$\tau \to \gamma\mu$ at STCF

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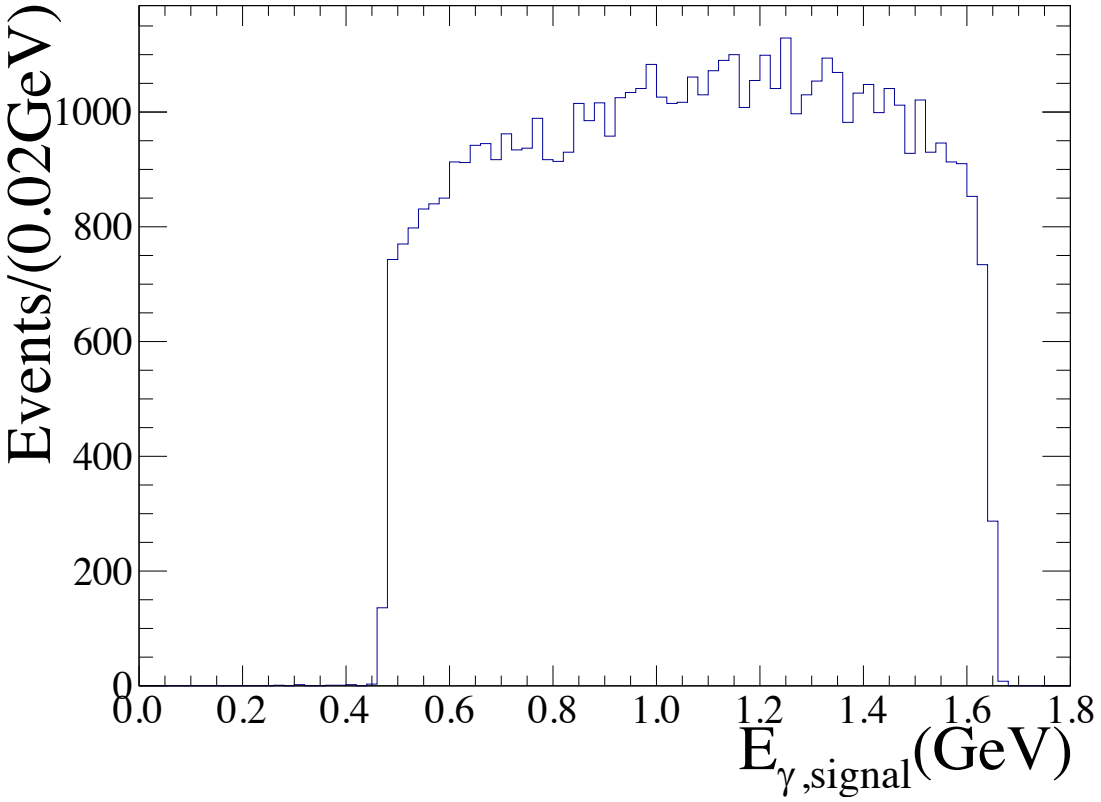
Double Tag

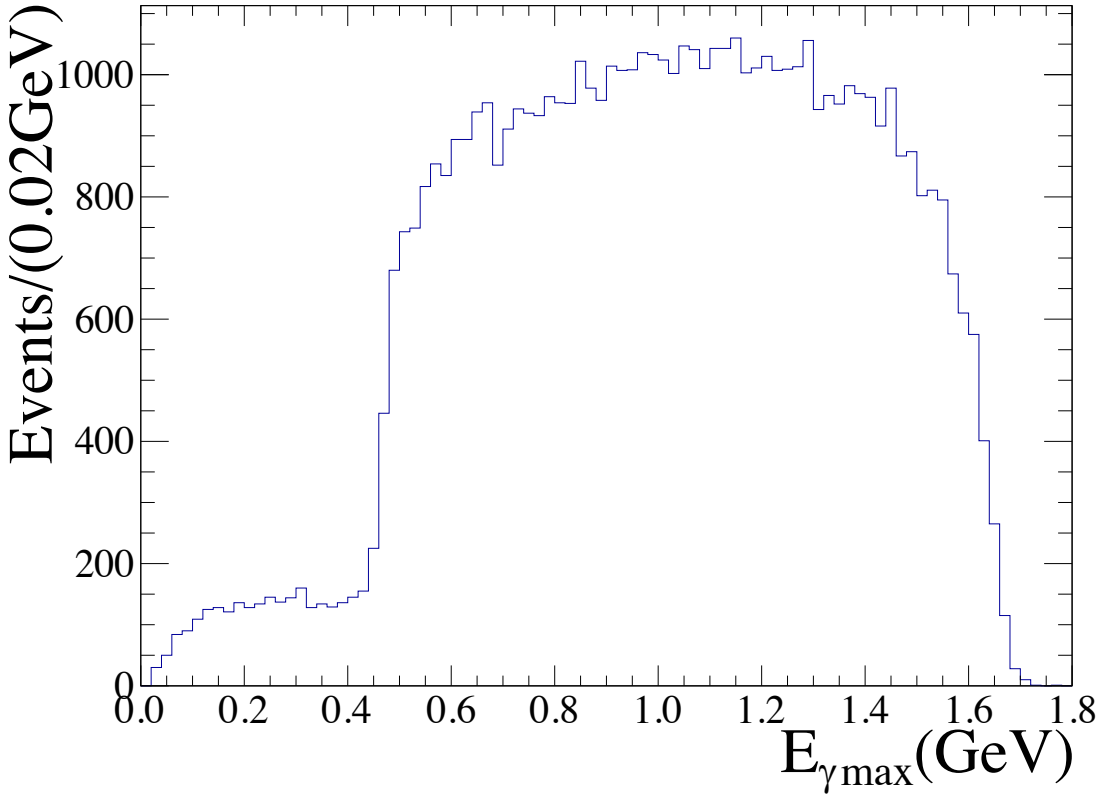
- signal side: tau– –> gamma mu–

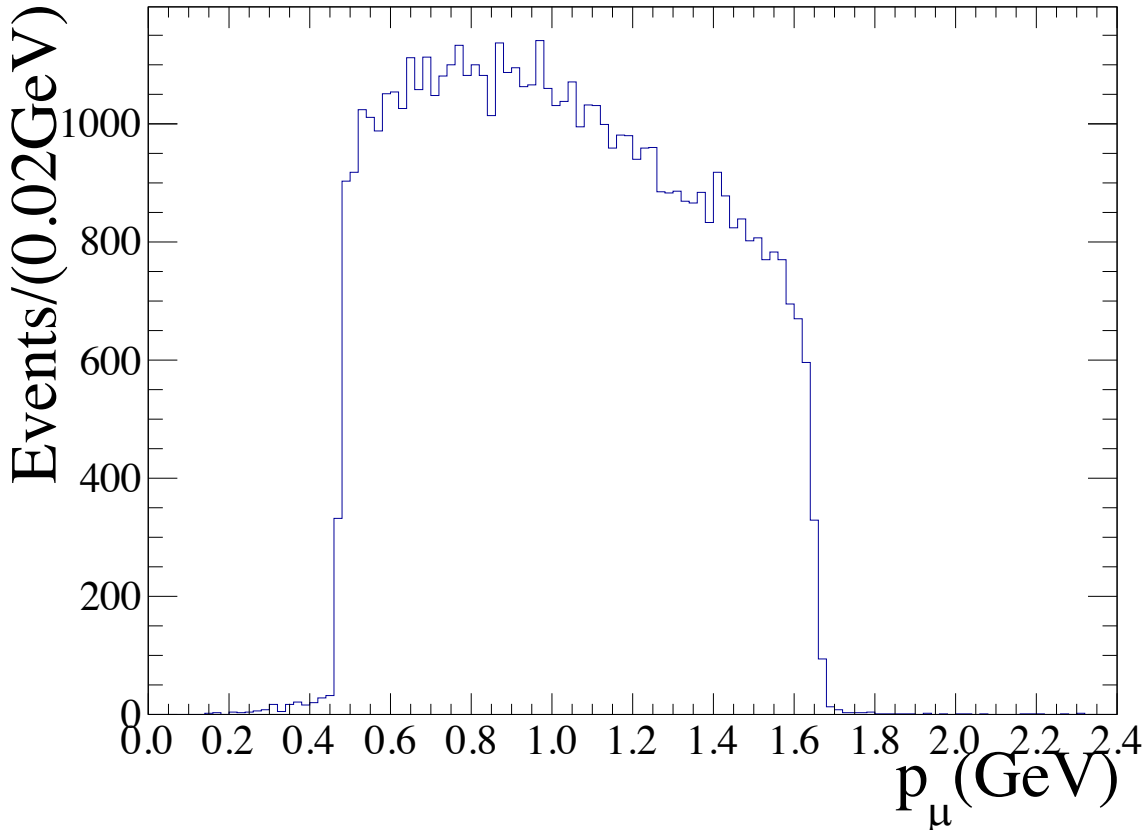
- tag side: tau+
  - `e+  nu_e  anti-nu_tau`
  - `mu+  nu_mu  anti-nu_tau`
  - `pi+  anti-nu_tau`
  - `pi+  pi0  anti-nu_tau`
  - `pi0  pi0  pi+  anti-nu_tau`
  - total tag efficiency ~80%

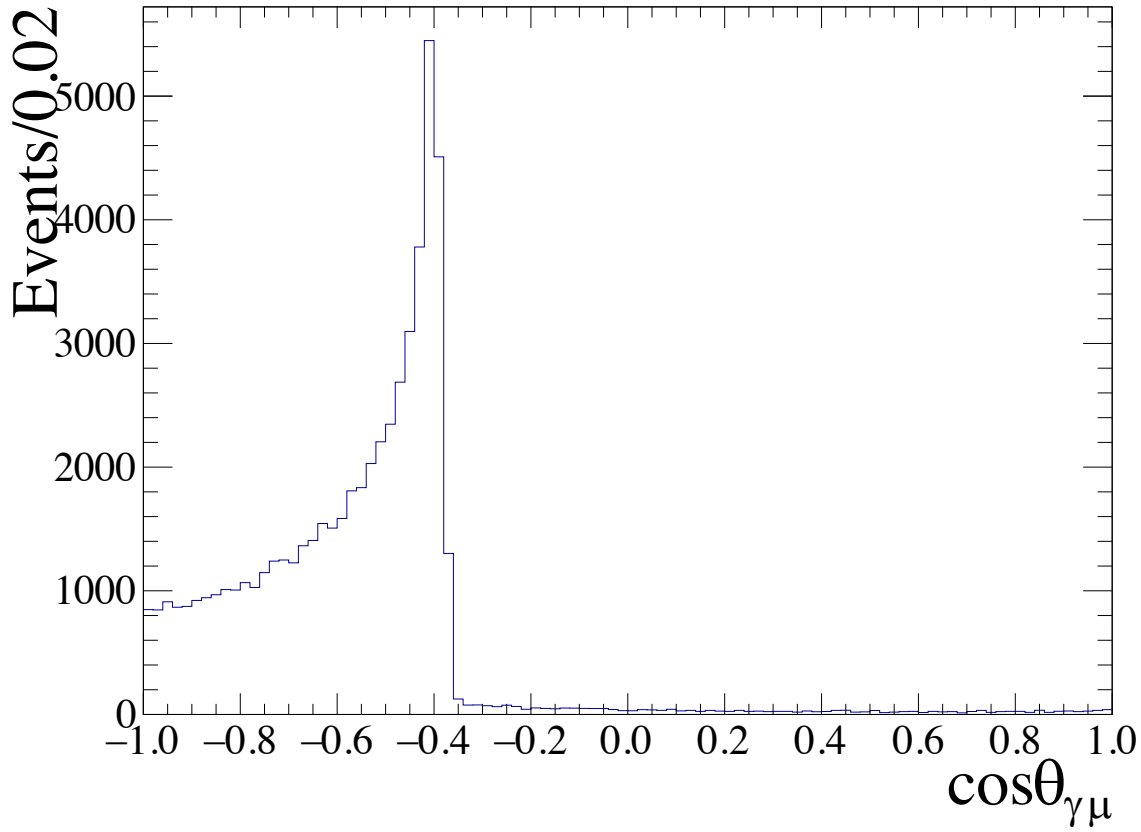
- 根据 e+, mu+, pi+, gamma 数来决定是哪个 tag 道

Gamma


Events/(0.02GeV)
0
200
400
600
800
1000
0.0
0.2
0.4
0.6
0.8
1.0
1.2
1.4
1.6
1.8
$E_{\gamma,signal}$(GeV)

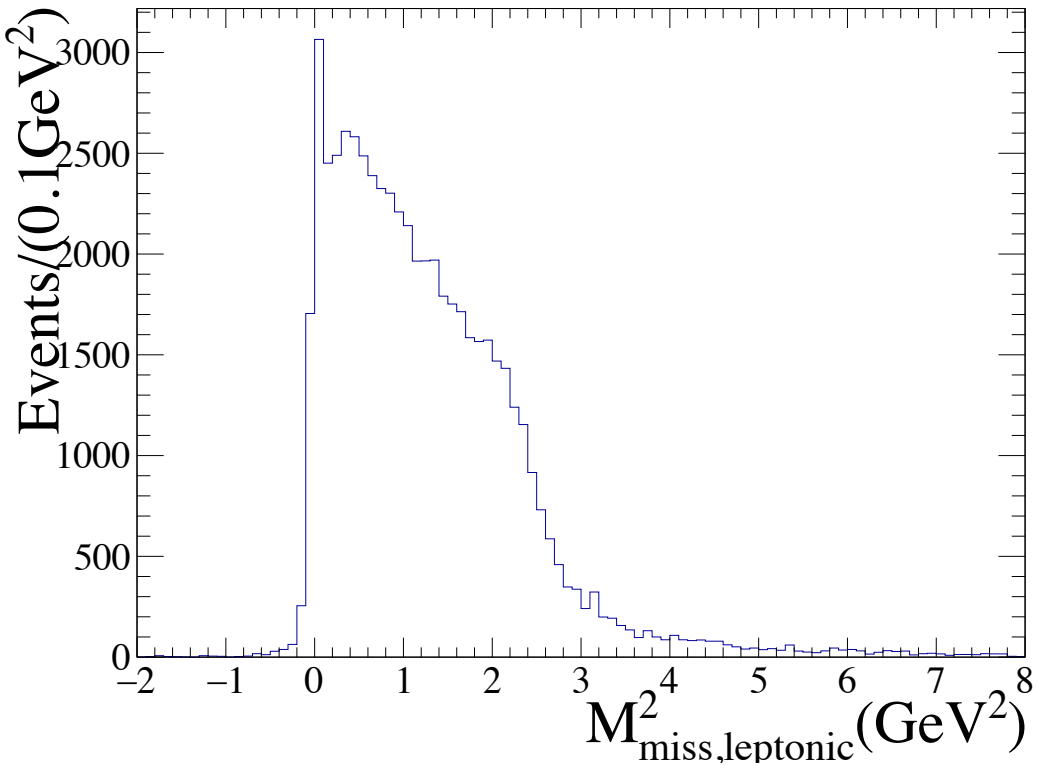

Events/(0.02GeV)
0
200
400
600
800
1000
0.0
0.2
0.4
0.6
0.8
1.0
1.2
1.4
1.6
1.8
$E_{\gamma max}$(GeV)

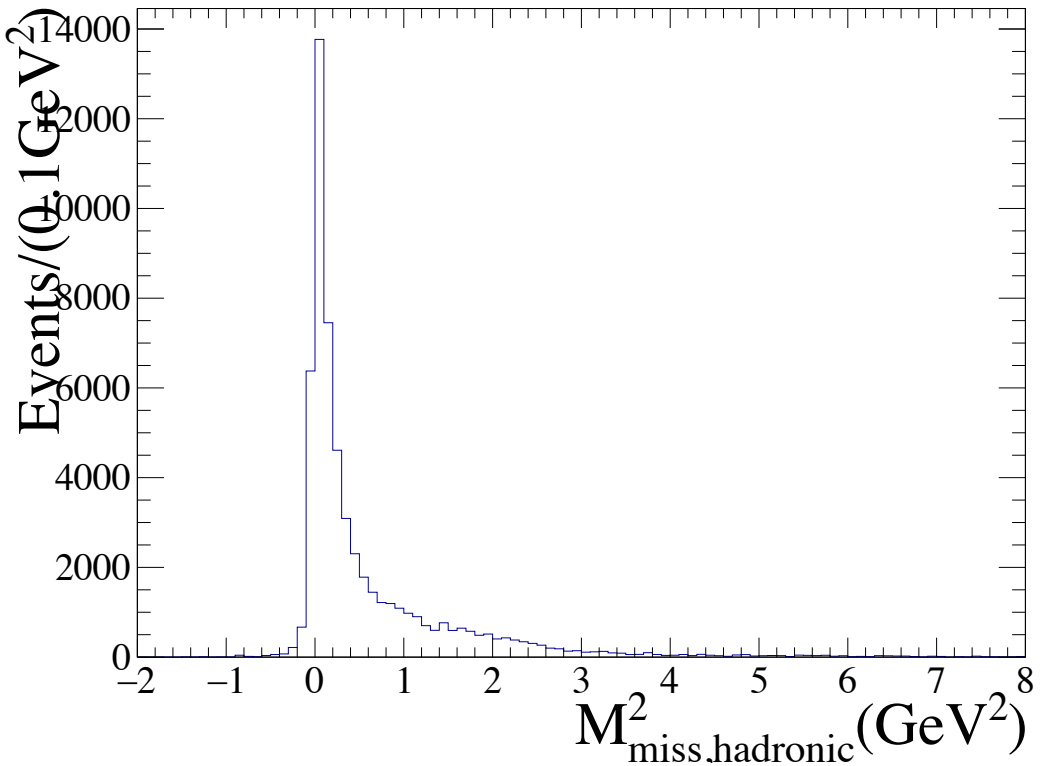


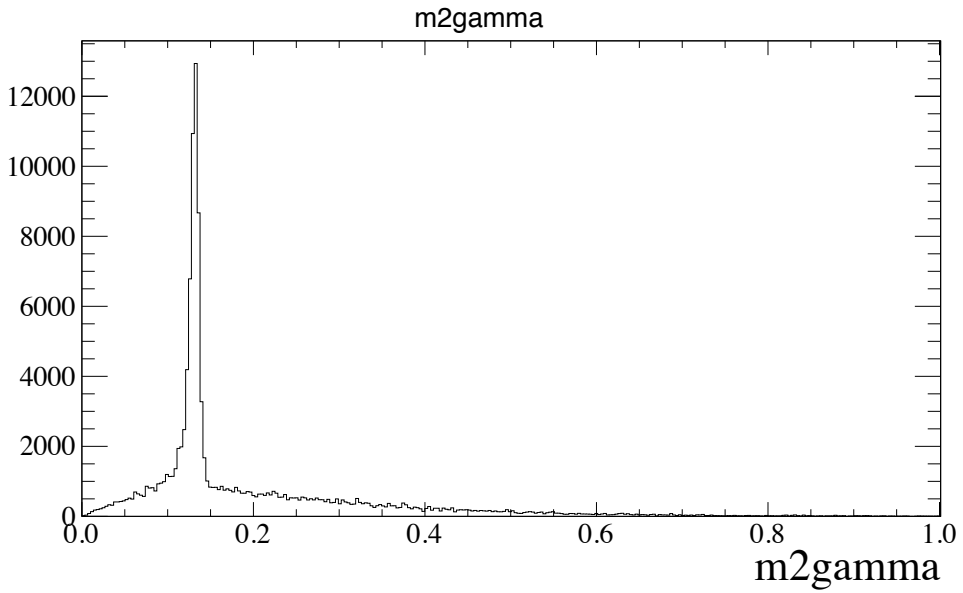


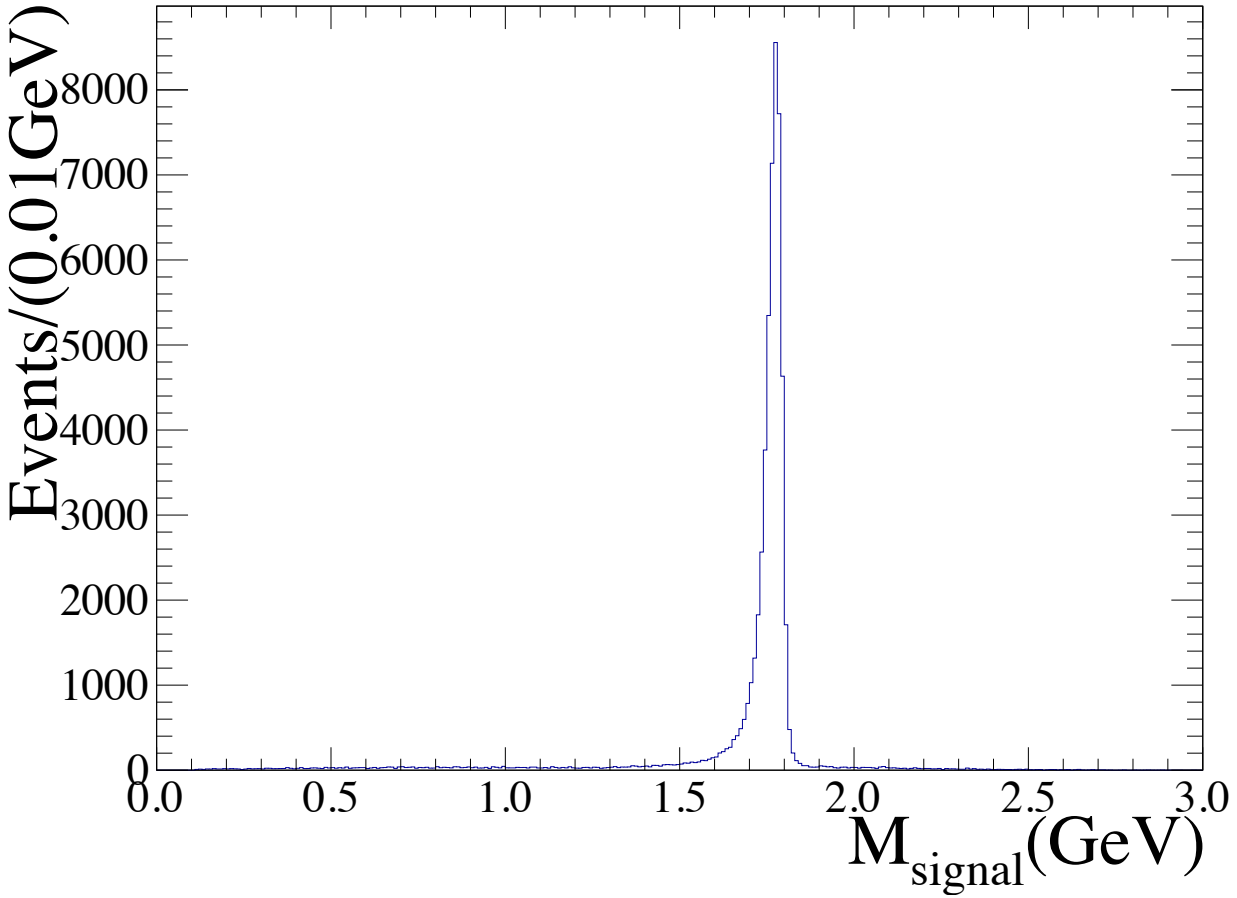
agree with kinematic calculation

M_{miss}^2

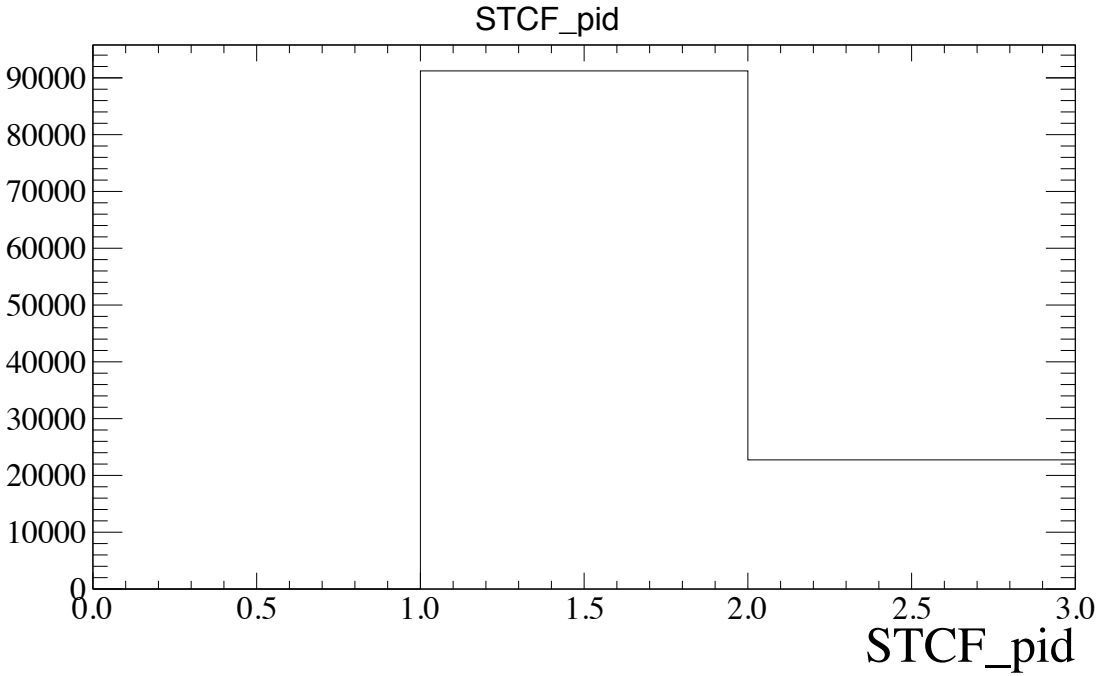

Events/(0.1GeV^2)
3000
2500
2000
1500
1000
500
0
−2
−1
0
1
2
3
4
5
6
7
8
$M^2_{miss,leptonic}$(GeV^2)

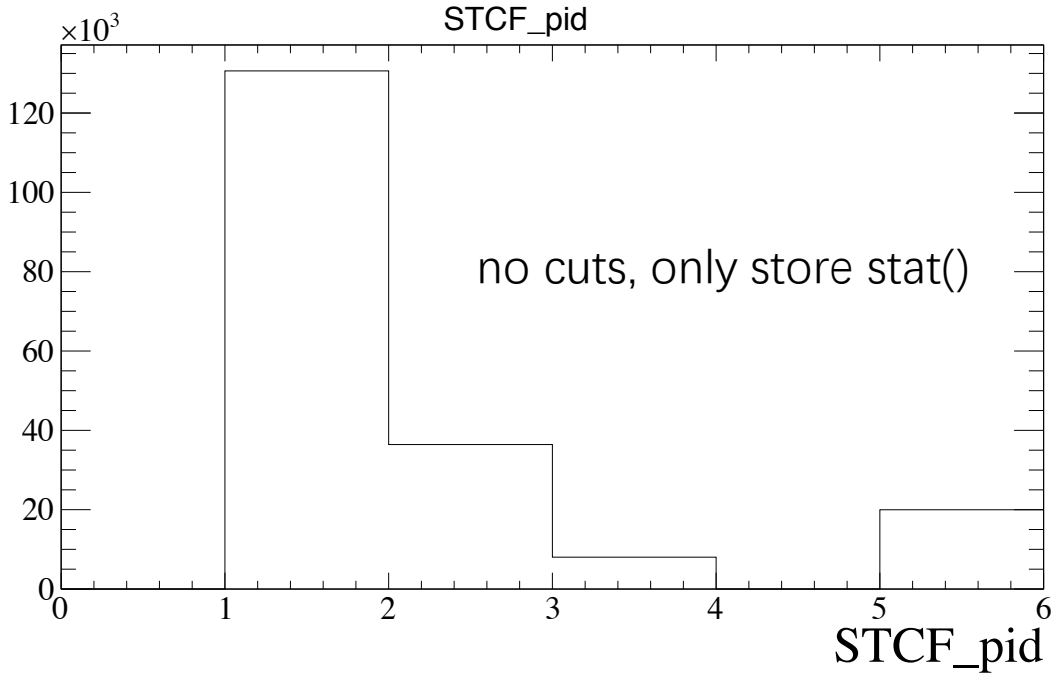

Events/(0.1GeV^2)
14000
12000
10000
8000
6000
4000
2000
0
−2
−1
0
1
2
3
4
5
6
7
8
$M^2_{miss,hadronic}$(GeV^2)


m2gamma
12000
10000
8000
6000
4000
2000
0
0.0
0.2
0.4
0.6
0.8
1.0
m2gamma


Events/(0.01GeV)
8000
7000
6000
5000
4000
3000
2000
1000
0
0.0
0.5
1.0
1.5
2.0
2.5
3.0
M_signal(GeV)

A problem: no e?





Efficiency

- total: 100000
- efficiency: 57.6%

- preliminary result, with very simple selection criteria

Next to do

- Solve the missing electron problem
- Run inclusive MC and optimize selection criteria
- Adjust detector performance scale factors (especially mu/pi pid)