Date: 03/02/2020

J/ψ production from ^{4}He

Luminosity: 1.2×10^{37} eN cm^{-2} s^{-1}
Target: 15-cm liquid ^{4}He (~ 2% radiation length)
Acceptance: p > 300 MeV, 6° < θ < 29°, full azimuthal
Cross section model: grids "duke-jpsi-02-19-2020" with and without the restriction "p" (initial nucleon in ^{4}He) < 300 MeV

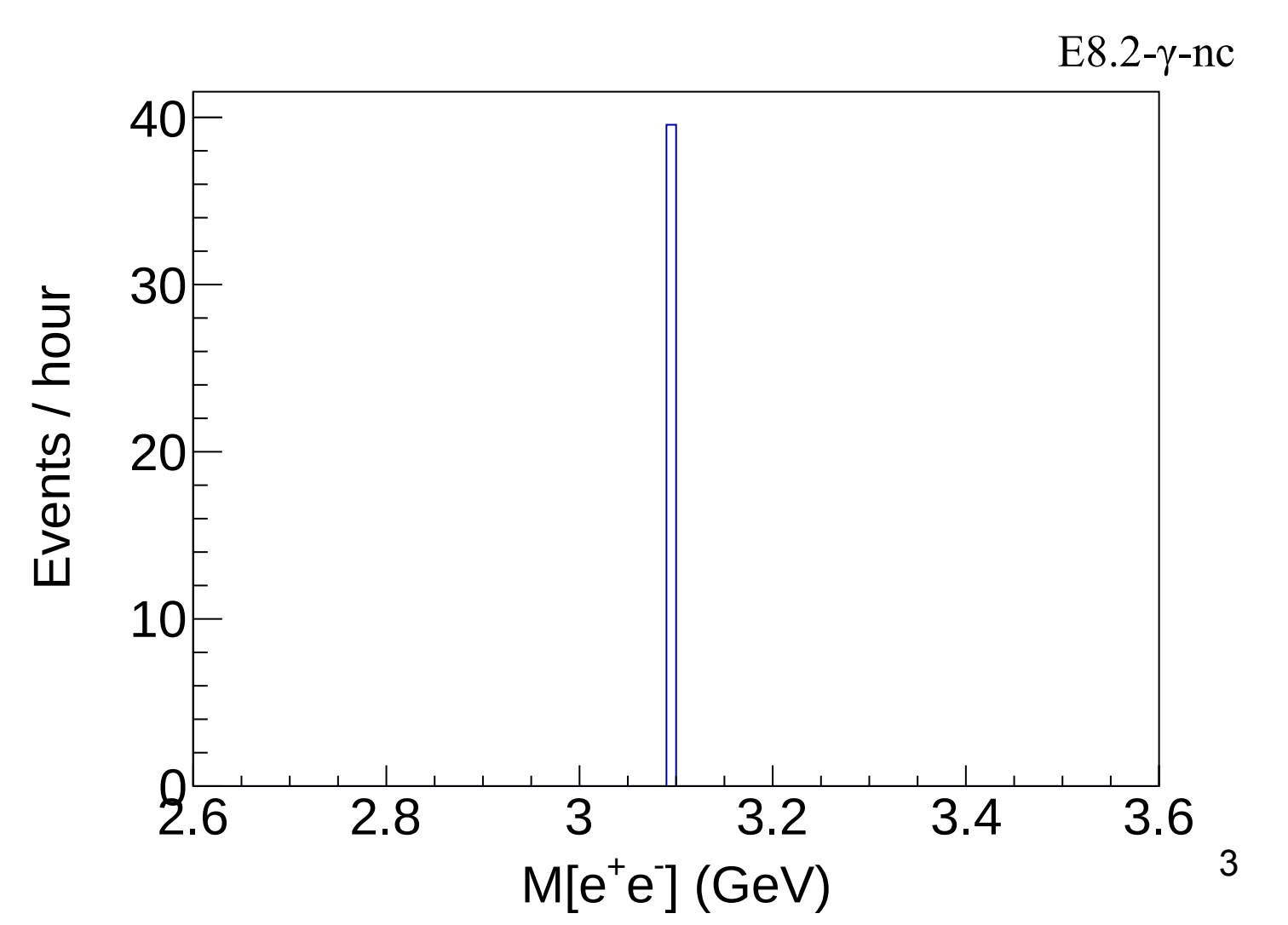
Photoproduction:
Bremsstrahlung photon with target as the radiator, select $6.2 < E_\gamma < E_{beam}$

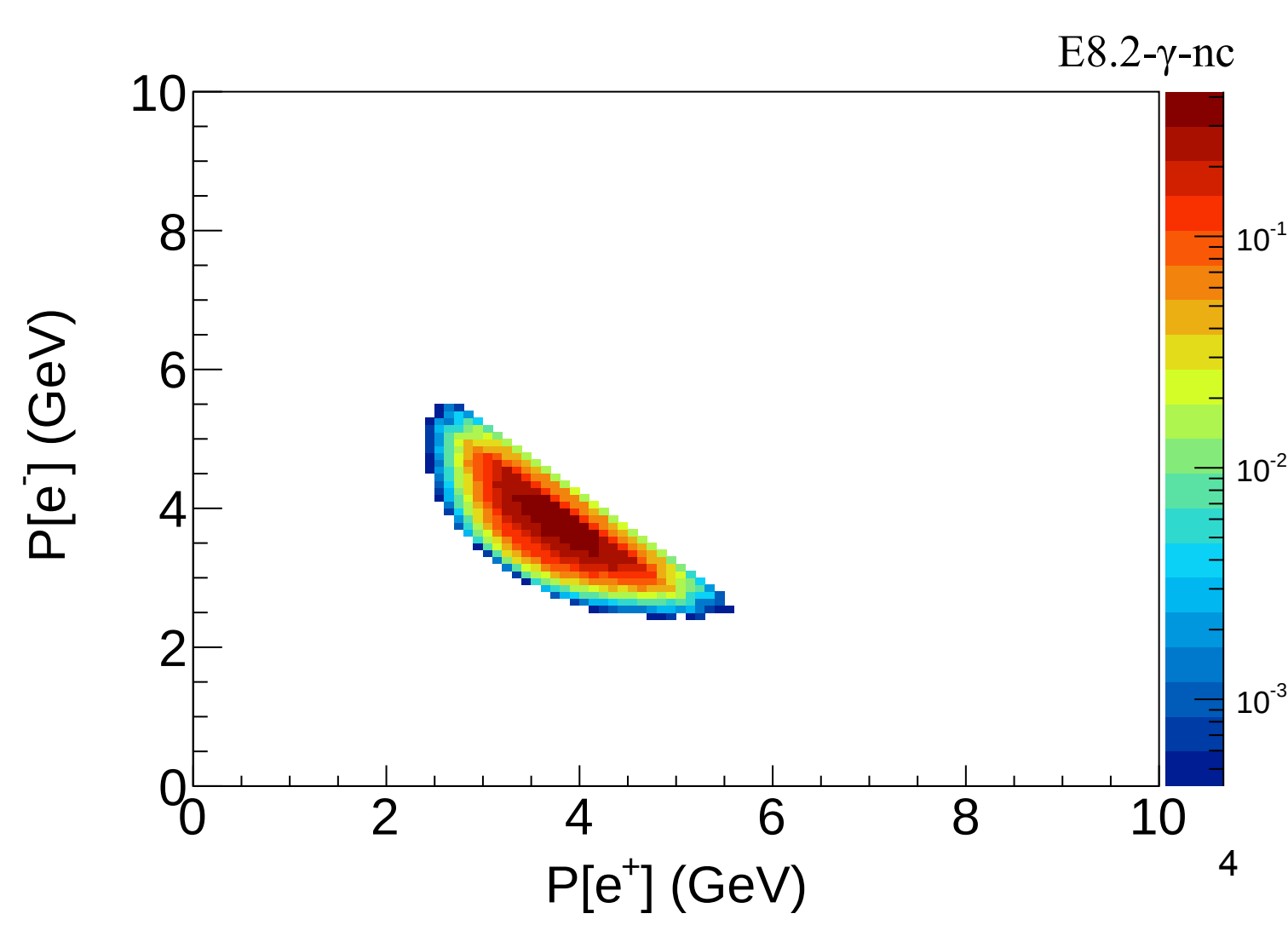
Purpose:
Different beam energies: 8.2 GeV and 7.2 GeV,
ensuring the bremsstrahlung photon is below the threshold.

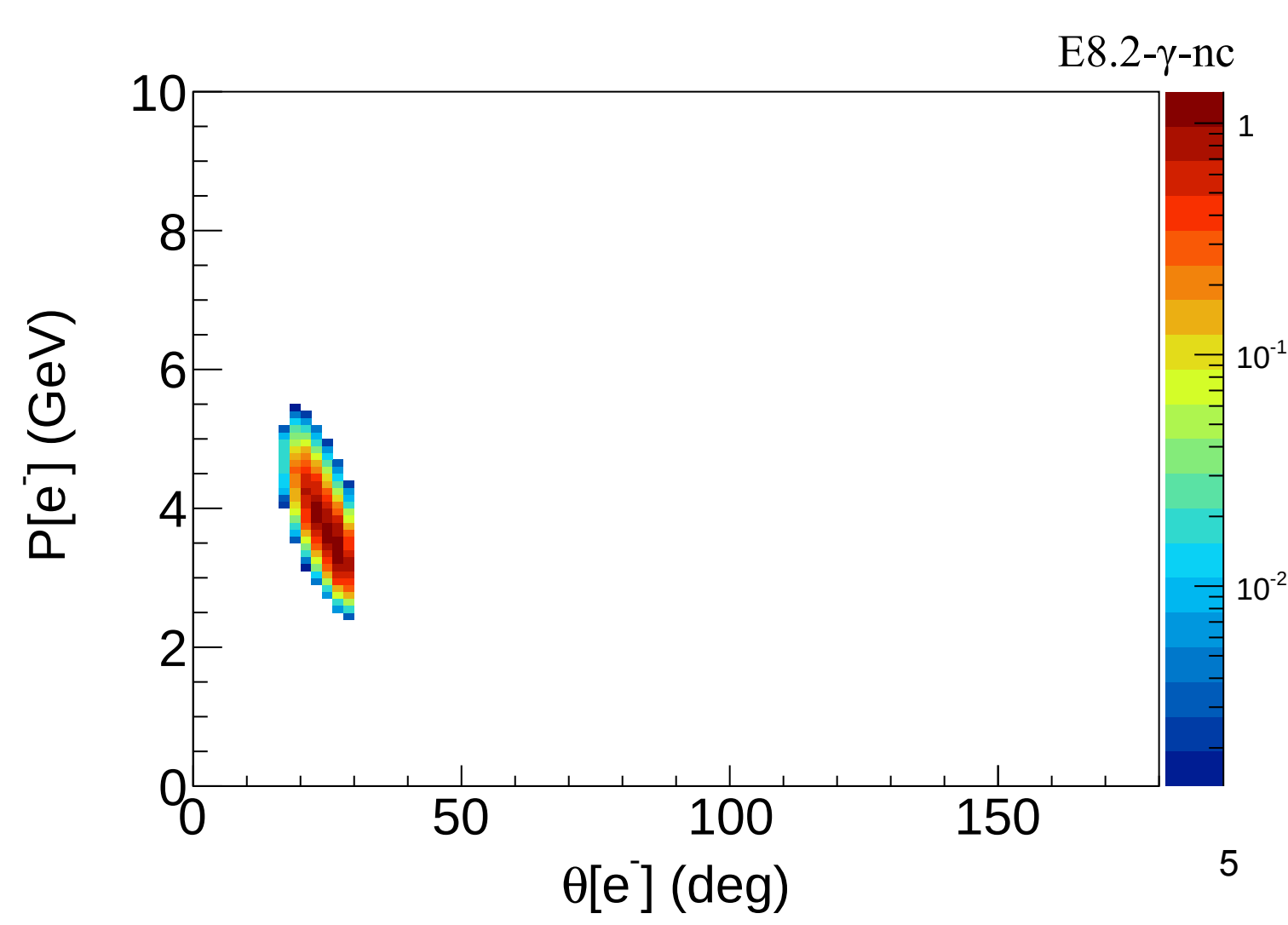
J/ψ production from ^{4}He

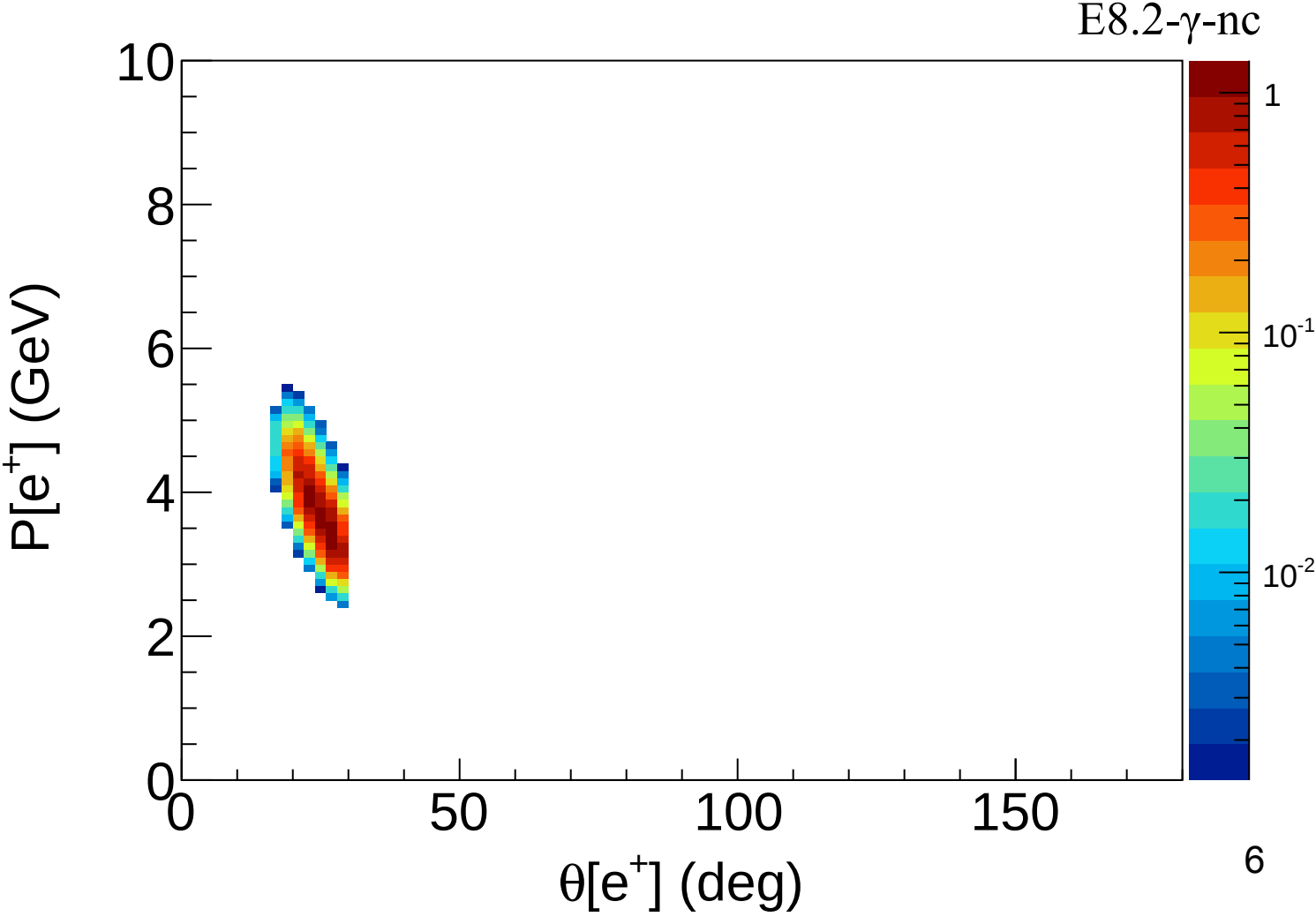
Simulated cases

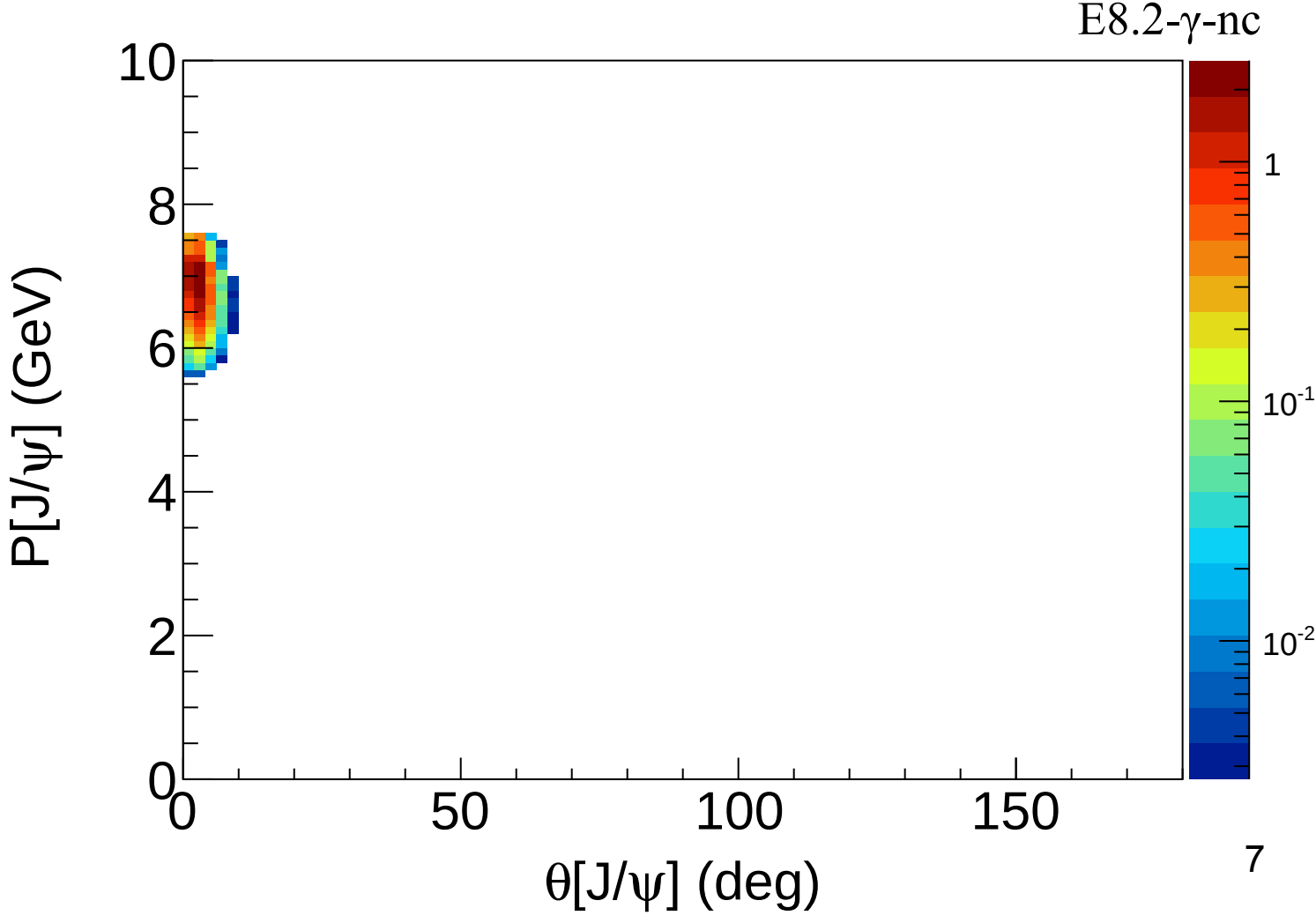
Label	e^- beam energy (GeV)	initial "p"
E8.2-γ-nc	8.2	No cut
E8.2-γ-c300	8.2	< 300 MeV
E7.2-γ-nc	7.2	No cut
E7.2-γ-c300	7.2	< 300 MeV

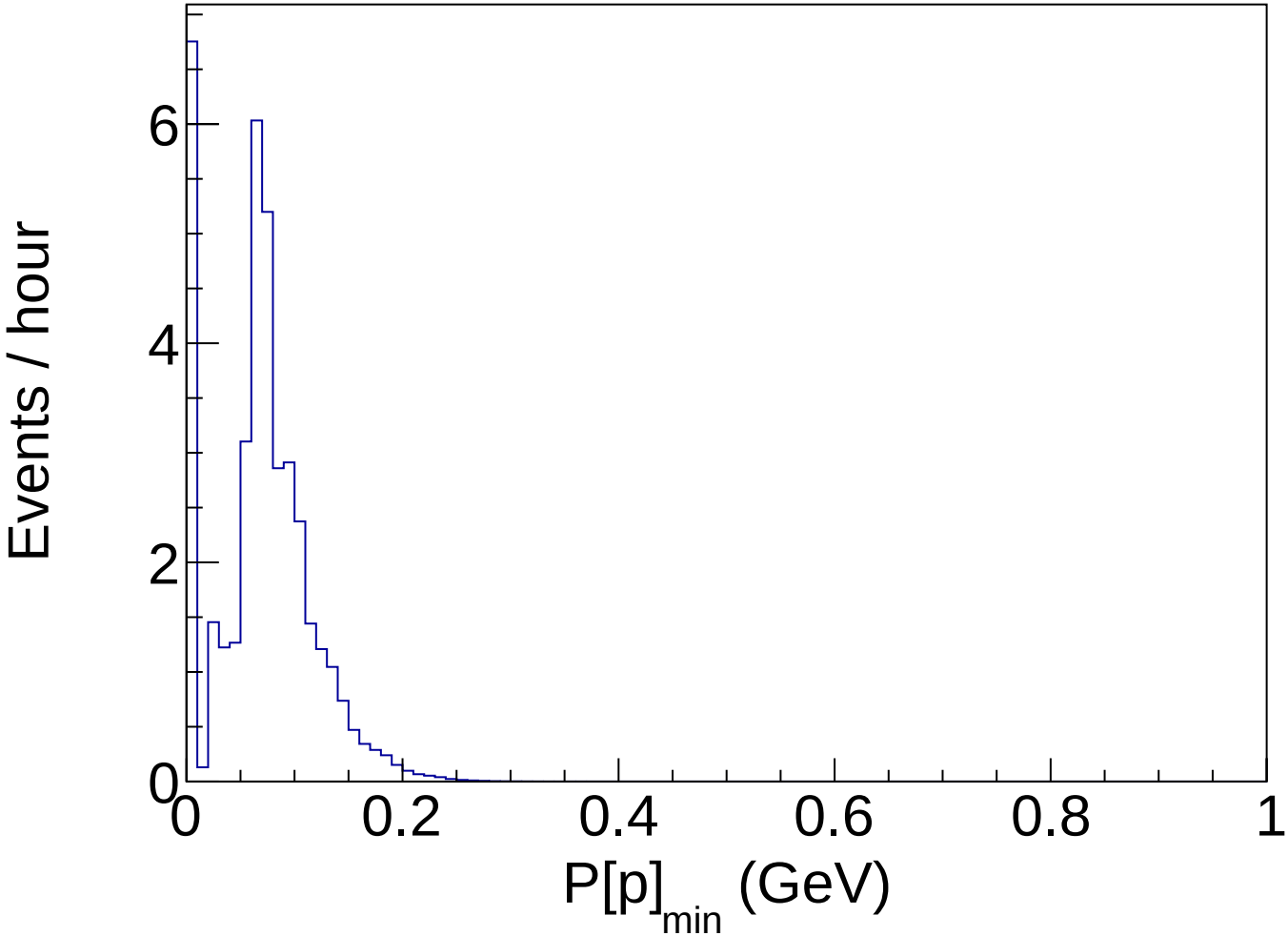

E8.2-γ-nc
Events / hour
0
10
20
30
40
2.6
2.8
3
3.2
3.4
3.6
M[e+e-] (GeV)

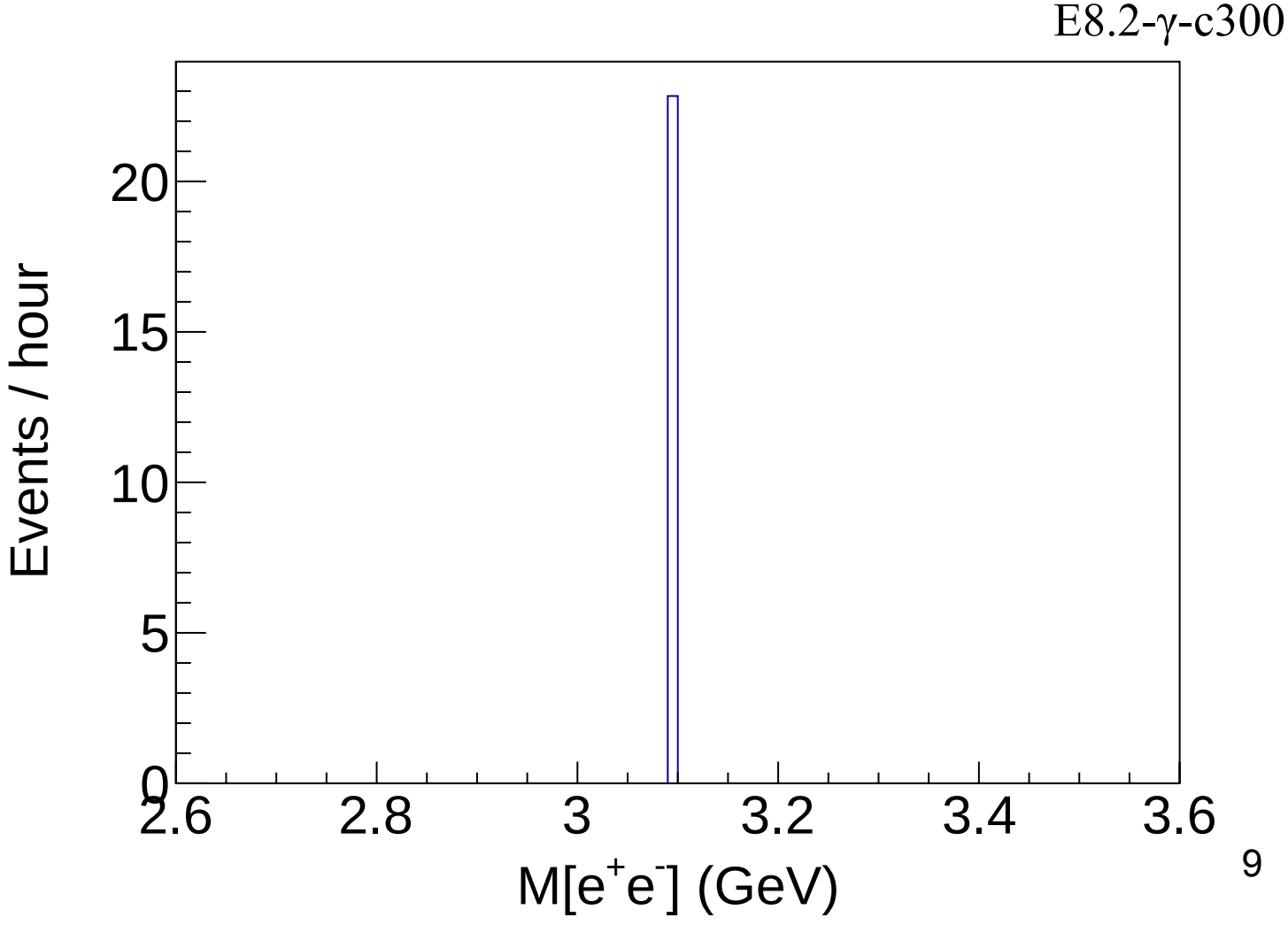

E8.2-γ-nc
P[e⁻] (GeV)
P[e⁺] (GeV)
0
2
4
6
8
10
10⁻¹
10⁻²
10⁻³
4

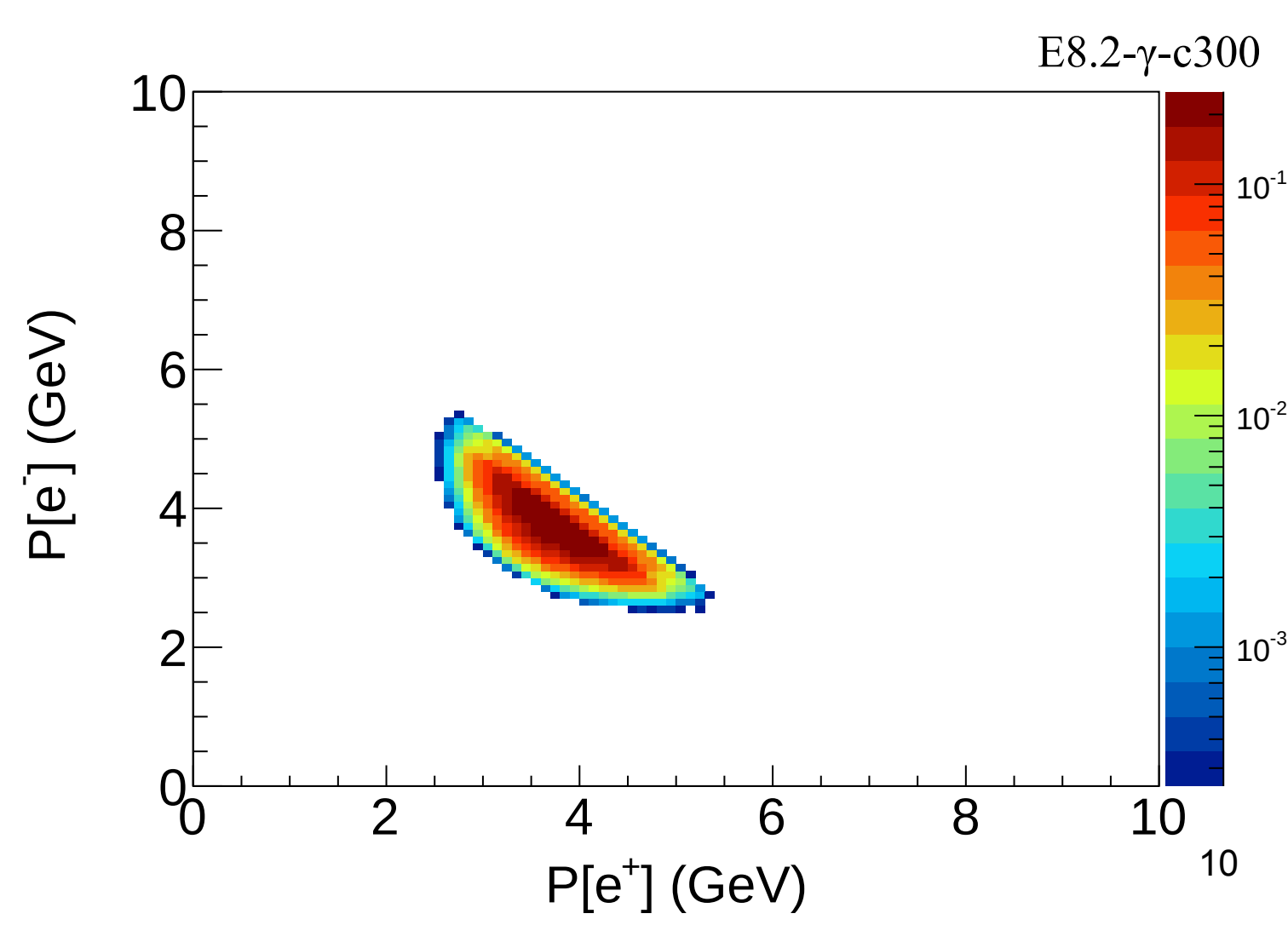

E8.2-γ-nc
P[e⁻] (GeV)
θ[e⁻] (deg)
0
2
4
6
8
10
0
50
100
150
1
10⁻¹
10⁻²
5

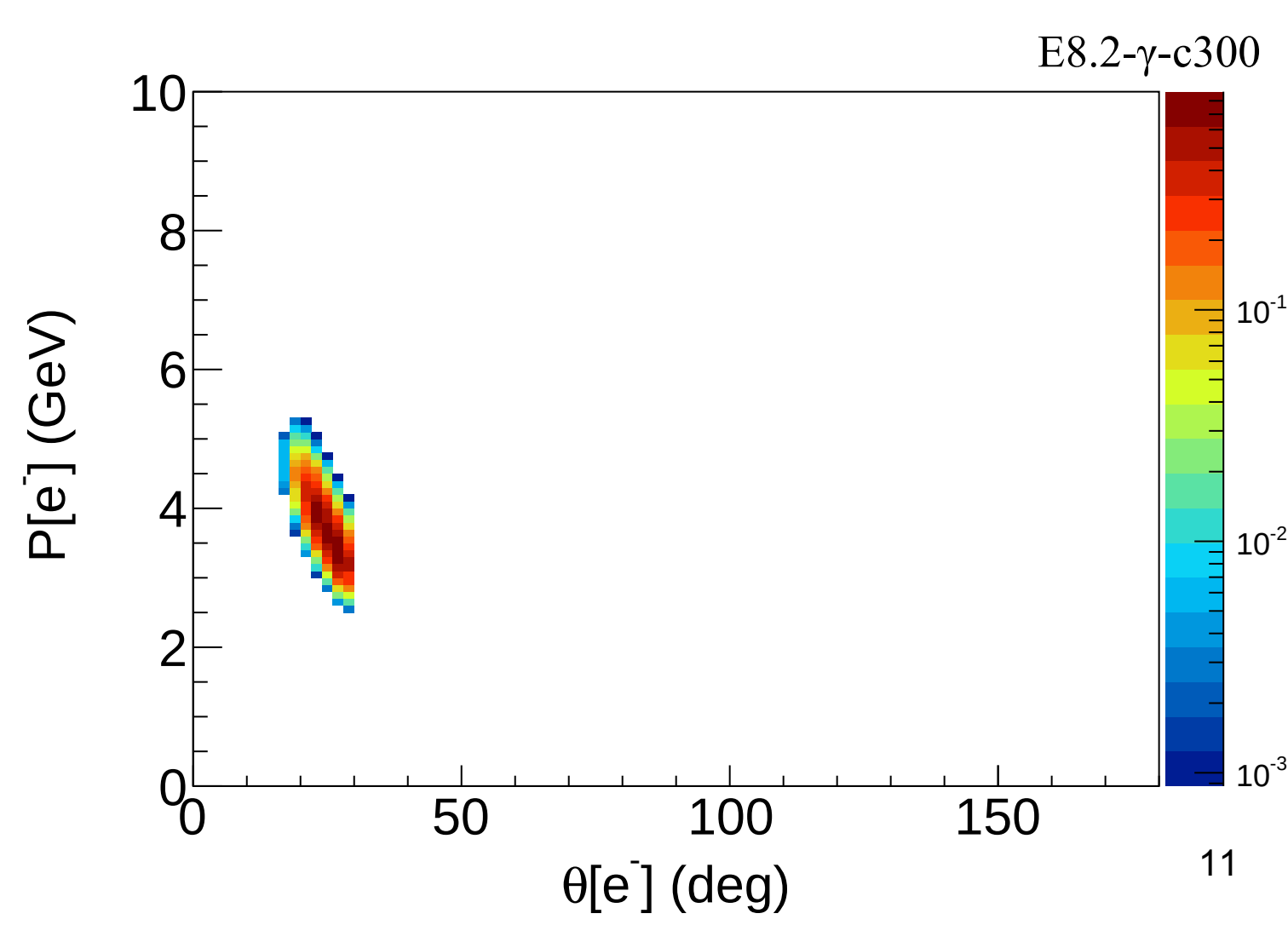

E8.2-γ-nc
P[e+] (GeV)
θ[e+] (deg)
0
2
4
6
8
10
0
50
100
150
1
10-1
10-2
6

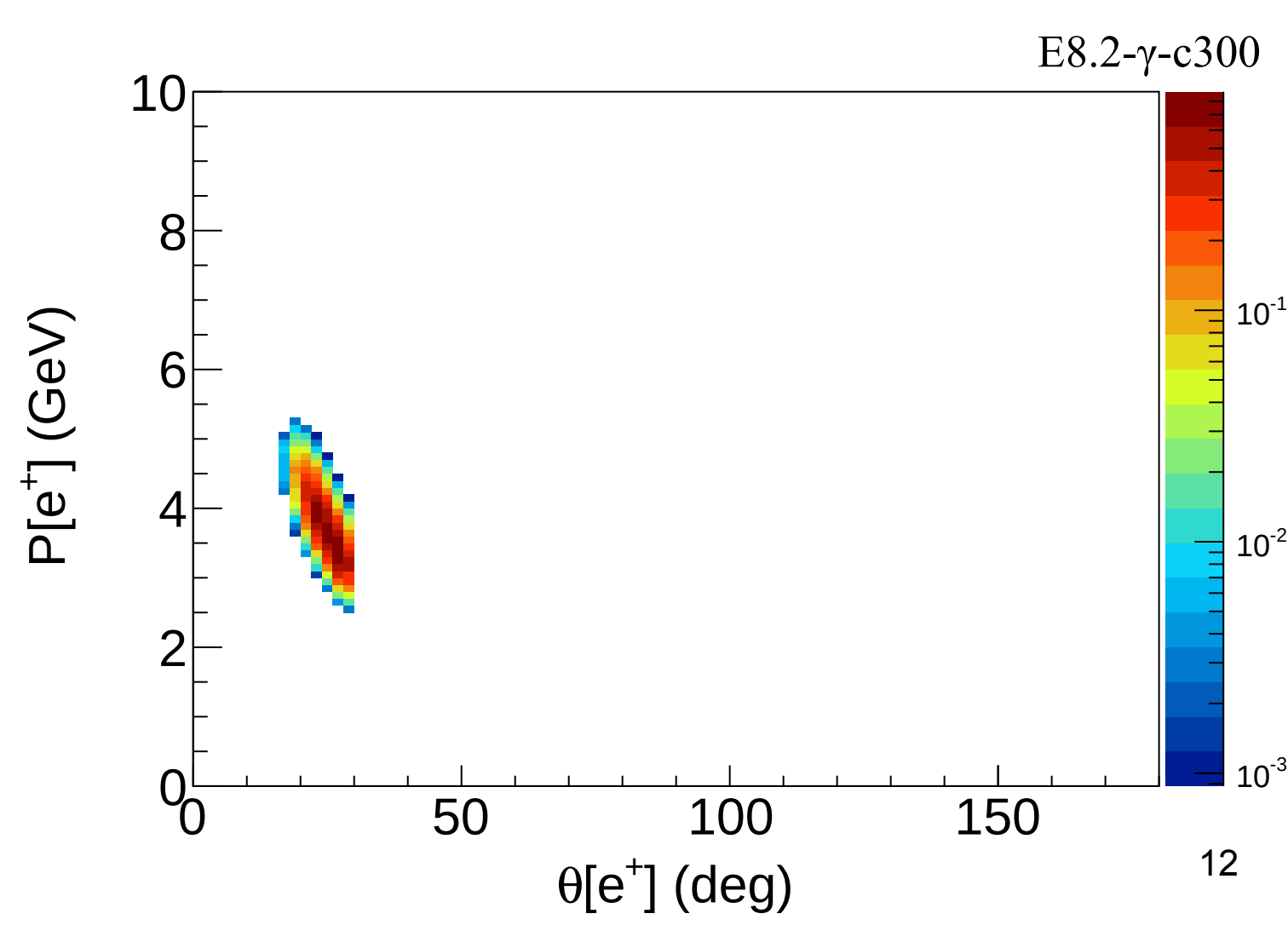

E8.2-γ-nc
P[J/ψ] (GeV)
θ[J/ψ] (deg)
0
2
4
6
8
10
0
50
100
150
1
10-1
10-2
7

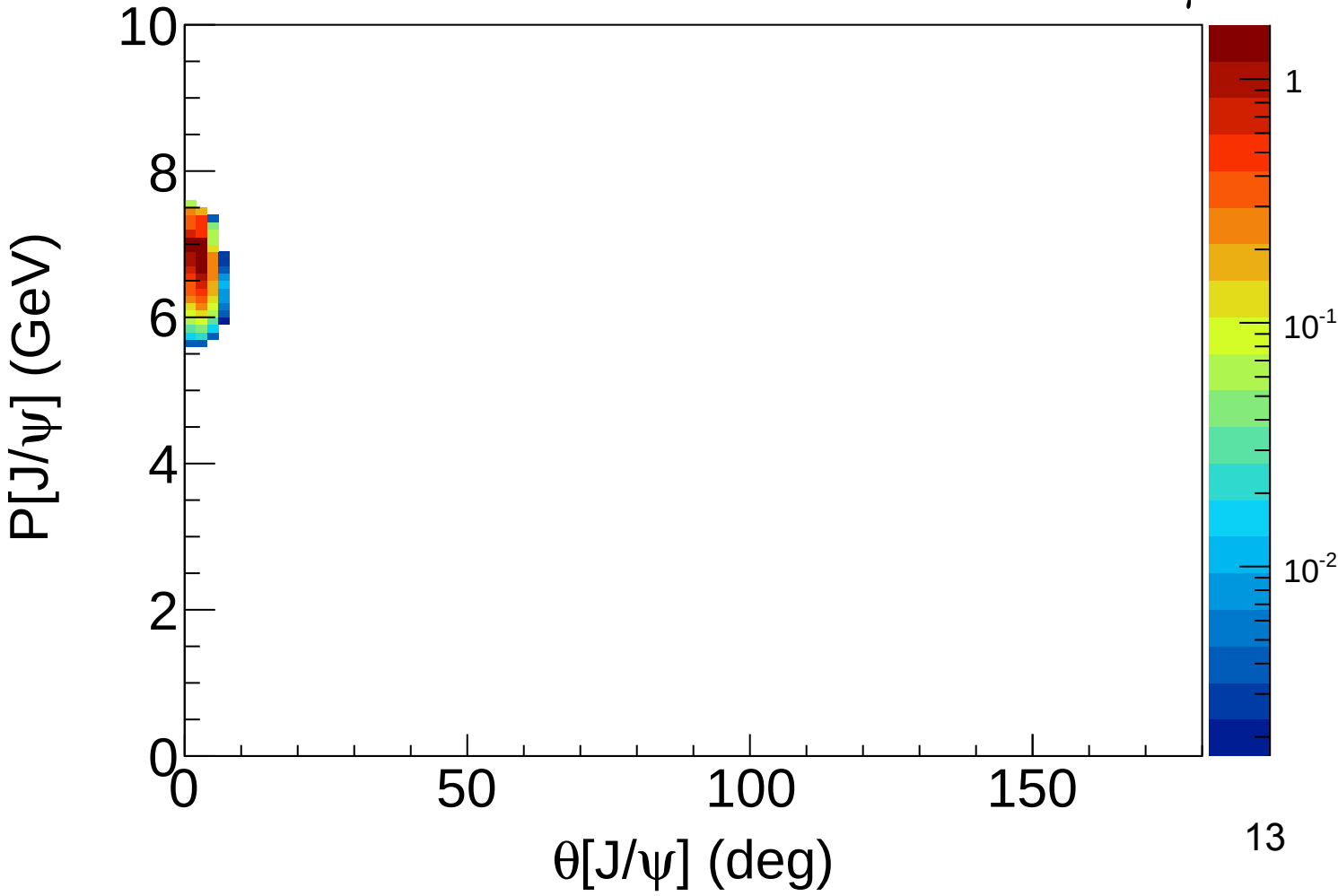

Events / hour
0
2
4
6
0
0.2
0.4
0.6
0.8
1
P[p]min (GeV)

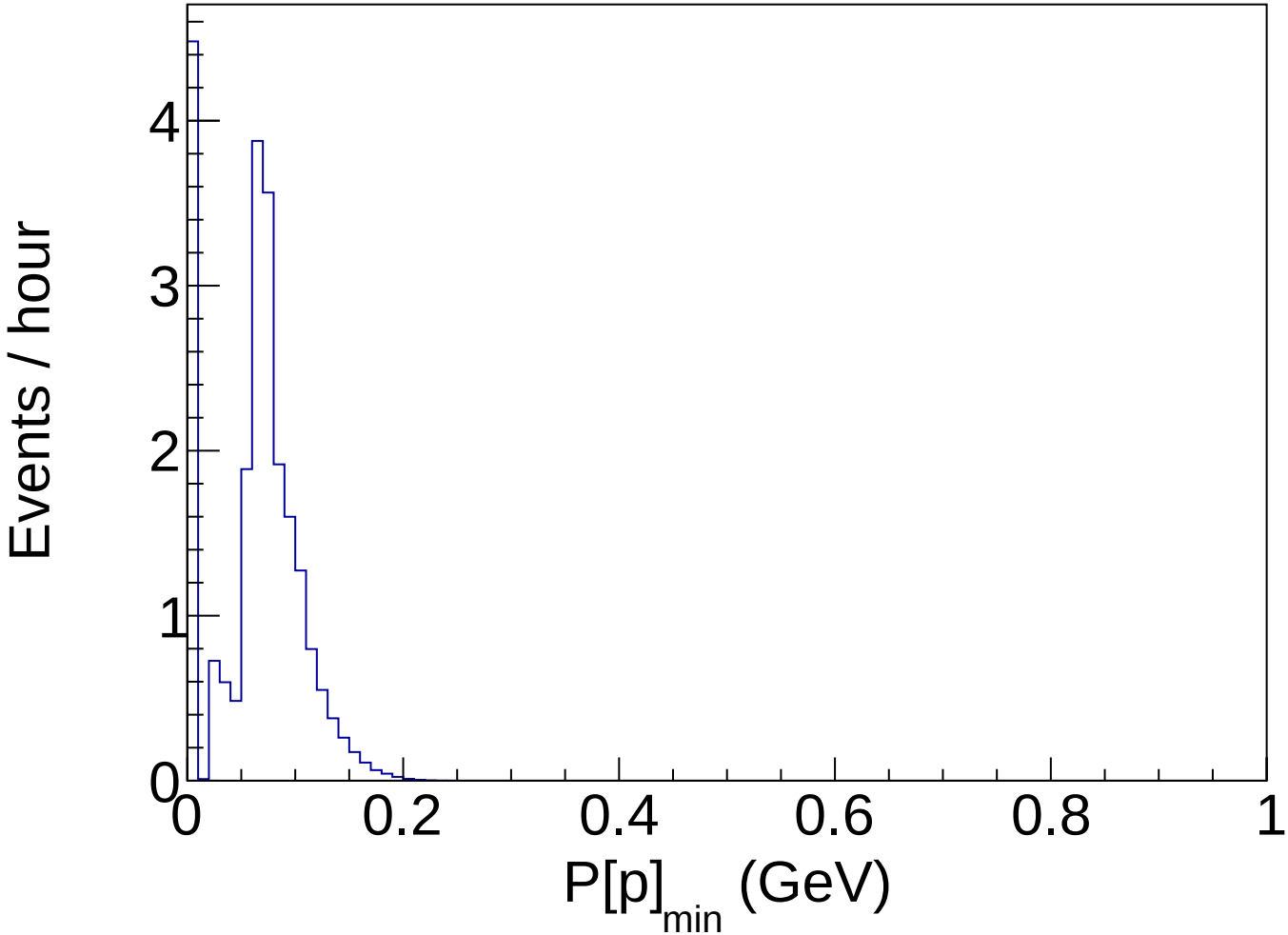

E8.2-γ-c300
Events / hour
0
5
10
15
20
2.6
2.8
3
3.2
3.4
3.6
M[e+e-] (GeV)

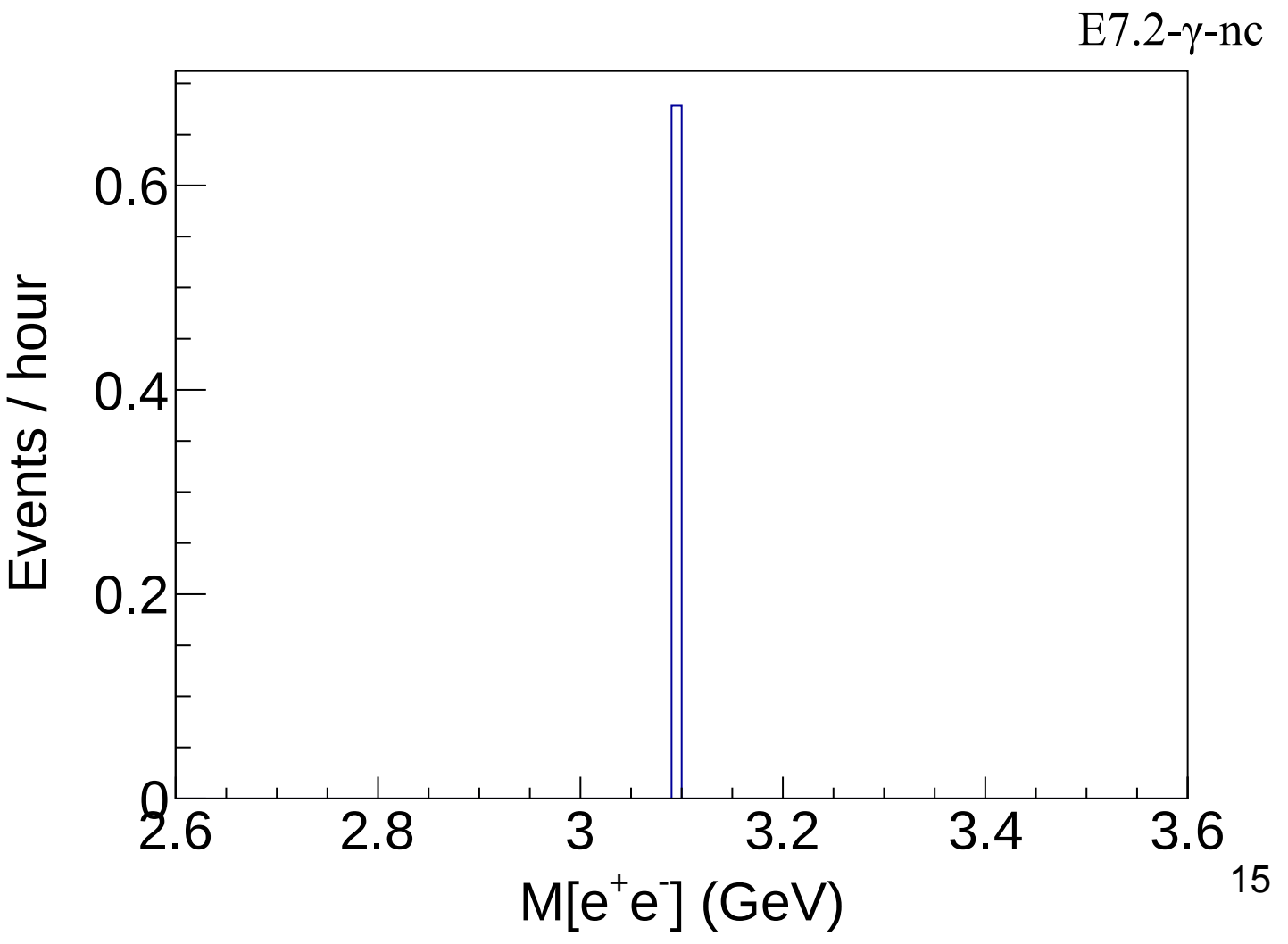

E8.2-γ-c300
P[e⁻] (GeV)
P[e⁺] (GeV)
0
2
4
6
8
10
10⁻¹
10⁻²
10⁻³

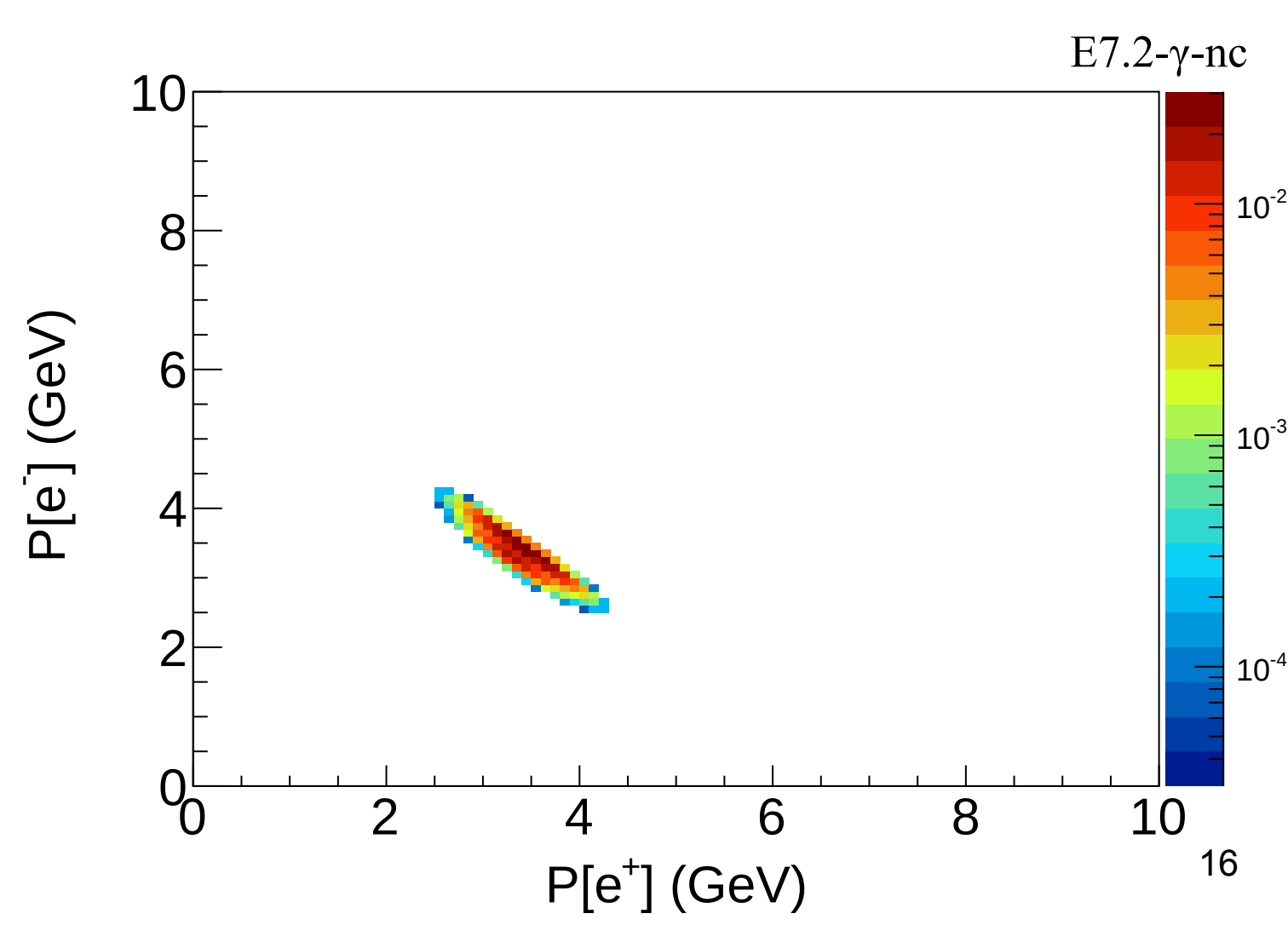

E8.2-γ-c300
10
8
6
4
2
0
P[e⁻] (GeV)
0
50
100
150
θ[e⁻] (deg)
10^-1
10^-2
10^-3
11

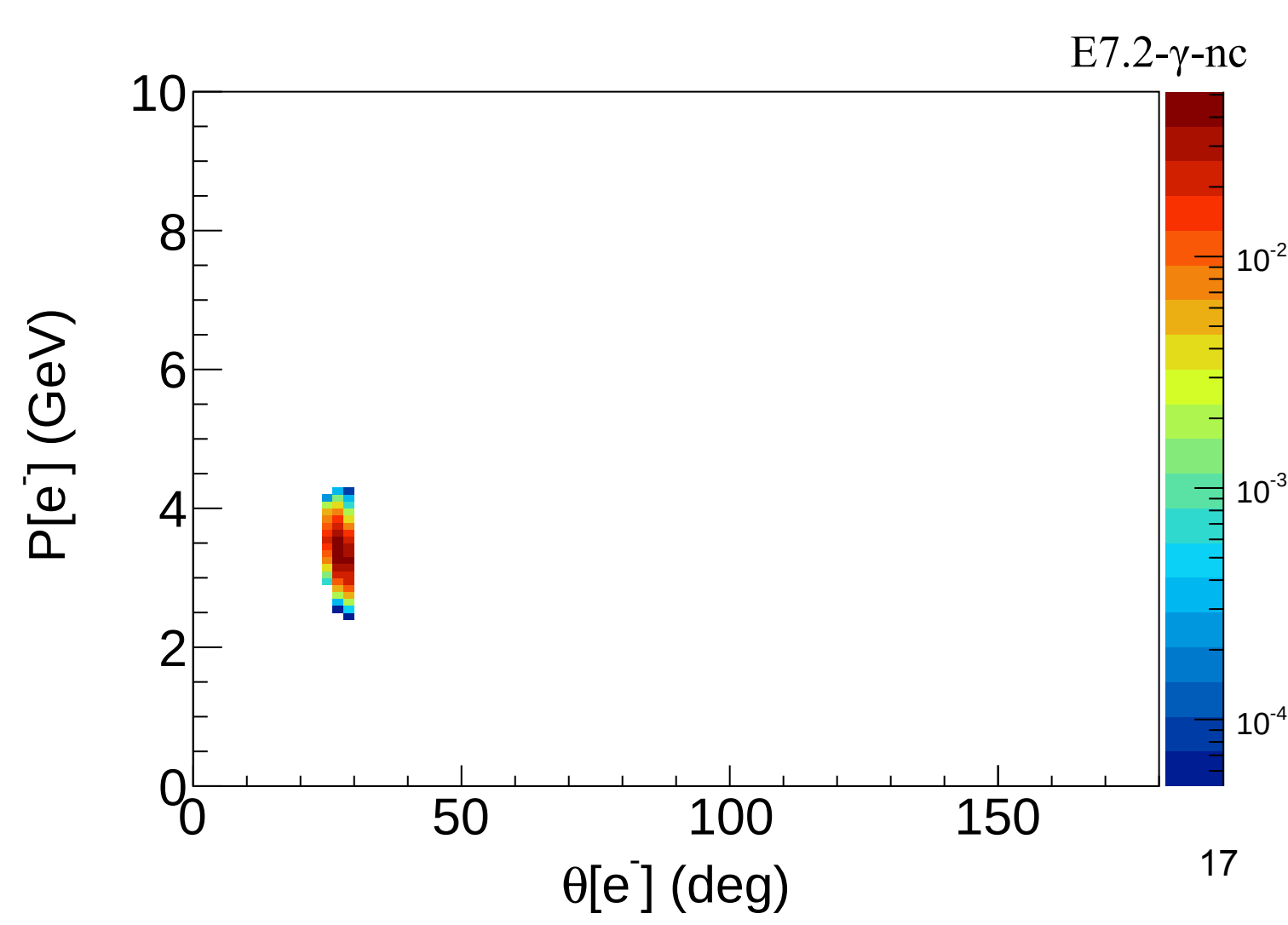

E8.2-γ-c300
P[e+] (GeV)
θ[e+] (deg)
0
2
4
6
8
10
0
50
100
150
10-1
10-2
10-3
12

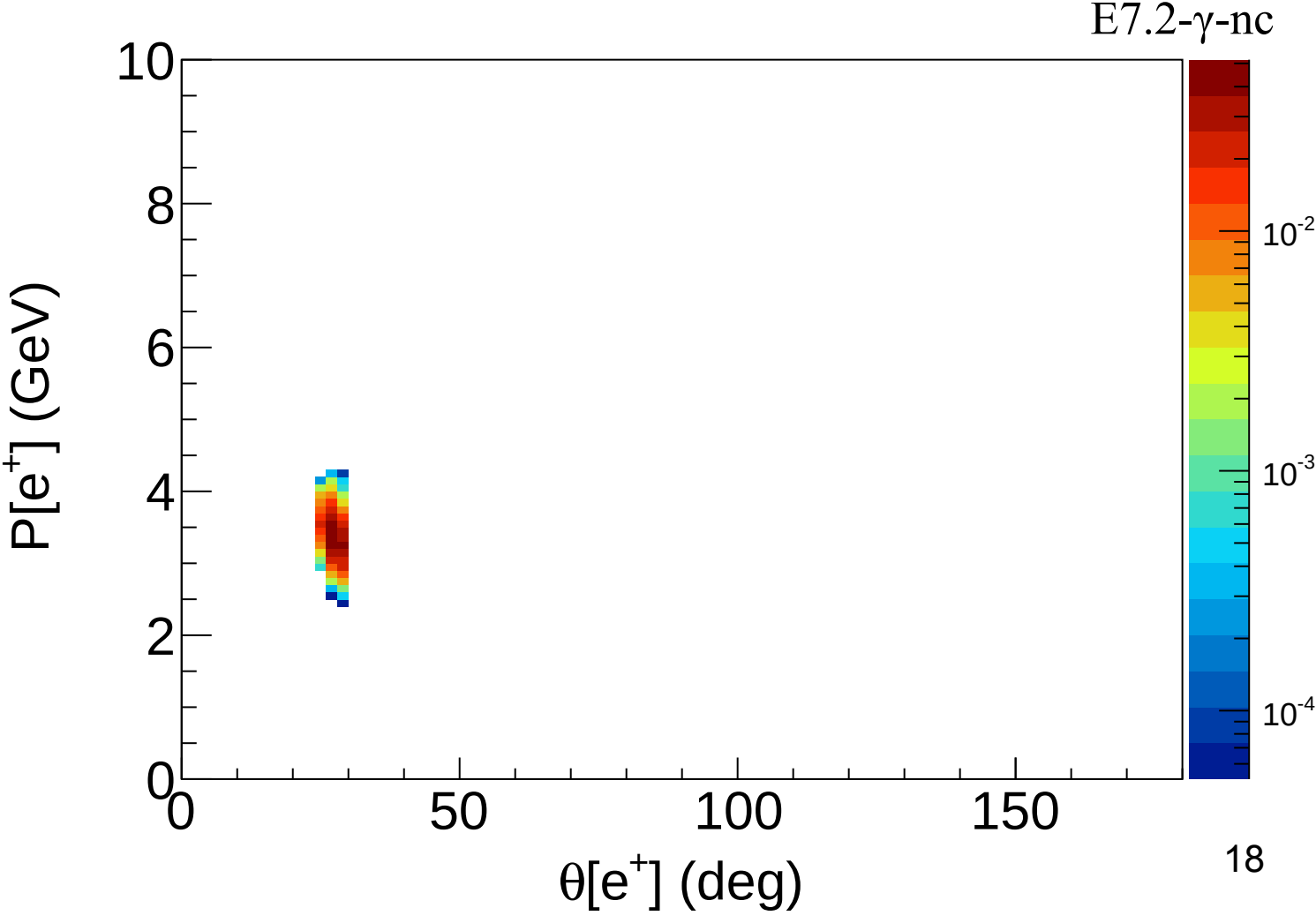

E8.2-γ-c300
P[J/ψ] (GeV)
θ[J/ψ] (deg)
0
2
4
6
8
10
0
50
100
150
1
10-1
10-2
13

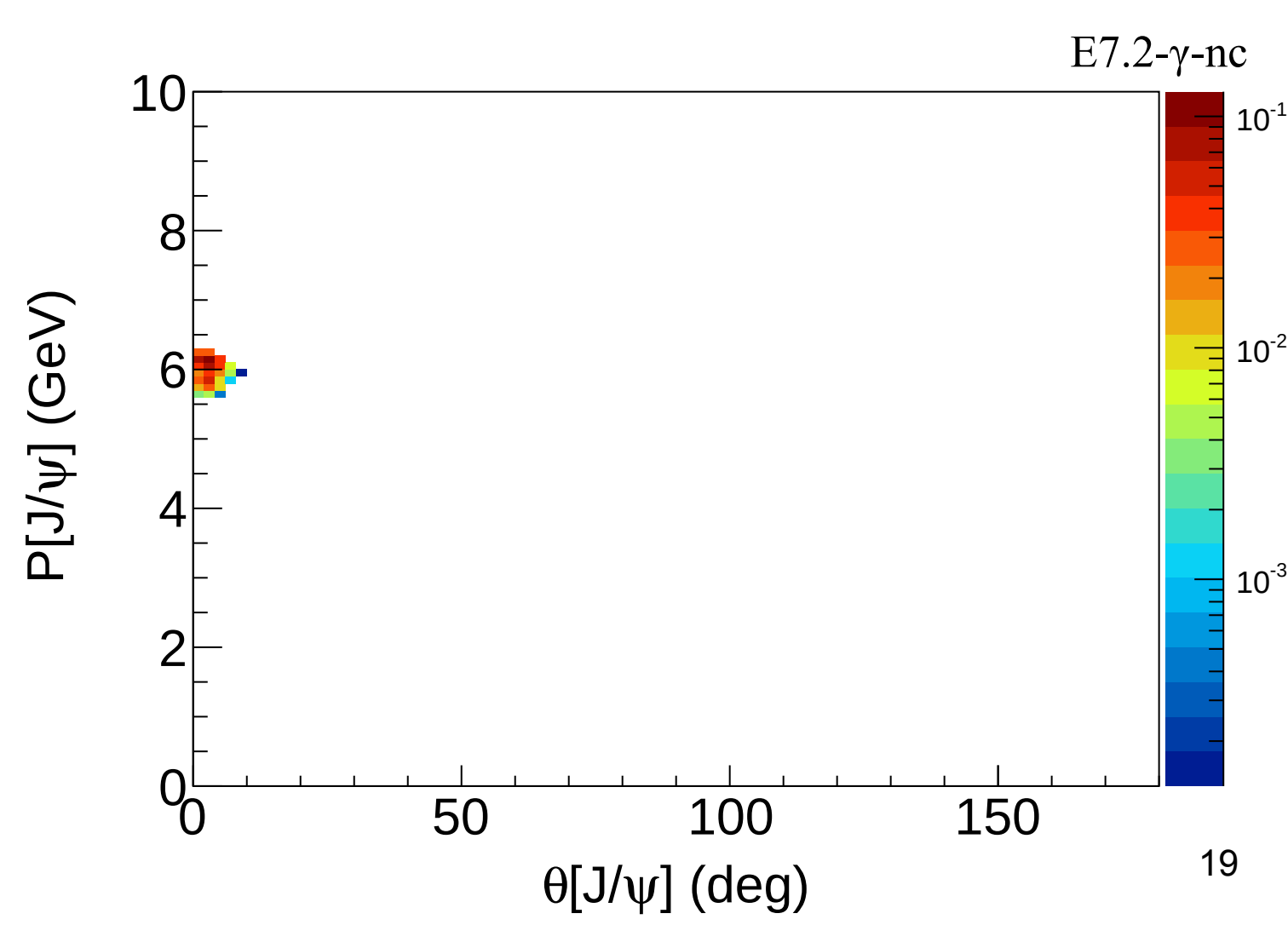

Events / hour
0
1
2
3
4
0
0.2
0.4
0.6
0.8
1
P[p]min (GeV)

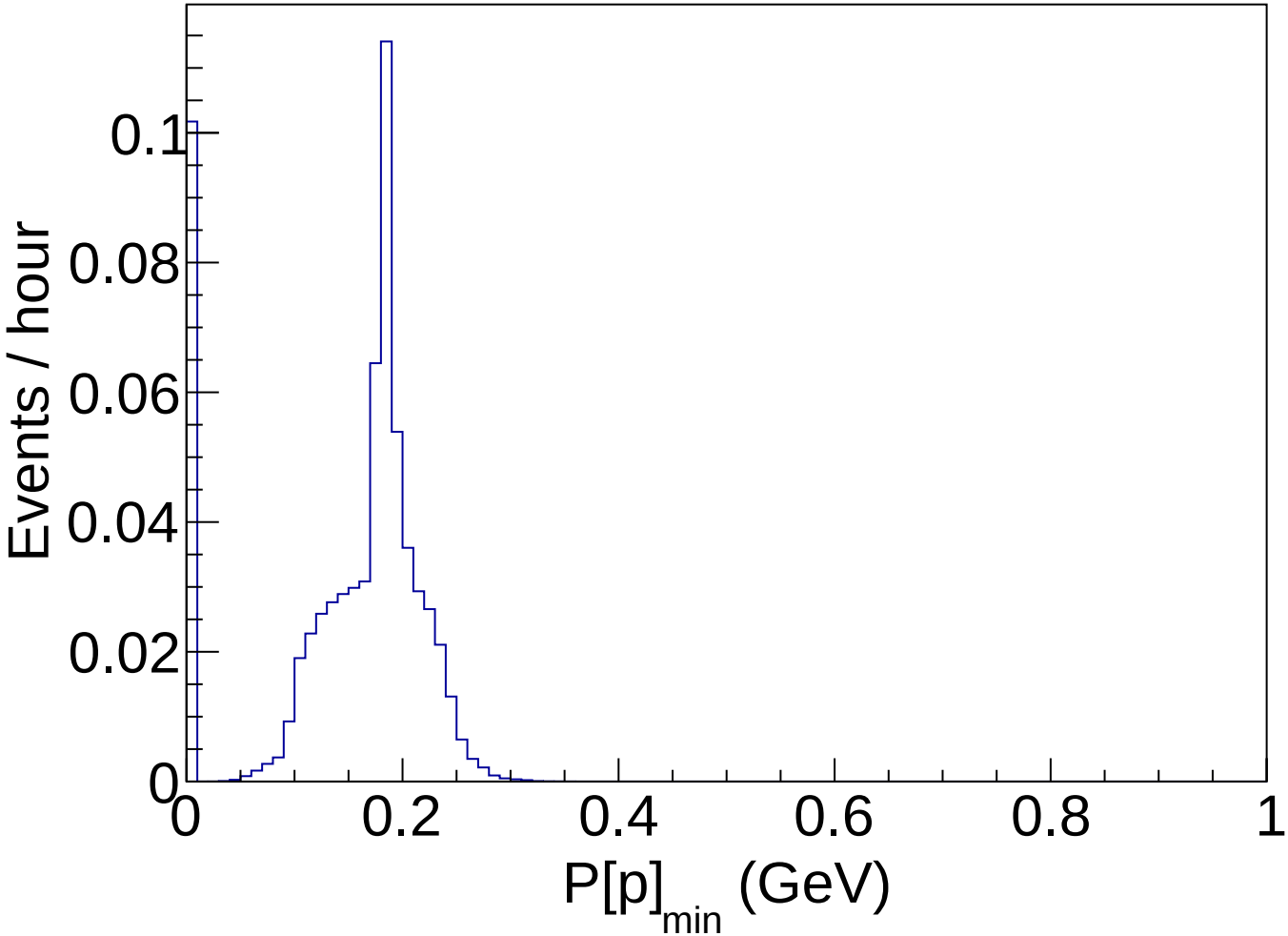

E7.2-γ-nc
Events / hour
0.6
0.4
0.2
0
2.6
2.8
3
3.2
3.4
3.6
M[e+e-] (GeV)

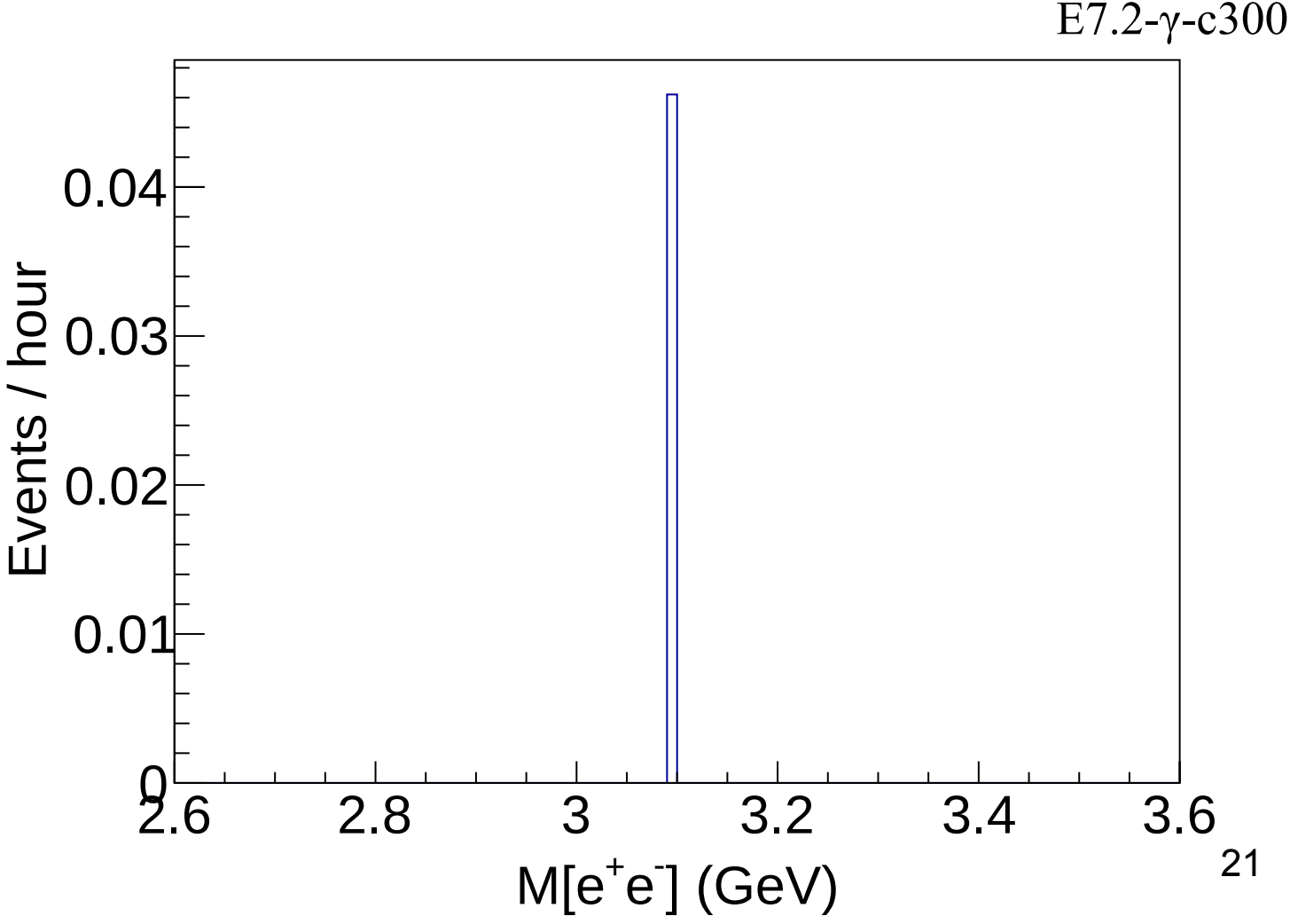

E7.2-γ-nc
P[e⁻] (GeV)
P[e⁺] (GeV)
0
2
4
6
8
10
10⁻²
10⁻³
10⁻⁴
16

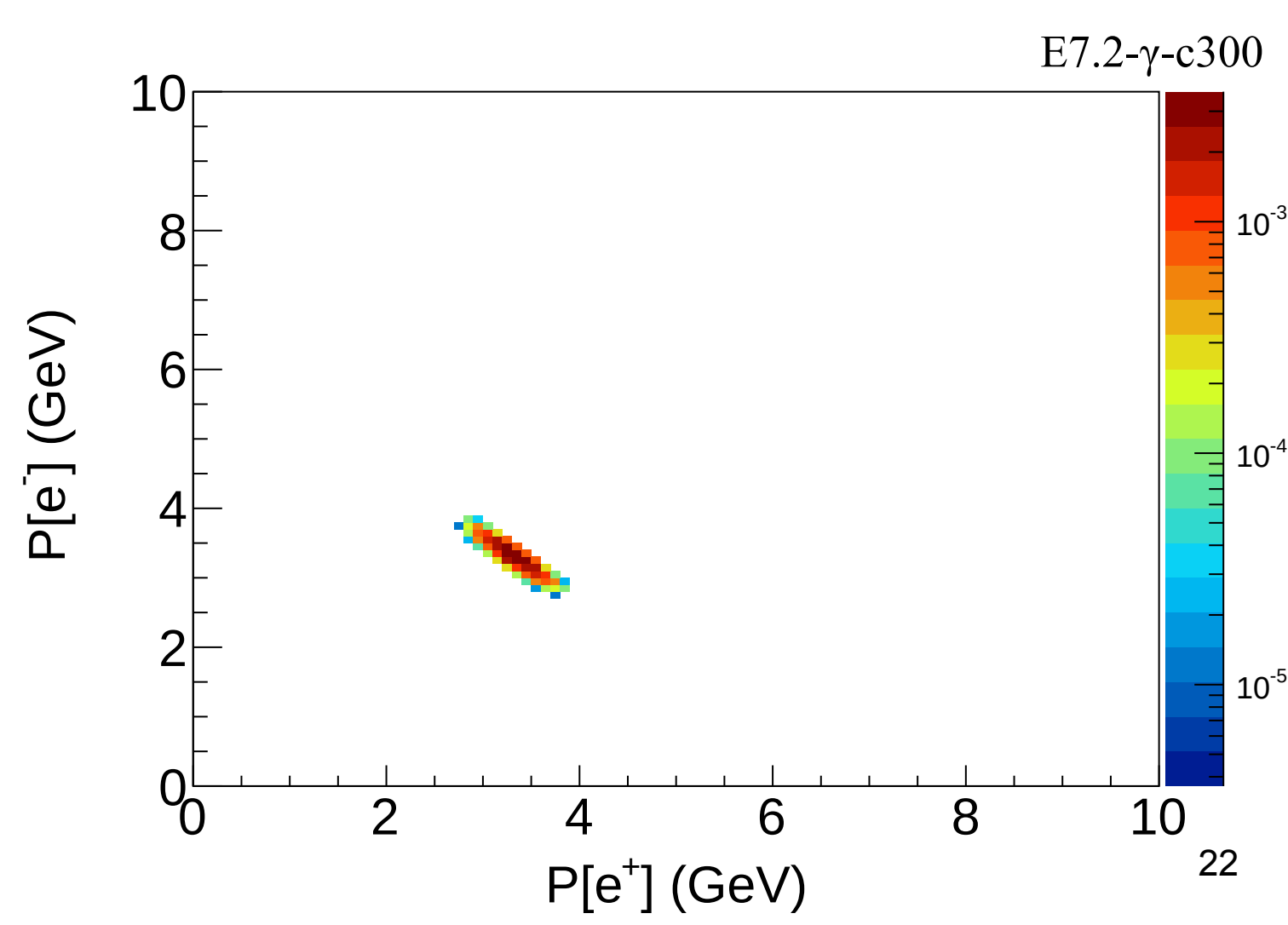

E7.2-γ-nc
10
8
6
4
2
0
0
50
100
150
P[e⁻] (GeV)
θ[e⁻] (deg)
10-2
10-3
10-4
17

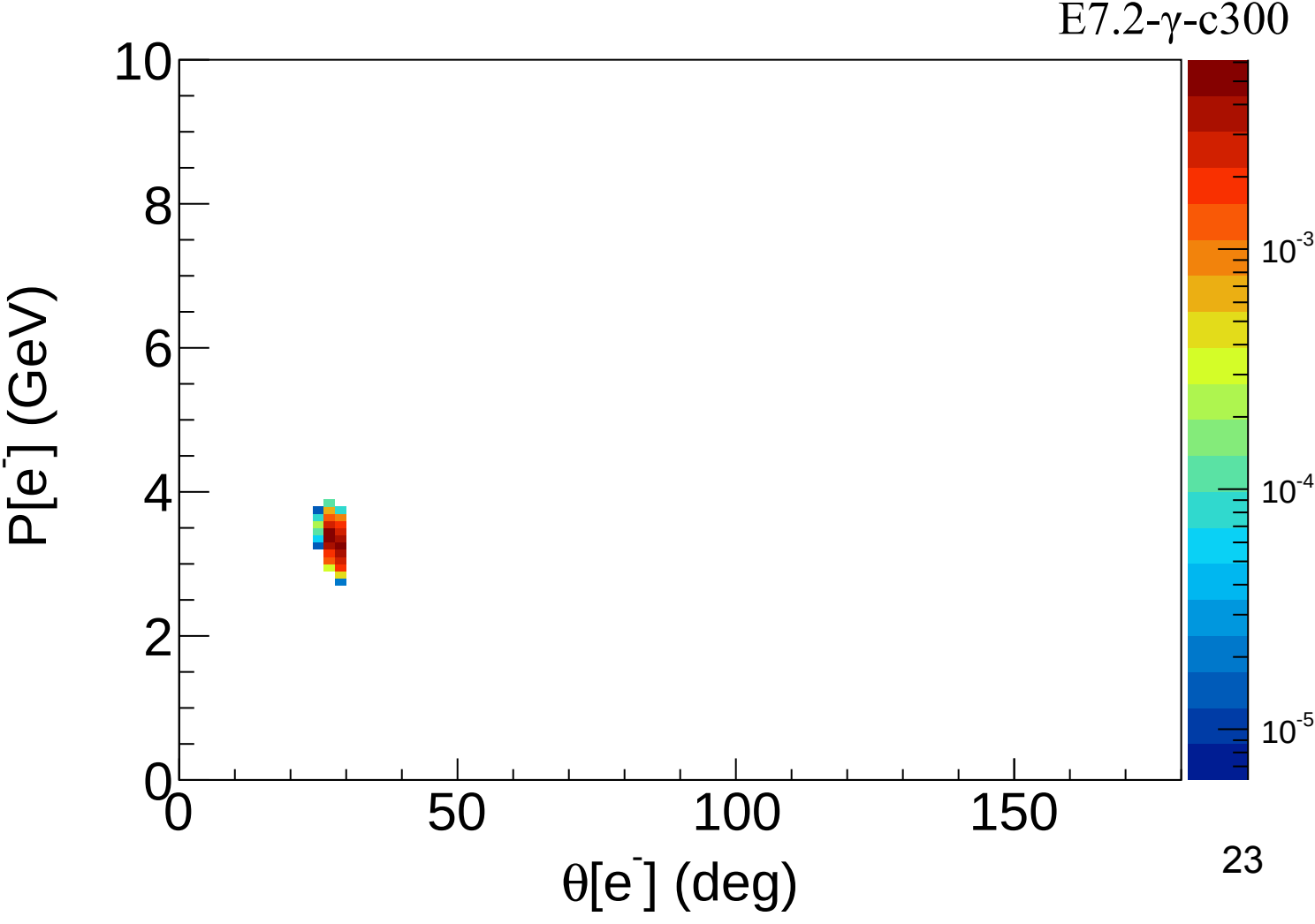

E7.2-γ-nc
P[e+] (GeV)
θ[e+] (deg)
0
2
4
6
8
10
0
50
100
150
10-2
10-3
10-4

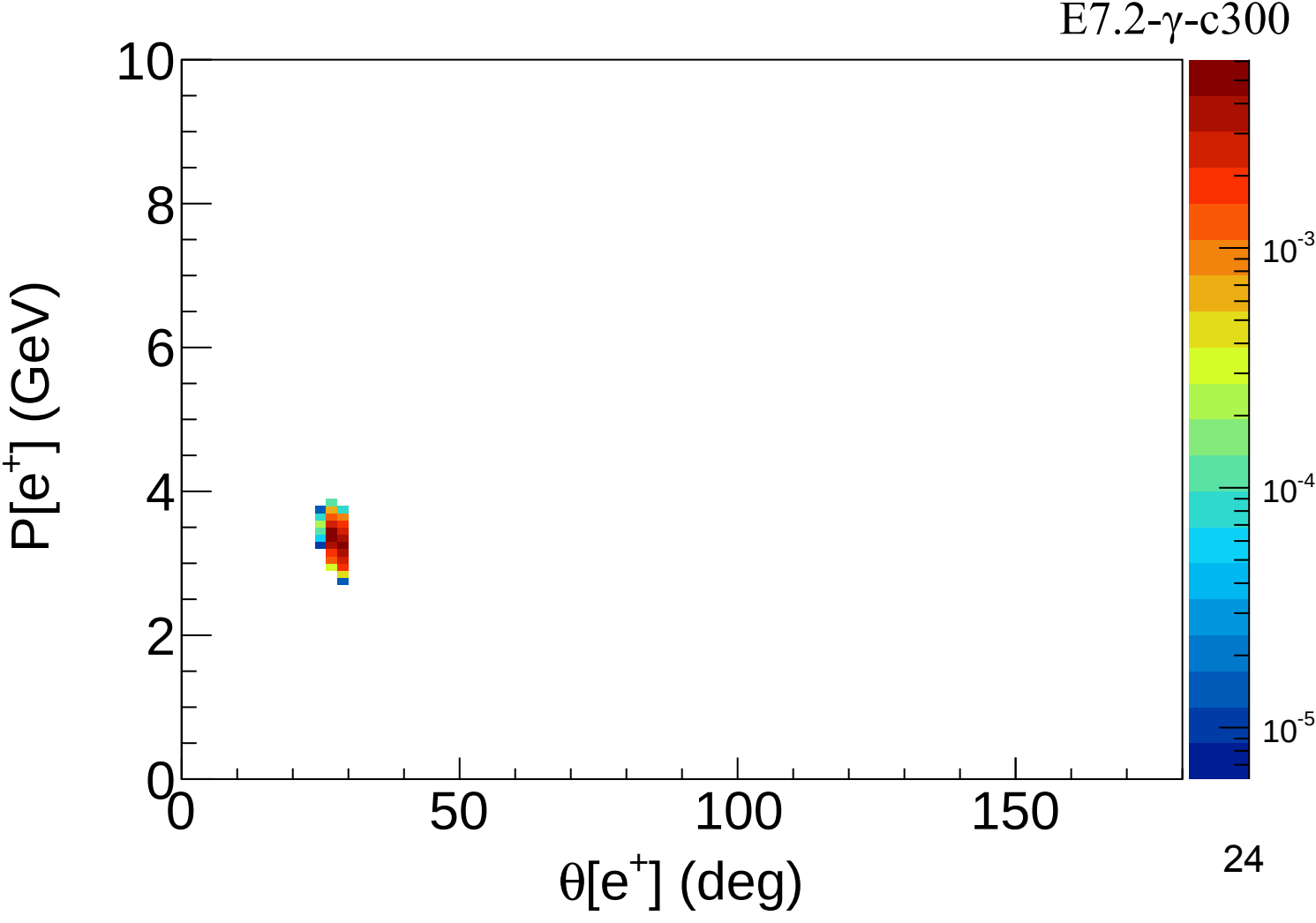

E7.2-γ-nc
P[J/ψ] (GeV)
θ[J/ψ] (deg)
0
2
4
6
8
10
0
50
100
150
10^{-1}
10^{-2}
10^{-3}
19

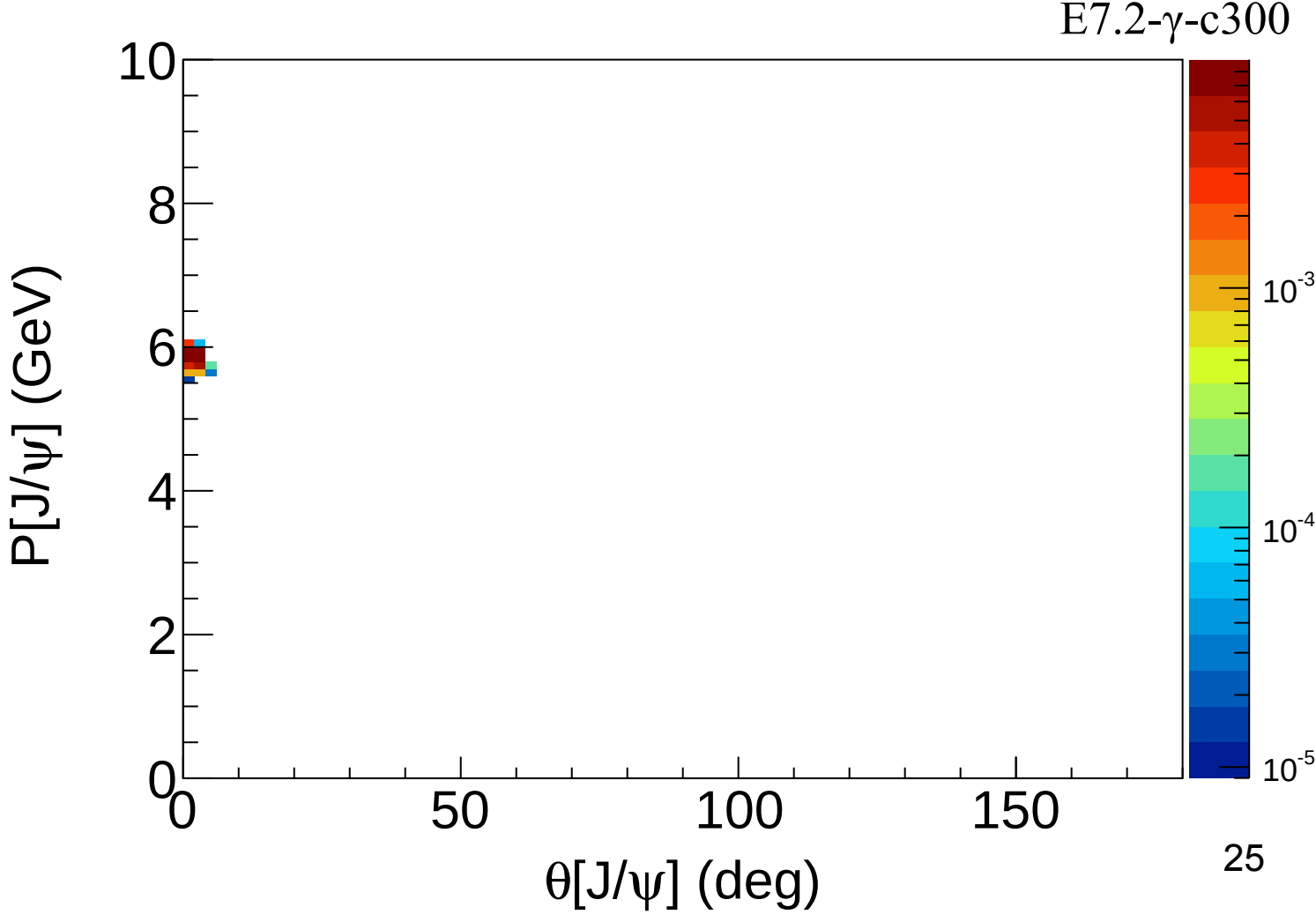

Events / hour
0.1
0.08
0.06
0.04
0.02
0
0
0.2
0.4
0.6
0.8
1
P[p]min (GeV)

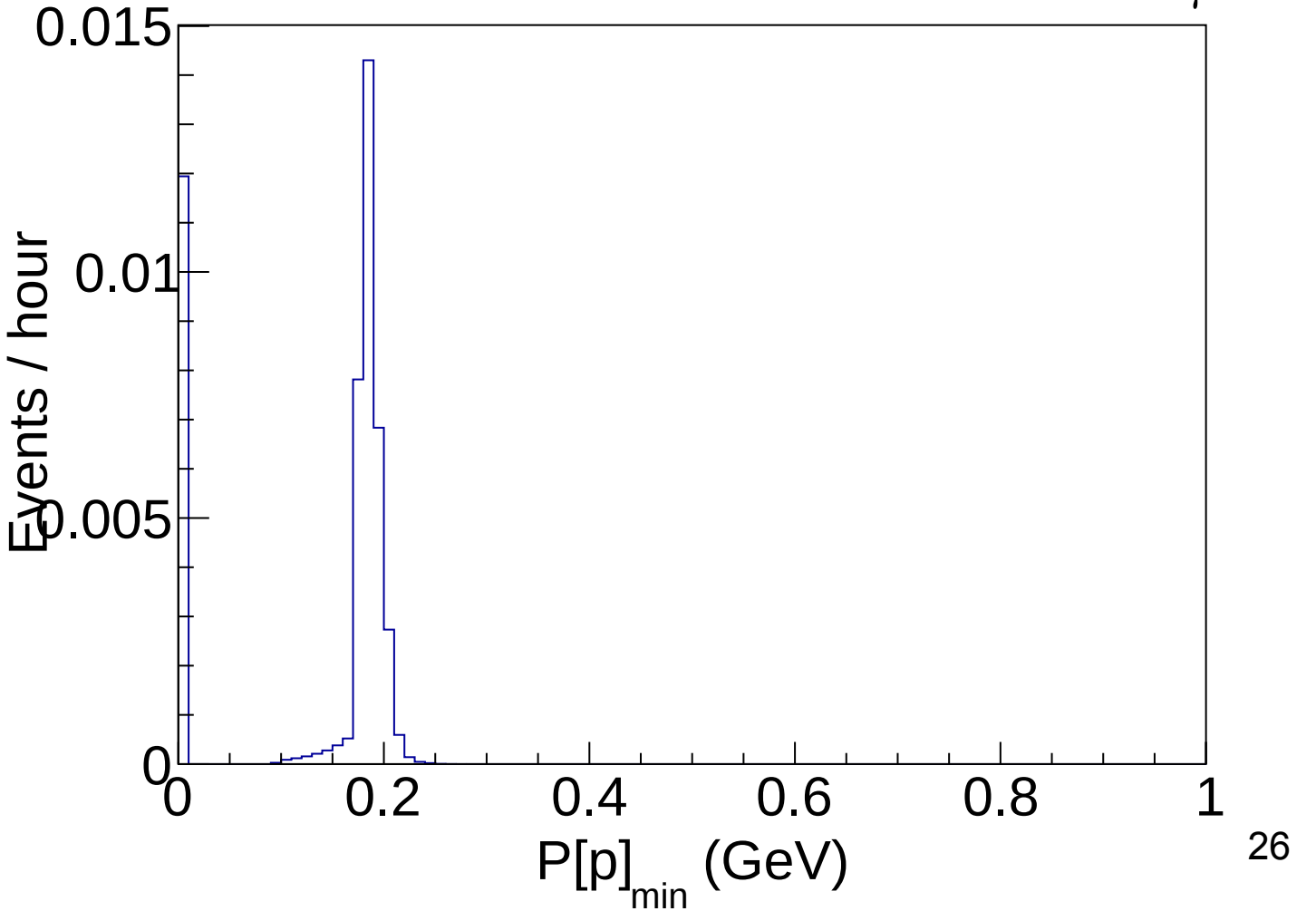

E7.2-γ-c300
Events / hour
0.04
0.03
0.02
0.01
0
2.6
2.8
3
3.2
3.4
3.6
M[e+e-] (GeV)


E7.2-γ-c300
P[e⁻] (GeV)
P[e⁺] (GeV)
0
2
4
6
8
10
10⁻³
10⁻⁴
10⁻⁵
22


E7.2-γ-c300
10
8
6
4
2
0
P[e⁻] (GeV)
0
50
100
150
θ[e⁻] (deg)
10⁻³
10⁻⁴
10⁻⁵
23


E7.2-γ-c300
P[e+] (GeV)
θ[e+] (deg)
0
2
4
6
8
10
0
50
100
150
10-3
10-4
10-5
24


E7.2-γ-c300
P[J/ψ] (GeV)
θ[J/ψ] (deg)
0
2
4
6
8
10
0
50
100
150
10^{-3}
10^{-4}
10^{-5}
25


E7.2-γ-c300
0.015
0.01
0.005
0
Events / hour
0
0.2
0.4
0.6
0.8
1
P[p]min (GeV)