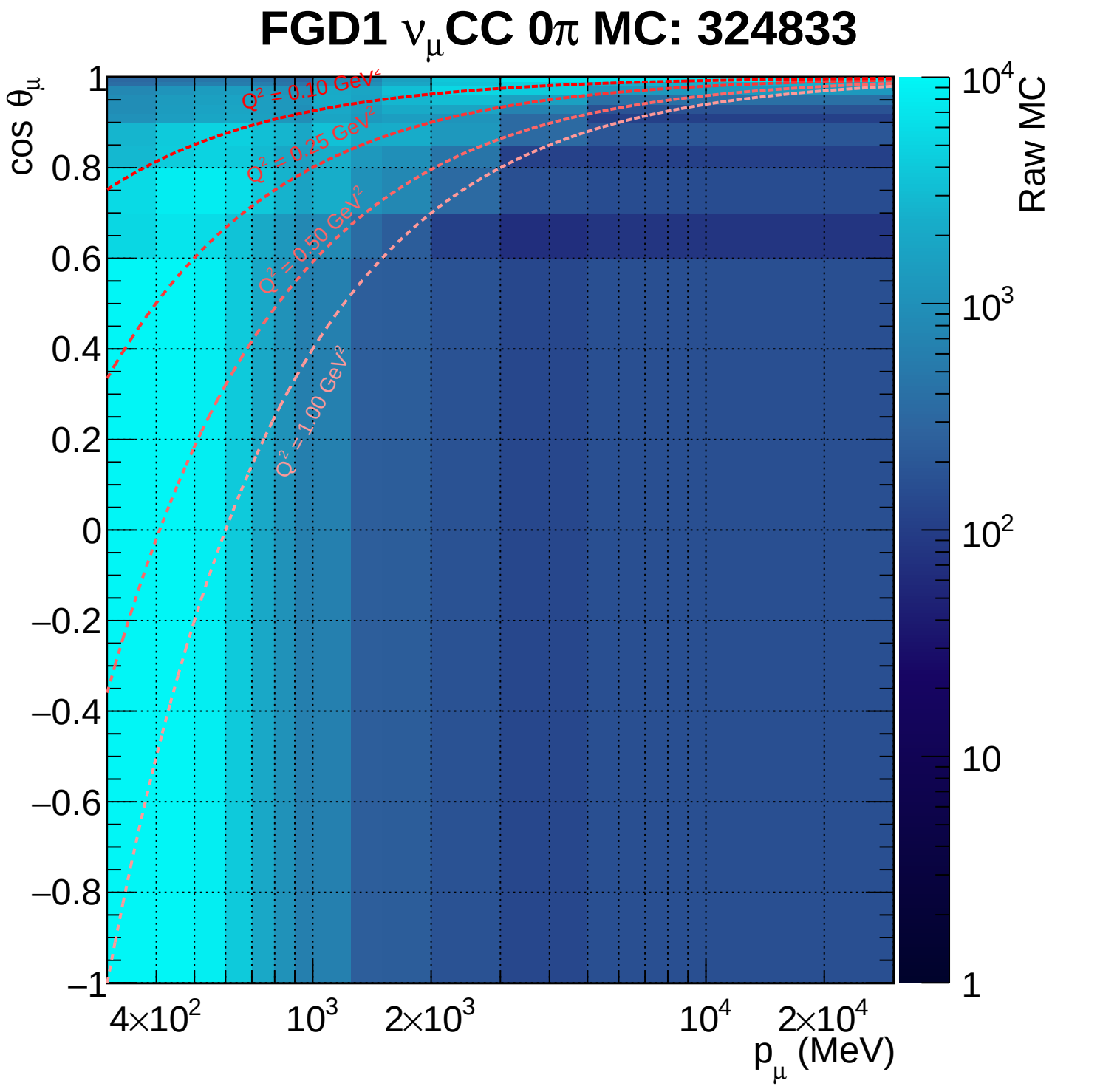
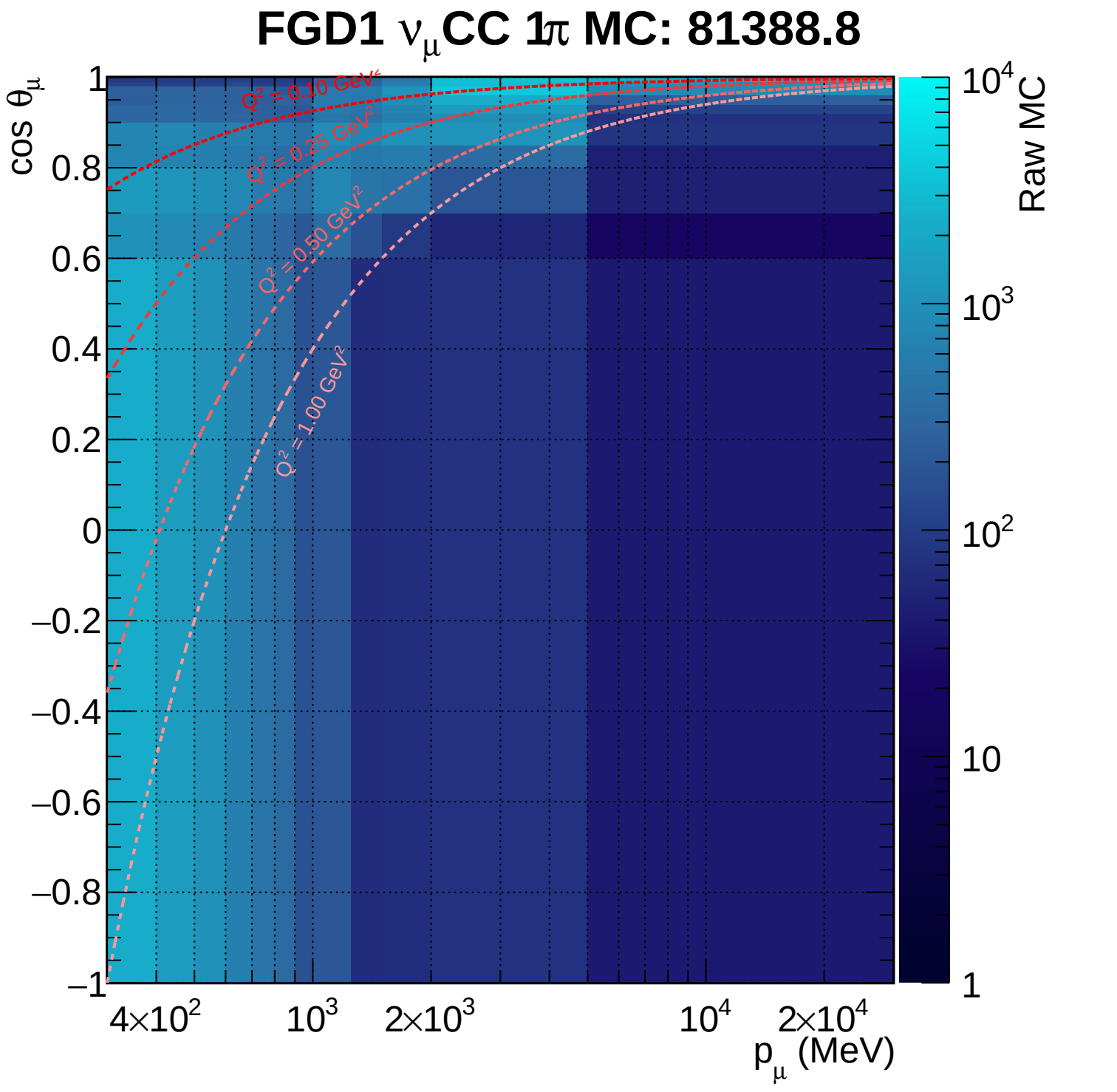
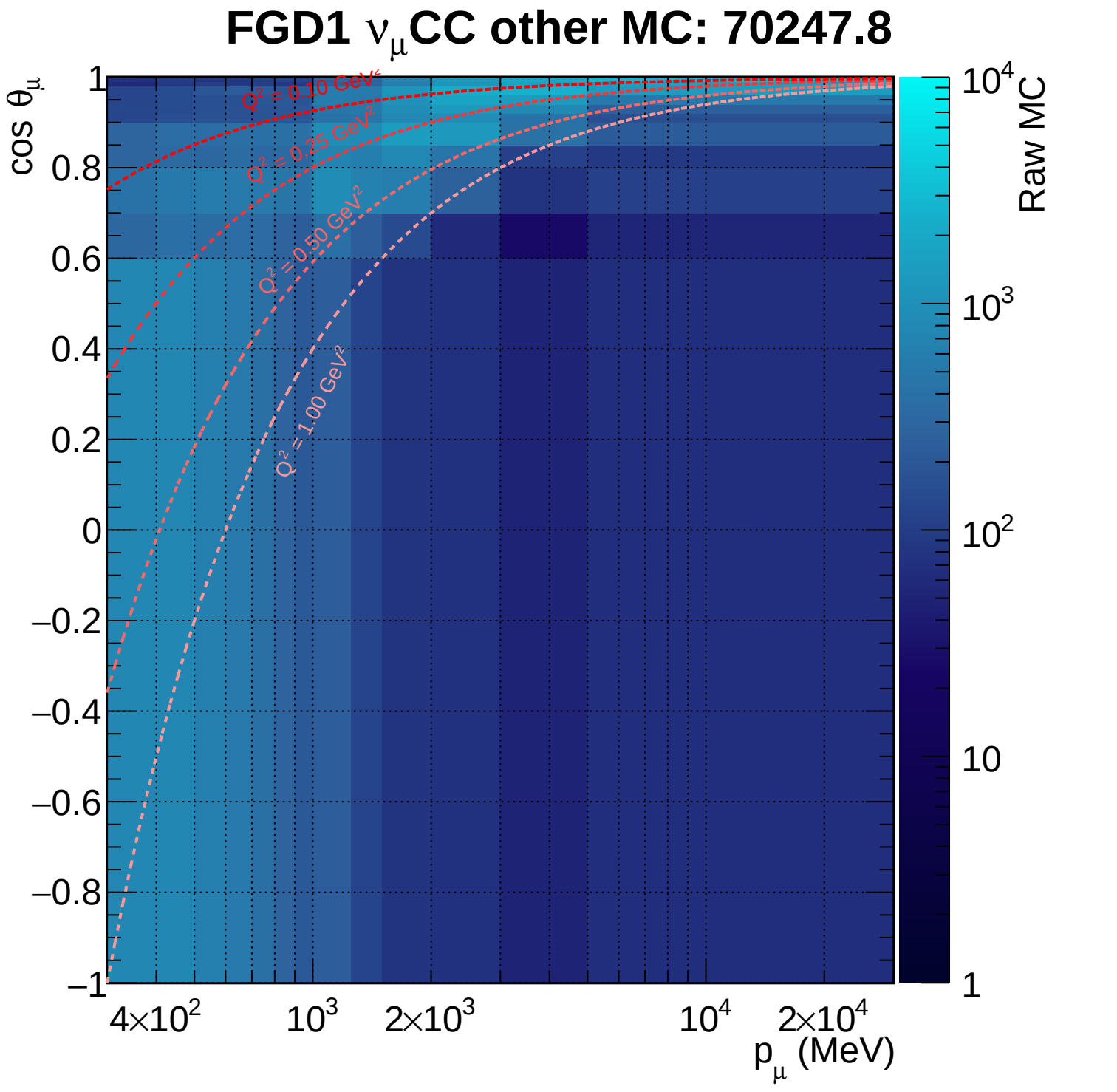
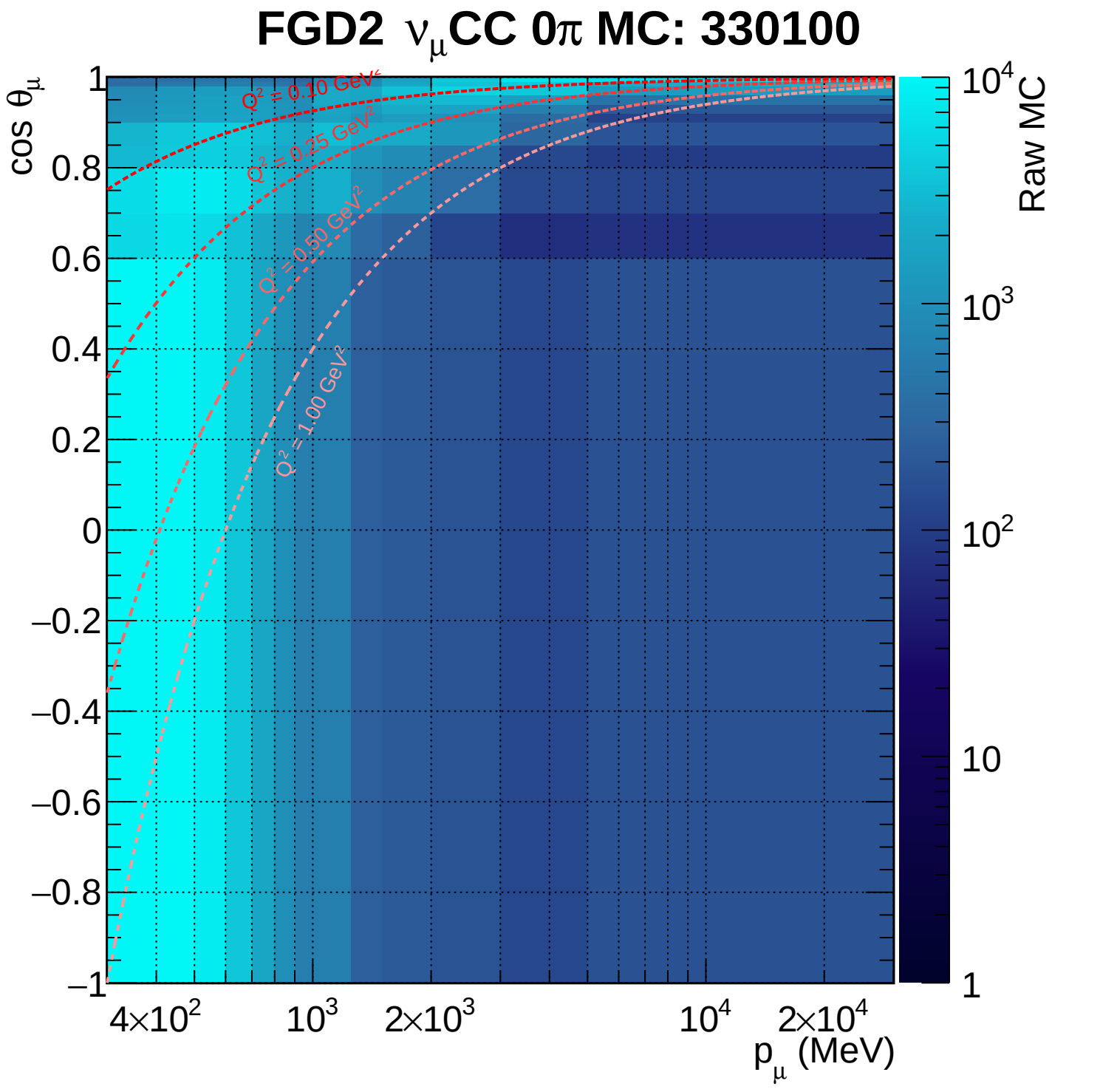
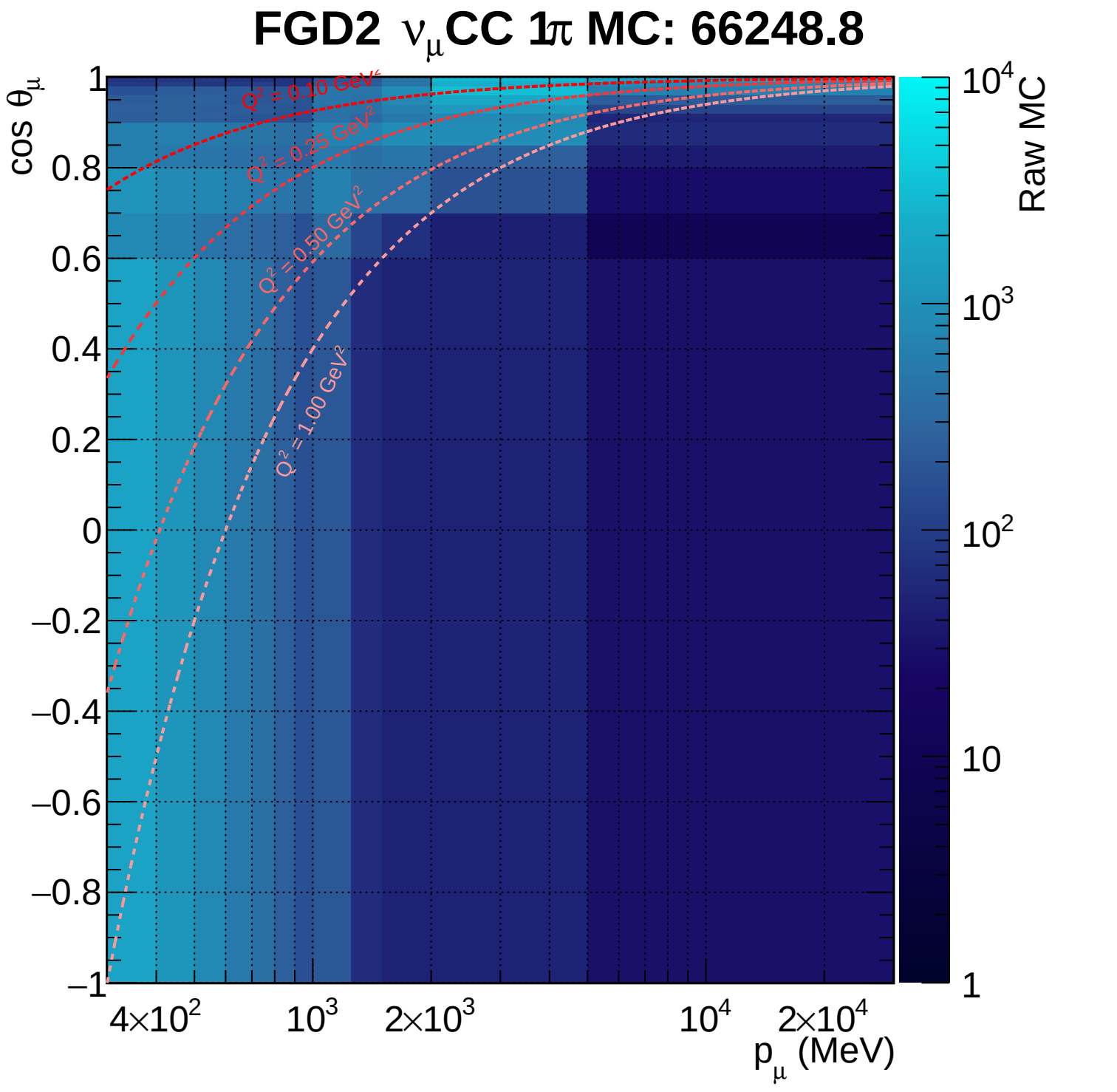
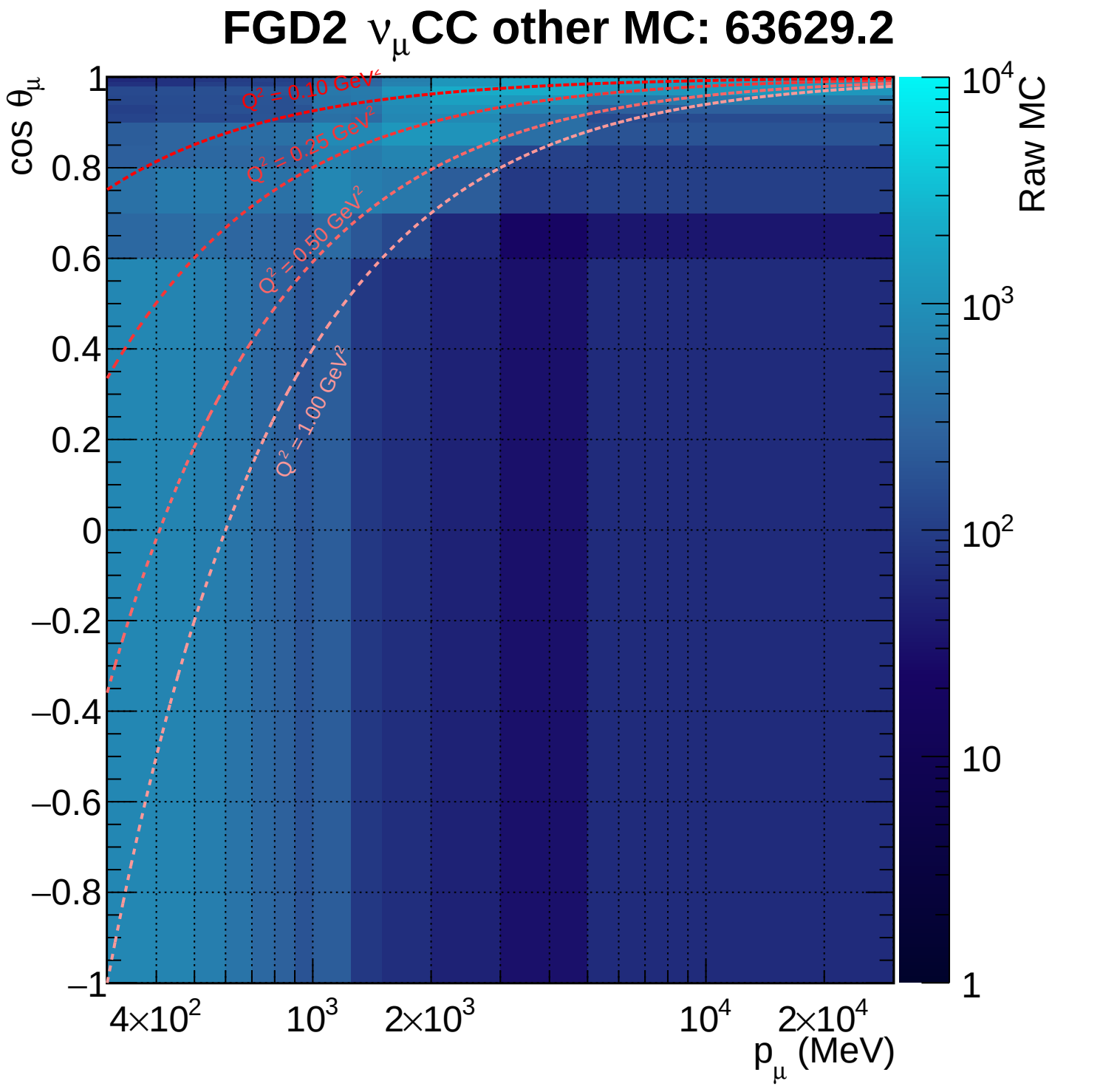

FGD1 ν_μCC 0π MC: 324833
cos θ_μ
1
0.8
0.6
0.4
0.2
0
−0.2
−0.4
−0.6
−0.8
−1
Q^2 = 0.10 GeV^2
Q^2 = 0.25 GeV^2
Q^2 = 0.50 GeV^2
Q^2 = 1.00 GeV^2
4×10^2
10^3
2×10^3
10^4
2×10^4
p_μ (MeV)
Raw MC
10^4
10^3
10^2
10
1

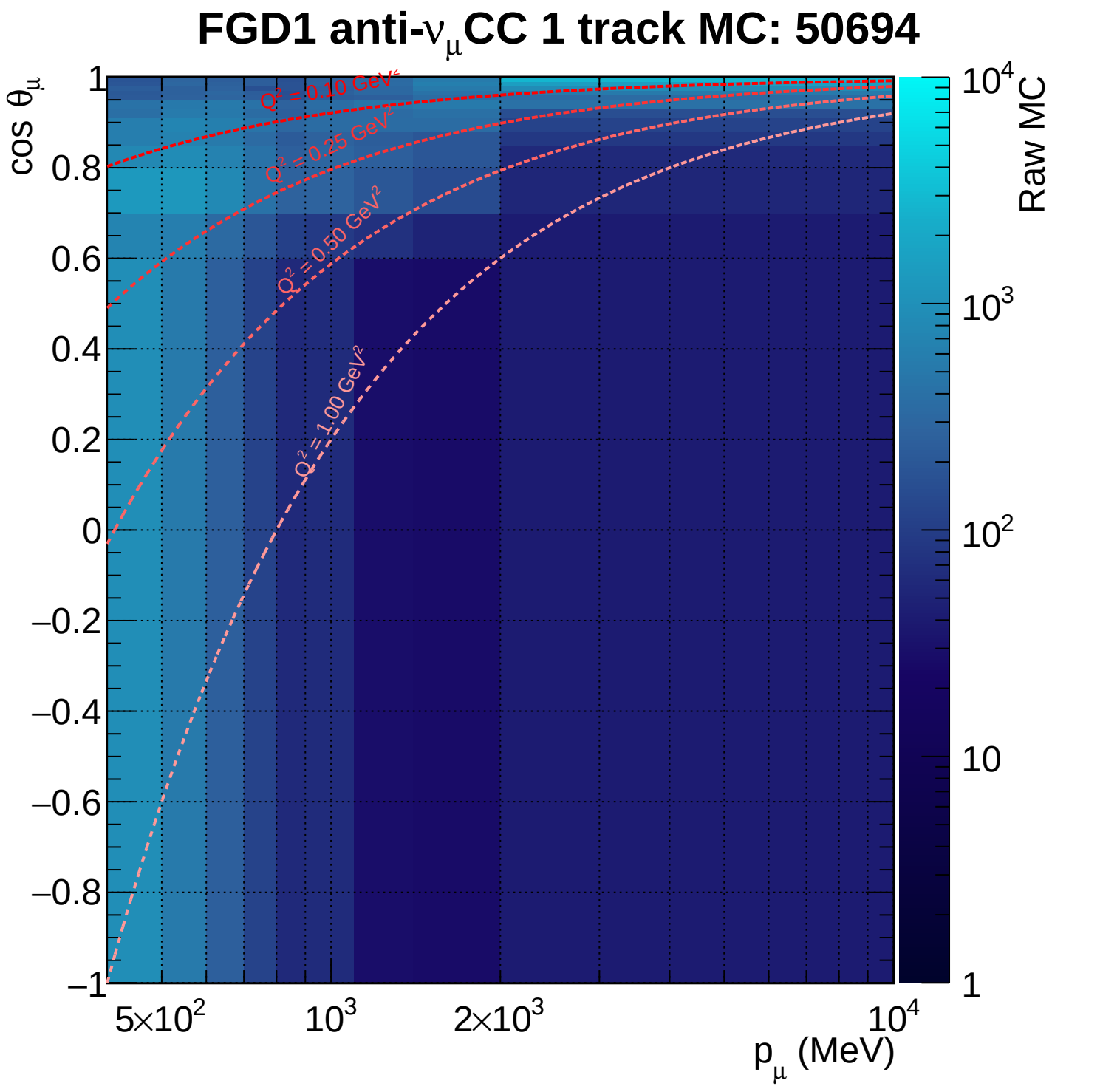

FGD1 ν_μCC 1π MC: 81388.8
cos θ_μ
1
0.8
0.6
0.4
0.2
0
−0.2
−0.4
−0.6
−0.8
−1
Q^2 = 0.10 GeV^2
Q^2 = 0.25 GeV^2
Q^2 = 0.50 GeV^2
Q^2 = 1.00 GeV^2
4×10^2
10^3
2×10^3
10^4
2×10^4
p_μ (MeV)
Raw MC
10^4
10^3
10^2
10
1

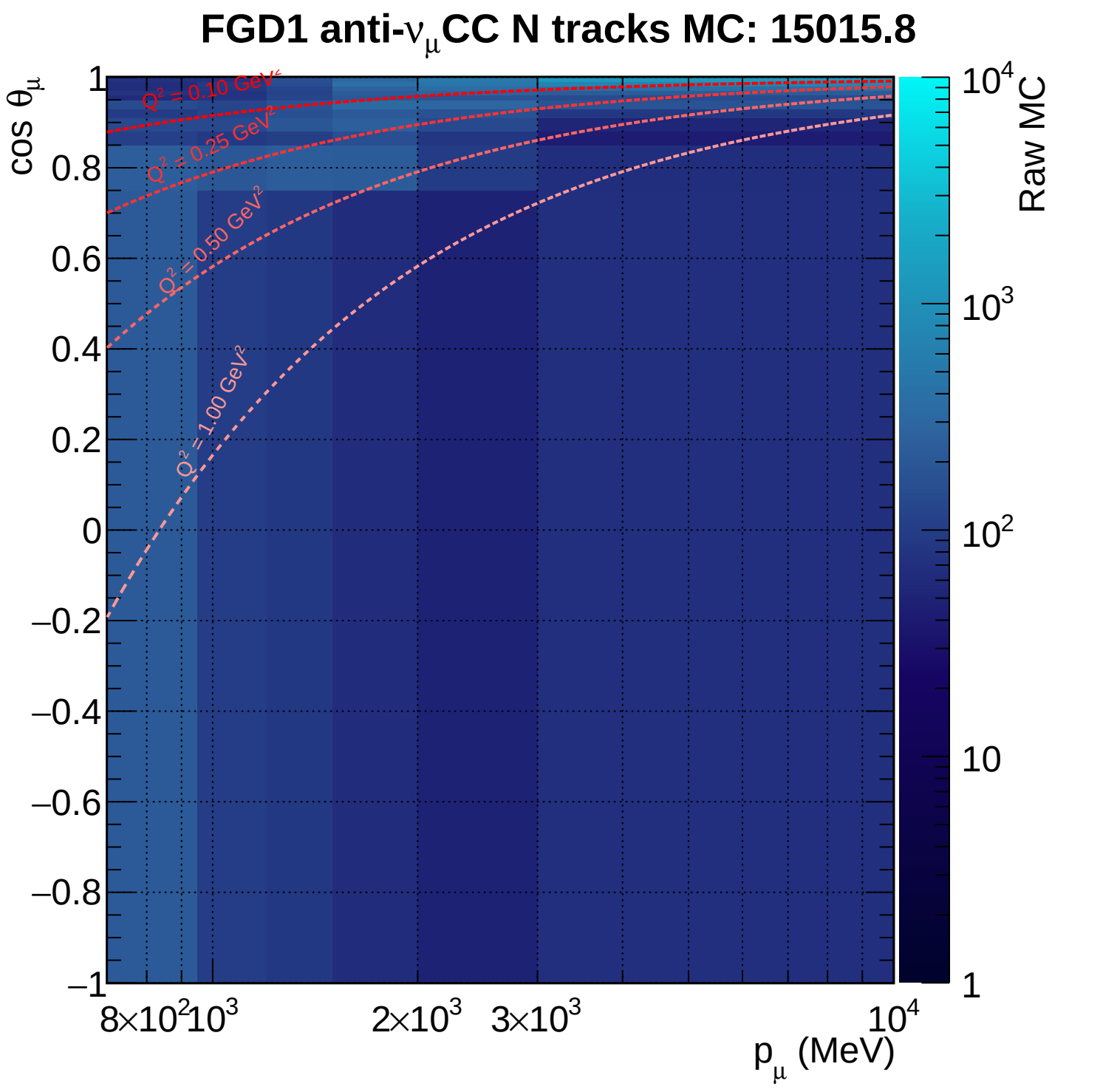

FGD1 ν_μCC other MC: 70247.8
cos θ_μ
1
0.8
0.6
0.4
0.2
0
−0.2
−0.4
−0.6
−0.8
−1
Q^2 = 0.10 GeV²
Q^2 = 0.25 GeV²
Q^2 = 0.50 GeV²
Q^2 = 1.00 GeV²
4×10²
10³
2×10³
10⁴
2×10⁴
p_μ (MeV)
Raw MC
10⁴
10³
10²
10
1

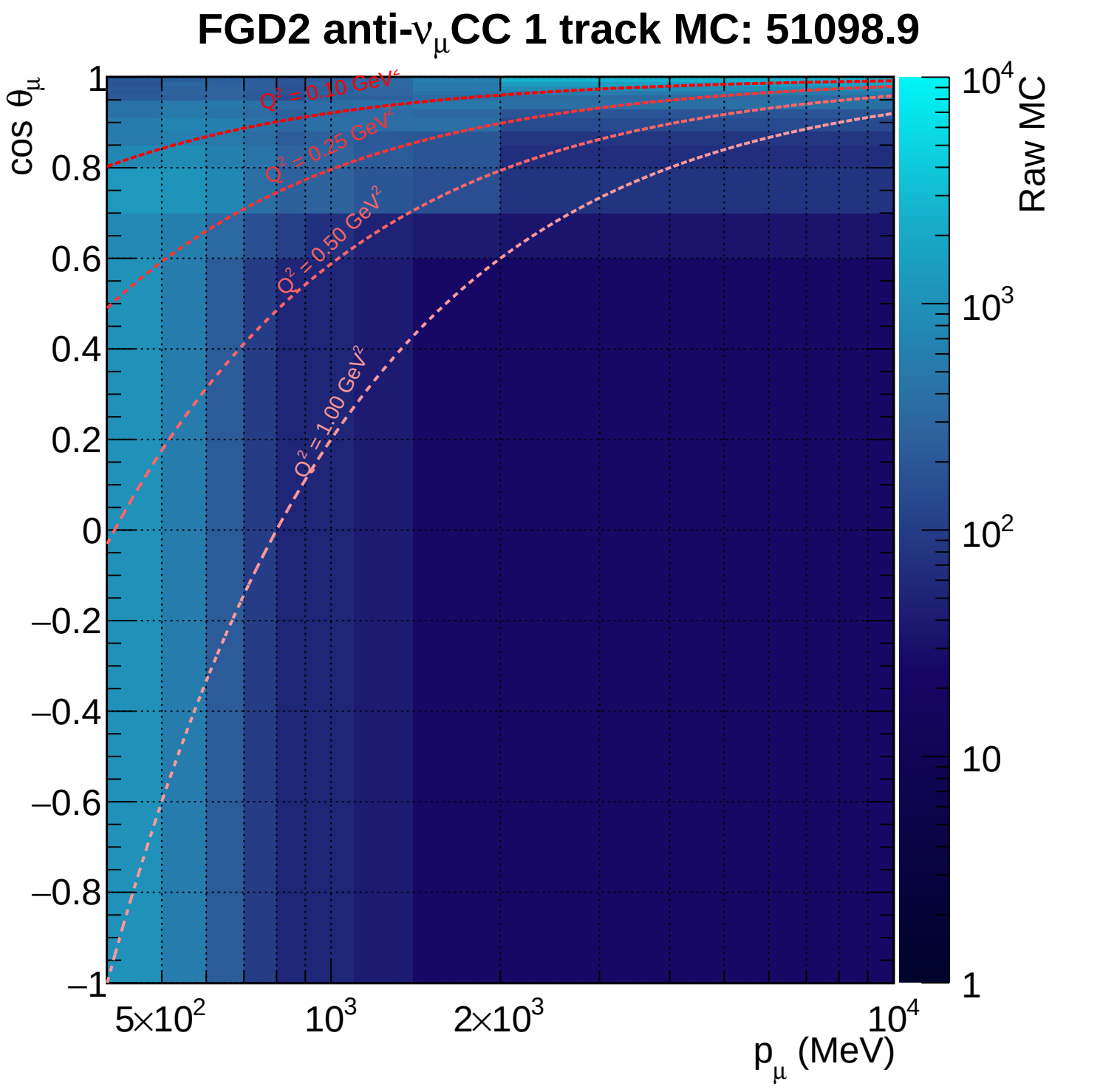

FGD2 ν_μCC 0π MC: 330100
cos θ_μ
1
0.8
0.6
0.4
0.2
0
−0.2
−0.4
−0.6
−0.8
−1
Q^2 = 0.10 GeV^2
Q^2 = 0.25 GeV^2
Q^2 = 0.50 GeV^2
Q^2 = 1.00 GeV^2
4×10^2
10^3
2×10^3
10^4
2×10^4
p_μ (MeV)
Raw MC
10^4
10^3
10^2
10
1

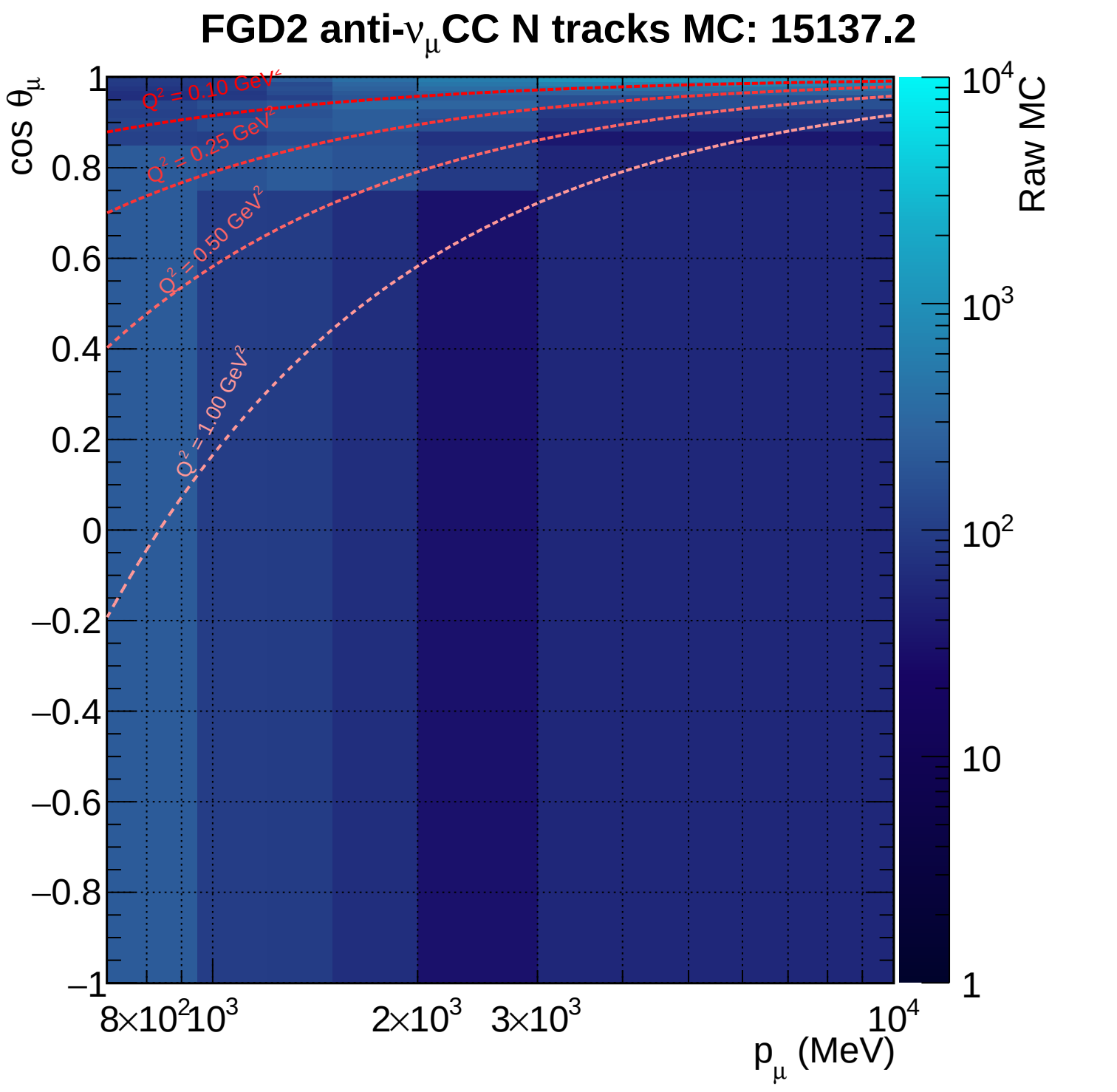

FGD2 ν_μCC 1π MC: 66248.8
cos θ_μ
1
0.8
0.6
0.4
0.2
0
−0.2
−0.4
−0.6
−0.8
−1
Q^2 = 0.10 GeV^2
Q^2 = 0.25 GeV^2
Q^2 = 0.50 GeV^2
Q^2 = 1.00 GeV^2
4×10^2
10^3
2×10^3
10^4
2×10^4
p_μ (MeV)
Raw MC
10^4
10^3
10^2
10
1

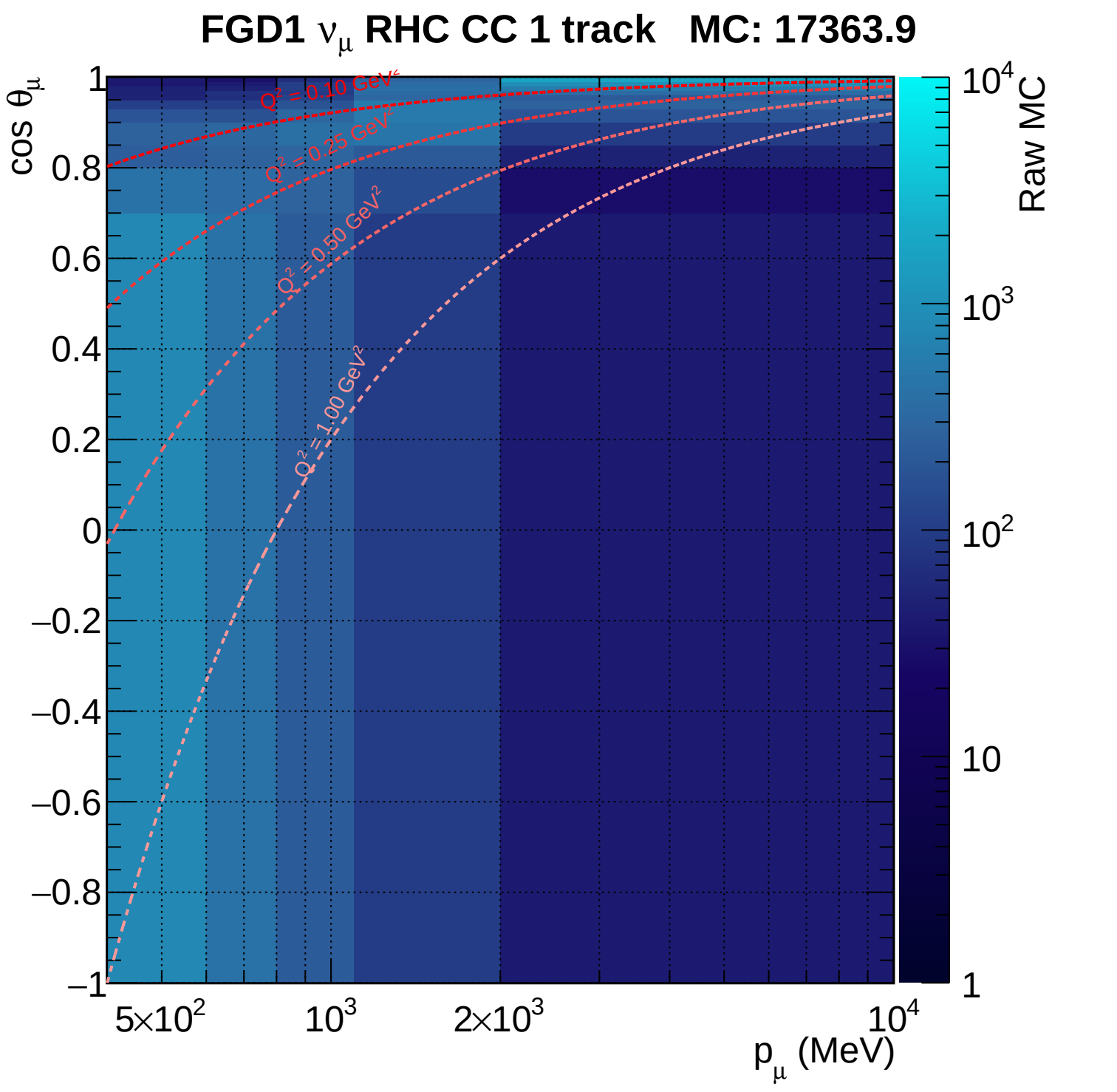

FGD2 ν_μCC other MC: 63629.2
cos θ_μ
1
0.8
0.6
0.4
0.2
0
−0.2
−0.4
−0.6
−0.8
−1
Q^2 = 0.10 GeV²
Q^2 = 0.25 GeV²
Q^2 = 0.50 GeV²
Q^2 = 1.00 GeV²
4×10²
10³
2×10³
10⁴
2×10⁴
p_μ (MeV)
Raw MC
10⁴
10³
10²
10
1

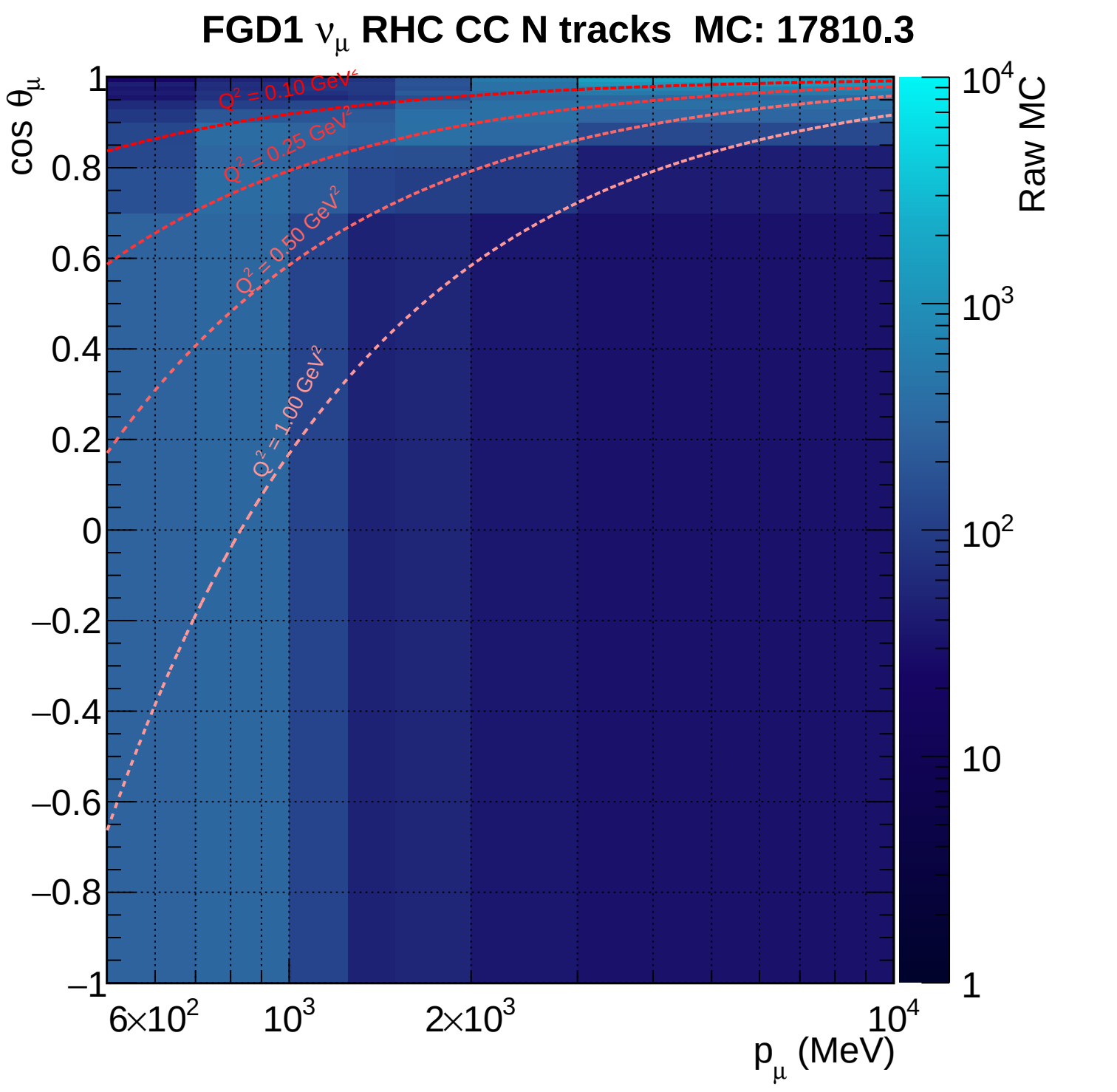

FGD1 anti-ν_μCC 1 track MC: 50694
cos θ_μ
1
0.8
0.6
0.4
0.2
0
−0.2
−0.4
−0.6
−0.8
−1
Q^2 = 0.10 GeV^2
Q^2 = 0.25 GeV^2
Q^2 = 0.50 GeV^2
Q^2 = 1.00 GeV^2
5×10^2
10^3
2×10^3
10^4
p_μ (MeV)
Raw MC
10^4
10^3
10^2
10
1

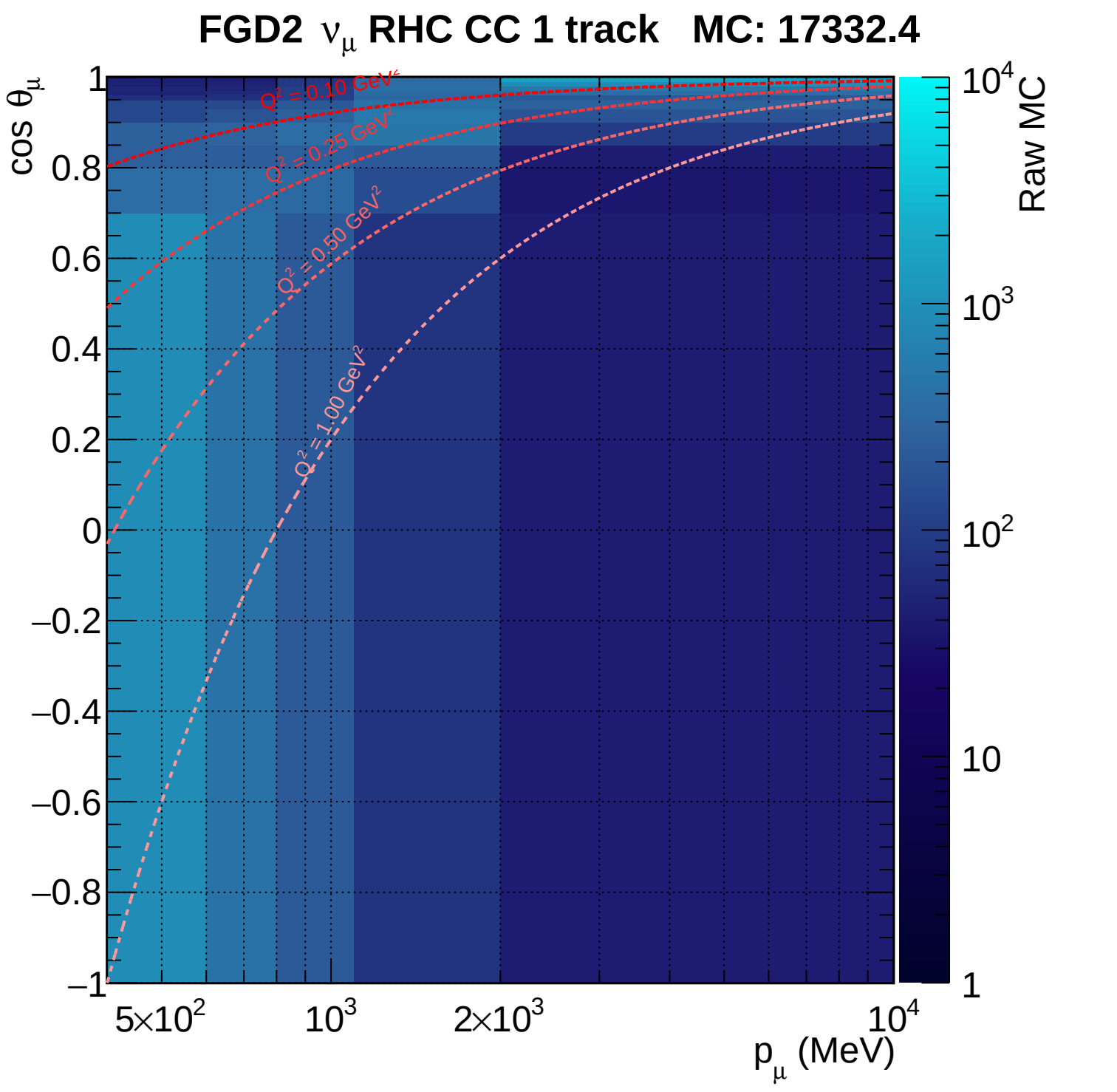

FGD1 anti-ν_μCC N tracks MC: 15015.8
cos θ_μ
1
0.8
0.6
0.4
0.2
0
−0.2
−0.4
−0.6
−0.8
−1
Q^2 = 0.10 GeV²
Q^2 = 0.25 GeV²
Q^2 = 0.50 GeV²
Q^2 = 1.00 GeV²
8×10²
10³
2×10³
3×10³
10⁴
p_μ (MeV)
Raw MC
10⁴
10³
10²
10
1

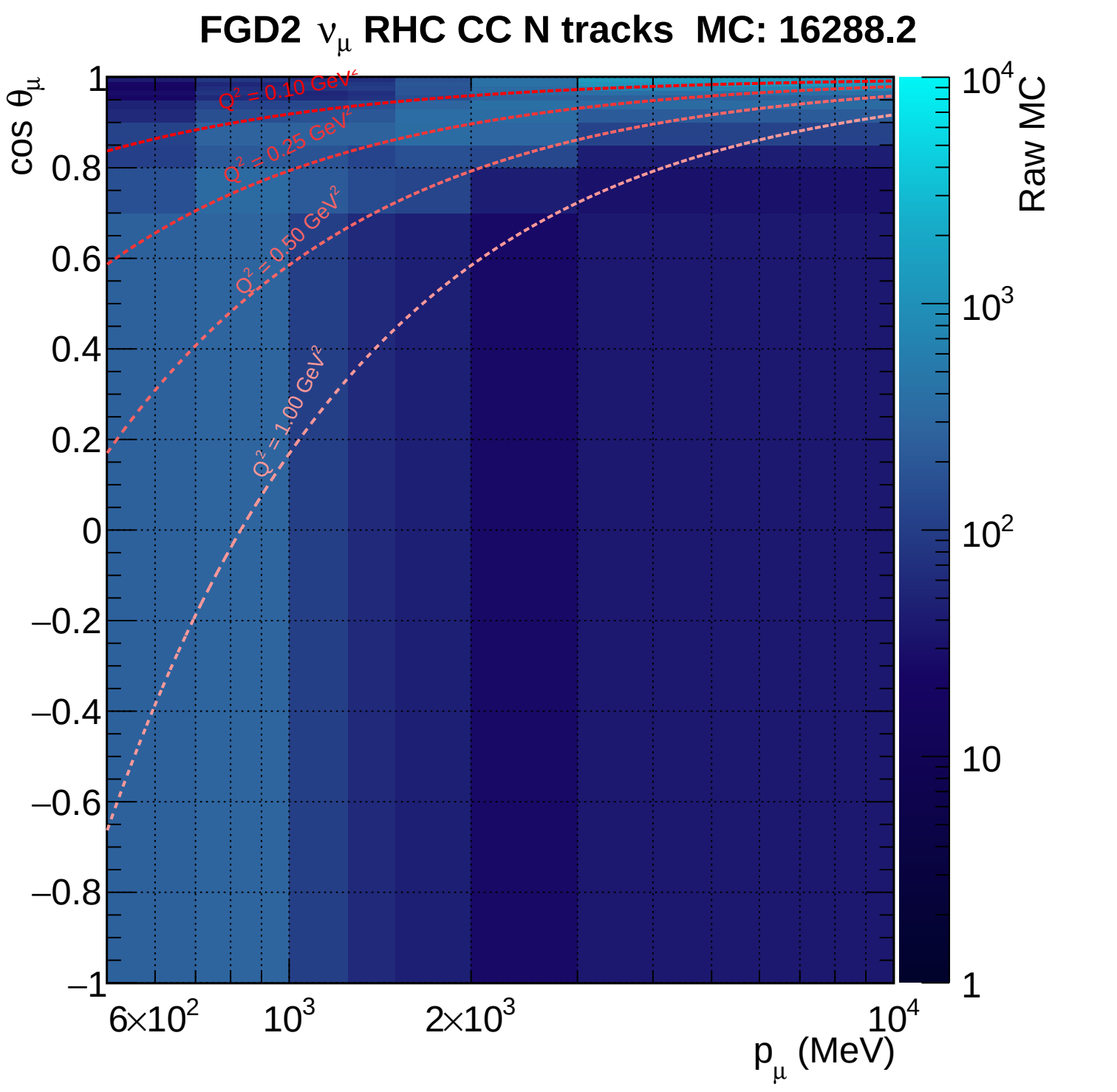

FGD2 anti-ν_μCC 1 track MC: 51098.9
cos θ_μ
1
0.8
0.6
0.4
0.2
0
−0.2
−0.4
−0.6
−0.8
−1
Q^2 = 0.10 GeV²
Q^2 = 0.25 GeV²
Q^2 = 0.50 GeV²
Q^2 = 1.00 GeV²
5×10²
10³
2×10³
10⁴
p_μ (MeV)
Raw MC
10⁴
10³
10²
10
1

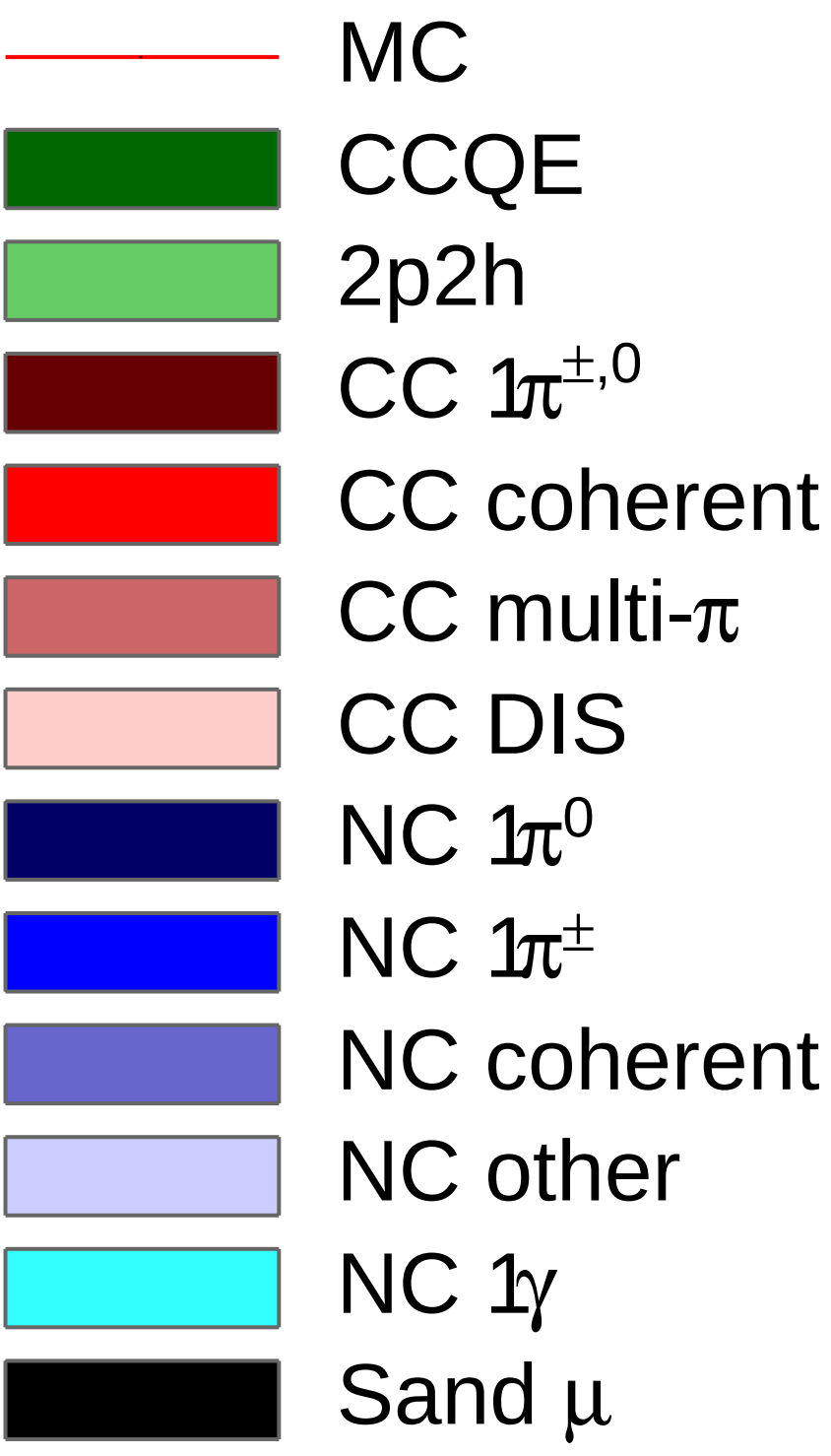

FGD2 anti-ν_μCC N tracks MC: 15137.2
$\cos\theta_\mu$
1
0.8
0.6
0.4
0.2
0
−0.2
−0.4
−0.6
−0.8
−1
Q^2 = 0.10 GeV²
Q^2 = 0.25 GeV²
Q^2 = 0.50 GeV²
Q^2 = 1.00 GeV²
8×10²
10³
2×10³
3×10³
10⁴
p_μ (MeV)
Raw MC
10⁴
10³
10²
10
1

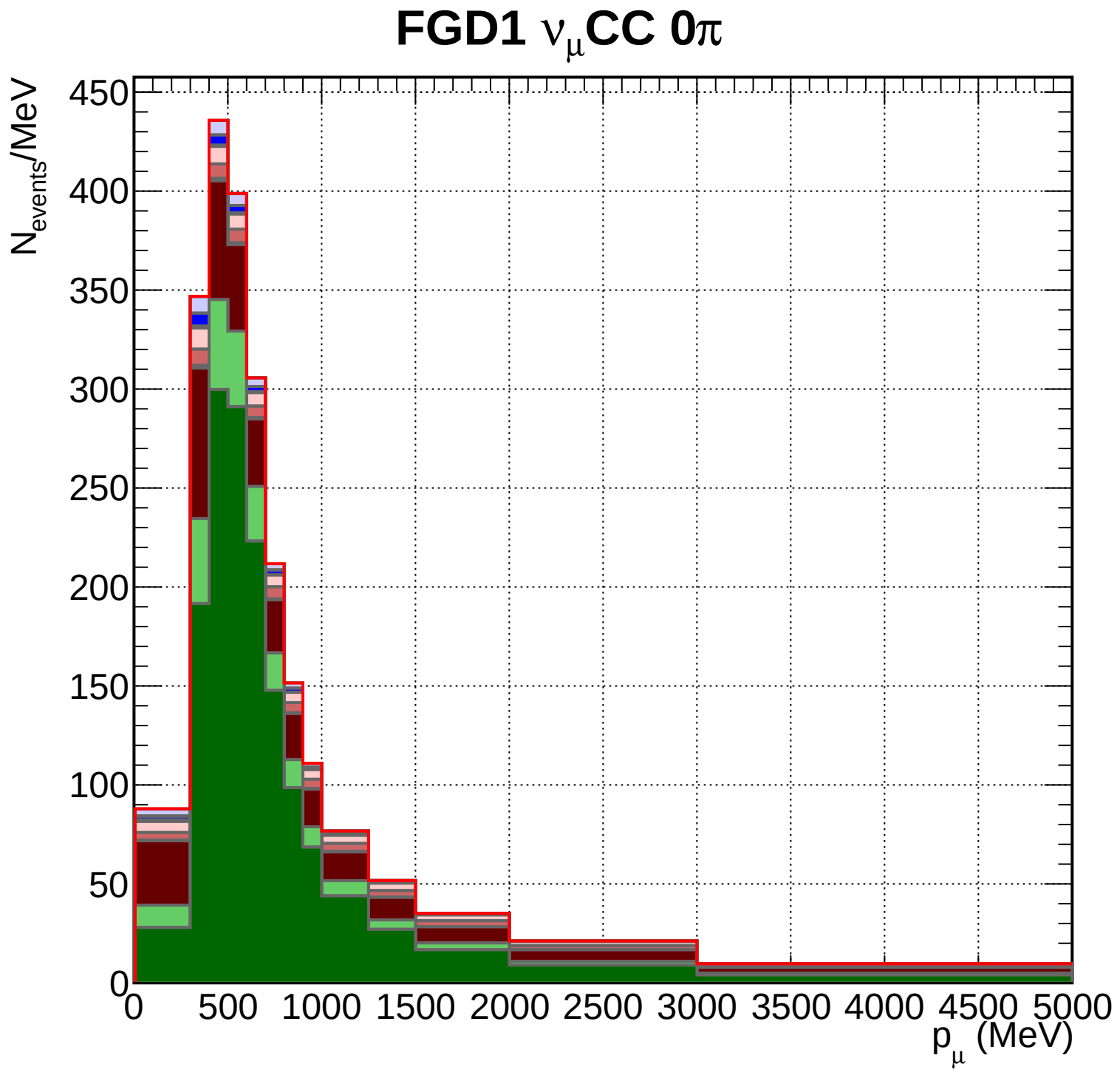

FGD1 ν_μ RHC CC 1 track MC: 17363.9
cos θ_μ
1
0.8
0.6
0.4
0.2
0
−0.2
−0.4
−0.6
−0.8
−1
Q^2 = 0.10 GeV²
Q^2 = 0.25 GeV²
Q^2 = 0.50 GeV²
Q^2 = 1.00 GeV²
5×10^2
10^3
2×10^3
10^4
p_μ (MeV)
Raw MC
10^4
10^3
10^2
10
1

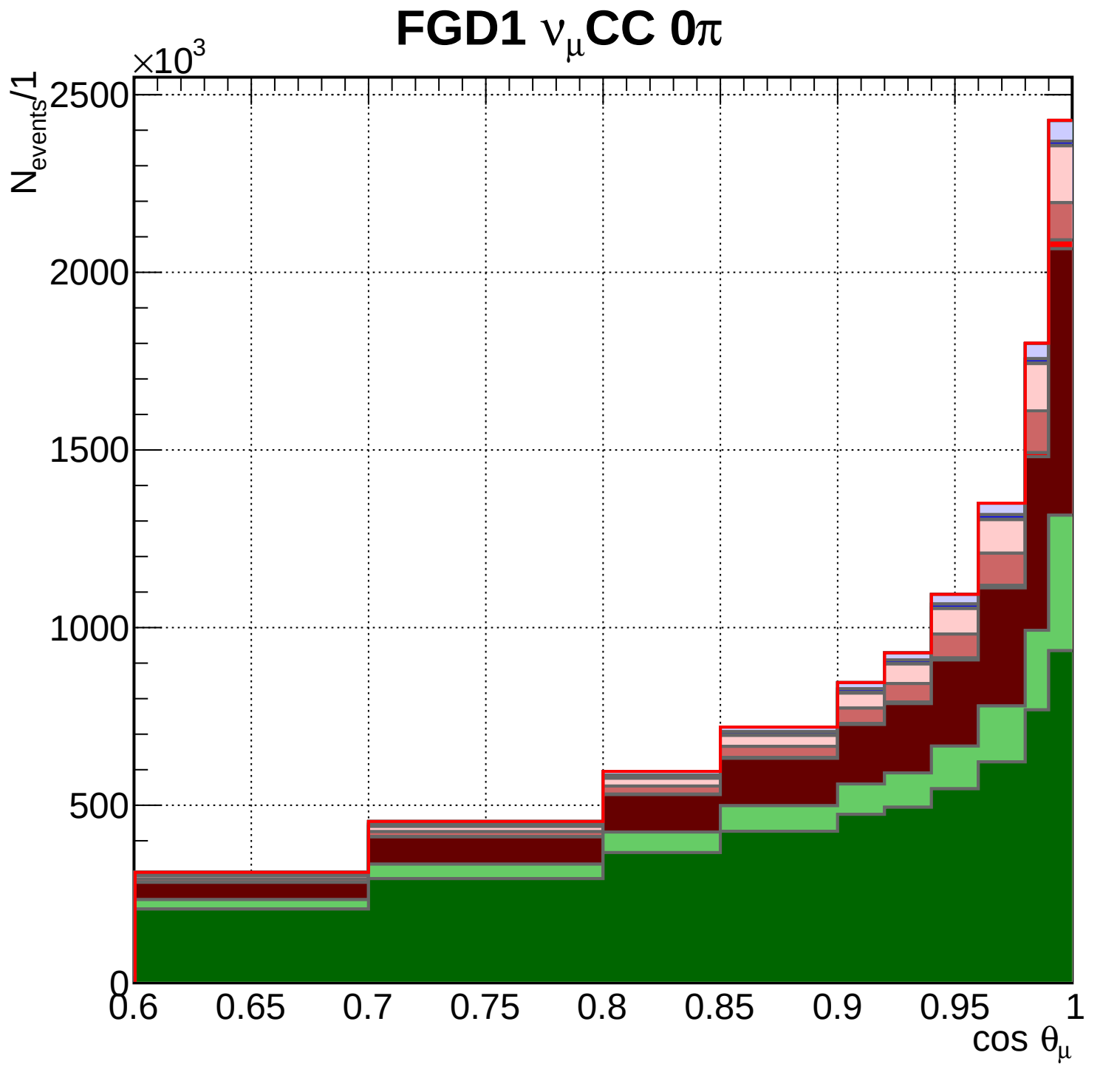

FGD1 ν_μ RHC CC N tracks MC: 17810.3
cos θ_μ
1
0.8
0.6
0.4
0.2
0
−0.2
−0.4
−0.6
−0.8
−1
Q^2 = 0.10 GeV²
Q^2 = 0.25 GeV²
Q^2 = 0.50 GeV²
Q^2 = 1.00 GeV²
6×10²
10³
2×10³
10⁴
p_μ (MeV)
Raw MC
10⁴
10³
10²
10
1

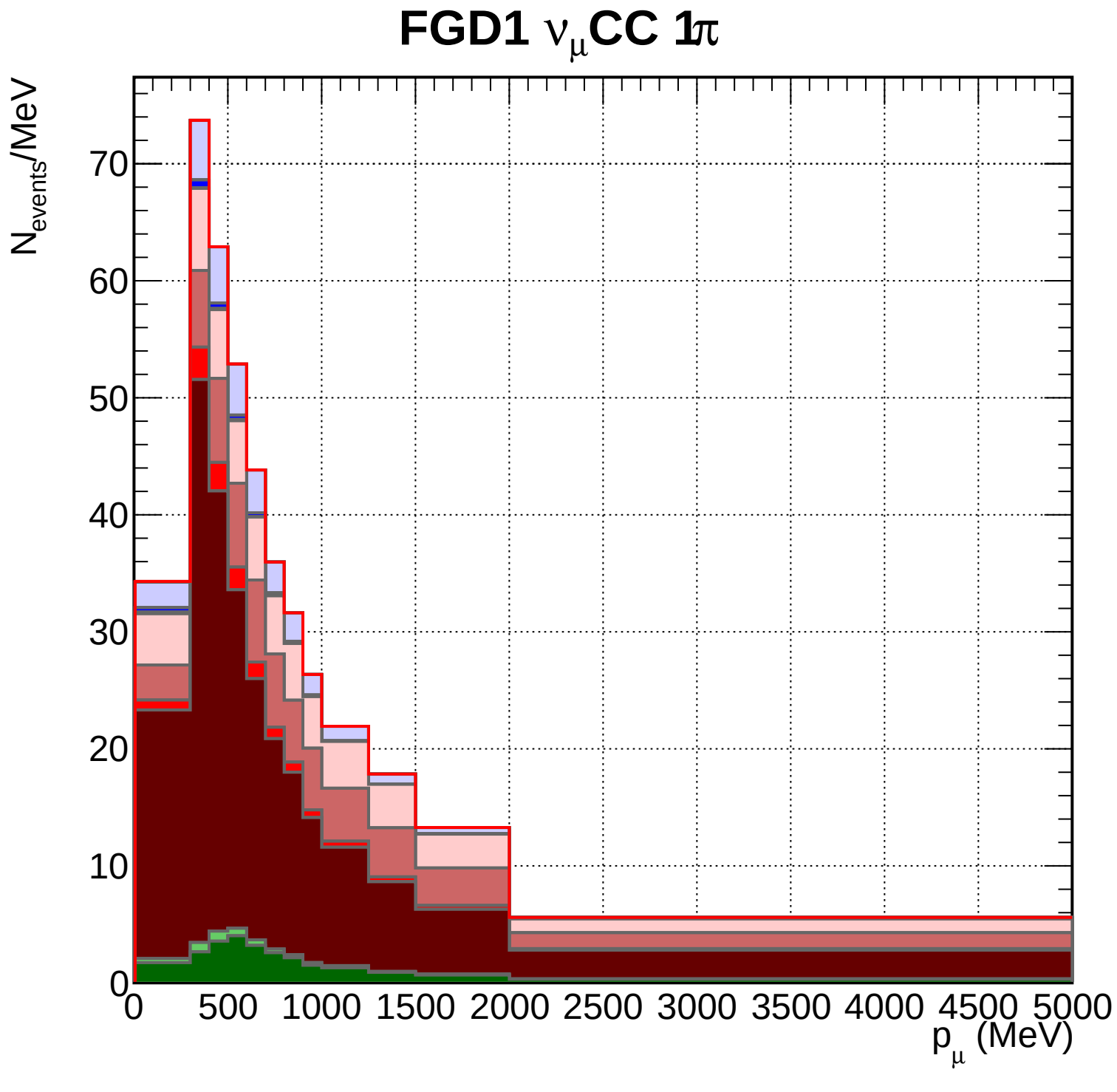

FGD2 ν_μ RHC CC 1 track MC: 17332.4
cos θ_μ
1
0.8
0.6
0.4
0.2
0
−0.2
−0.4
−0.6
−0.8
−1
Q^2 = 0.10 GeV²
Q^2 = 0.25 GeV²
Q^2 = 0.50 GeV²
Q^2 = 1.00 GeV²
5×10²
10³
2×10³
10⁴
p_μ (MeV)
Raw MC
10⁴
10³
10²
10
1

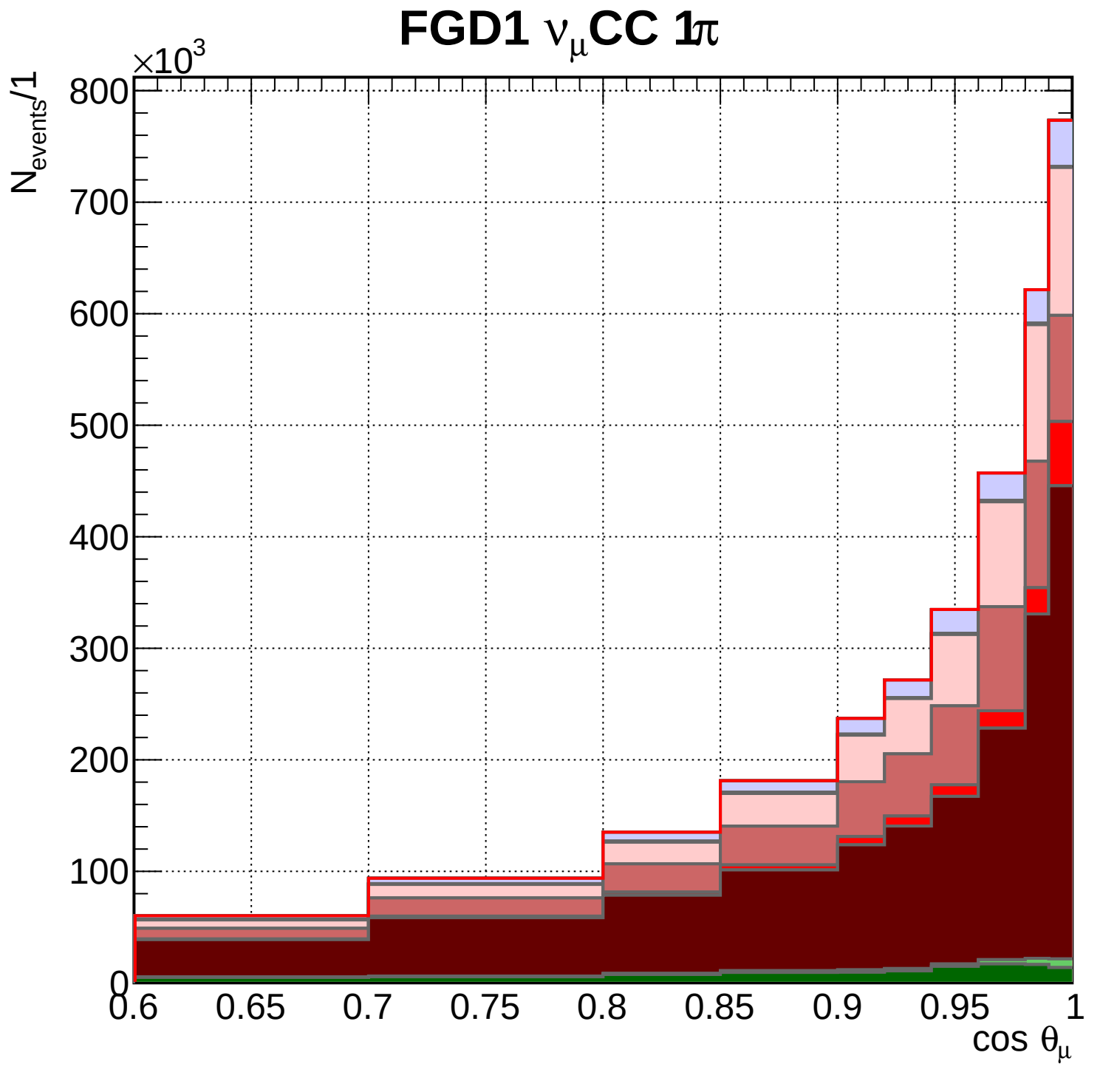

FGD2 ν_μ RHC CC N tracks MC: 16288.2
cos θ_μ
1
0.8
0.6
0.4
0.2
0
−0.2
−0.4
−0.6
−0.8
−1
Q^2 = 0.10 GeV²
Q^2 = 0.25 GeV²
Q^2 = 0.50 GeV²
Q^2 = 1.00 GeV²
6×10²
10³
2×10³
10⁴
p_μ (MeV)
Raw MC
10⁴
10³
10²
10
1

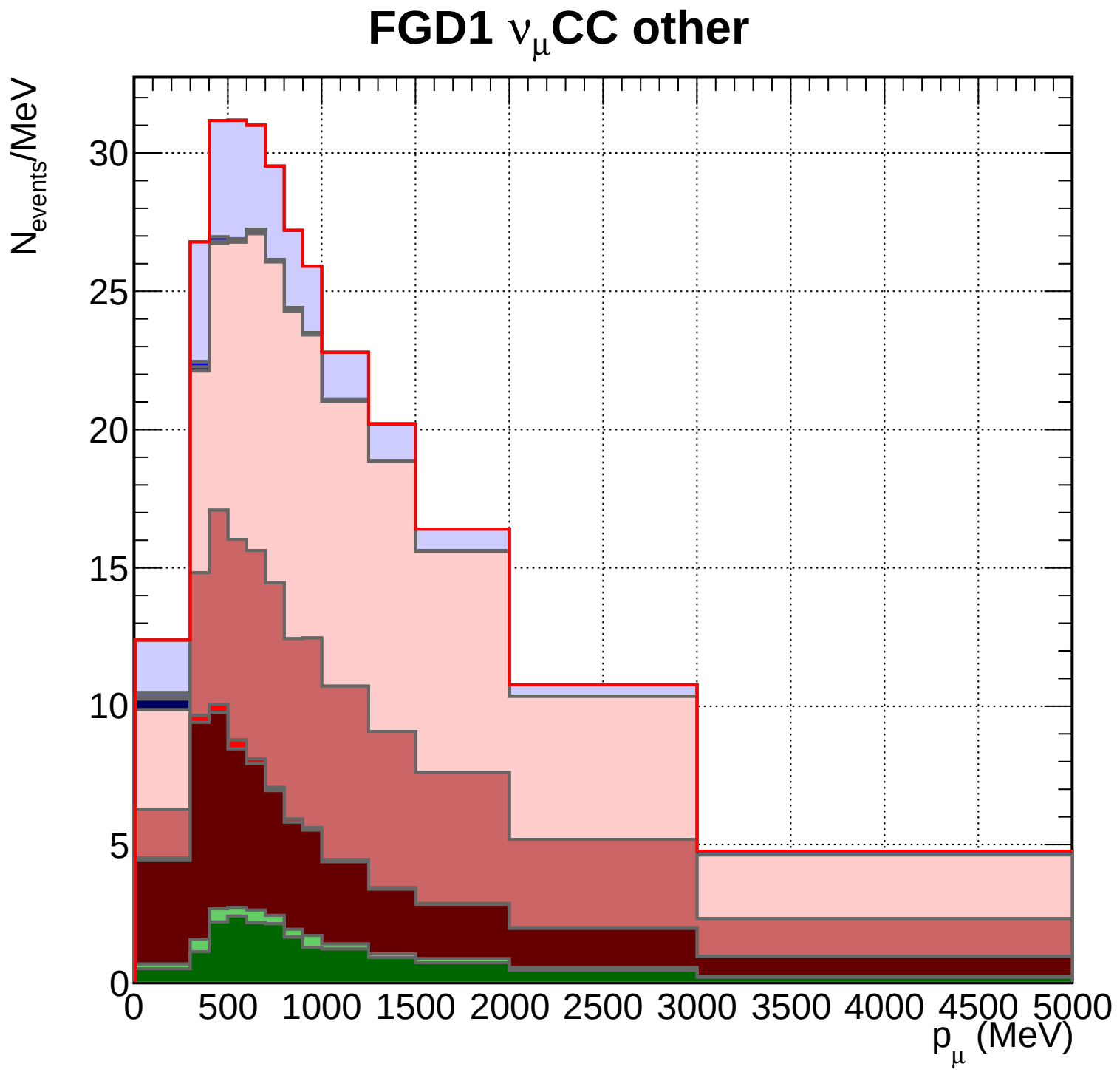

MC
CCQE
2p2h
CC 1π±,0
CC coherent
CC multi-π
CC DIS
NC 1π0
NC 1π±
NC coherent
NC other
NC 1γ
Sand μ

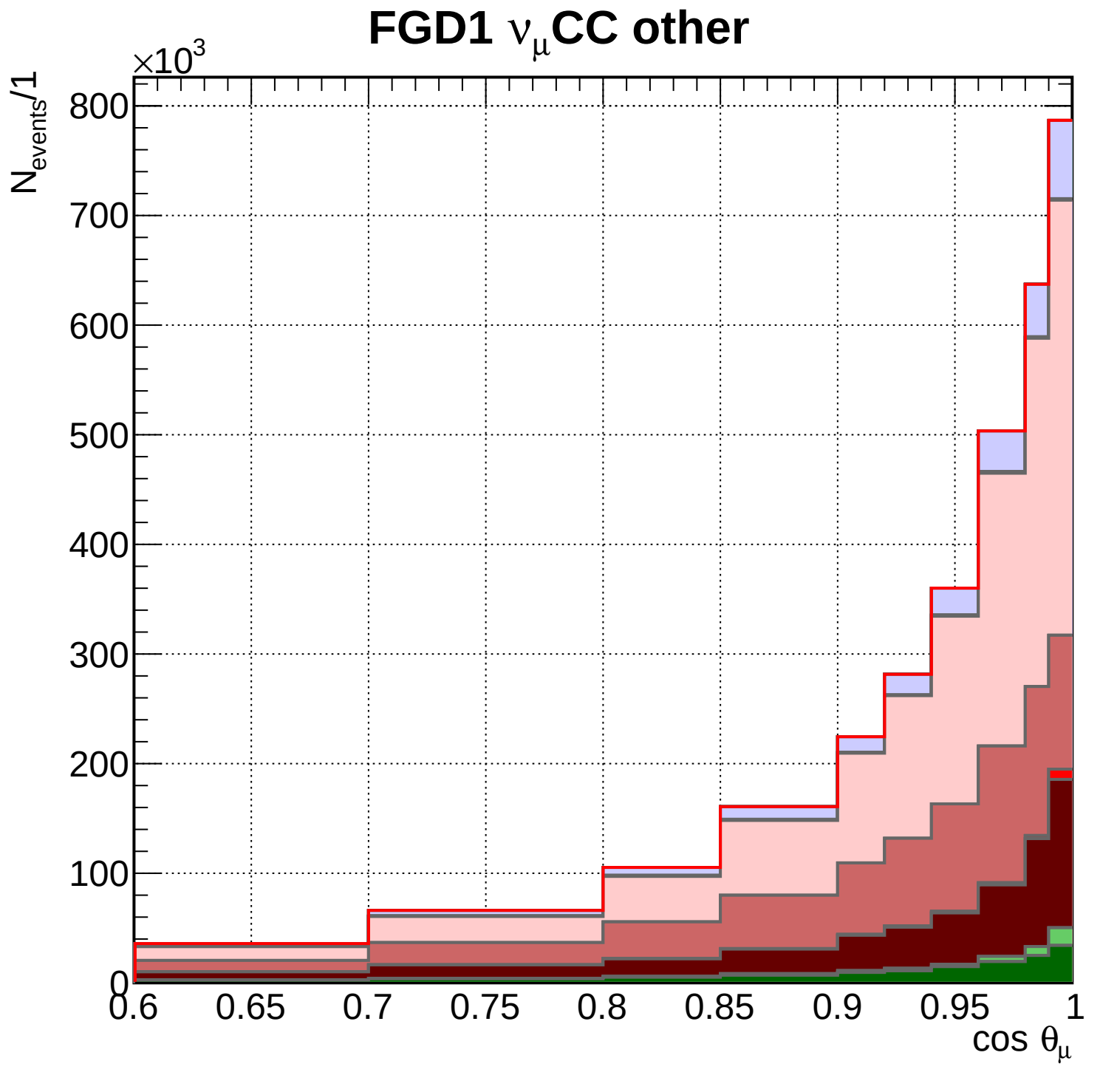

FGD1 ν_μCC 0π
N_{events}/MeV
450
400
350
300
250
200
150
100
50
0
0
500
1000
1500
2000
2500
3000
3500
4000
4500
5000
p_μ (MeV)

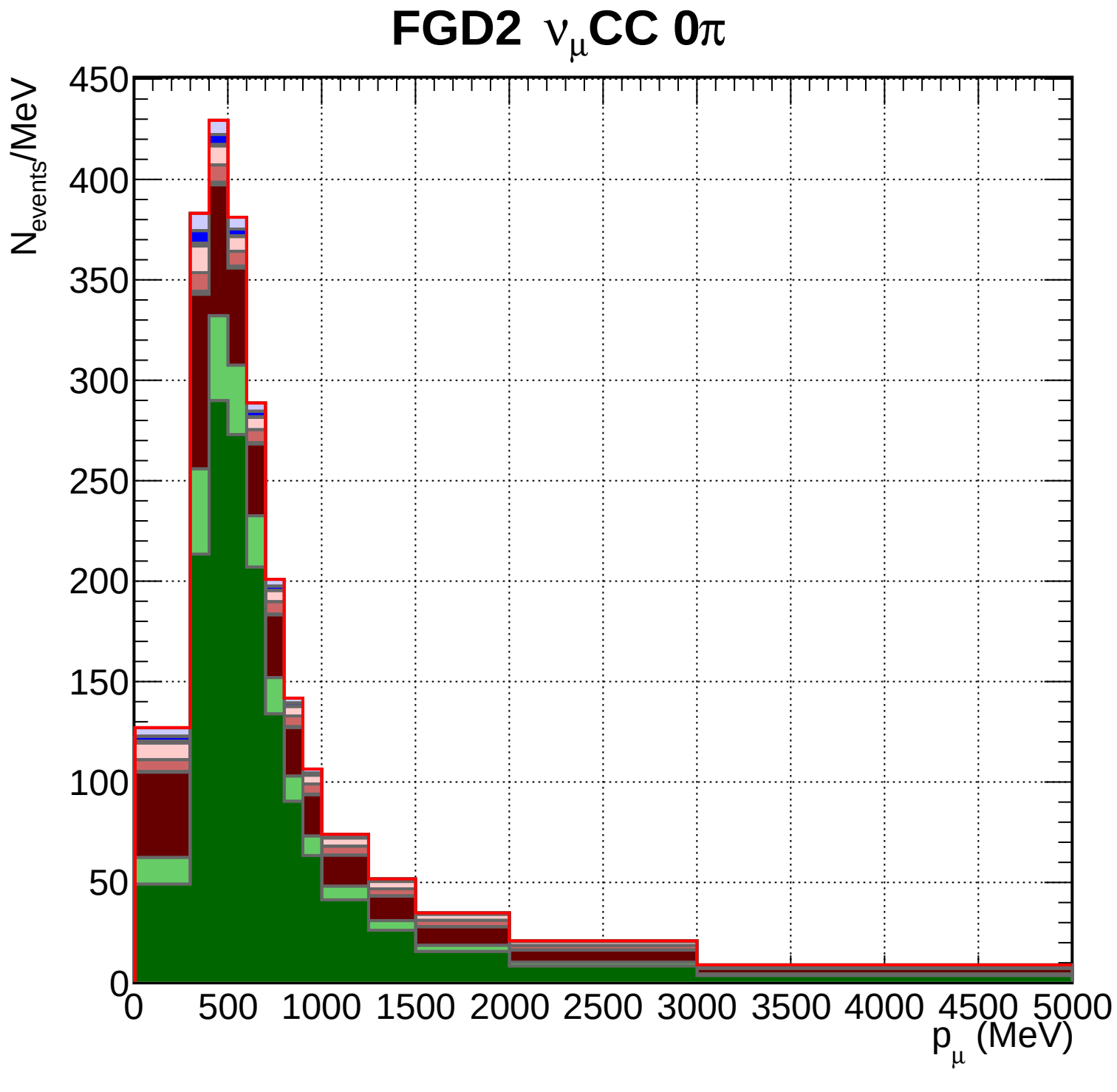

FGD1 ν_μCC 0π
$\times 10^3$
N_{events}/1
2500
2000
1500
1000
500
0
0.6
0.65
0.7
0.75
0.8
0.85
0.9
0.95
1
cos θ_μ

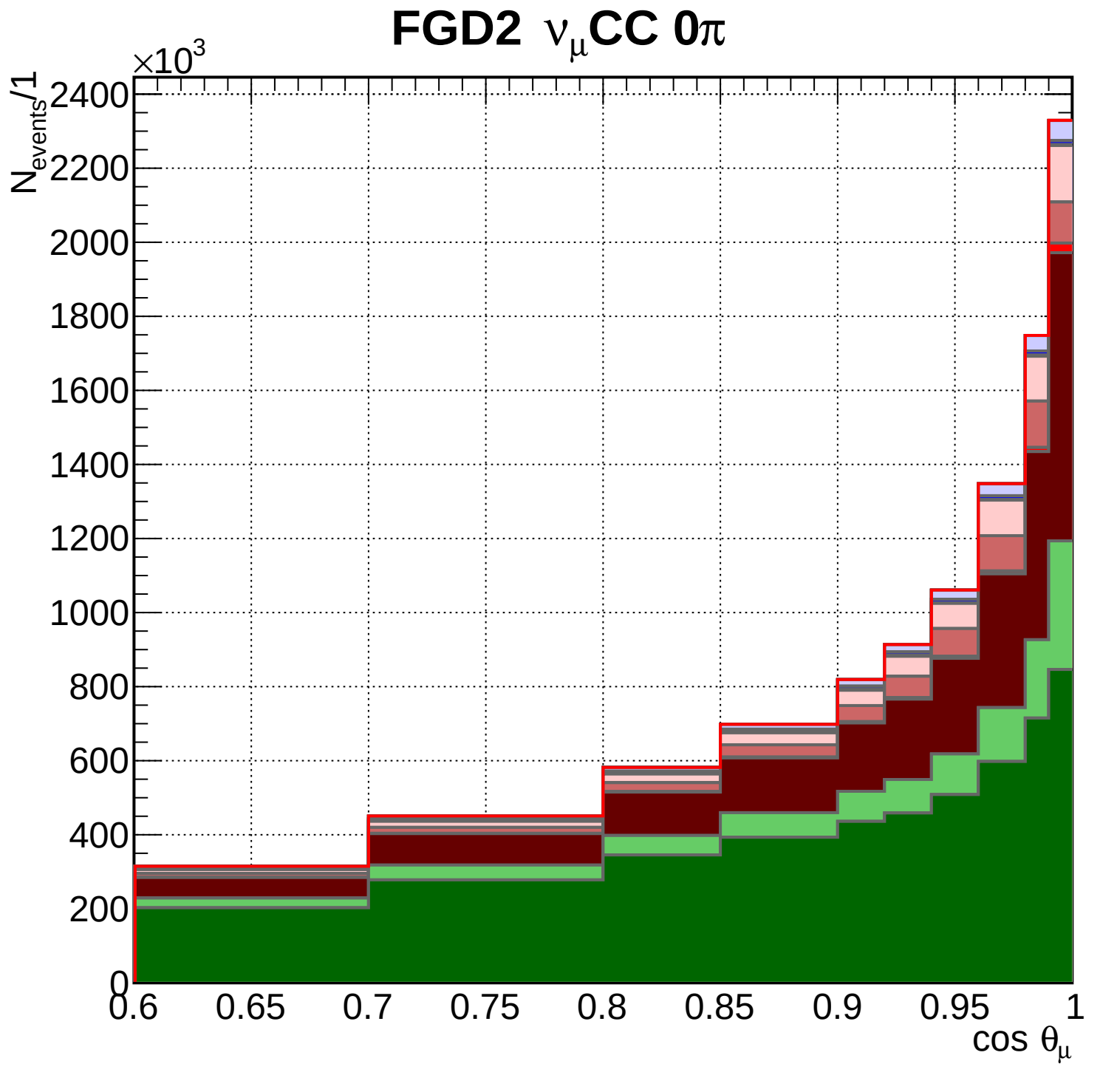

FGD1 ν_μCC 1π
N_{events}/MeV
0
10
20
30
40
50
60
70
0
500
1000
1500
2000
2500
3000
3500
4000
4500
5000
p_μ (MeV)

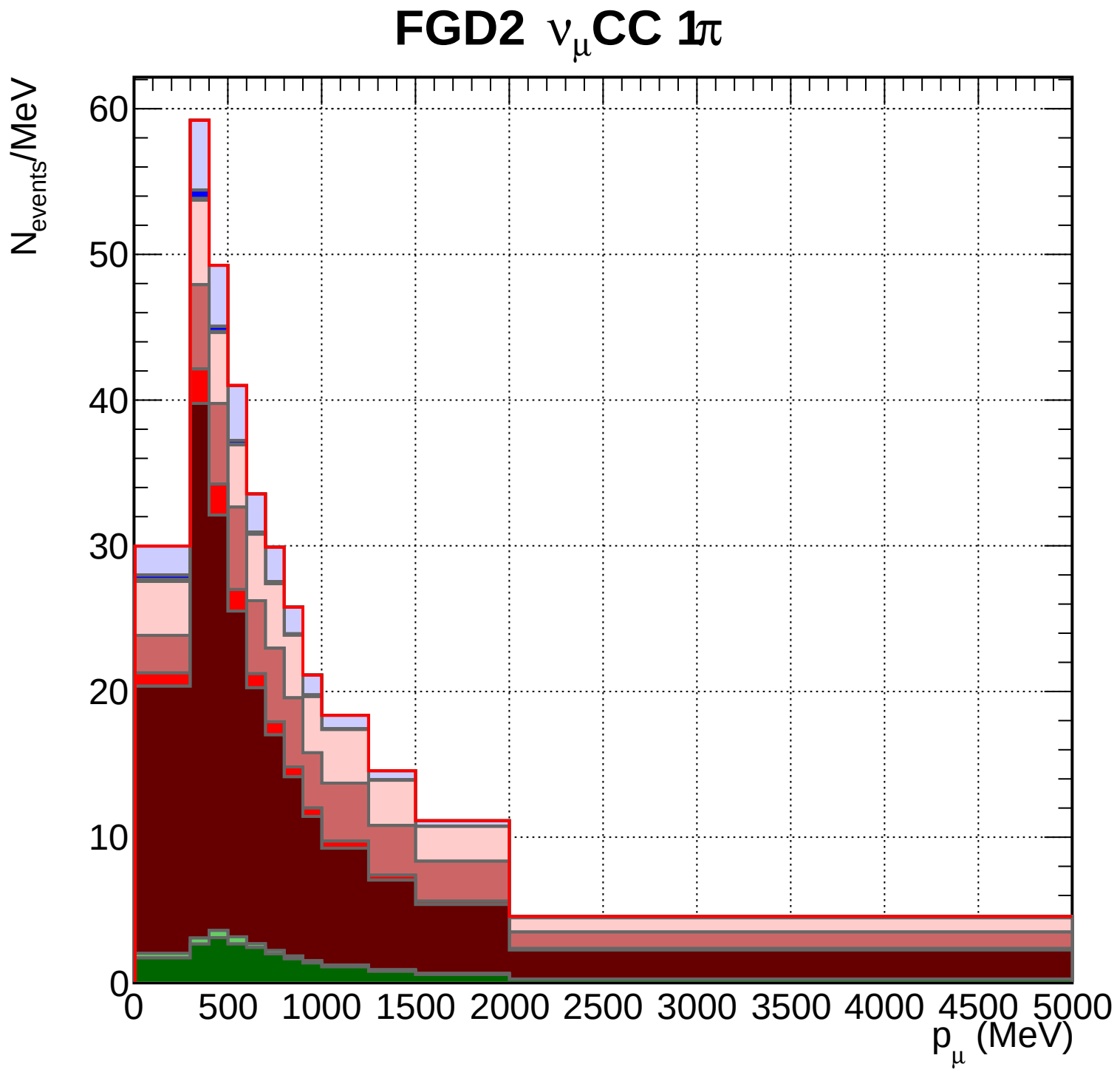

FGD1 ν_μCC 1π
$\times 10^3$
N_{events}/1
800
700
600
500
400
300
200
100
0
0.6
0.65
0.7
0.75
0.8
0.85
0.9
0.95
1
cos θ_μ

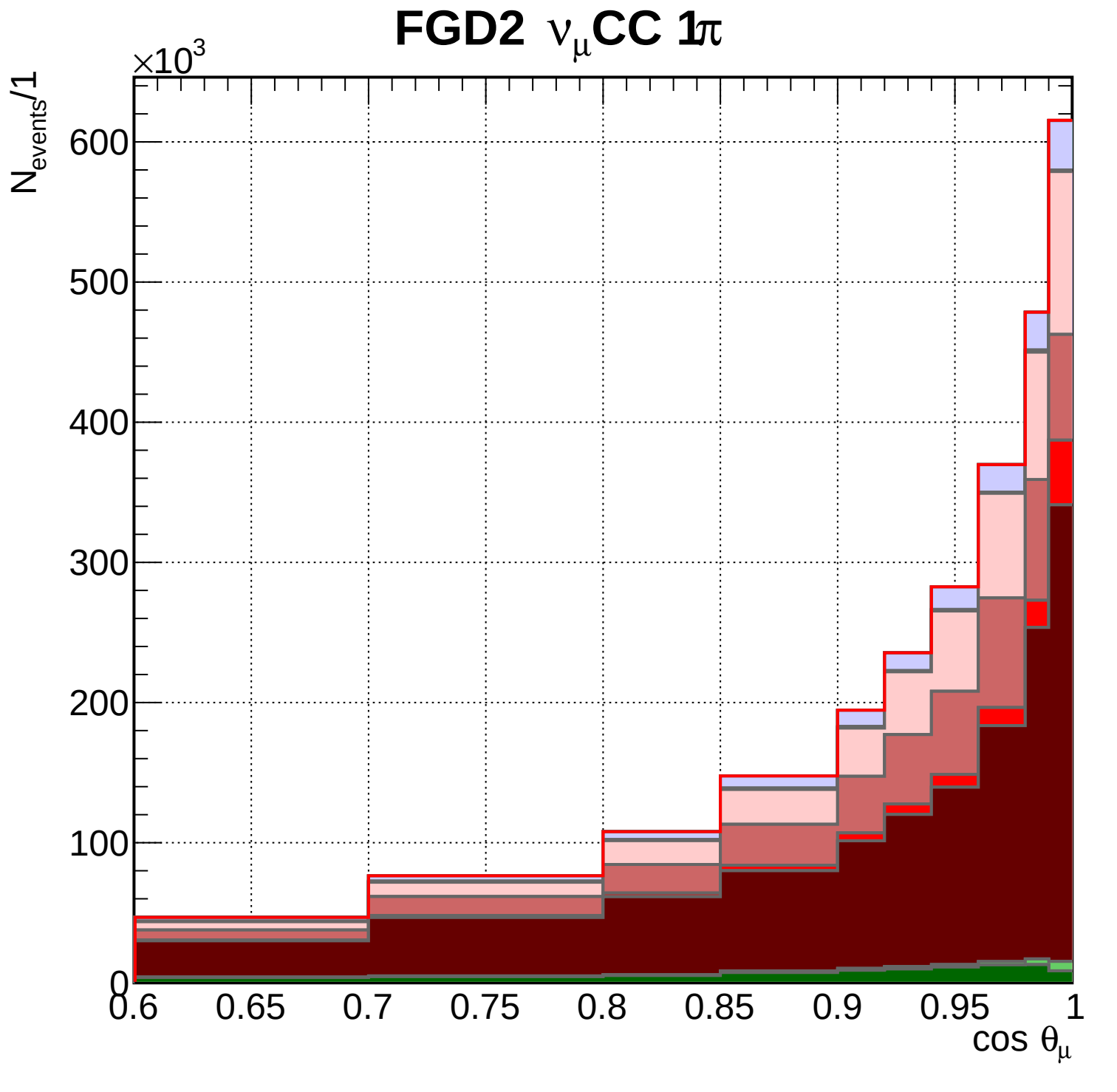

FGD1 ν_μCC other
N_{events}/MeV
0
5
10
15
20
25
30
0
500
1000
1500
2000
2500
3000
3500
4000
4500
5000
p_μ (MeV)

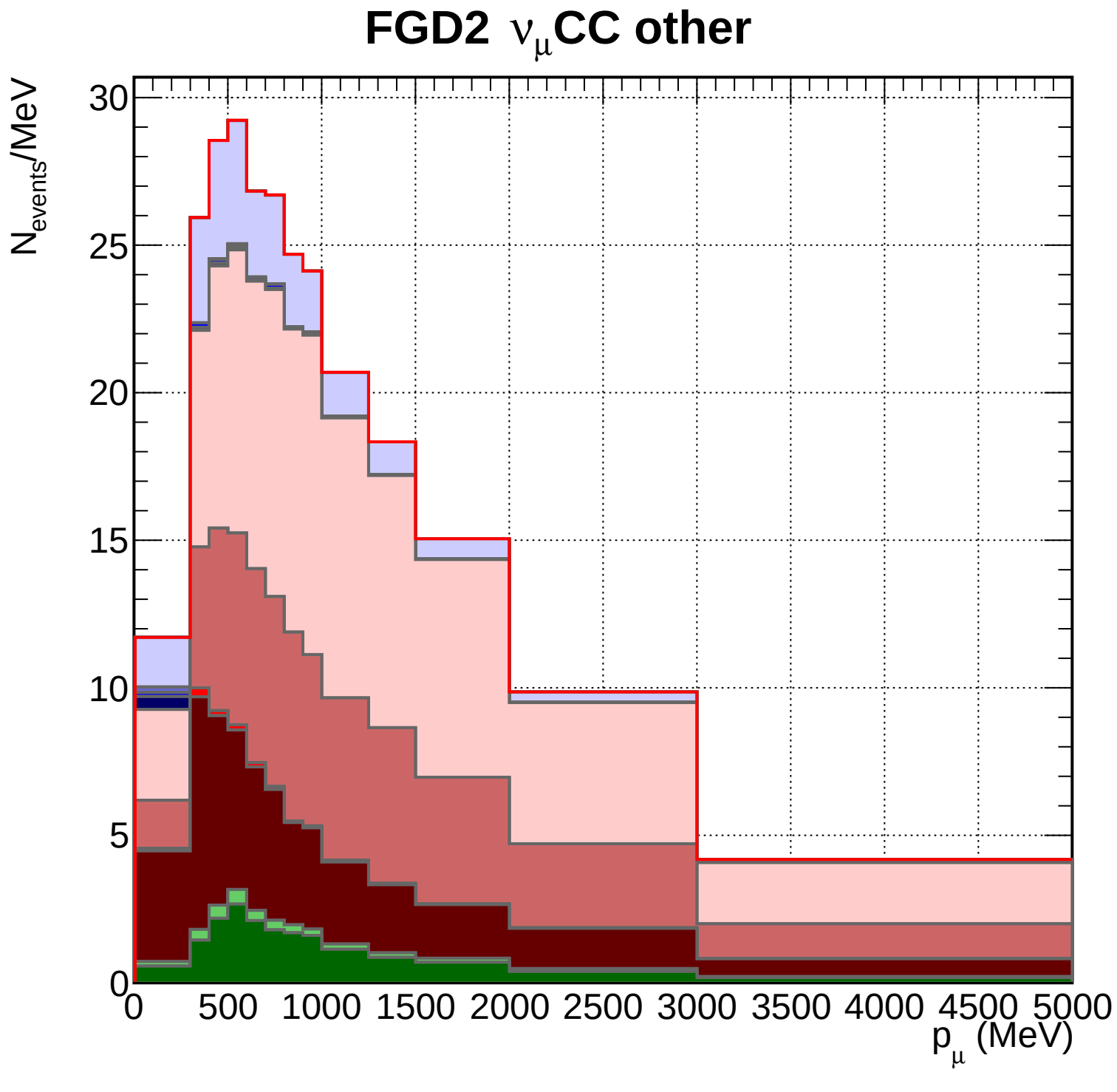

FGD1 ν_μCC other
$\times 10^3$
N_{events}/1
800
700
600
500
400
300
200
100
0
0.6
0.65
0.7
0.75
0.8
0.85
0.9
0.95
1
cos θ_μ

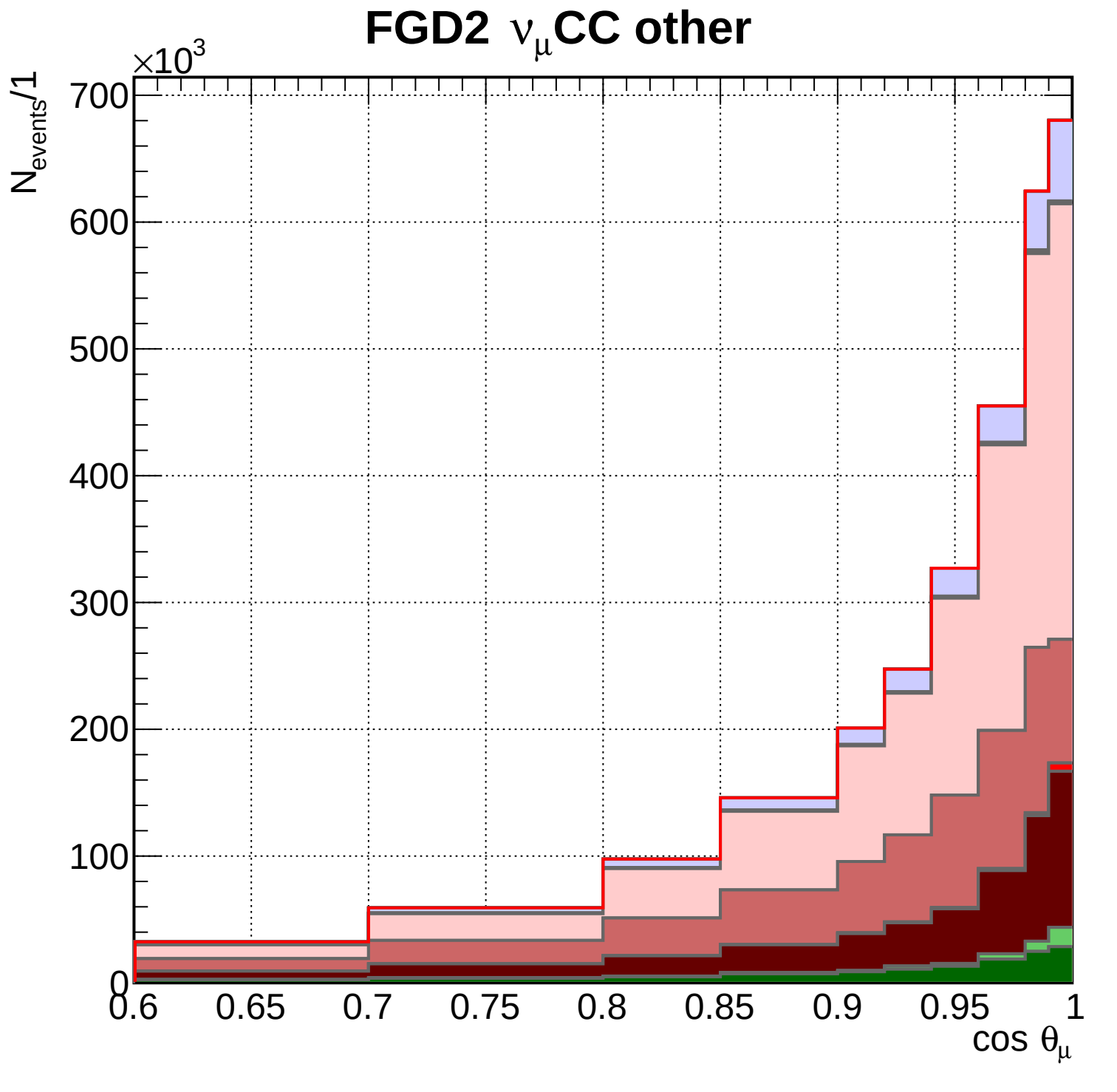

FGD2 ν_μCC 0π
N_{events}/MeV
450
400
350
300
250
200
150
100
50
0
0
500
1000
1500
2000
2500
3000
3500
4000
4500
5000
p_μ (MeV)

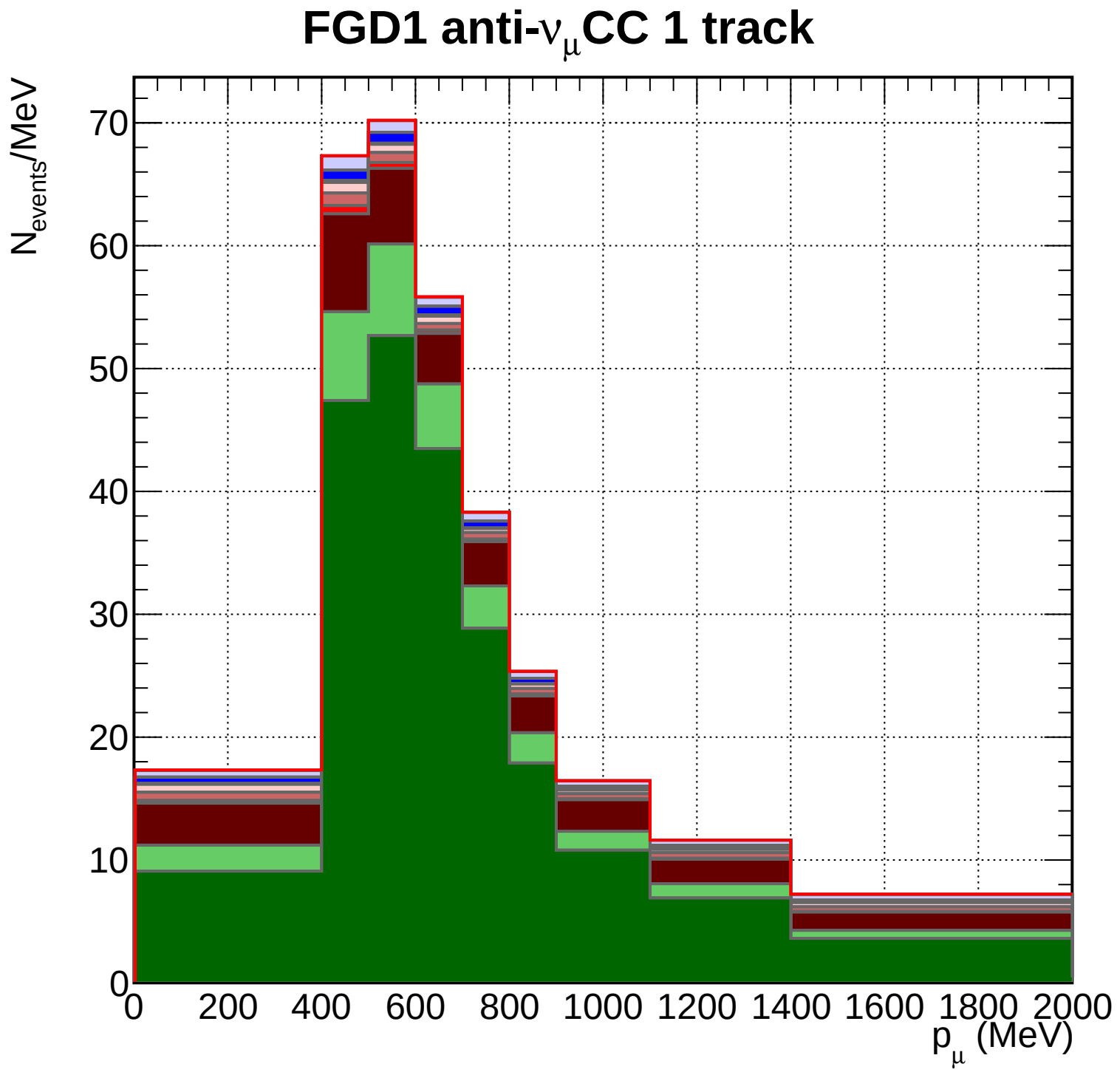

FGD2 ν_μCC 0π
$\times 10^3$
N_{events}/1
2400
2200
2000
1800
1600
1400
1200
1000
800
600
400
200
0
0.6
0.65
0.7
0.75
0.8
0.85
0.9
0.95
1
cos θ_μ

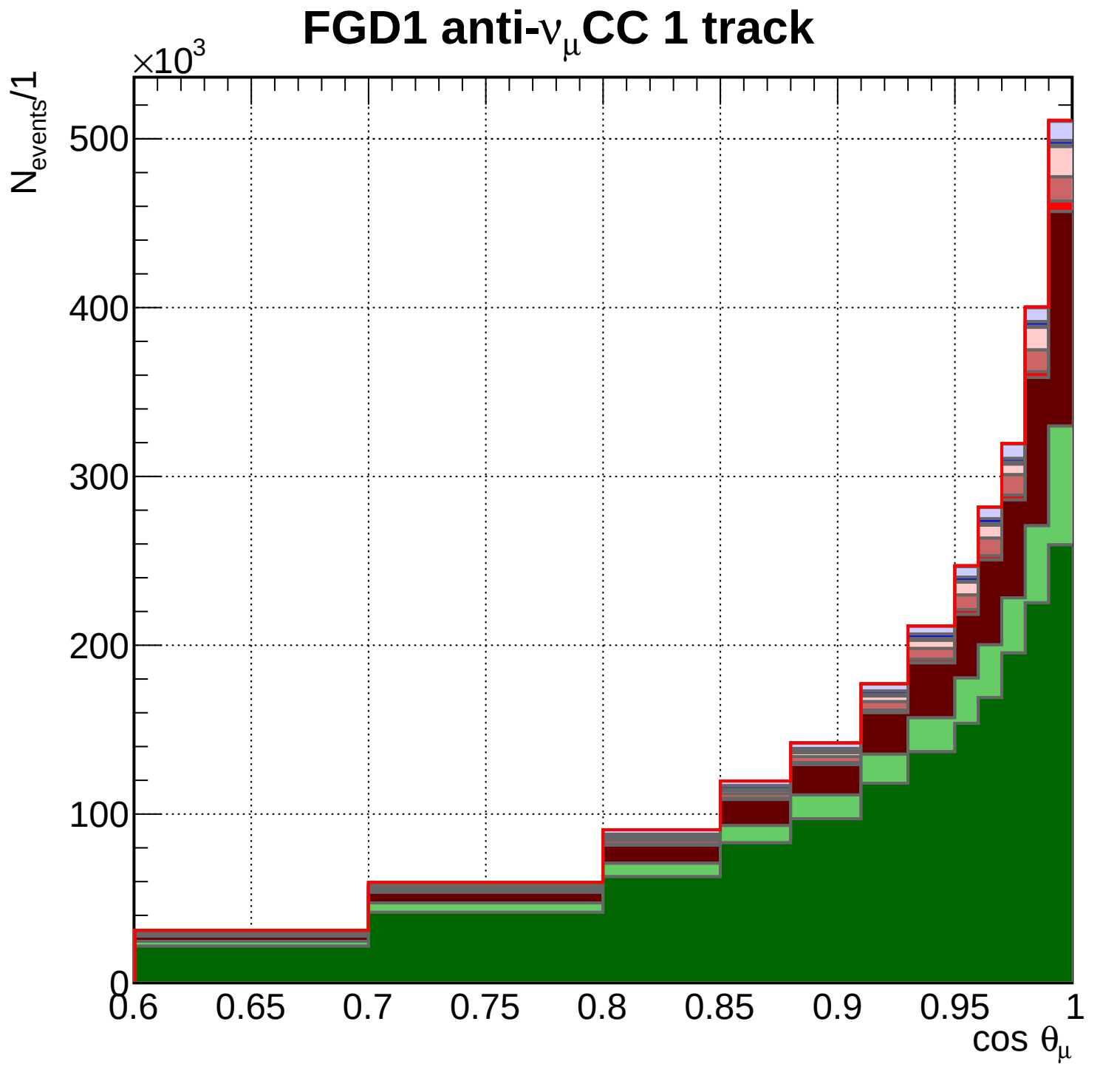

FGD2 ν_μCC 1π
N_{events}/MeV
60
50
40
30
20
10
0
0
500
1000
1500
2000
2500
3000
3500
4000
4500
5000
p_μ (MeV)

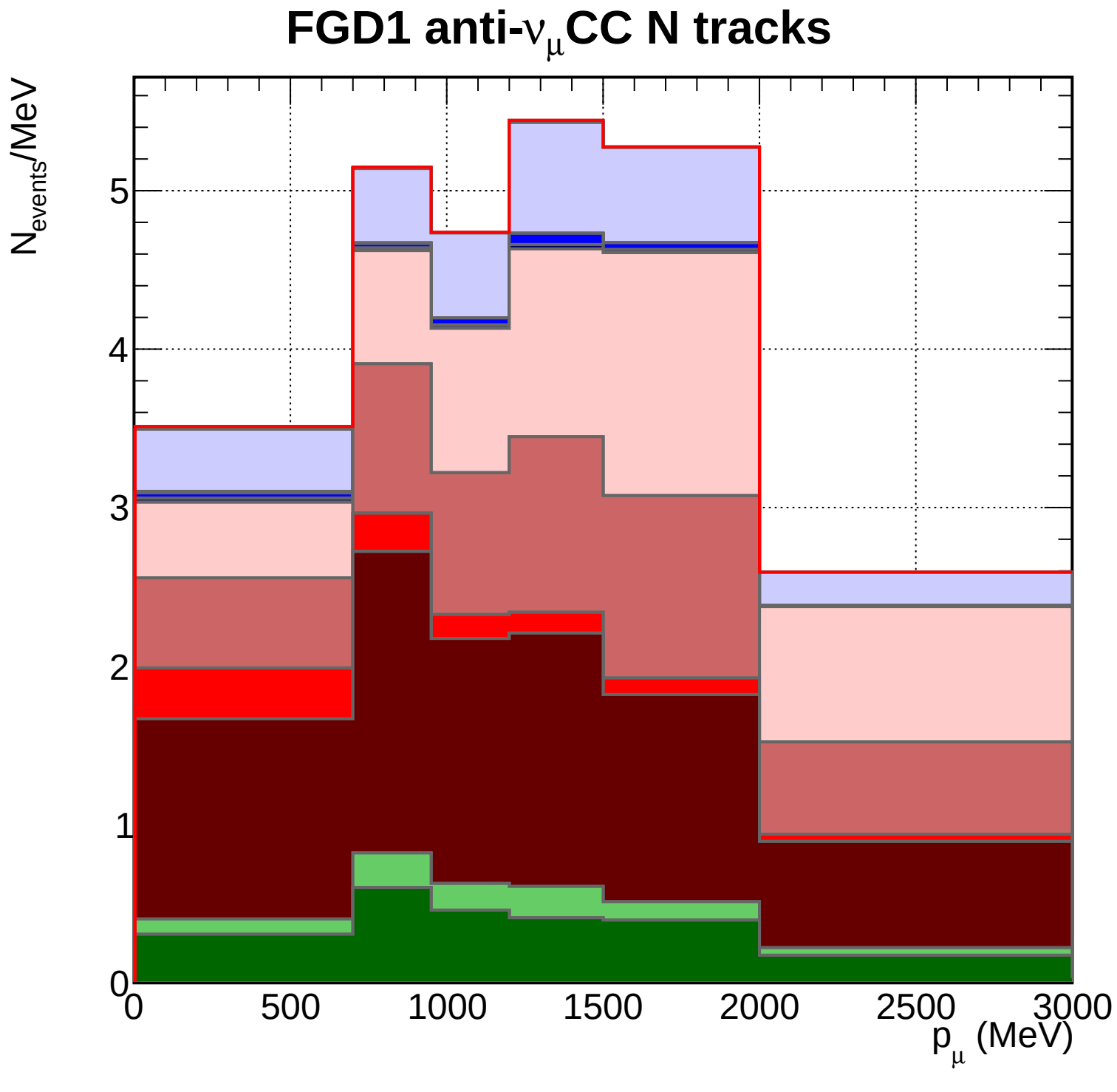

FGD2 ν_μCC 1π
$\times 10^3$
N_{events}/1
600
500
400
300
200
100
0
0.6
0.65
0.7
0.75
0.8
0.85
0.9
0.95
1
cos θ_μ

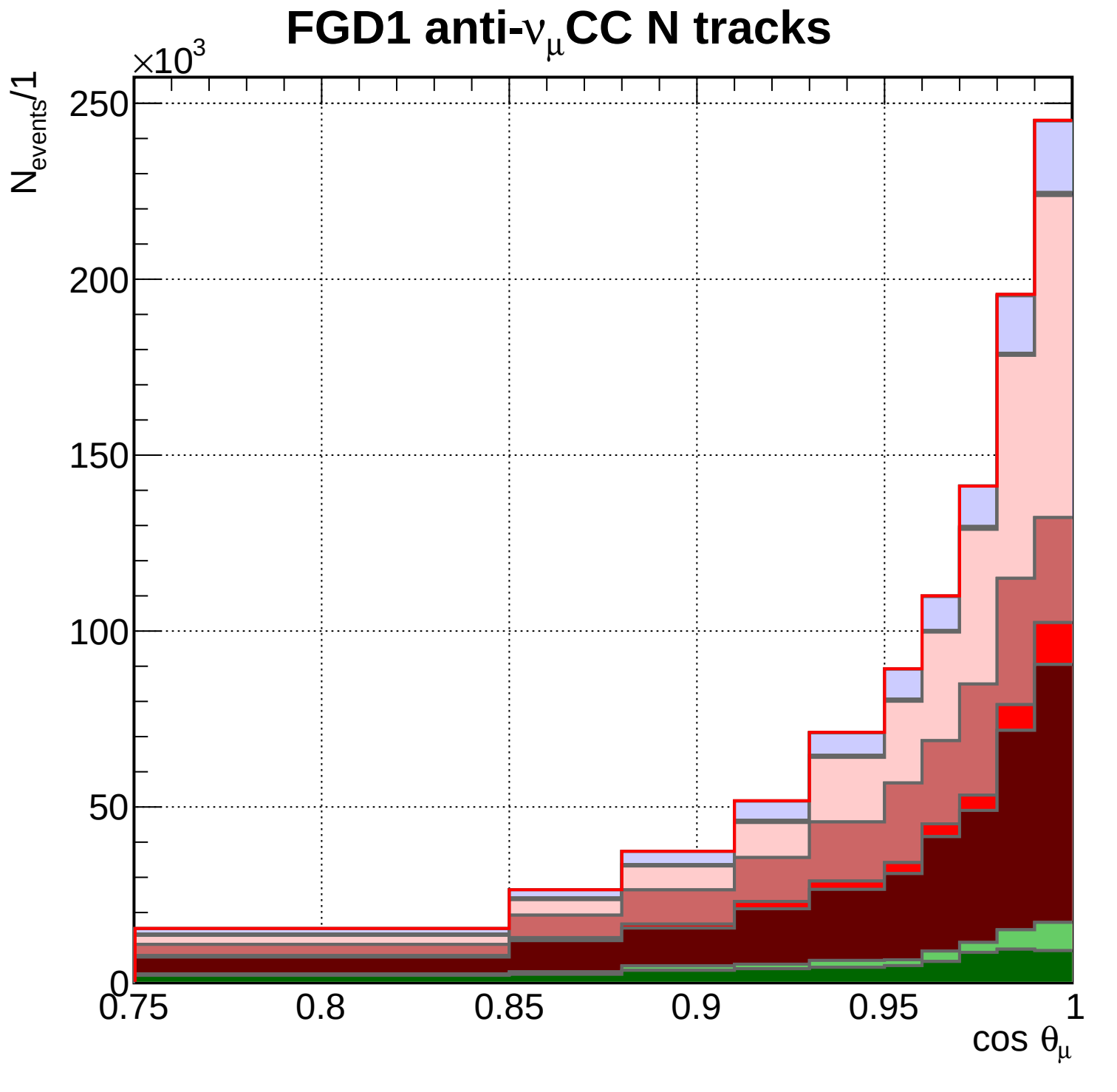

FGD2 ν_μCC other
N_{events}/MeV
30
25
20
15
10
5
0
0
500
1000
1500
2000
2500
3000
3500
4000
4500
5000
p_μ (MeV)

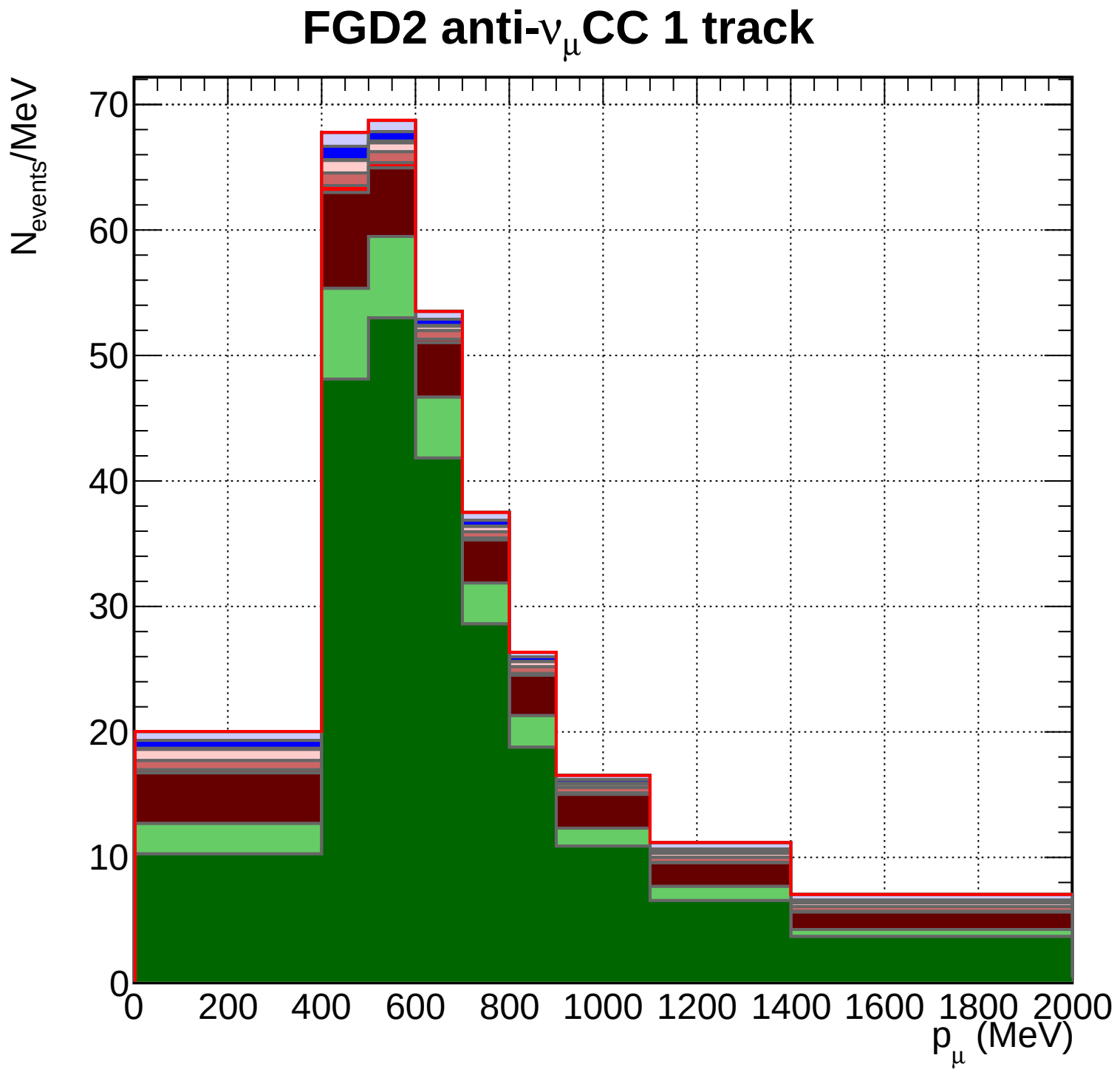

FGD2 ν_μCC other
$\times 10^3$
N_{events}/1
700
600
500
400
300
200
100
0
0.6
0.65
0.7
0.75
0.8
0.85
0.9
0.95
1
cos θ_μ

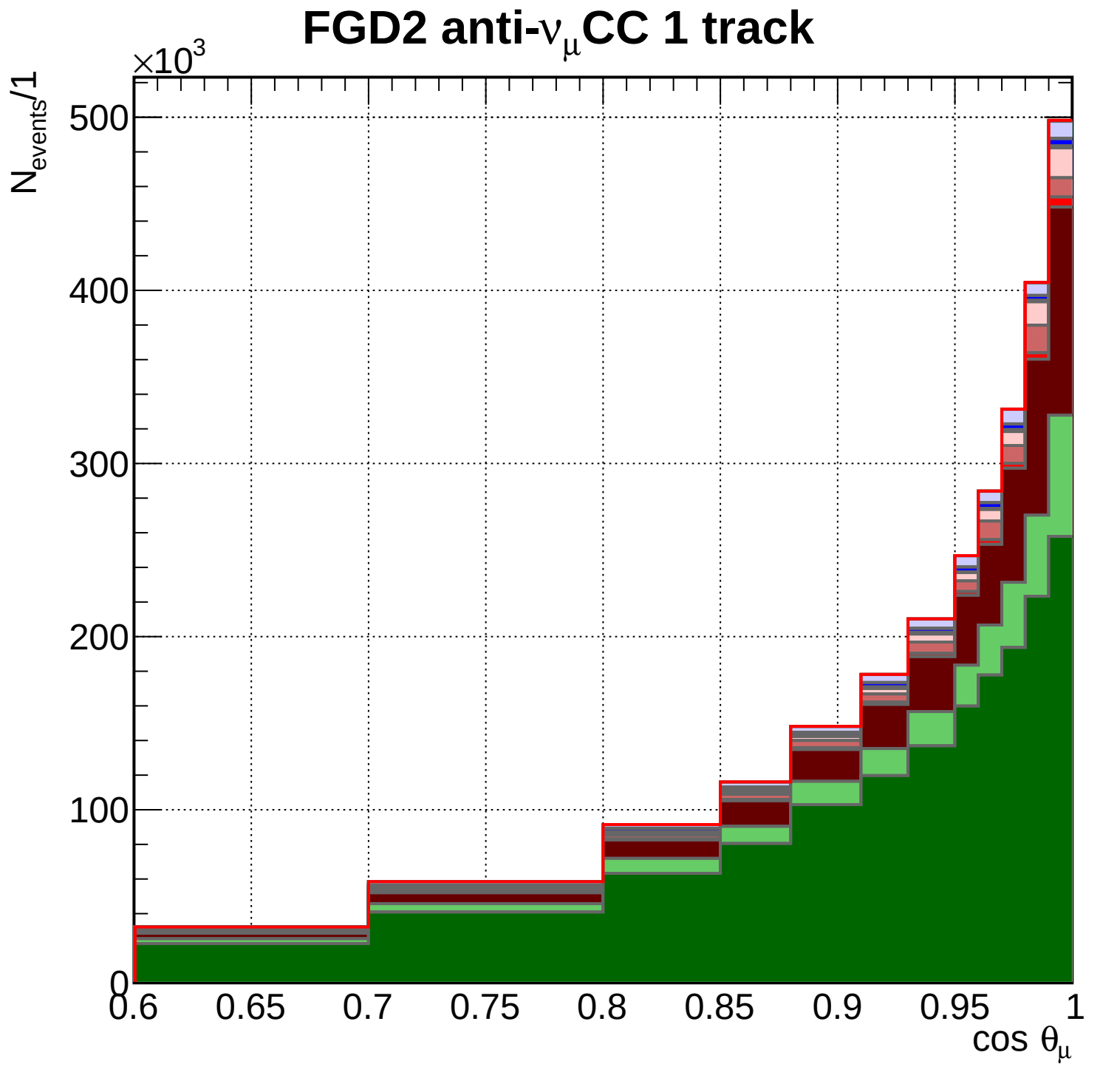

FGD1 anti-ν_μCC 1 track
N_{events}/MeV
0
10
20
30
40
50
60
70
0
200
400
600
800
1000
1200
1400
1600
1800
2000
p_μ (MeV)

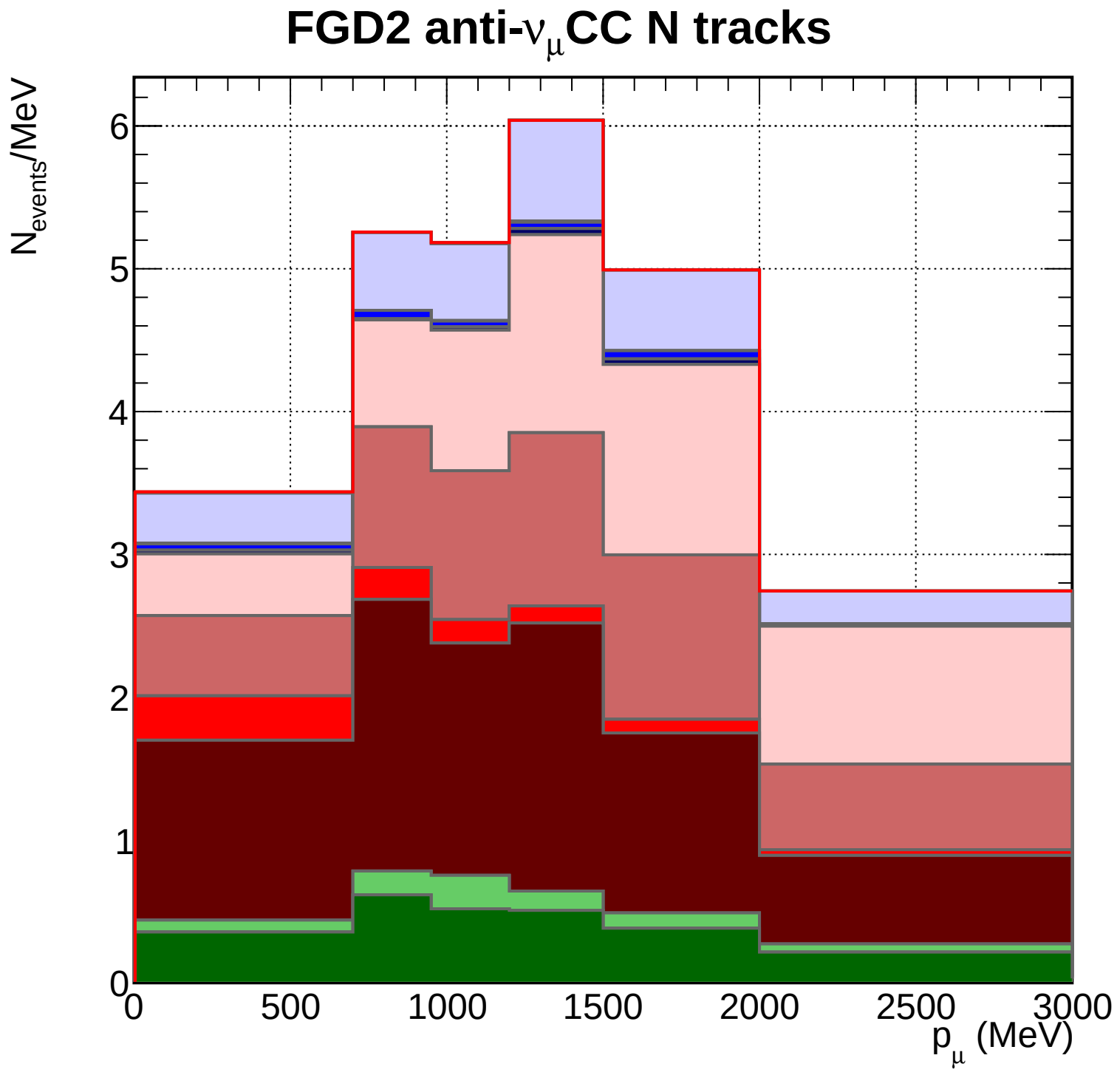

FGD1 anti-ν_μCC 1 track
$\times 10^3$
N_{events}/1
500
400
300
200
100
0
0.6
0.65
0.7
0.75
0.8
0.85
0.9
0.95
1
cos θ_μ

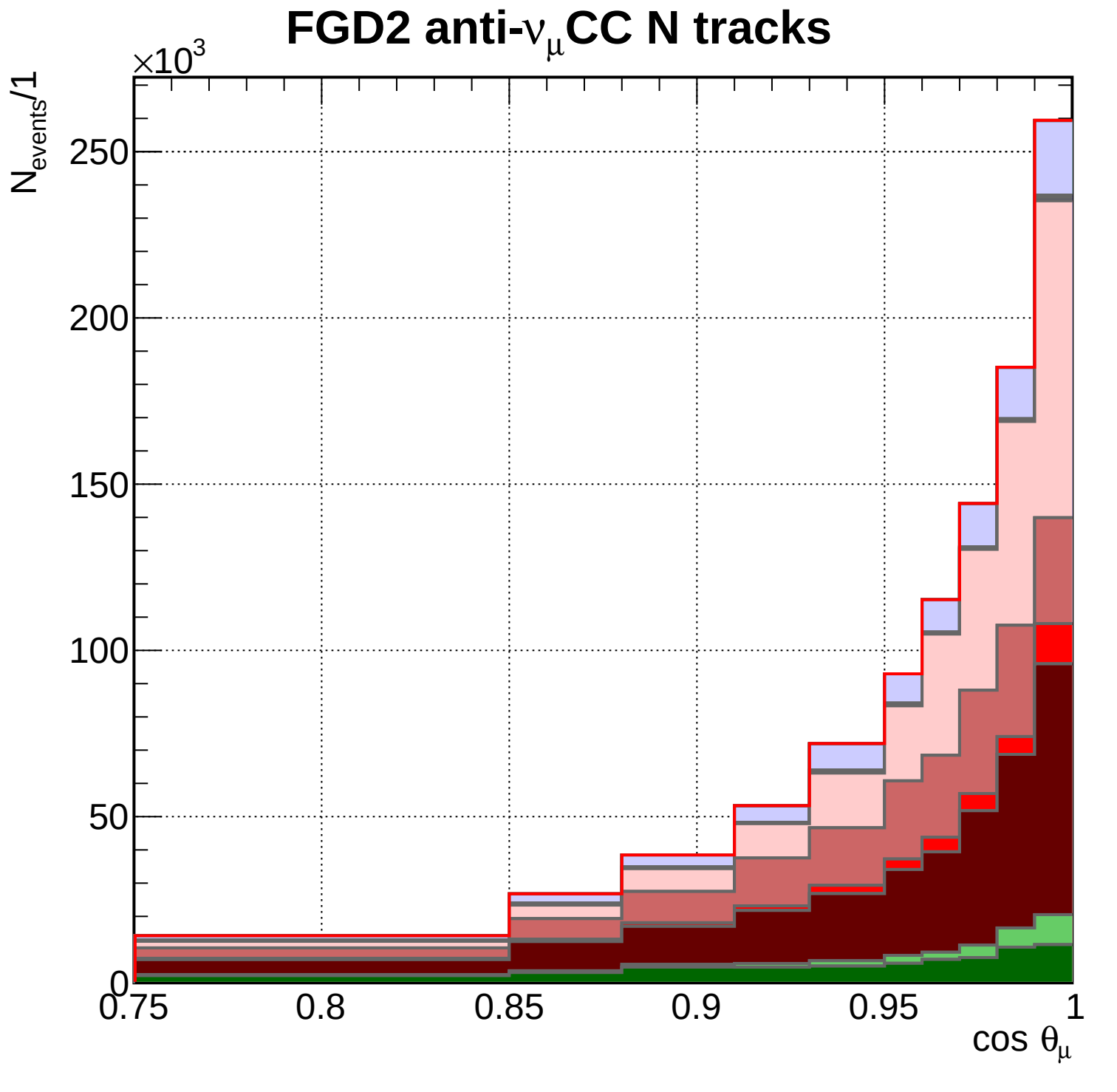

FGD1 anti-ν_μCC N tracks
N_{events}/MeV
0
1
2
3
4
5
0
500
1000
1500
2000
2500
3000
p_μ (MeV)

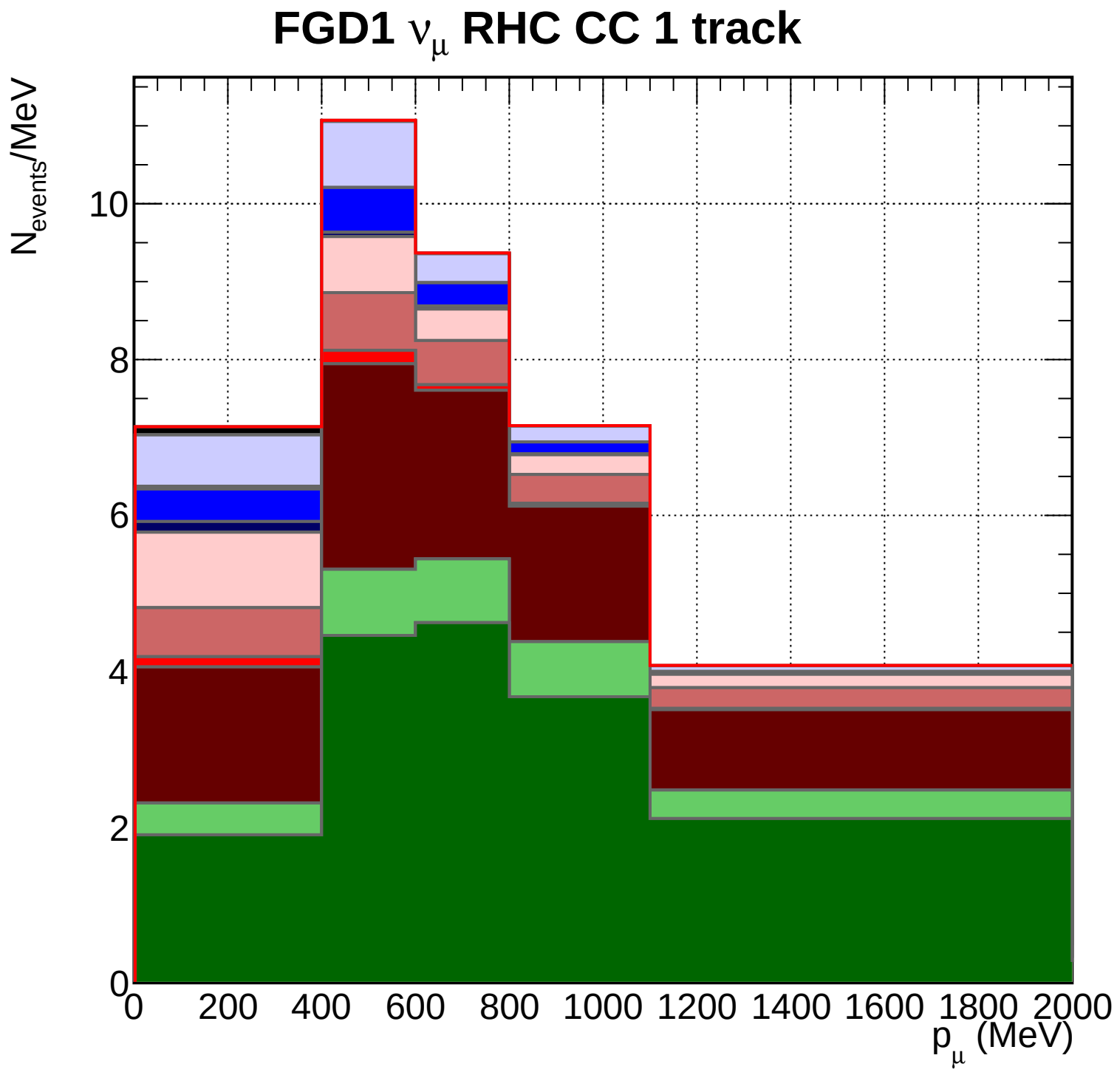

FGD1 anti-ν_μCC N tracks
$\times 10^3$
N_{events}/1
250
200
150
100
50
0
0.75
0.8
0.85
0.9
0.95
1
cos θ_μ

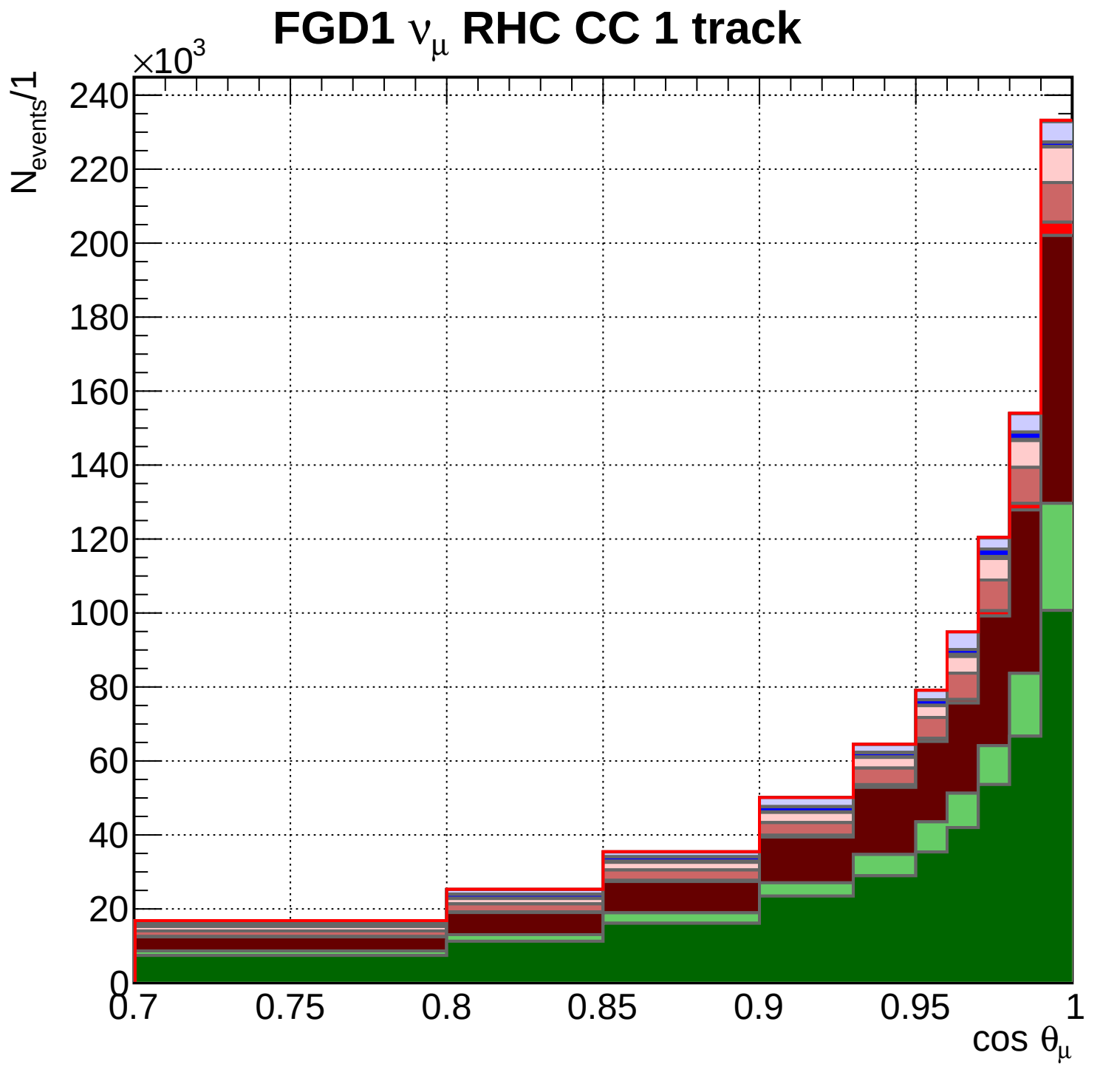

FGD2 anti-ν_μCC 1 track
N_{events}/MeV
70
60
50
40
30
20
10
0
0
200
400
600
800
1000
1200
1400
1600
1800
2000
p_μ (MeV)

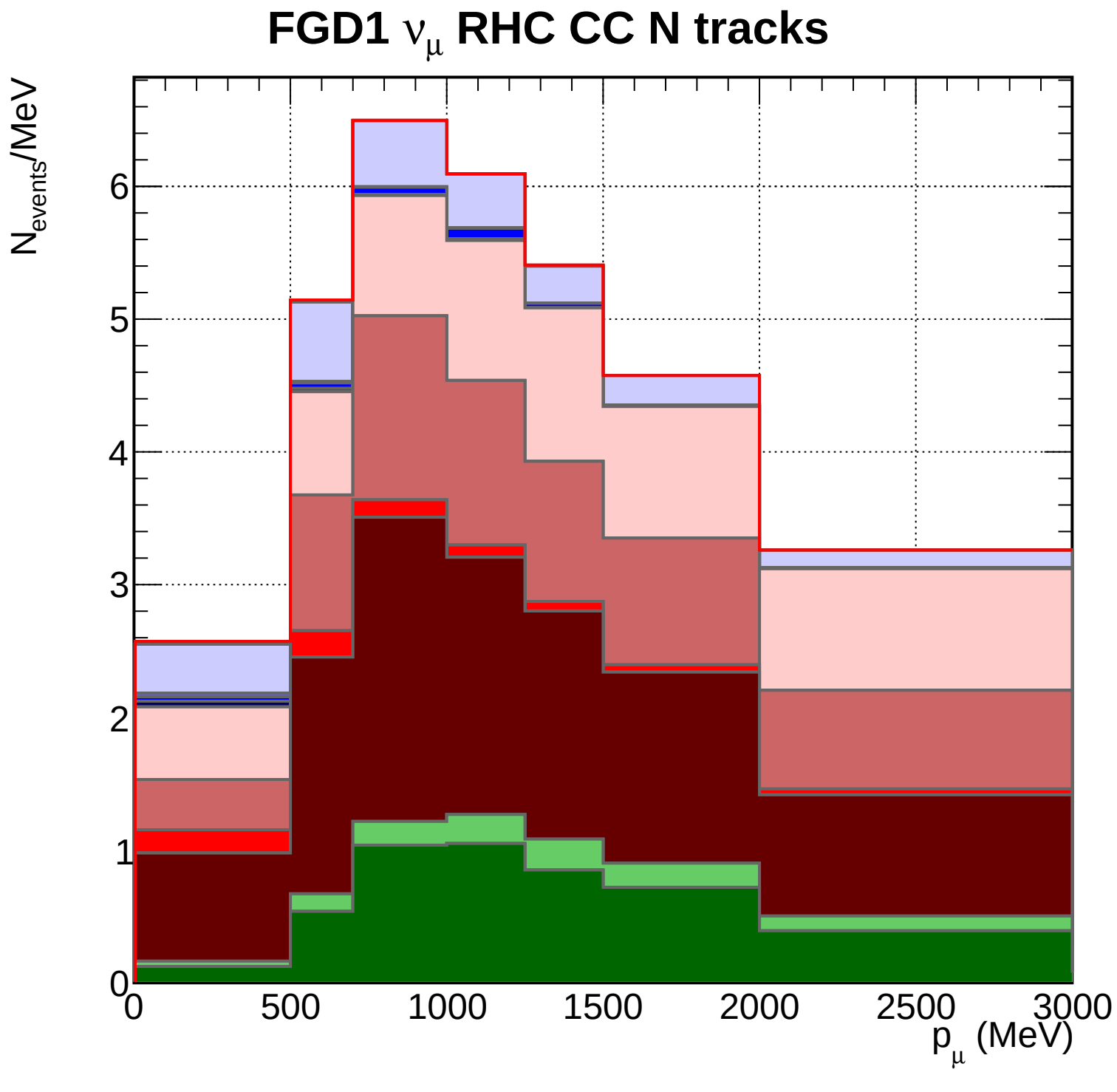

FGD2 anti-ν_μCC 1 track
$\times 10^3$
N_{events}/1
500
400
300
200
100
0
0.6
0.65
0.7
0.75
0.8
0.85
0.9
0.95
1
cos θ_μ

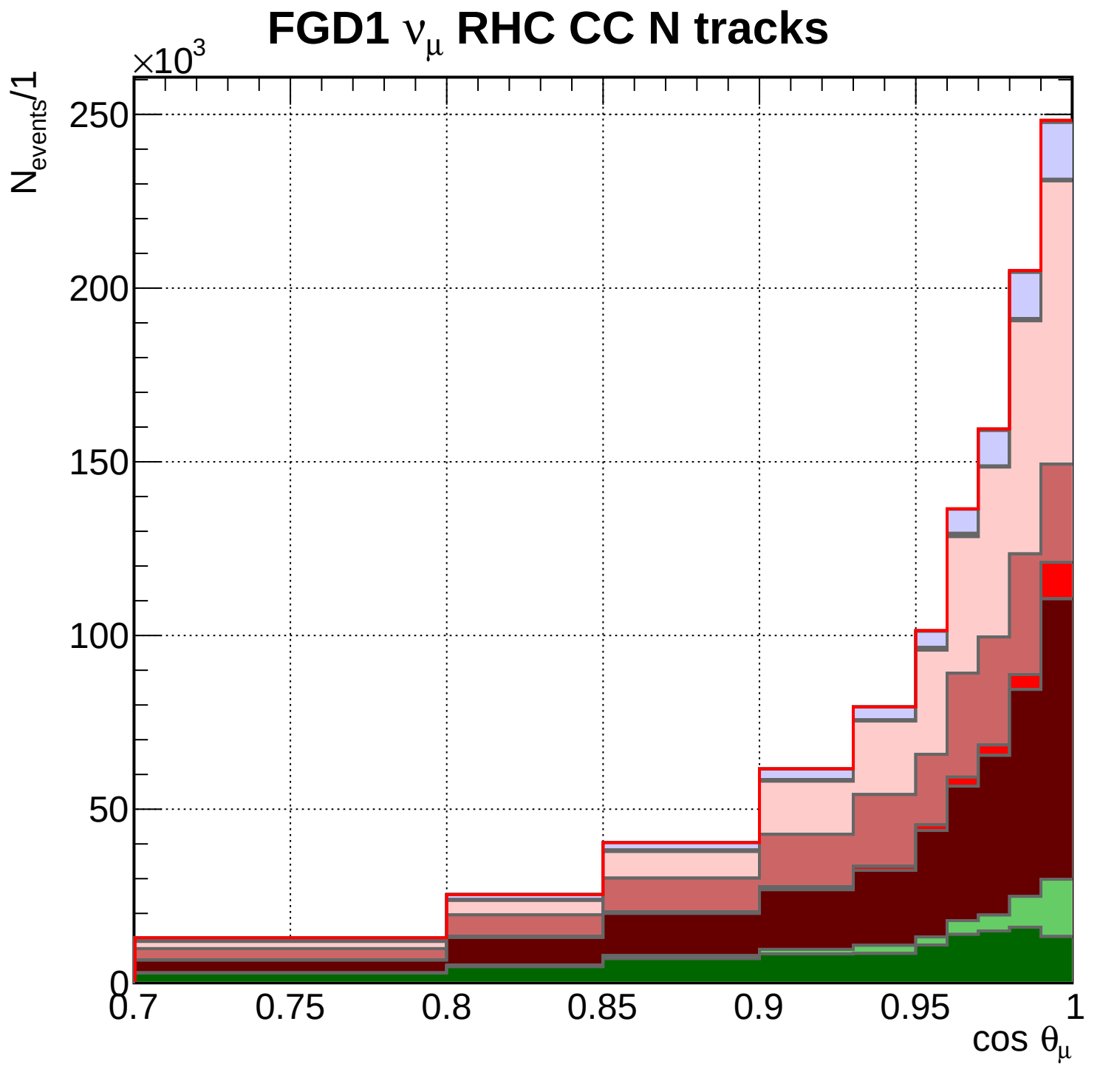

FGD2 anti-ν_μCC N tracks
N_{events}/MeV
0
1
2
3
4
5
6
0
500
1000
1500
2000
2500
3000
p_μ (MeV)

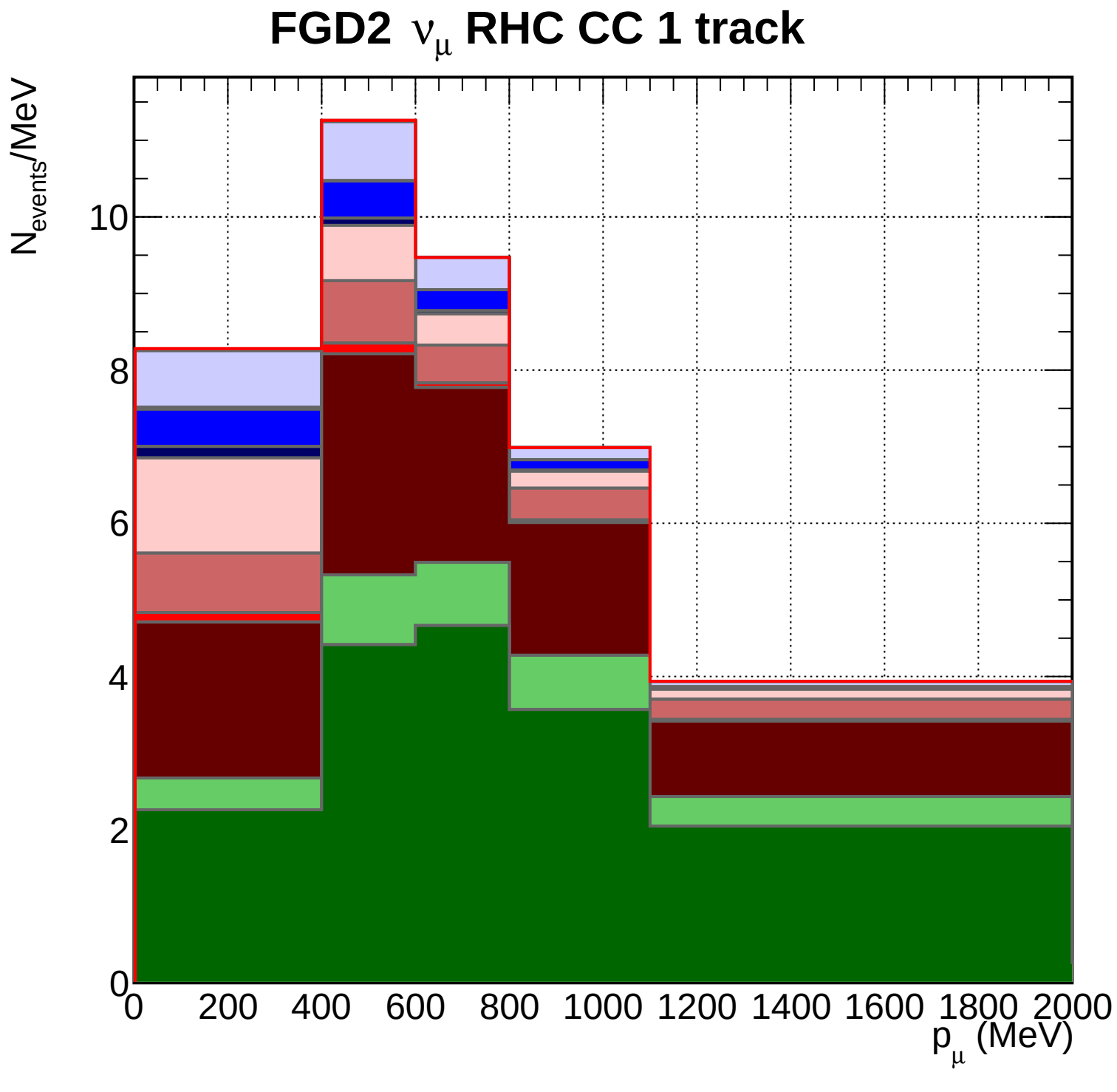

FGD2 anti-ν_μCC N tracks
$\times 10^3$
N_{events}/1
250
200
150
100
50
0
0.75
0.8
0.85
0.9
0.95
1
cos θ_μ

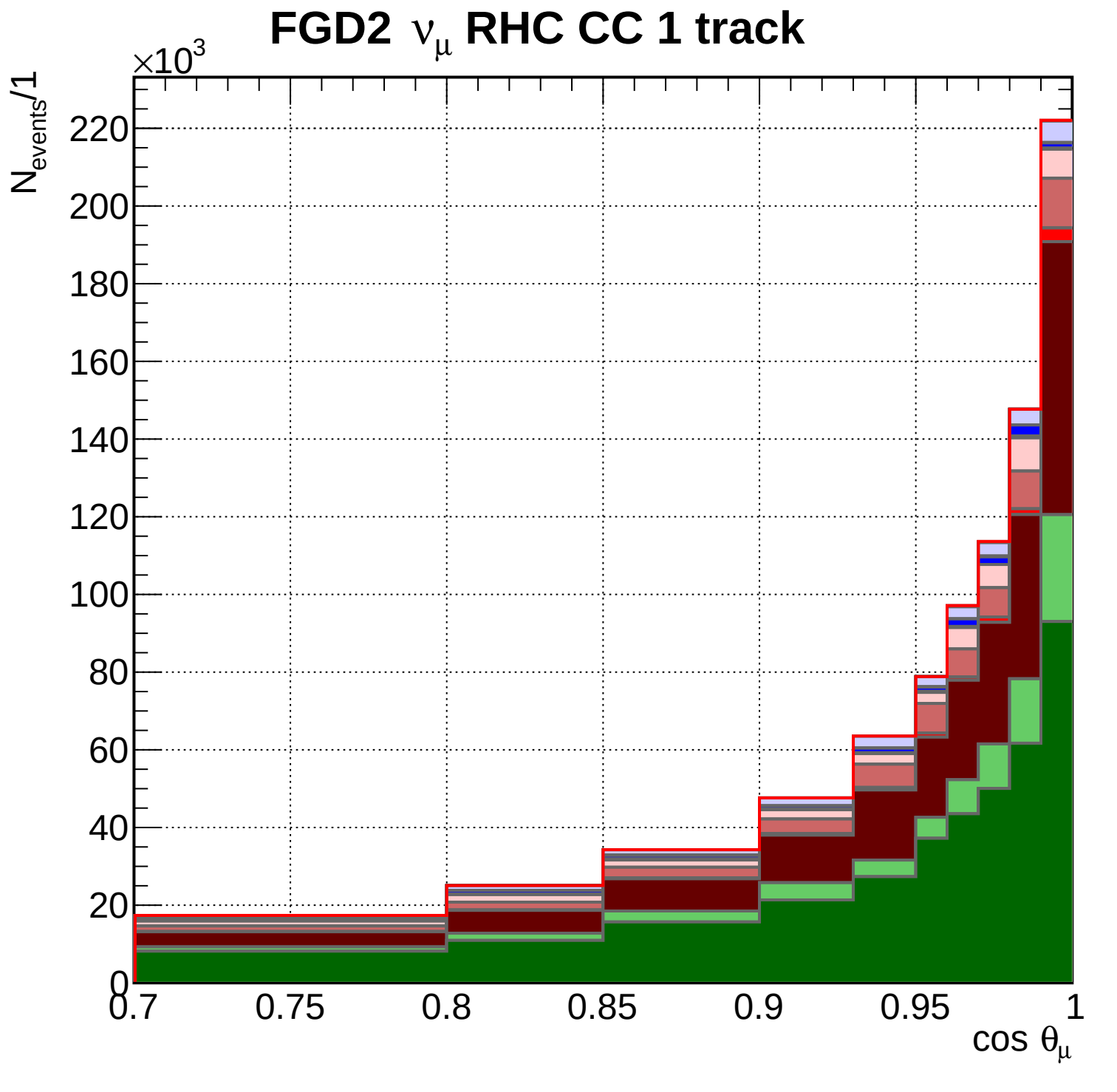

FGD1 ν_μ RHC CC 1 track
N_{events}/MeV
0
2
4
6
8
10
0
200
400
600
800
1000
1200
1400
1600
1800
2000
p_μ (MeV)

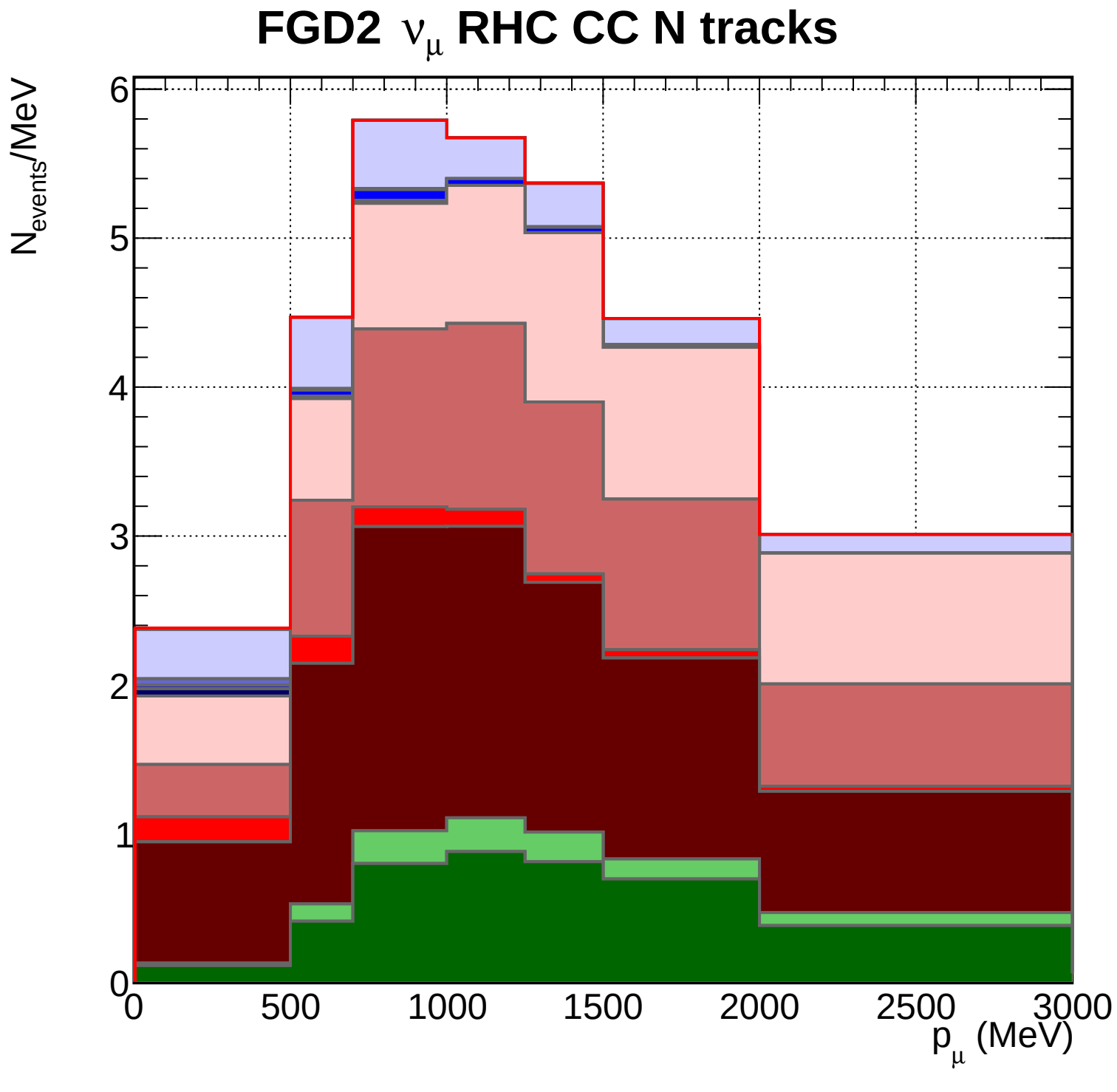

FGD1 ν_μ RHC CC 1 track
$\times 10^3$
N_{events}/1
240
220
200
180
160
140
120
100
80
60
40
20
0
0.7
0.75
0.8
0.85
0.9
0.95
1
cos θ_μ

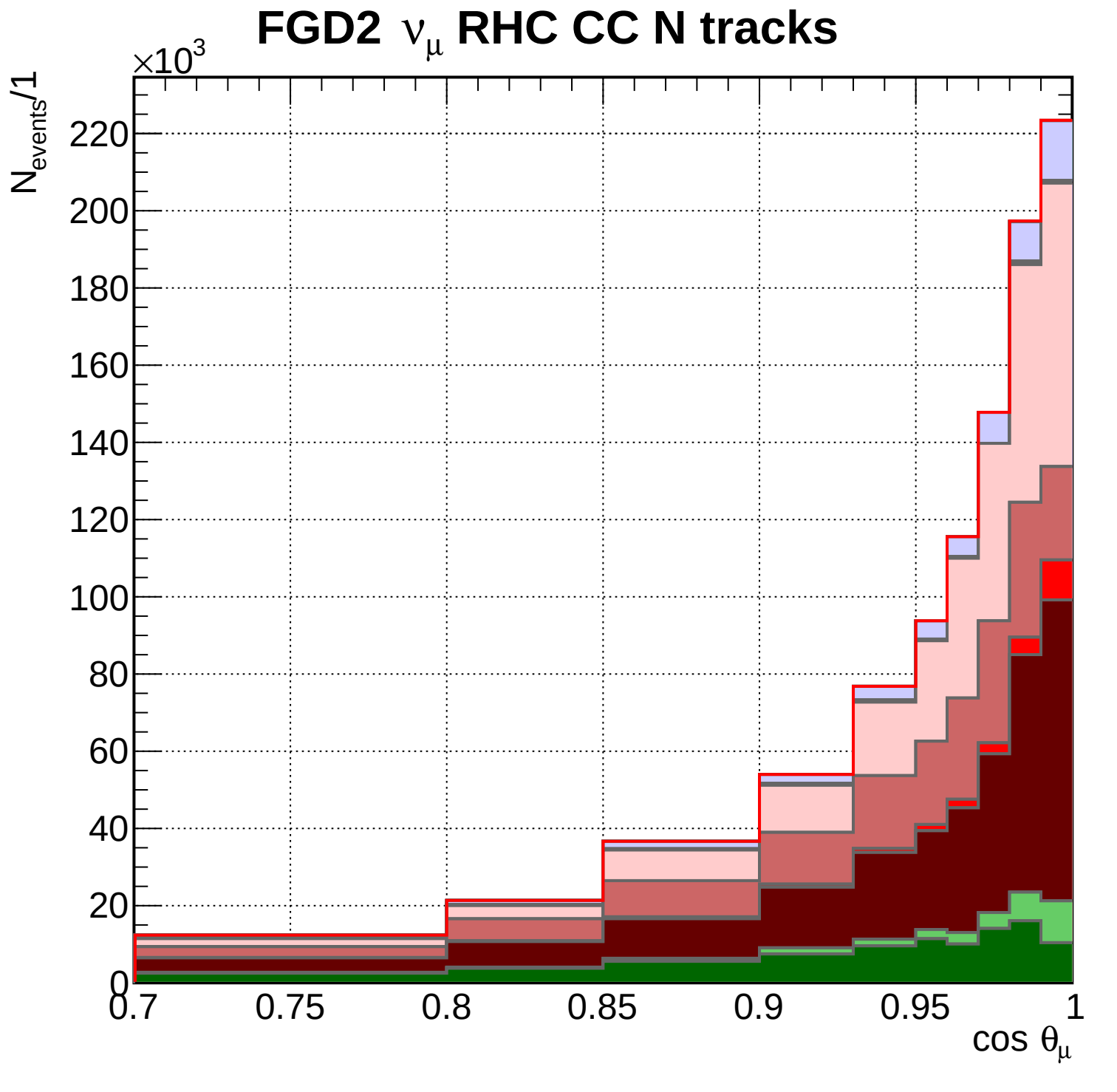

FGD1 ν_μ RHC CC N tracks
N_{events}/MeV
0
1
2
3
4
5
6
0
500
1000
1500
2000
2500
3000
p_μ (MeV)


FGD1 ν_μ RHC CC N tracks
$\times 10^3$
N_{events}/1
250
200
150
100
50
0
0.7
0.75
0.8
0.85
0.9
0.95
1
cos θ_μ


FGD2 ν_μ RHC CC 1 track
N_{events}/MeV
0
2
4
6
8
10
0
200
400
600
800
1000
1200
1400
1600
1800
2000
p_μ (MeV)


FGD2 ν_μ RHC CC 1 track
$\times 10^3$
N_{events}/1
220
200
180
160
140
120
100
80
60
40
20
0
0.7
0.75
0.8
0.85
0.9
0.95
1
cos θ_μ


FGD2 ν_μ RHC CC N tracks
N_{events}/MeV
0
1
2
3
4
5
6
0
500
1000
1500
2000
2500
3000
p_μ (MeV)


FGD2 ν_μ RHC CC N tracks
$\times 10^3$
N_{events}/1
220
200
180
160
140
120
100
80
60
40
20
0
0.7
0.75
0.8
0.85
0.9
0.95
1
cos θ_μ