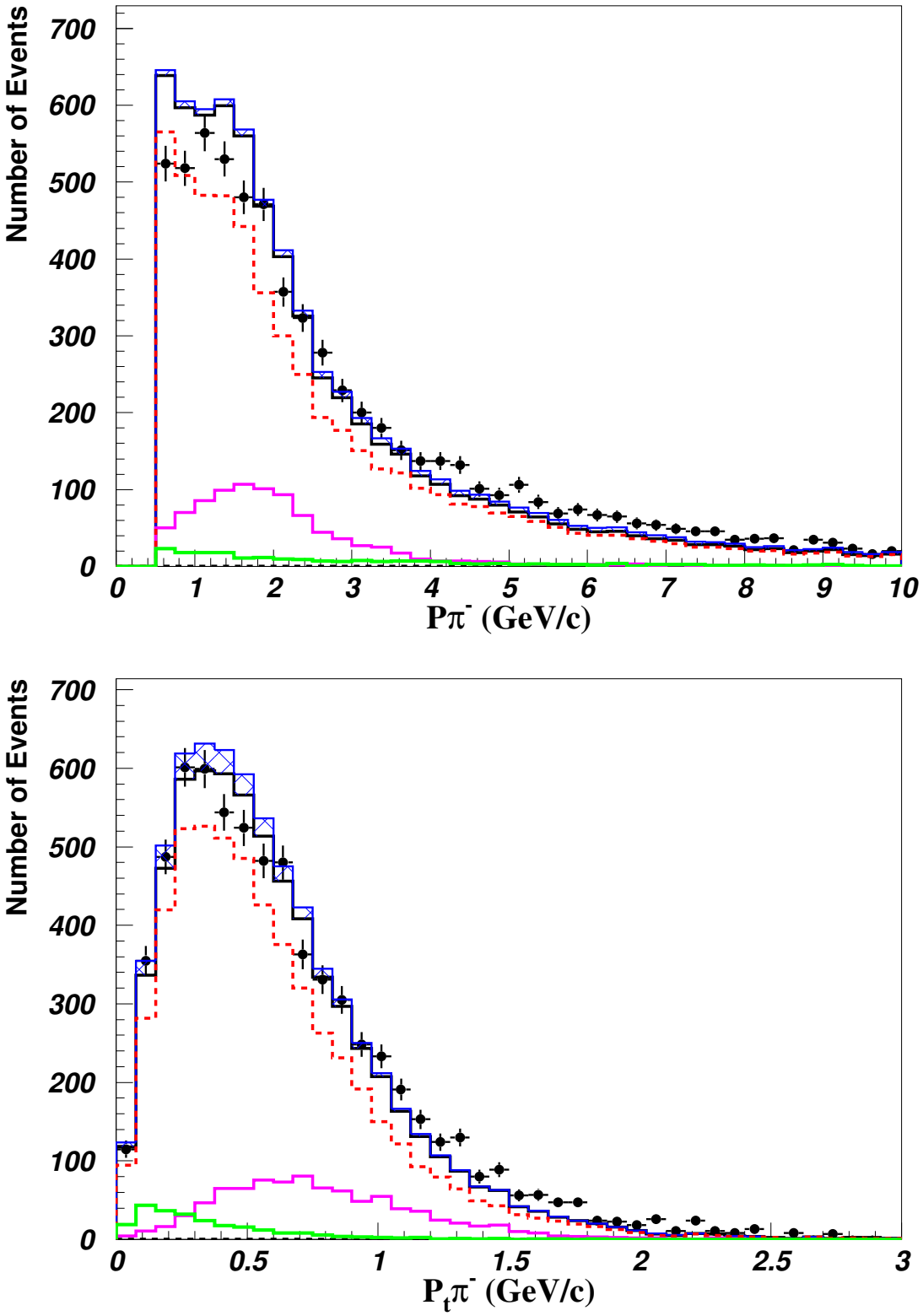


Figure 53: $P_t\pi^-$

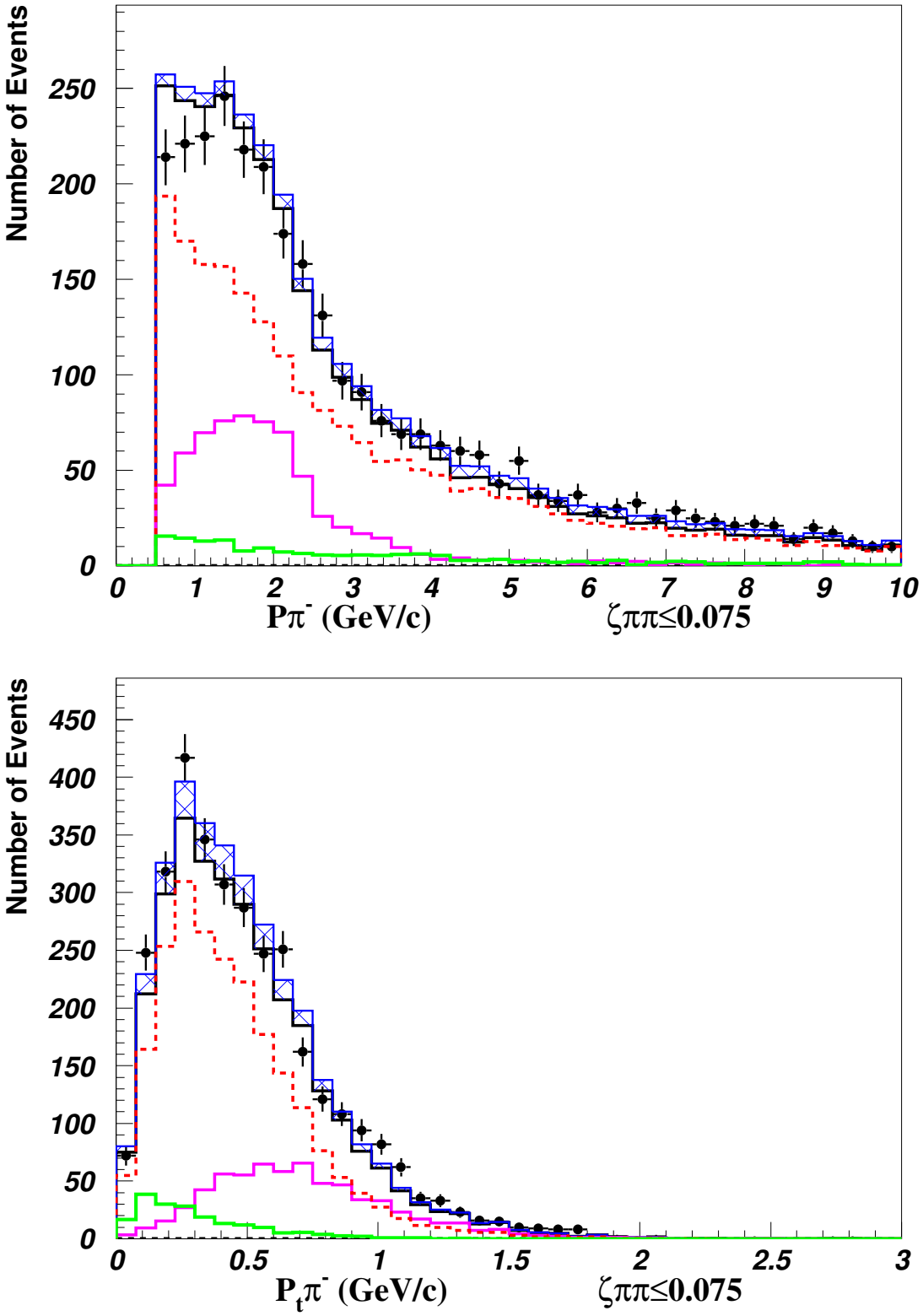


Figure 54: $P_t\pi^-$ (Signal Region)

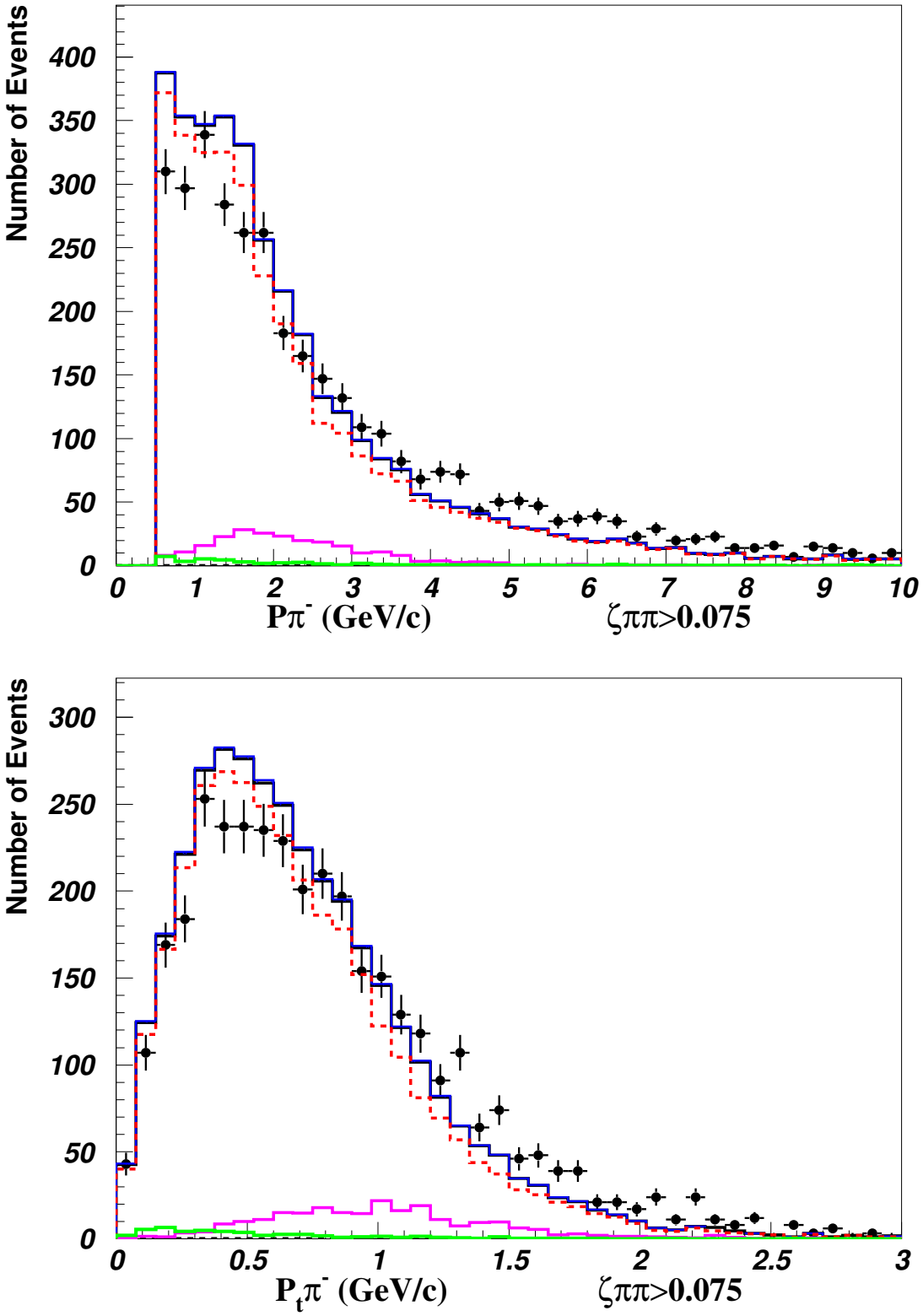


Figure 55: $P_t\pi^-$ (Background Region)

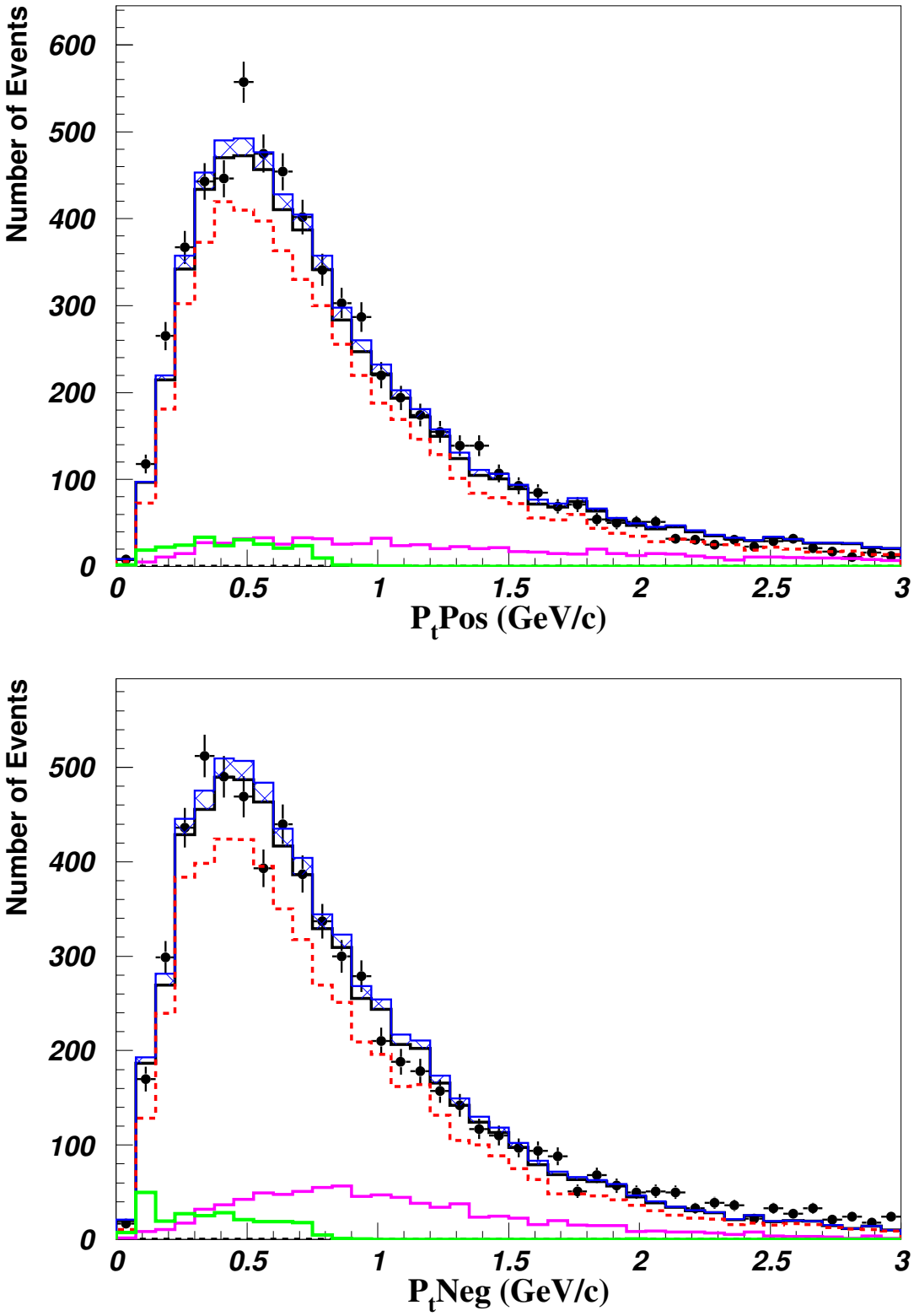
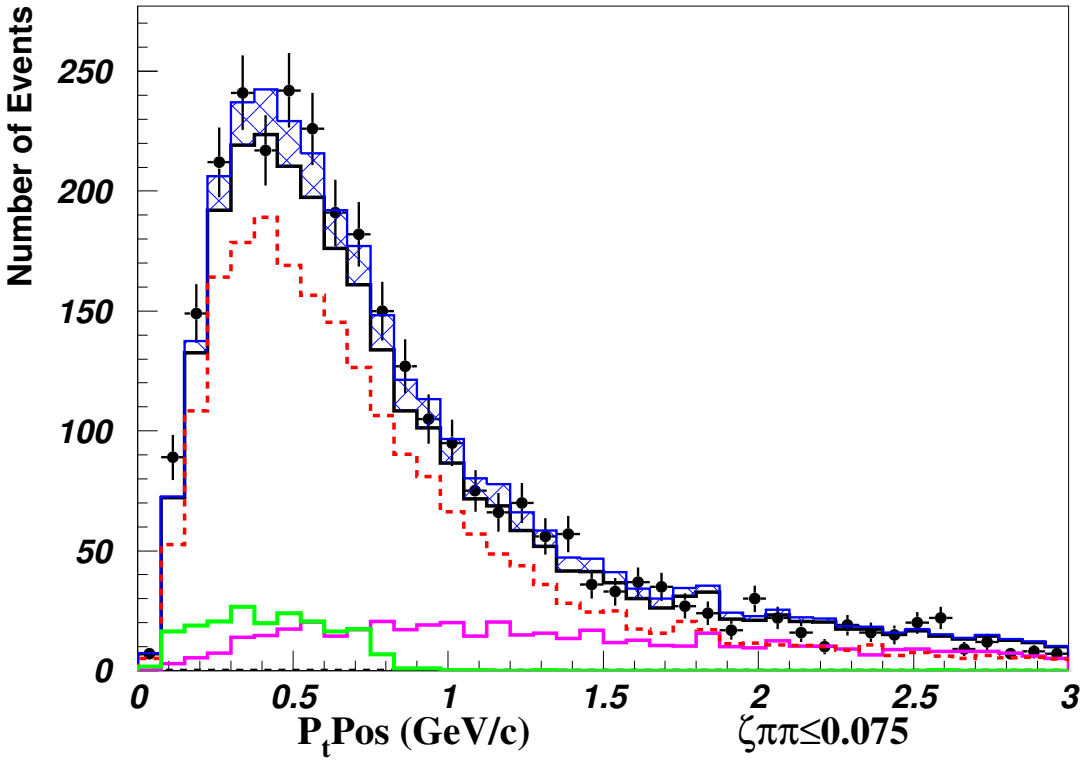


Figure 56: Ptpos and Ptneg



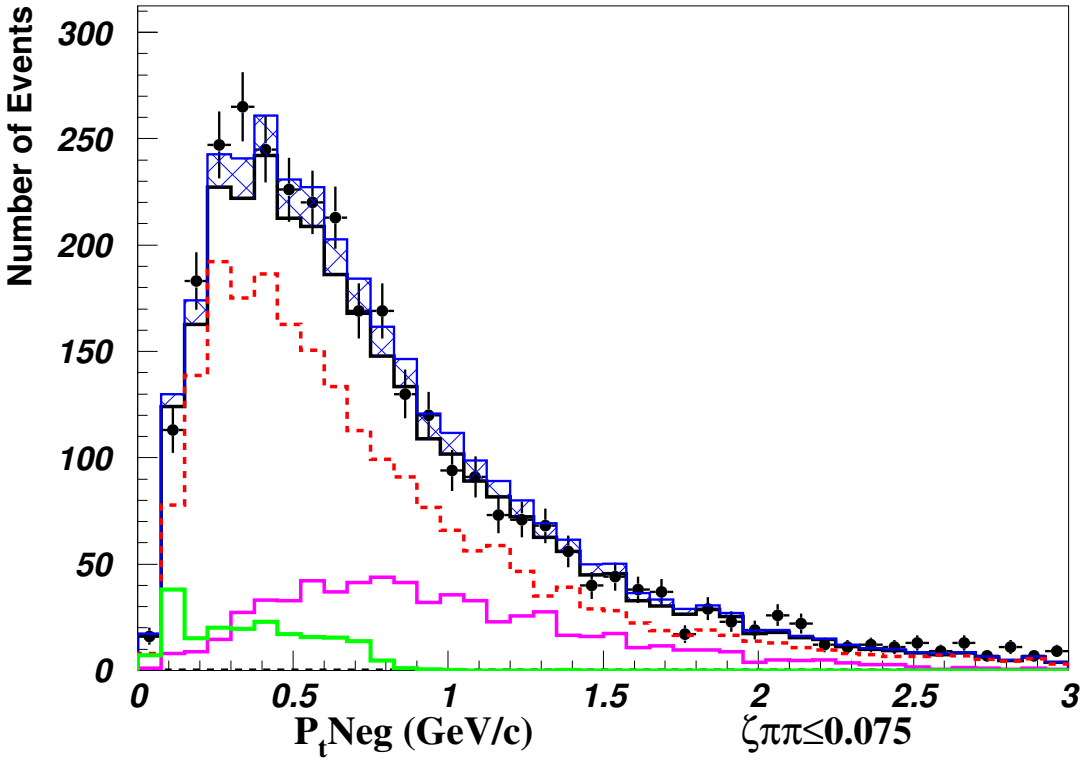


Figure 57: Ptpos and Ptneg (Signal Region)

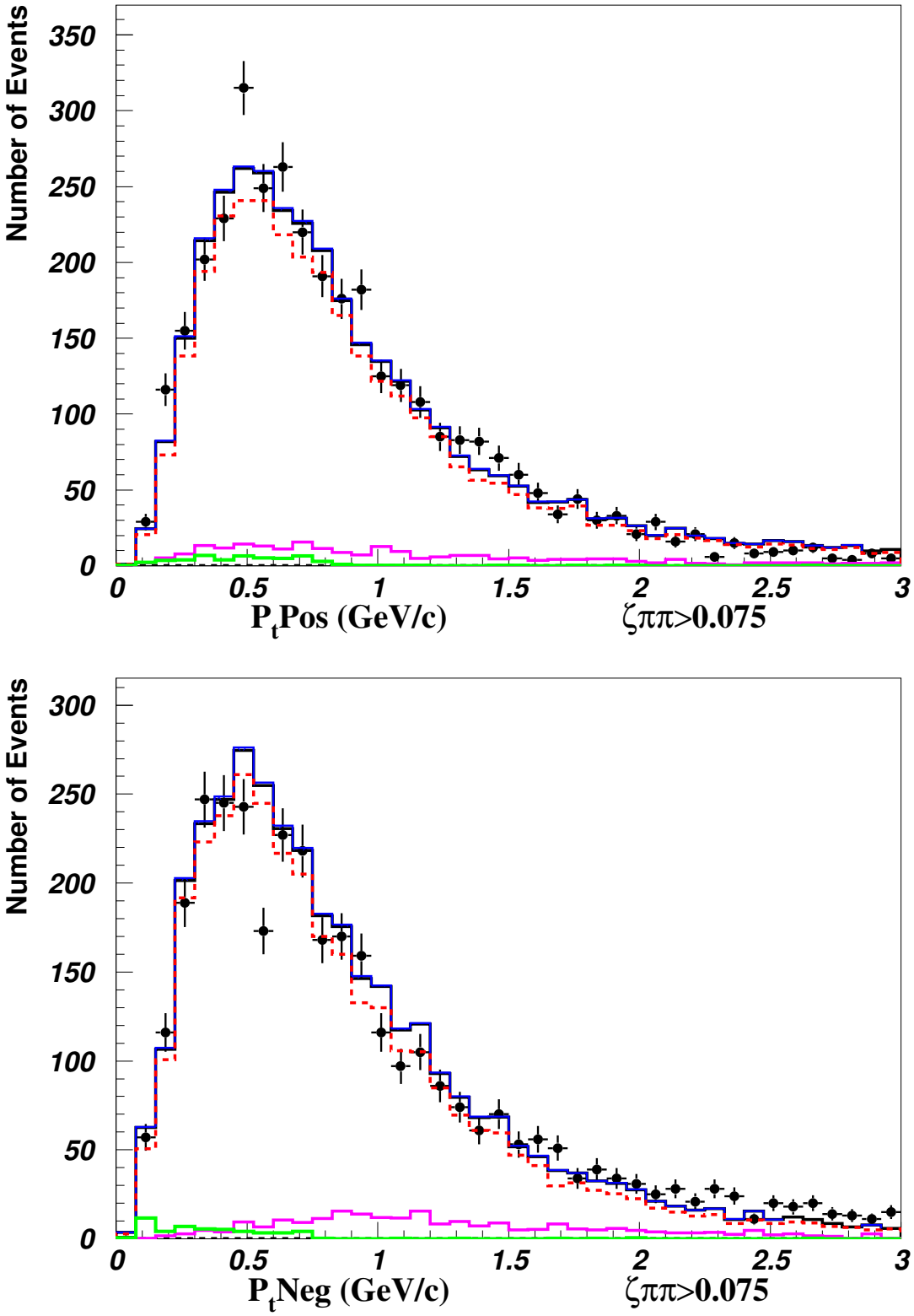


Figure 58: Ptpos and Ptneg (Background Region)

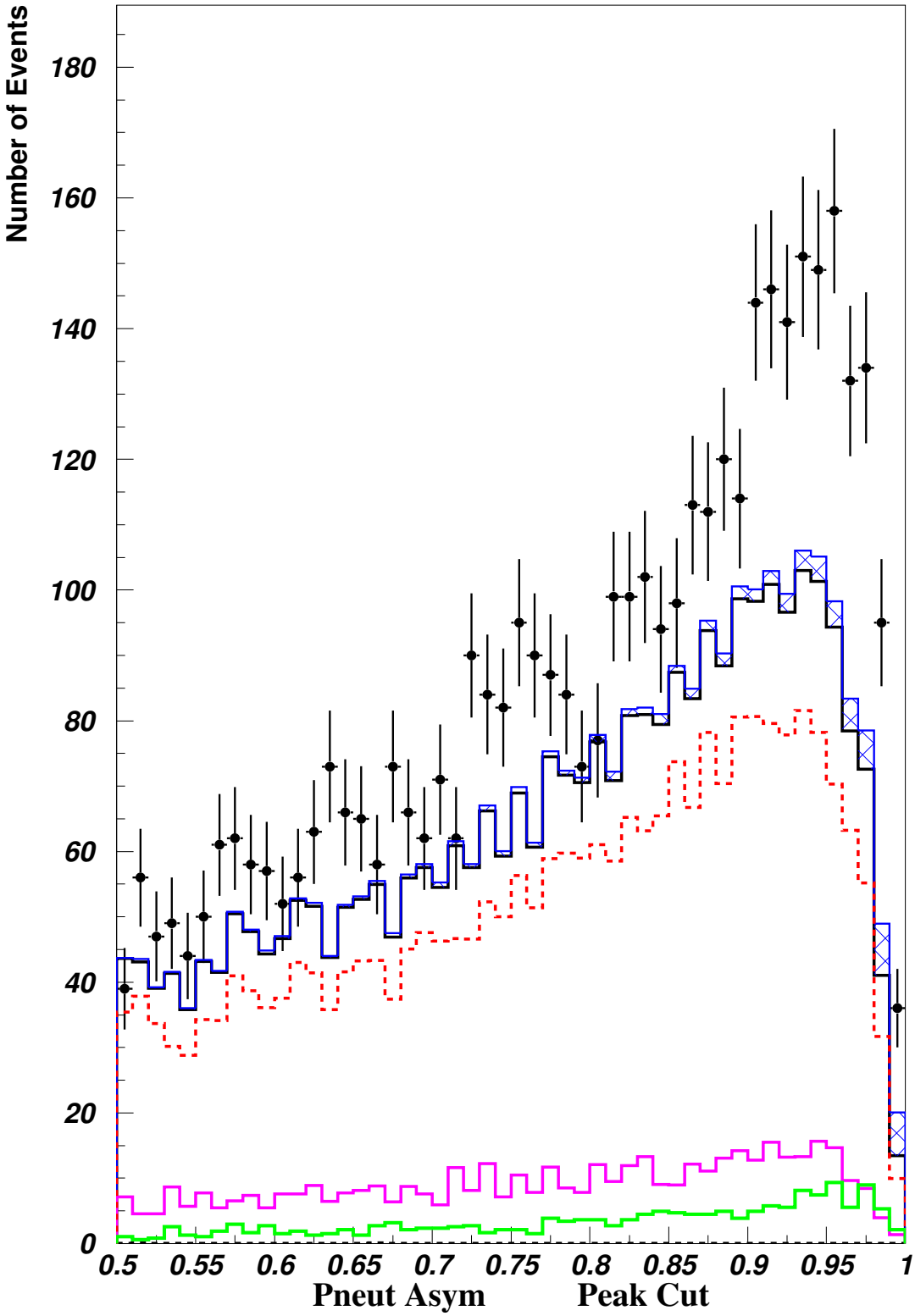


Figure 59: PAN (Neutral Momentum Assymetry)

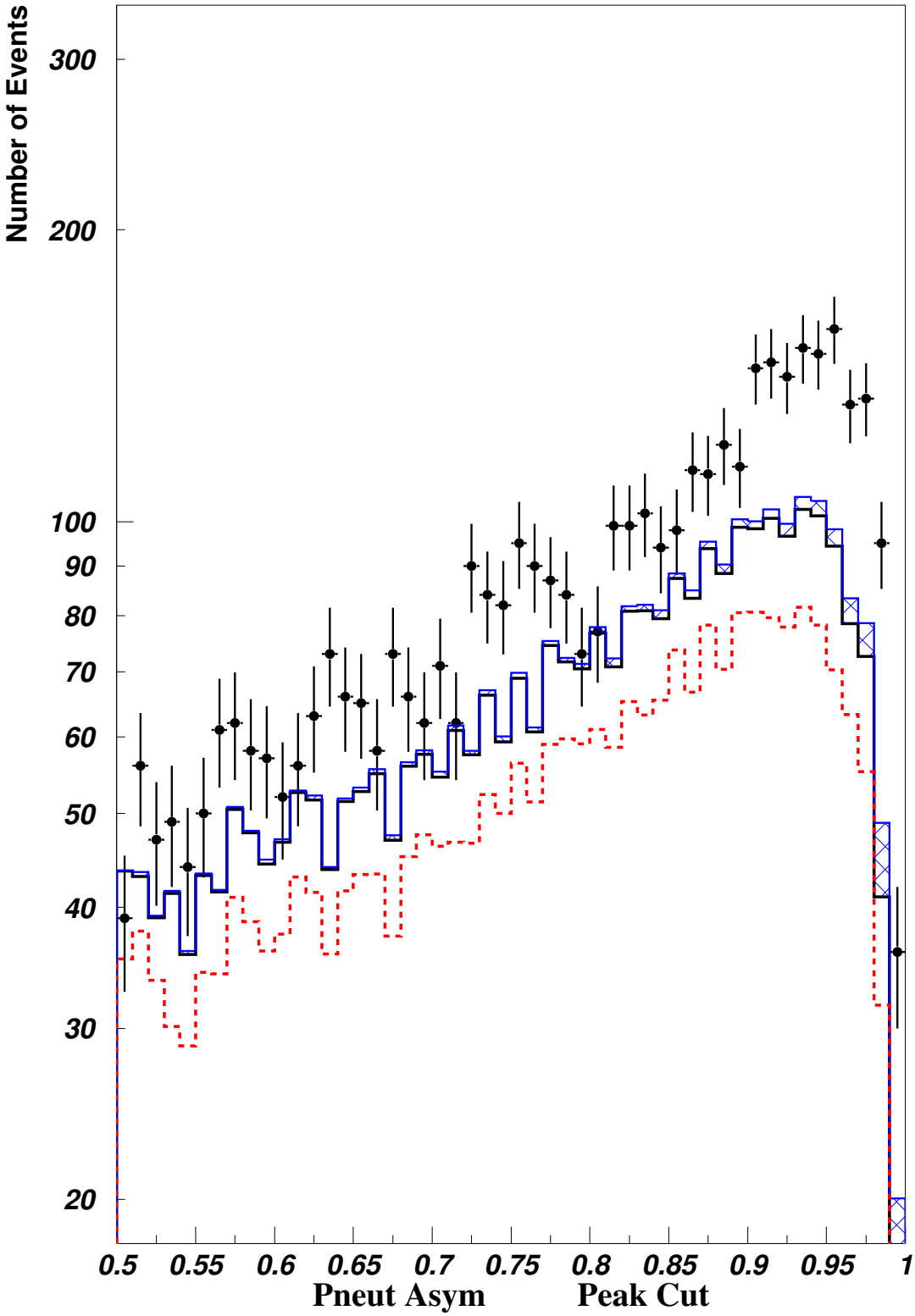


Figure 60: PAN (Neutral Momentum Assymetry (log scale))

9 Extra Plots

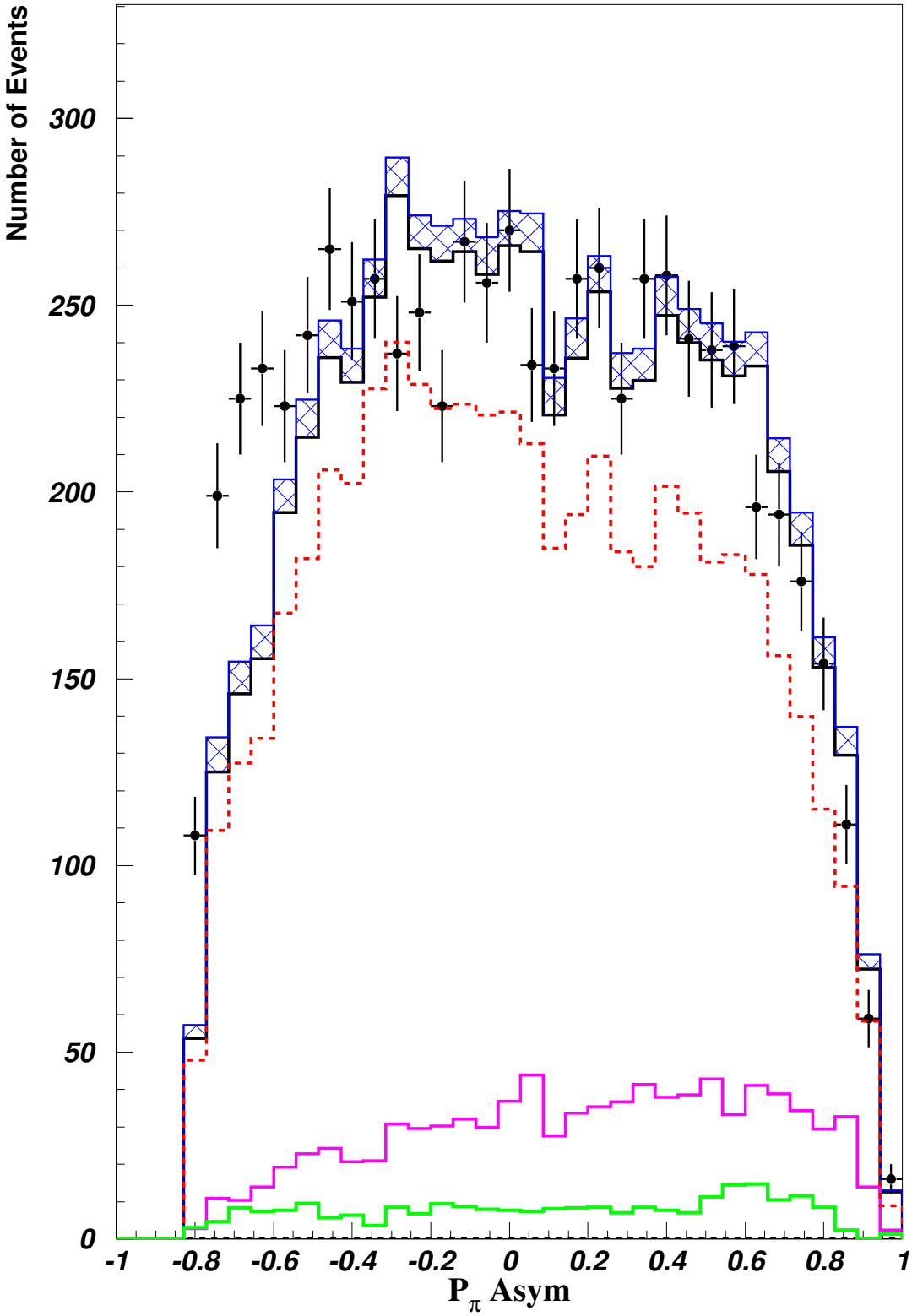


Figure 61: P_π Asymetry

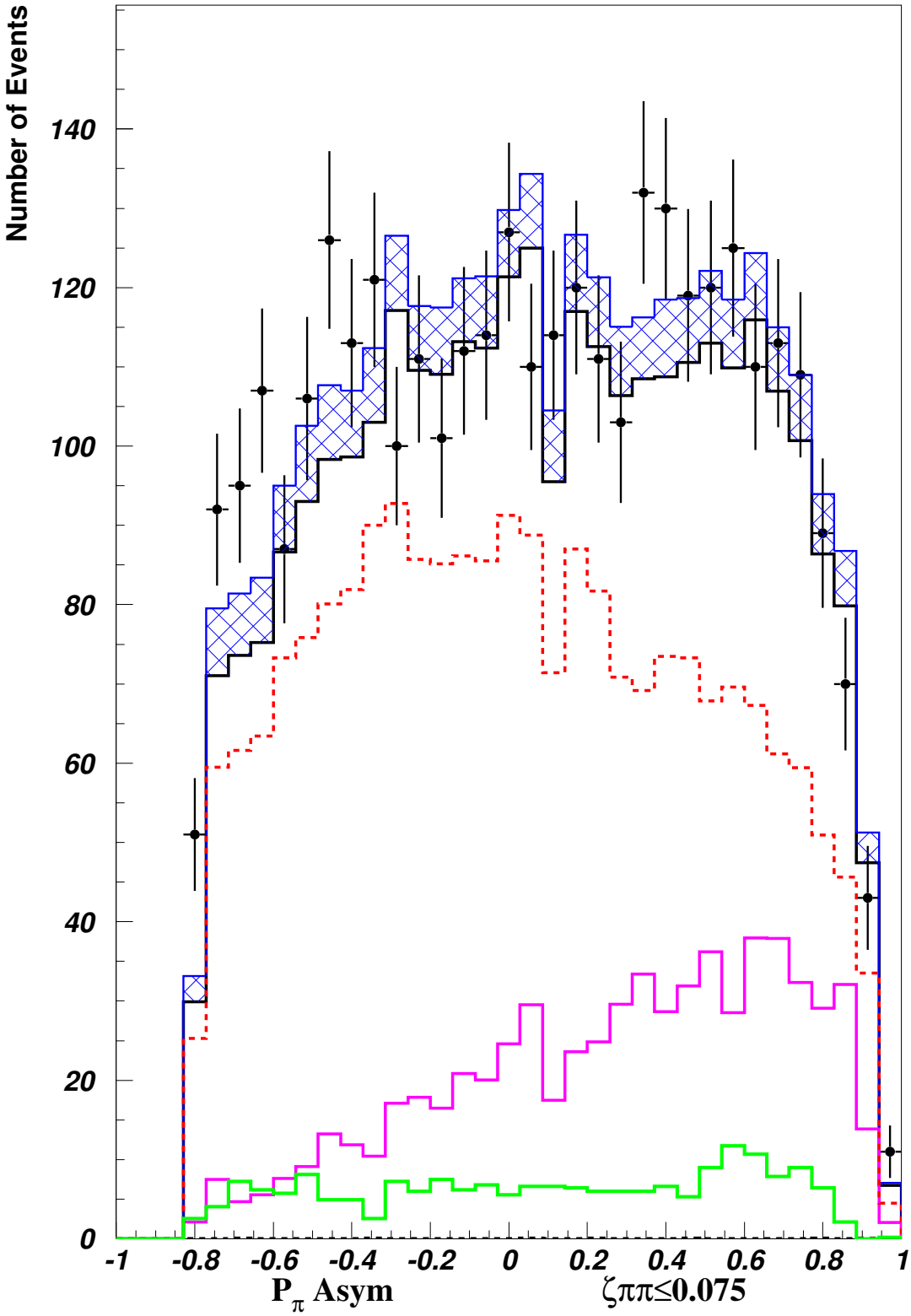


Figure 62: P_π Asymmetry (Signal Region)

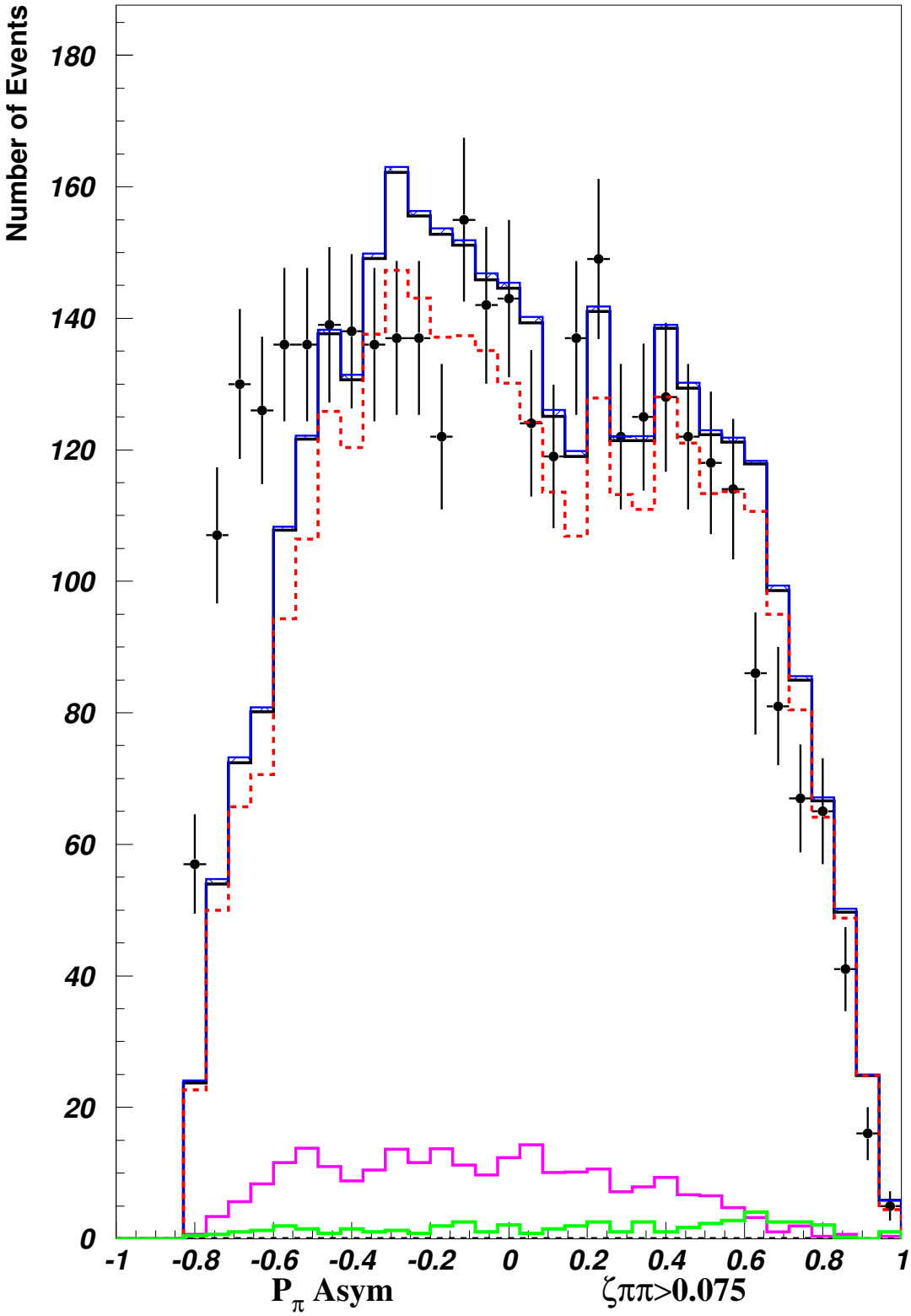


Figure 63: P_π Asymmetry (Background Region)

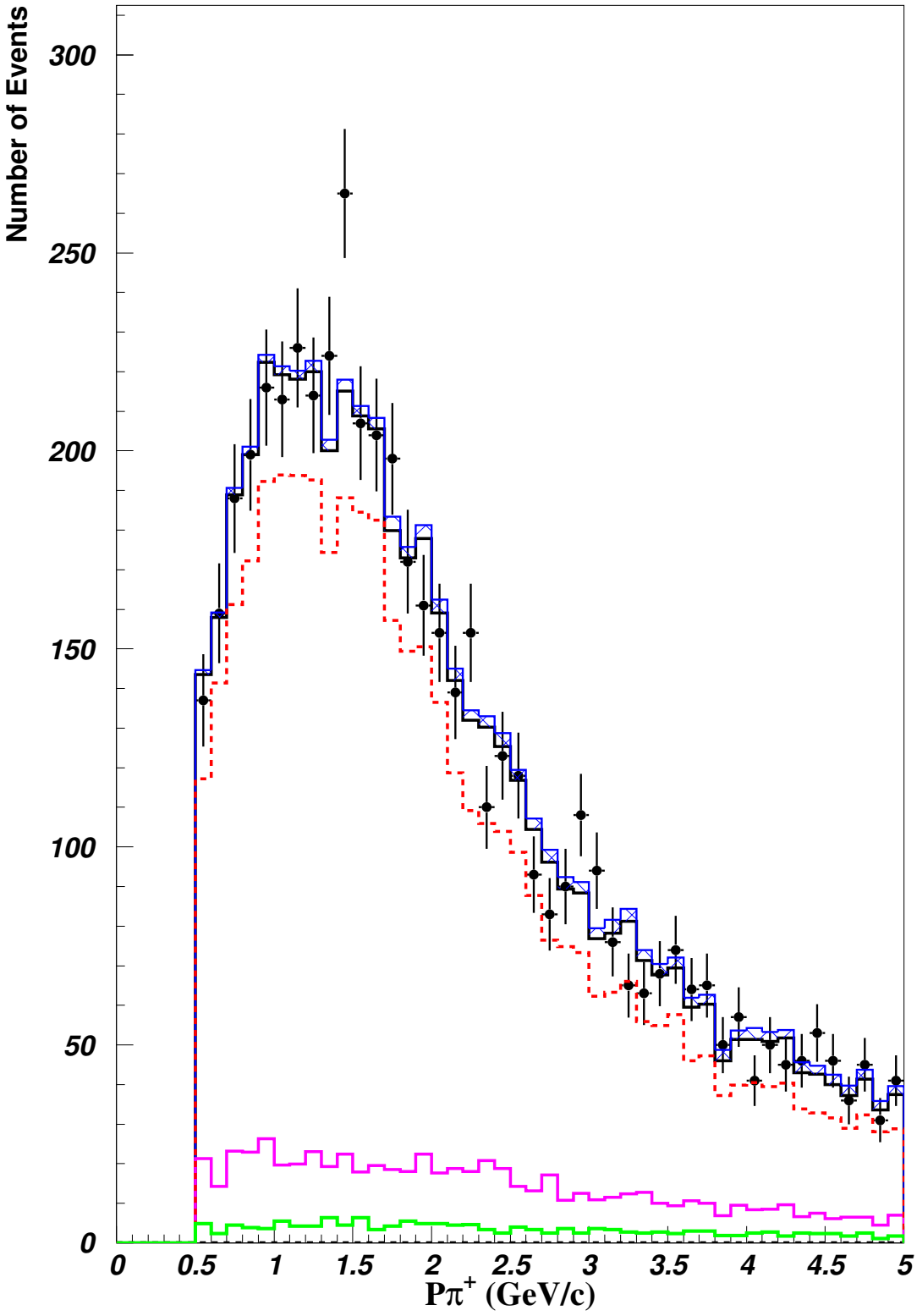

Number of Events
300
250
200
150
100
50
0
0
0.5
1
1.5
2
2.5
3
3.5
4
4.5
5
Pπ+ (GeV/c)

Figure 64: P_+

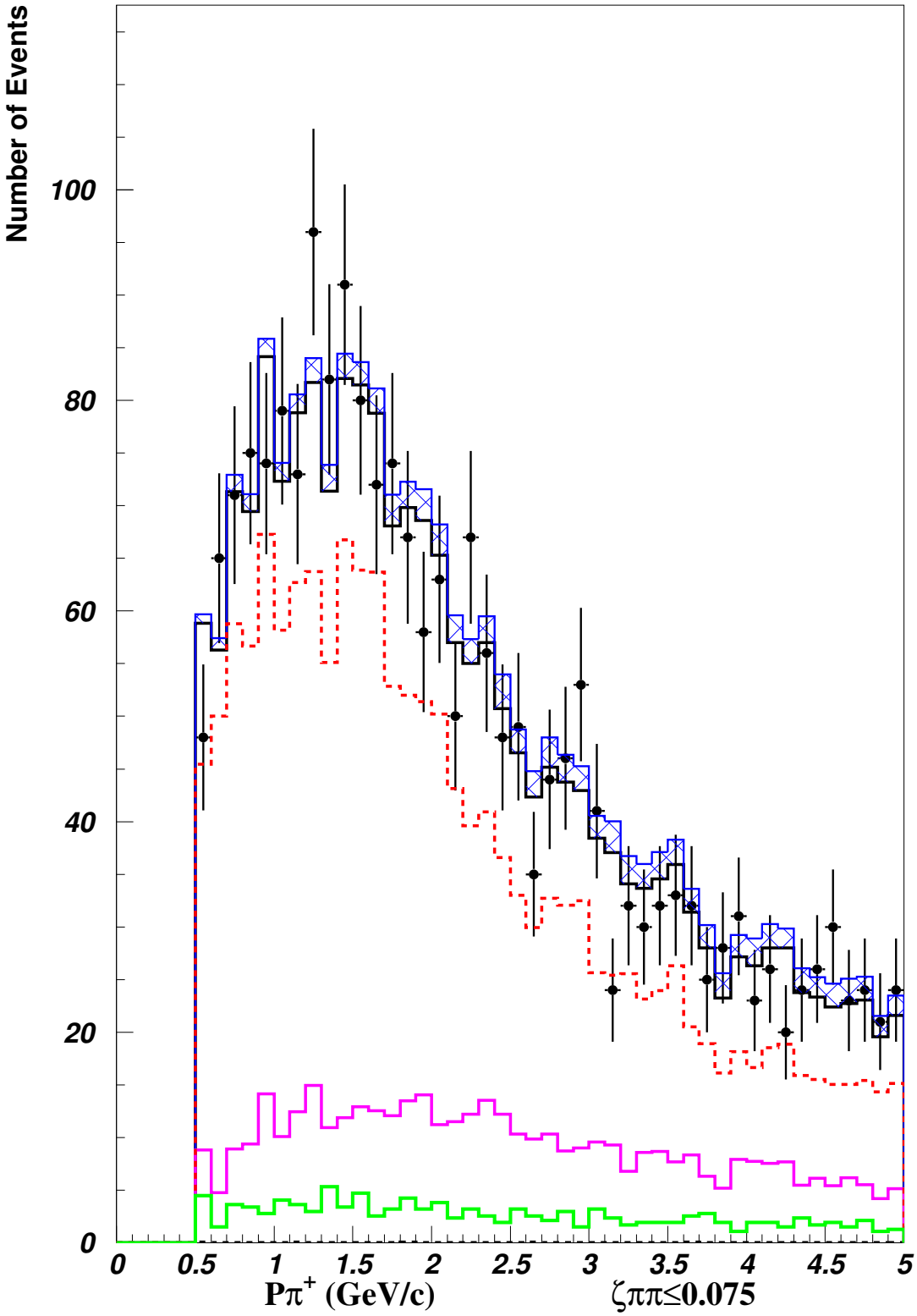


Figure 65: P_+ (Signal Region)

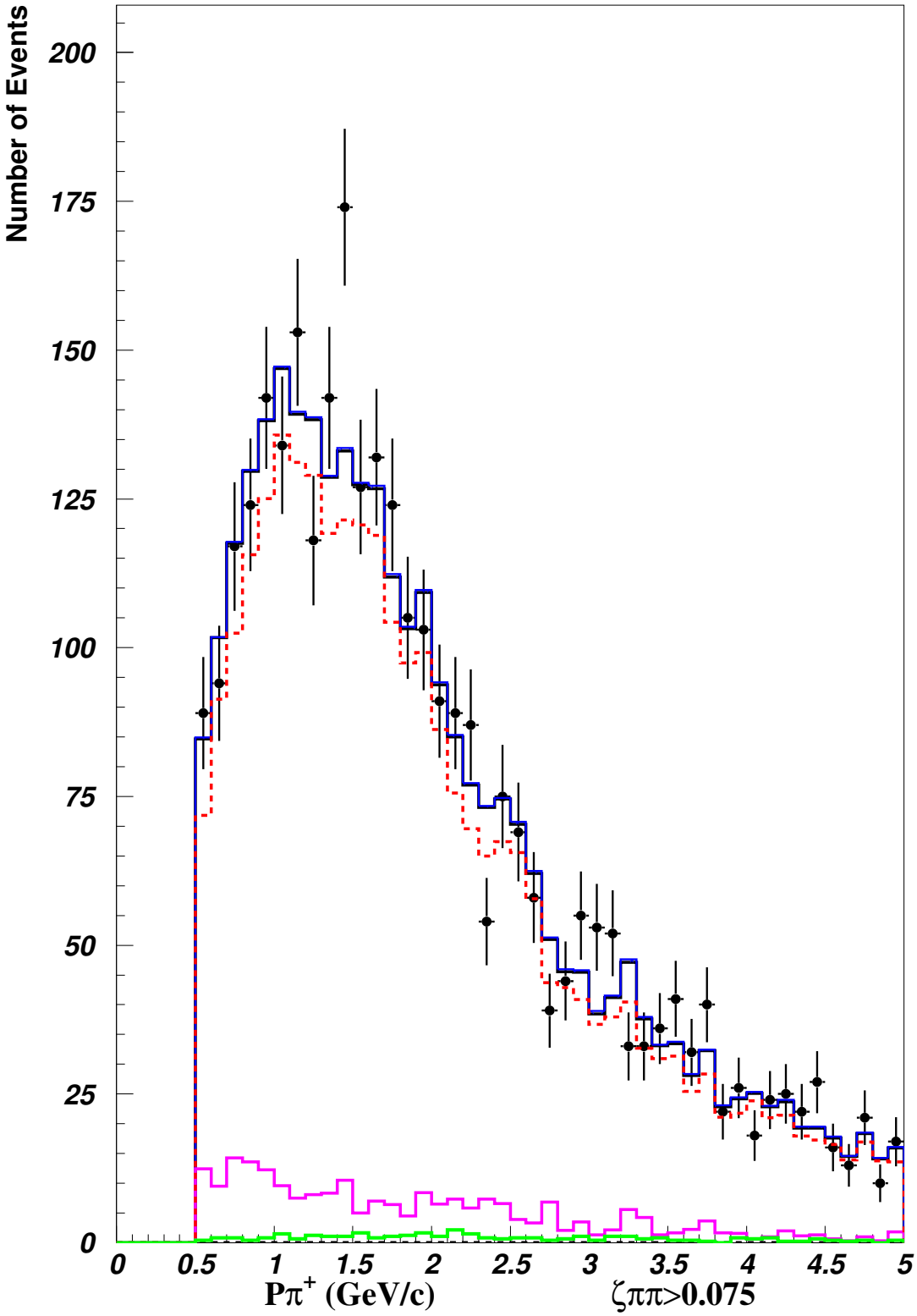


Figure 66: P_+ (Background Region)

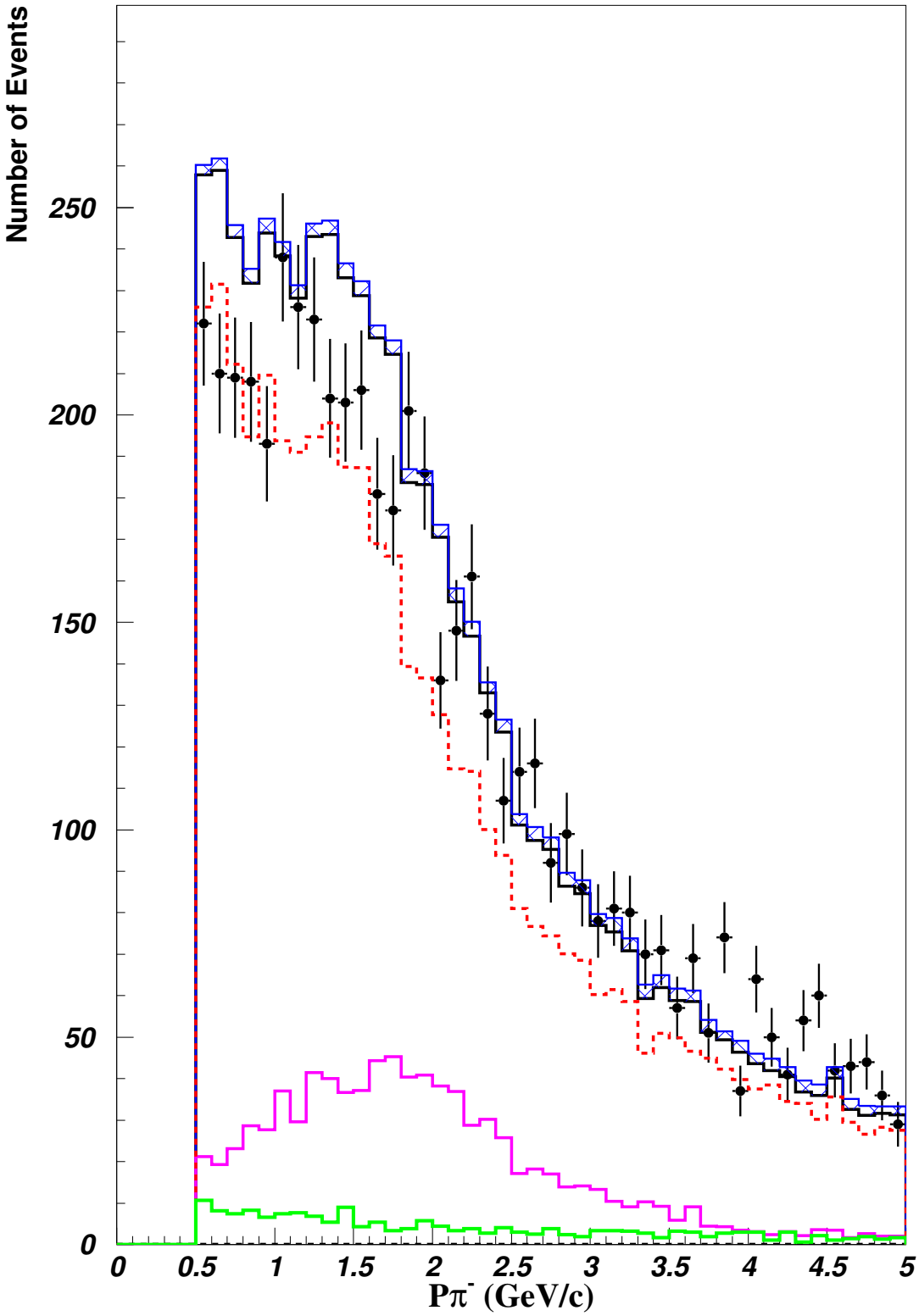

Number of Events
250
200
150
100
50
0
0
0.5
1
1.5
2
2.5
3
3.5
4
4.5
5
Pπ⁻ (GeV/c)

Figure 67: P_{-}

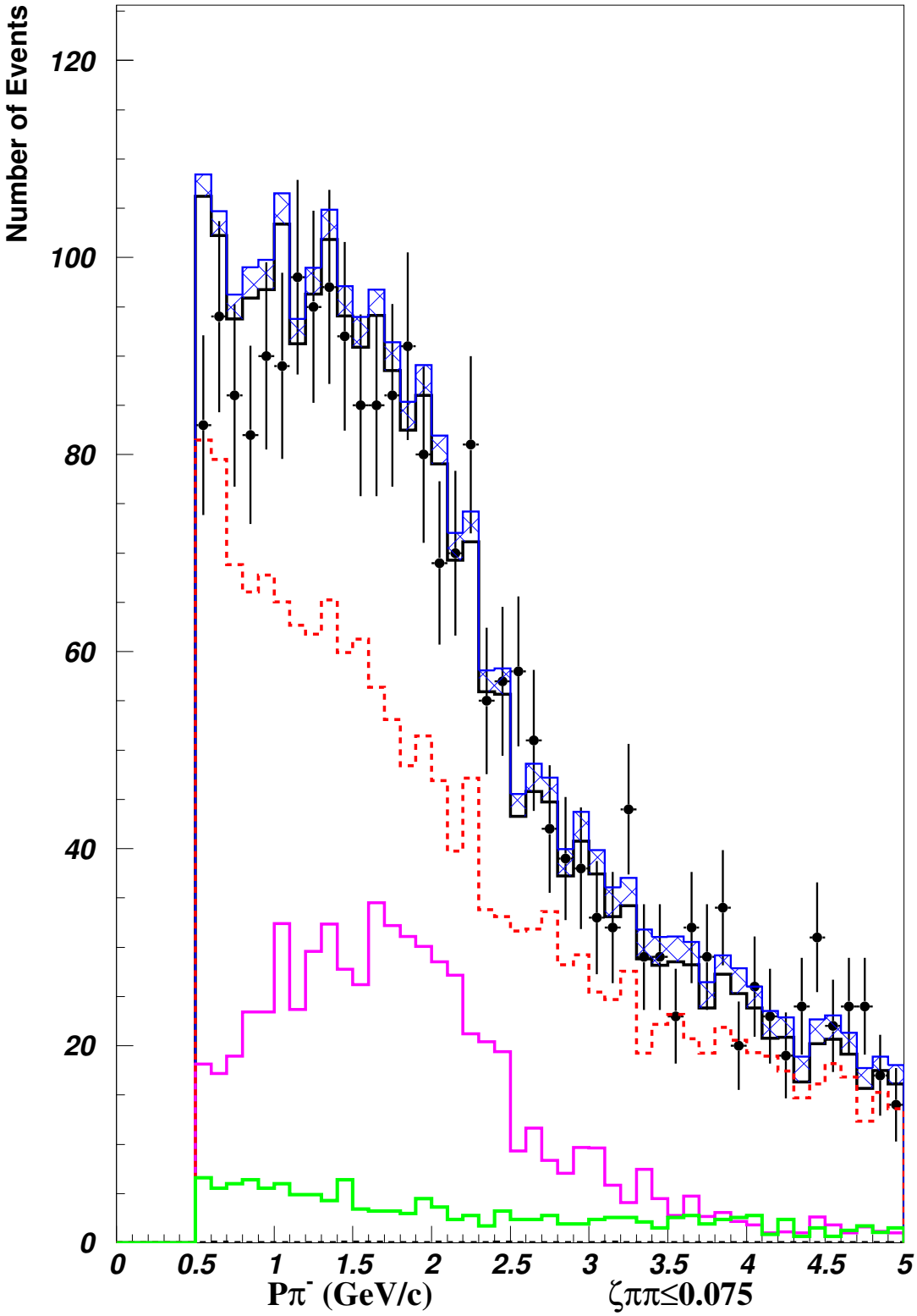


Figure 68: P_{-} (Signal Region)

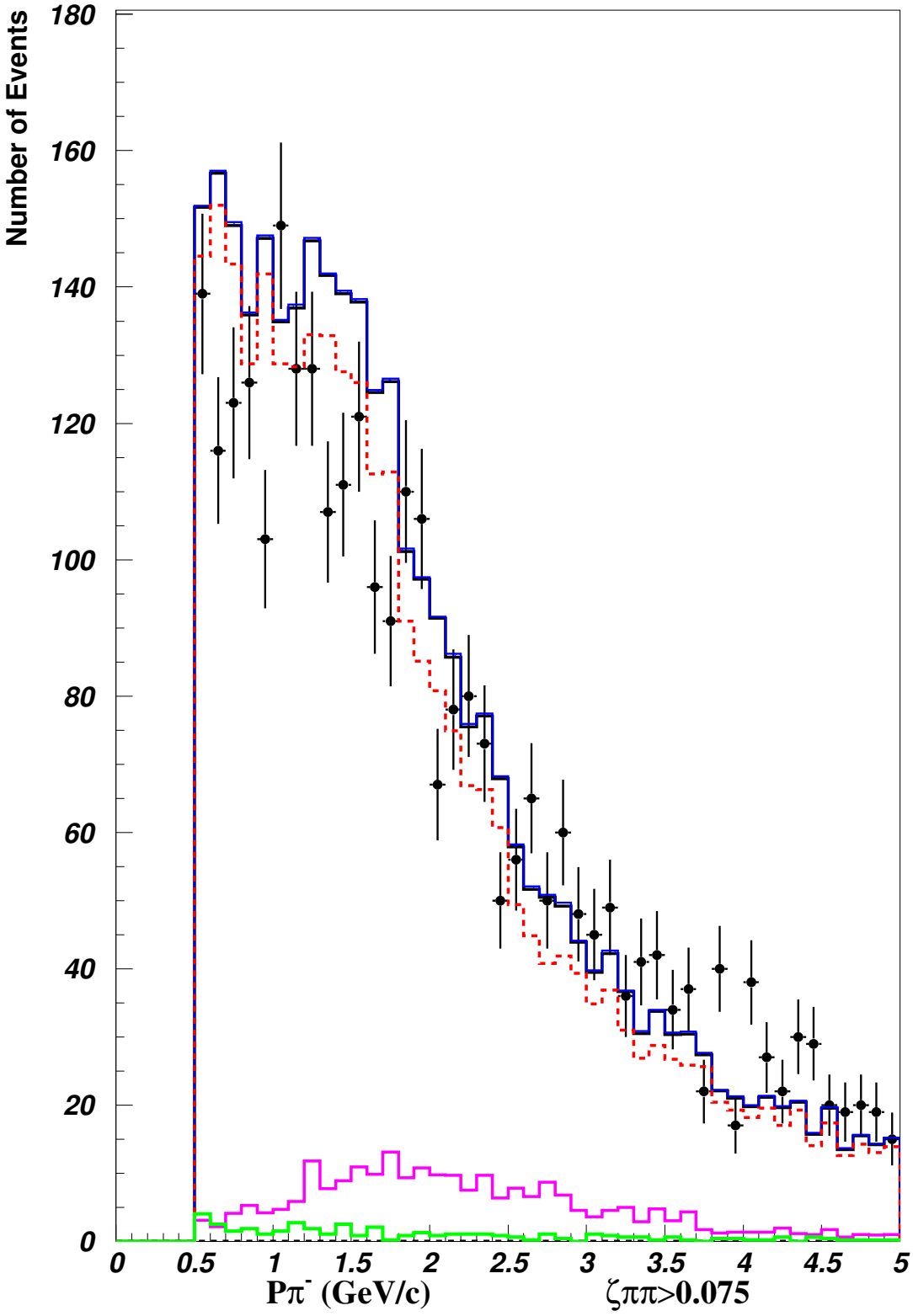


Figure 69: P_{-} (Background Region)

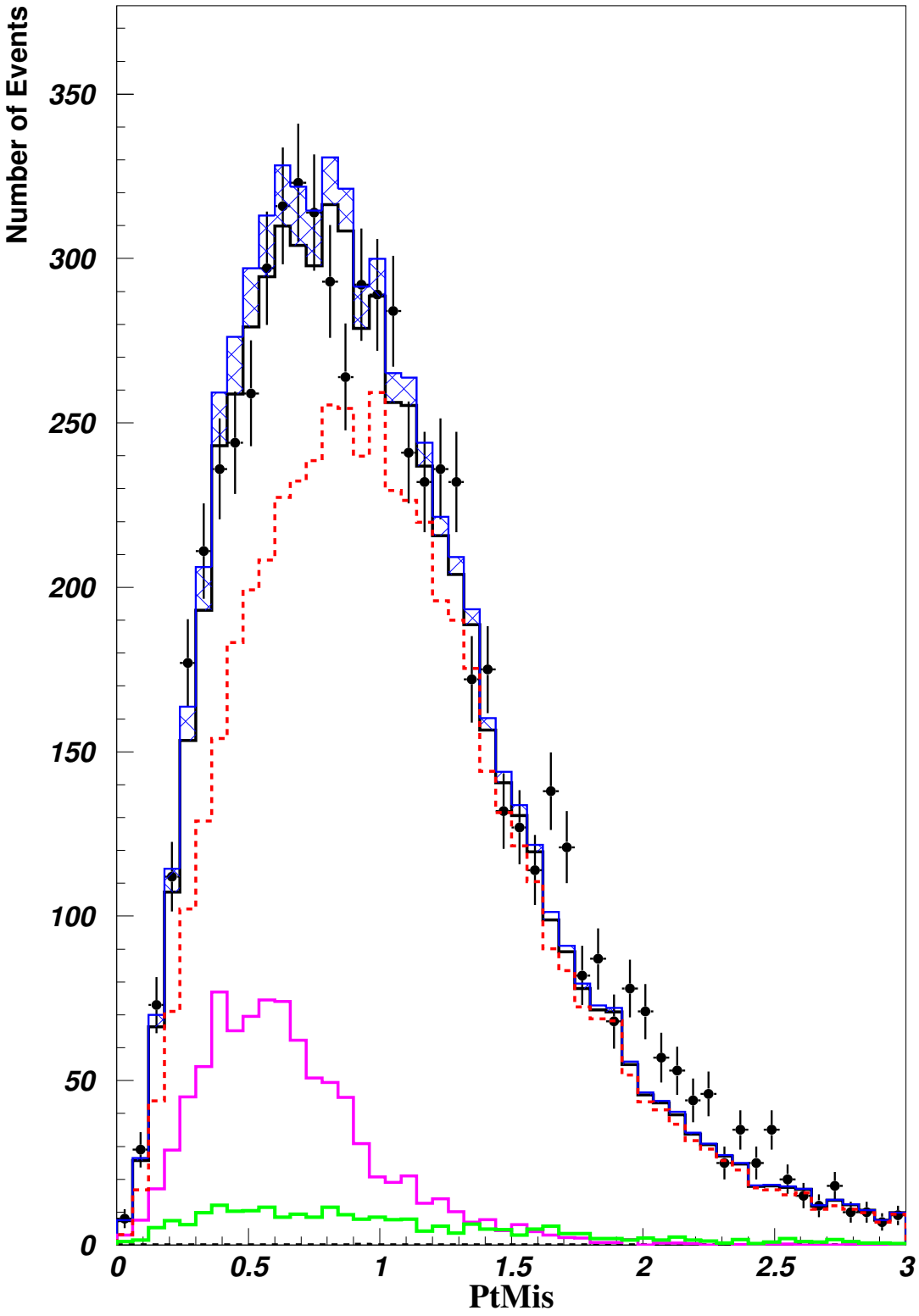


Figure 70: P_tMis

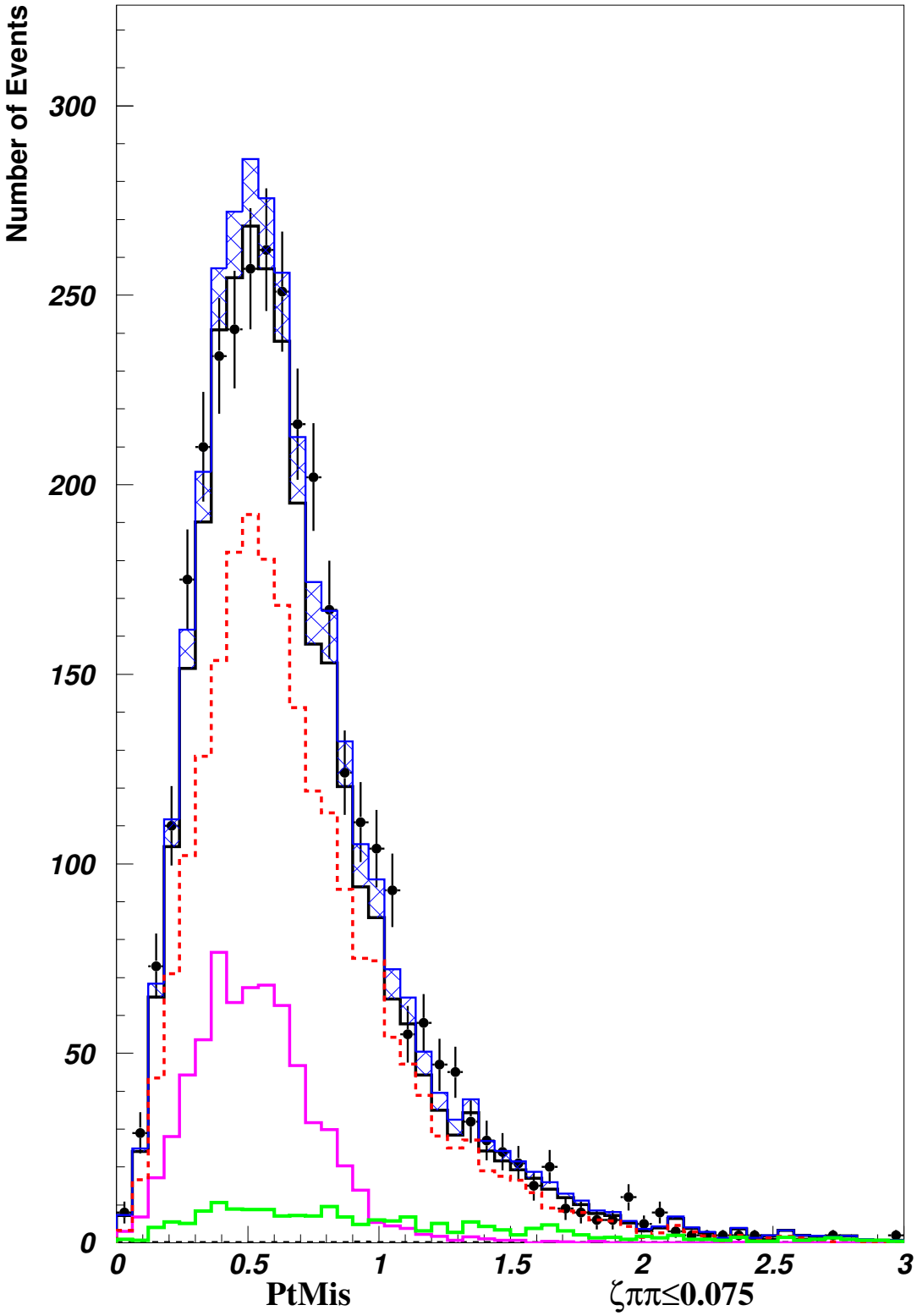


Figure 71: P_tMis (Signal Region)

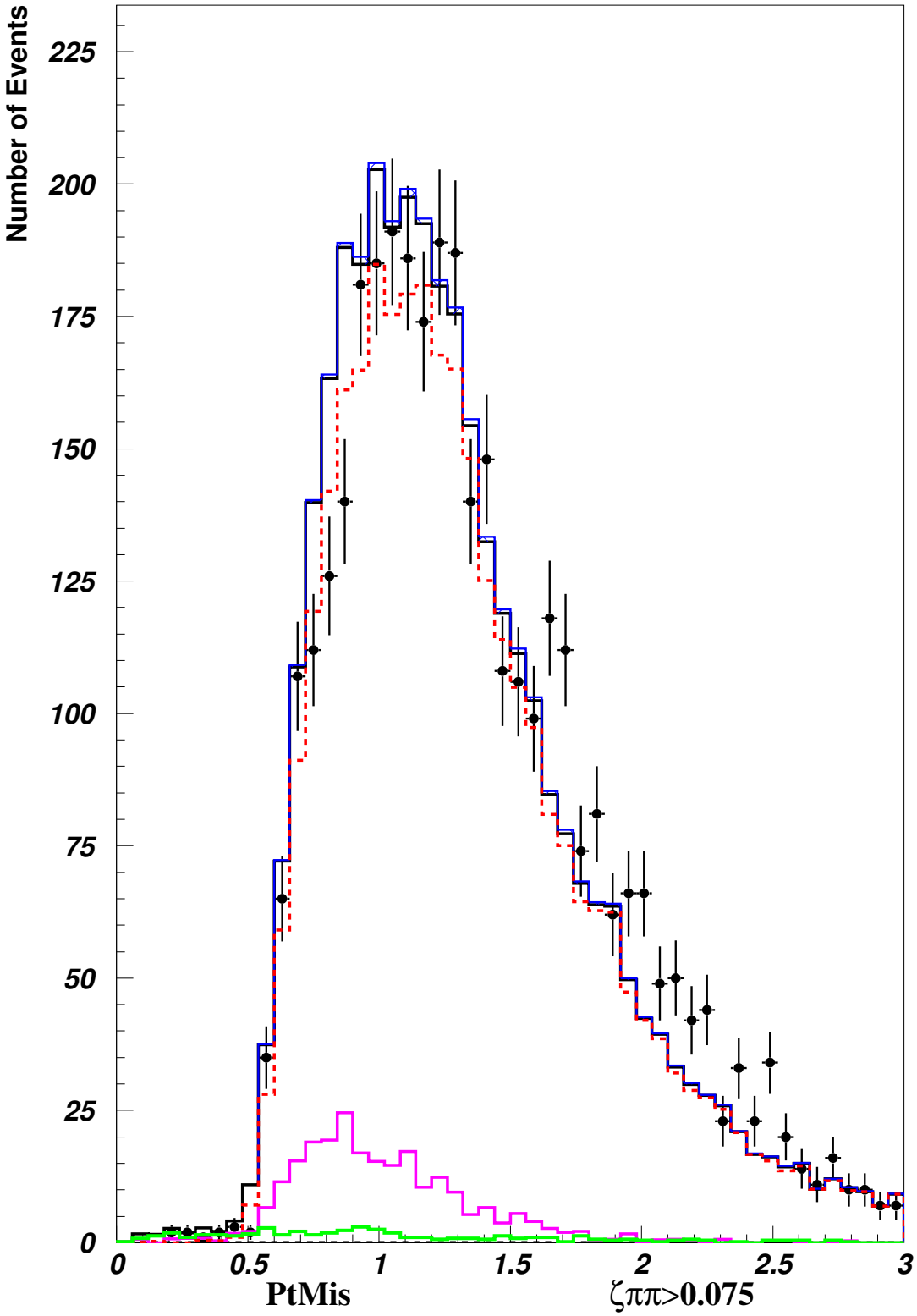


Figure 72: P_tMis (Background Region)

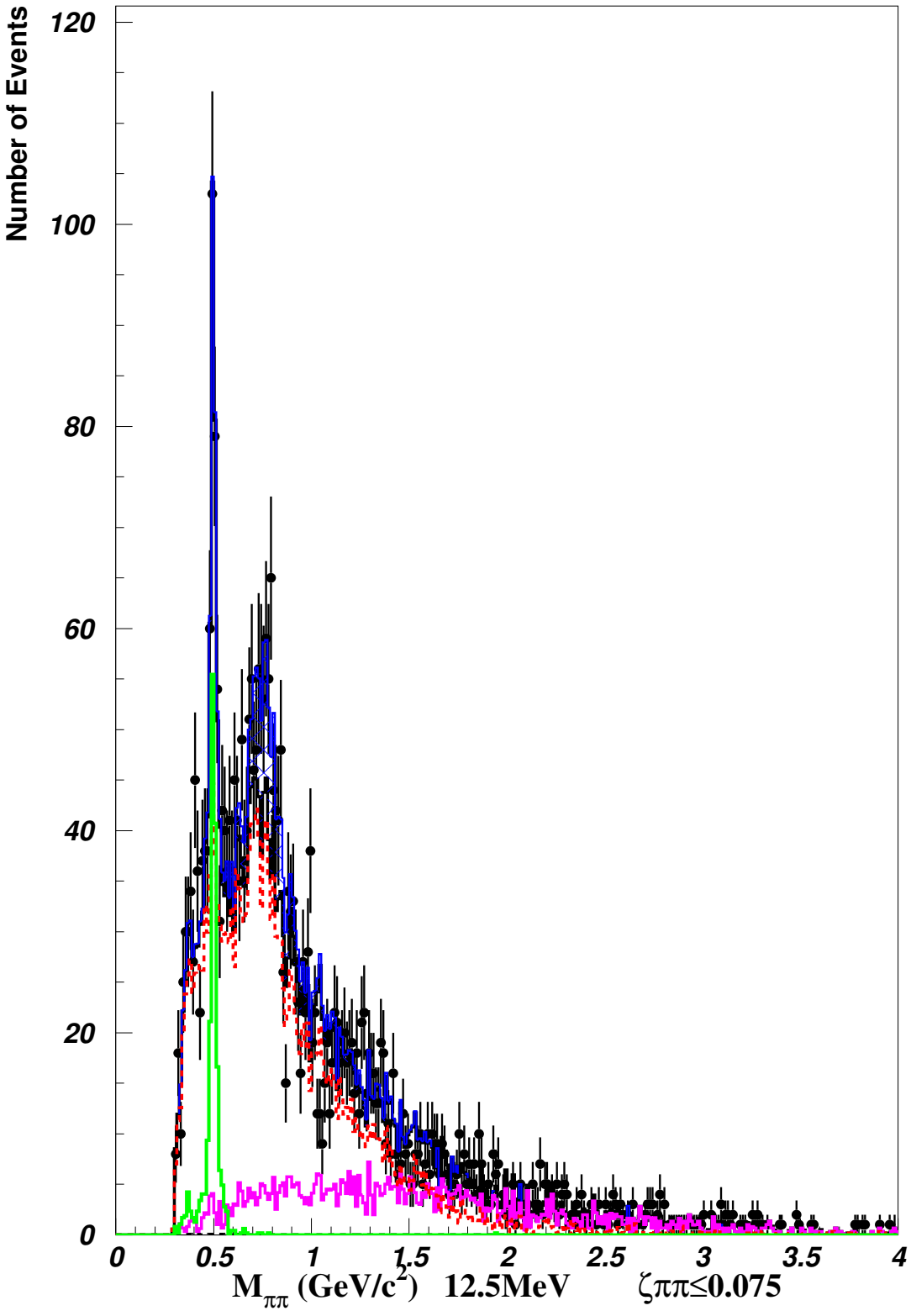


Figure 73: $M_{\pi\pi}$ 12.5MeV
(Signal Region)

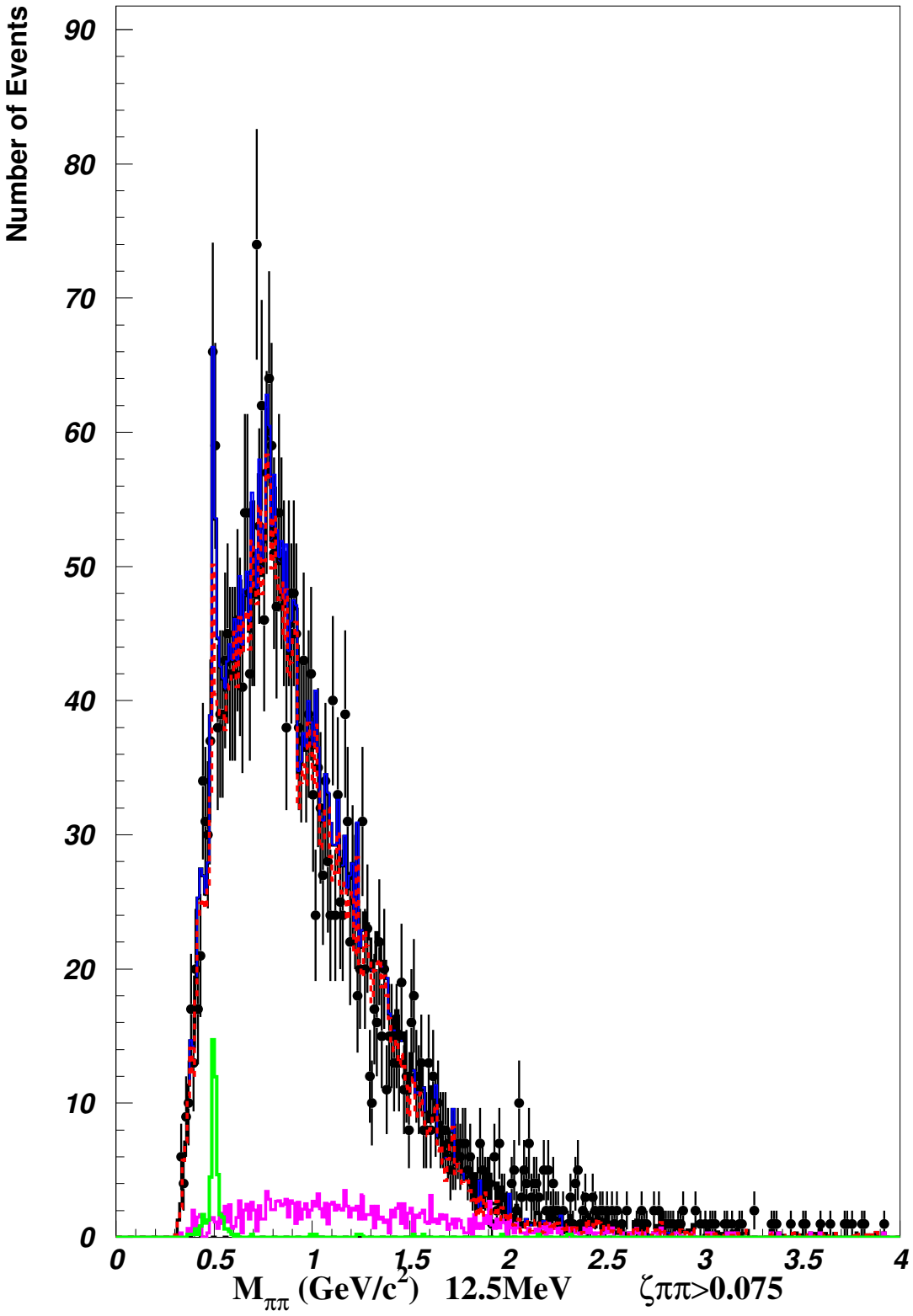


Figure 74: $M_{\pi\pi}$ 12.5MeV
(Background Region)

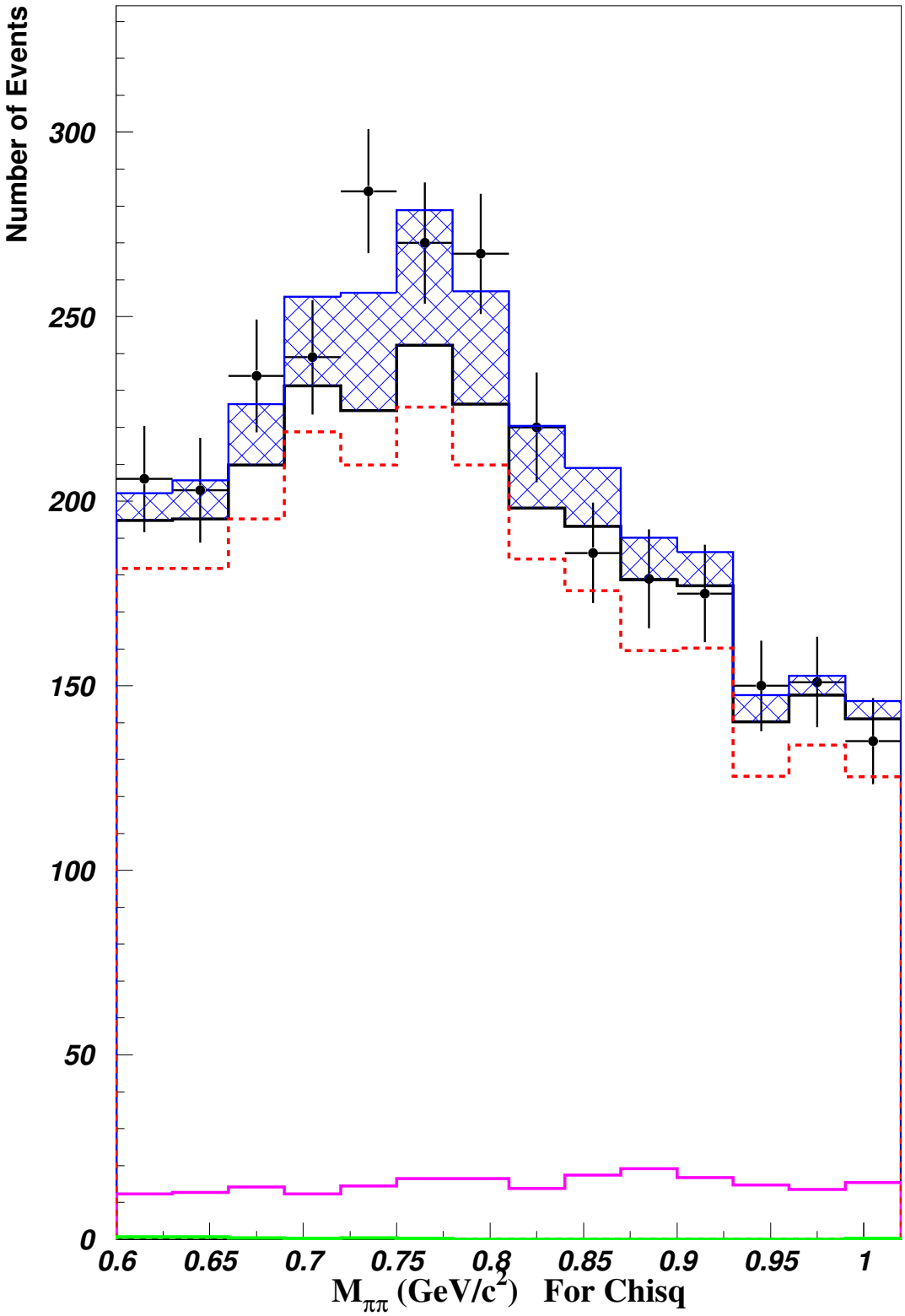


Figure 75: $M_{\pi\pi}$ For χ^2

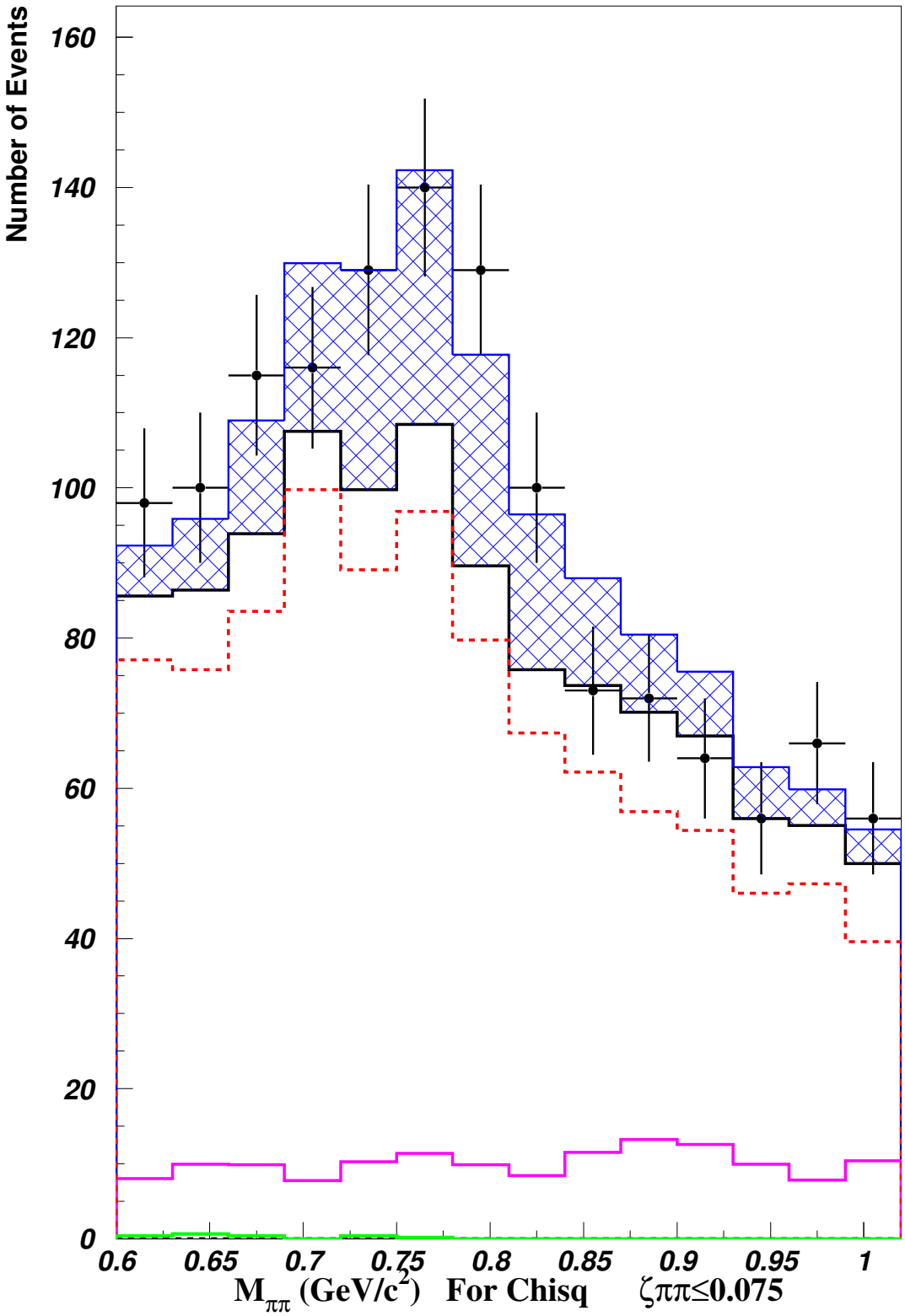


Figure 76: $M_{\pi\pi}$ For χ^2
(Signal Region)

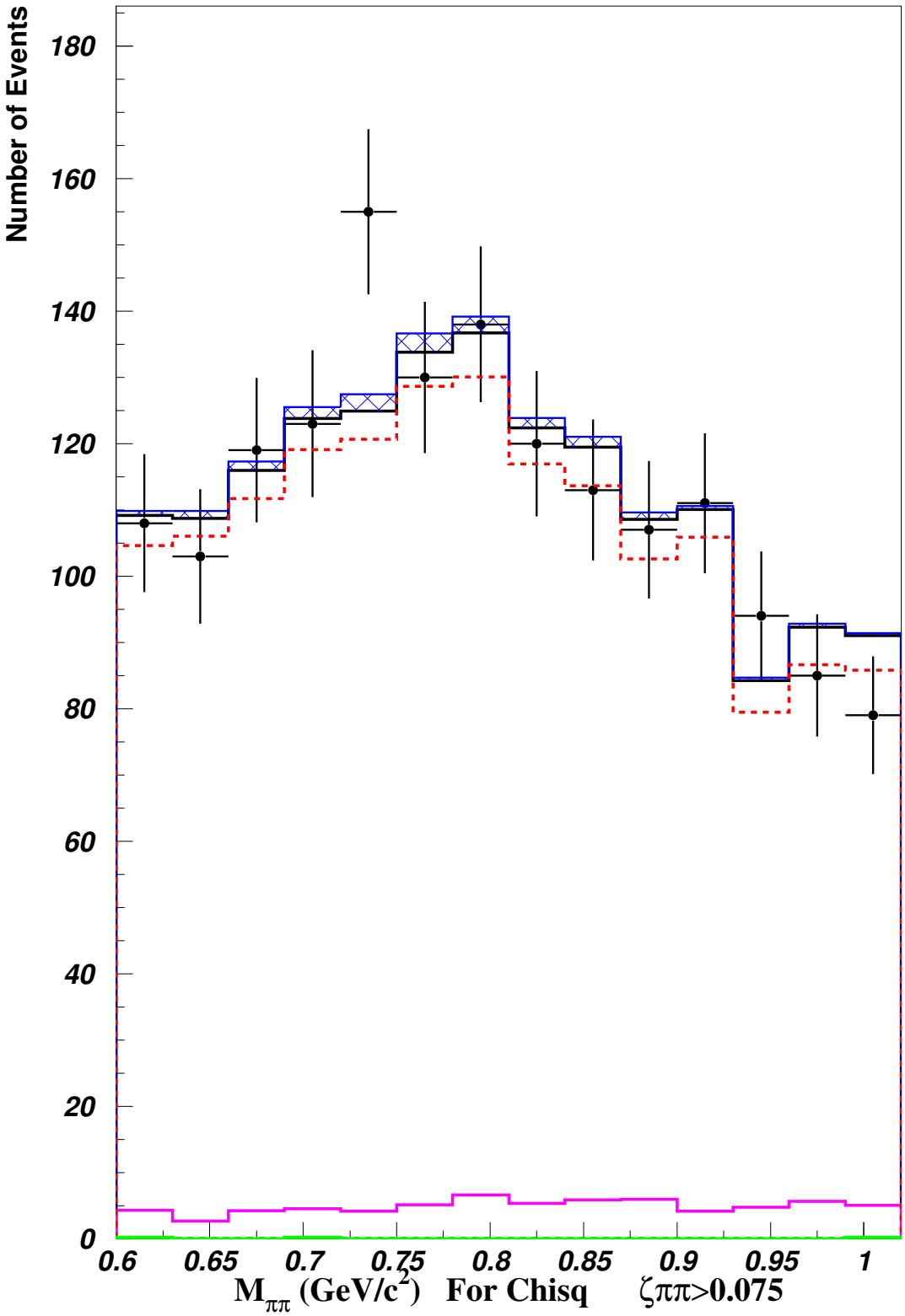


Figure 77: $M_{\pi\pi}$ For χ^2
(Background Region)

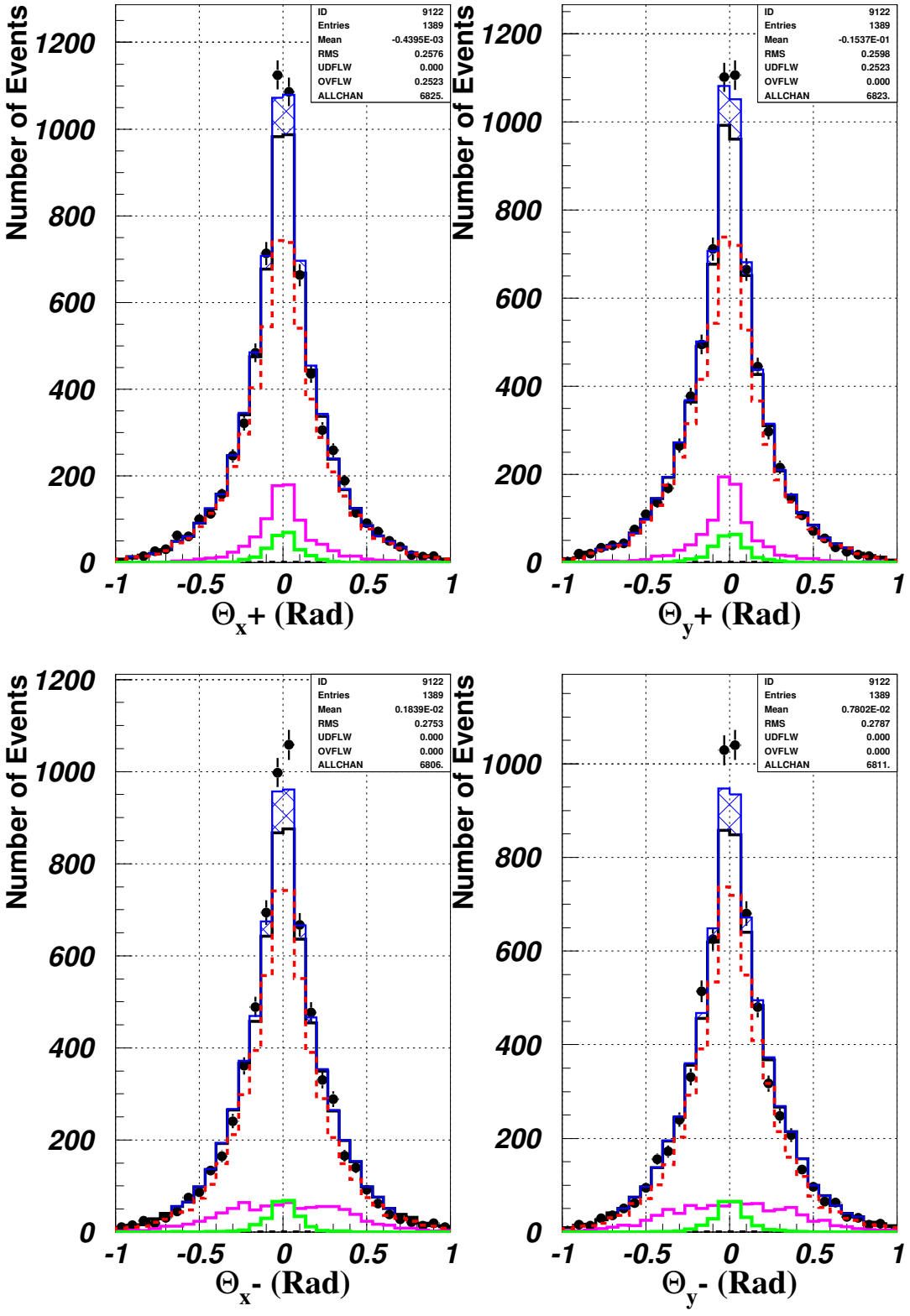


Figure 78: θ_x and θ_y