Electron End Cap EMCalorimeter progress

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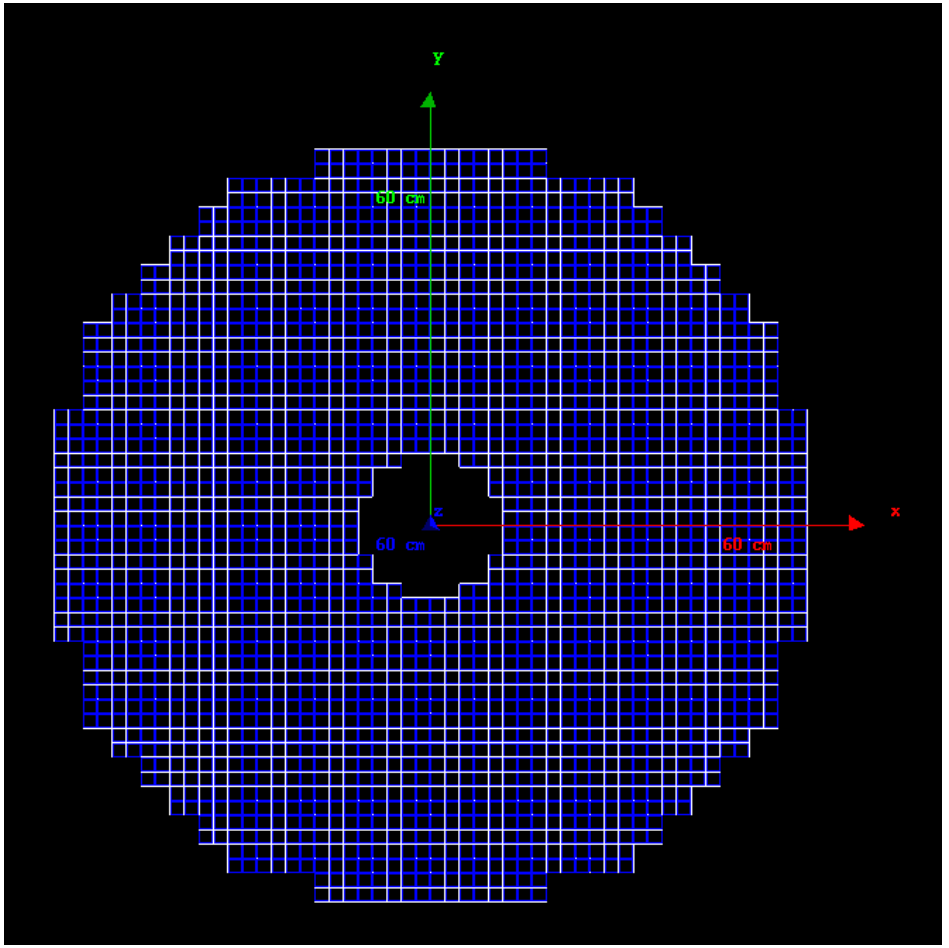
EEMC configuration

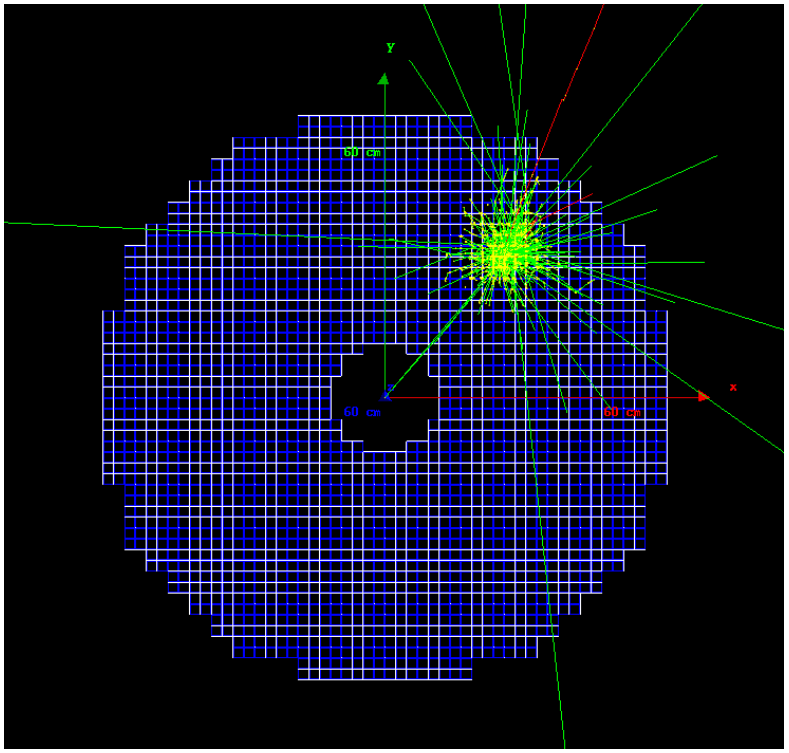


	Inner
Scin material	lead tungsten
Dimension[cm]	1.8 x 1.8 x 20
pe per GeV	15000
tower shell[cm]	0.1
Inner R[cm]	10
Outer R[cm]	53
eta range	-3.64 ~ -1.99
z range[cm]	-190 ~ -210
N towers	2112

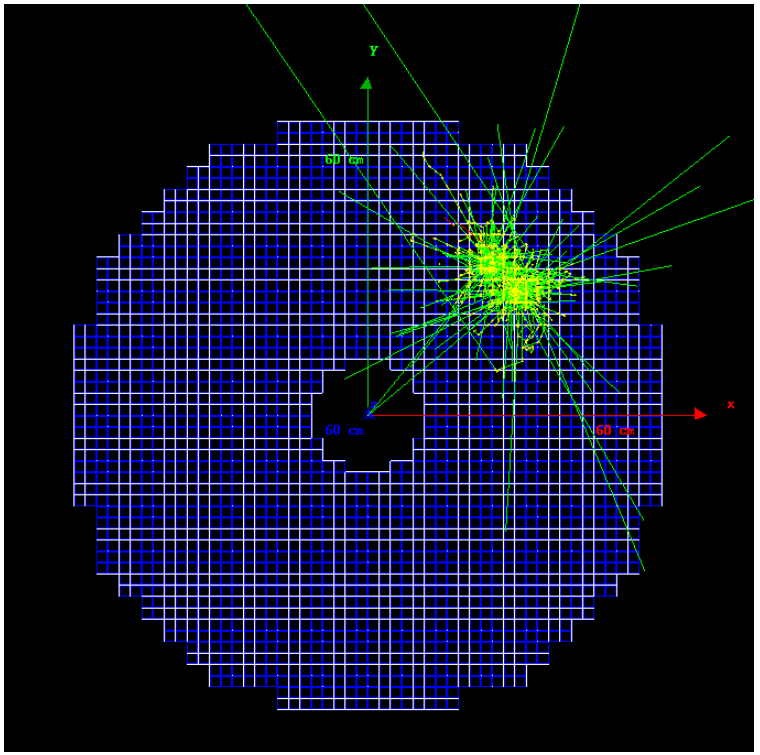
Close events separation

- pi0 -> g + g (Br: 0.988)
- run pure photons pairs
  to study the separation ability

```
/particle/select pi0
/particle/property/decay/dump 1
G4DecayTable:  pi0
0:  BR:  0.988  [Phase Space]   :   gamma gamma
1:  BR:  0.012  [Dalitz Decay]   :   gamma e- e+
```

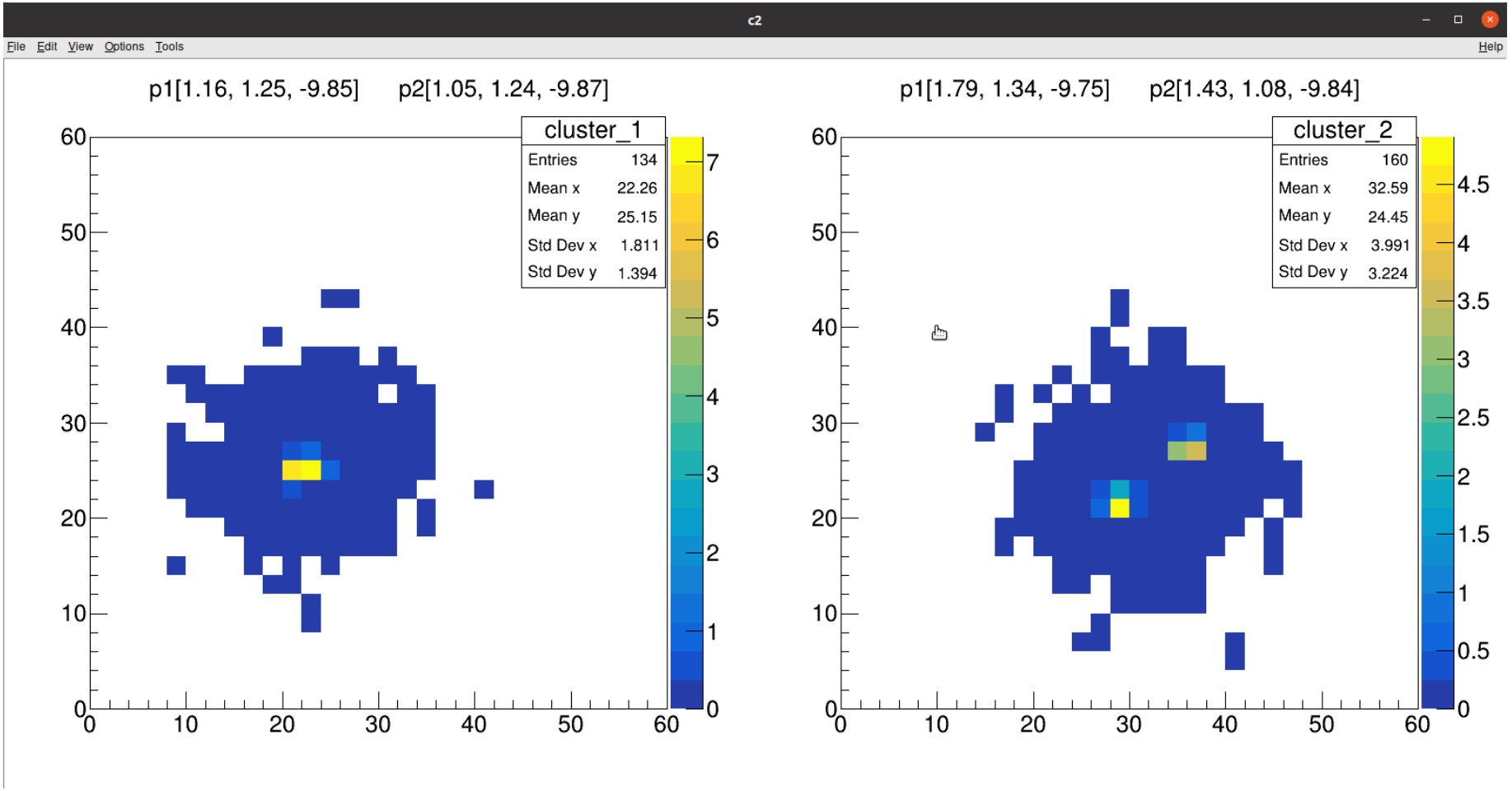


very close



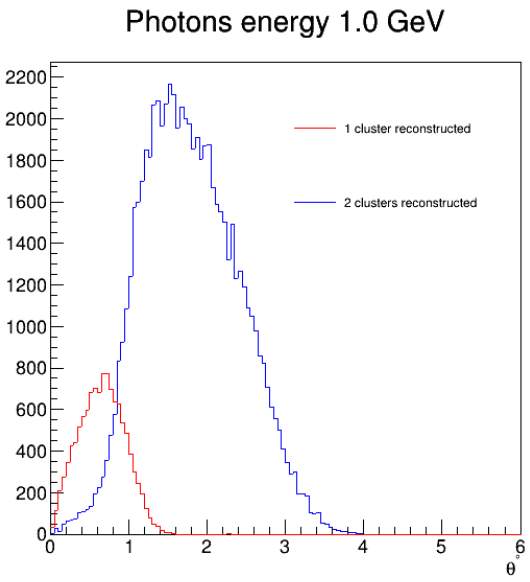
separated

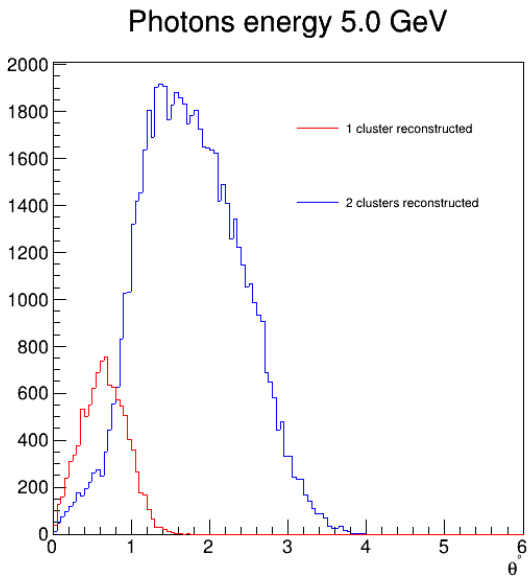
Close events separation

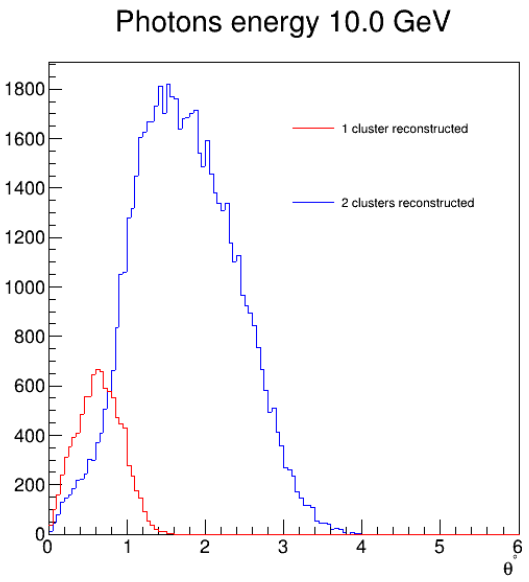


Close events separation

- 3 different E photons pair: [1,1], [5, 5], [10, 10] GeV
- 3 different mixed E photons pair: [1,10], [5, 10], [10, 10] GeV
- Separation efficiency:
  #(2 clusters events) / #total events



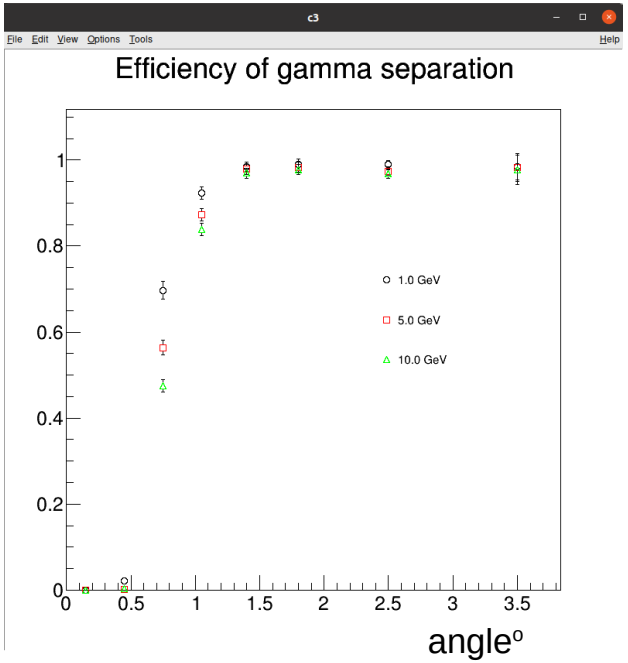


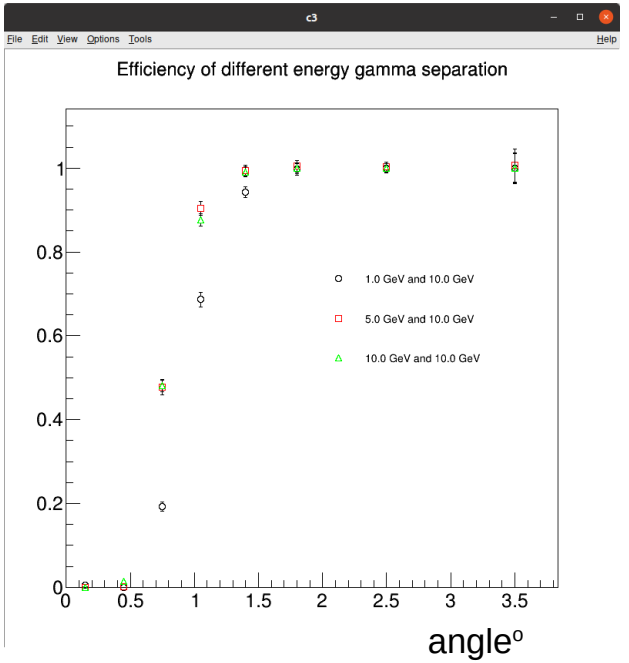


Close events separation

- Regardless energy, the separation efficiency reach 100% after 1.2° (~4cm)
- lower energy has better separation than higher energy in small angle case, since the smaller size of cluster.

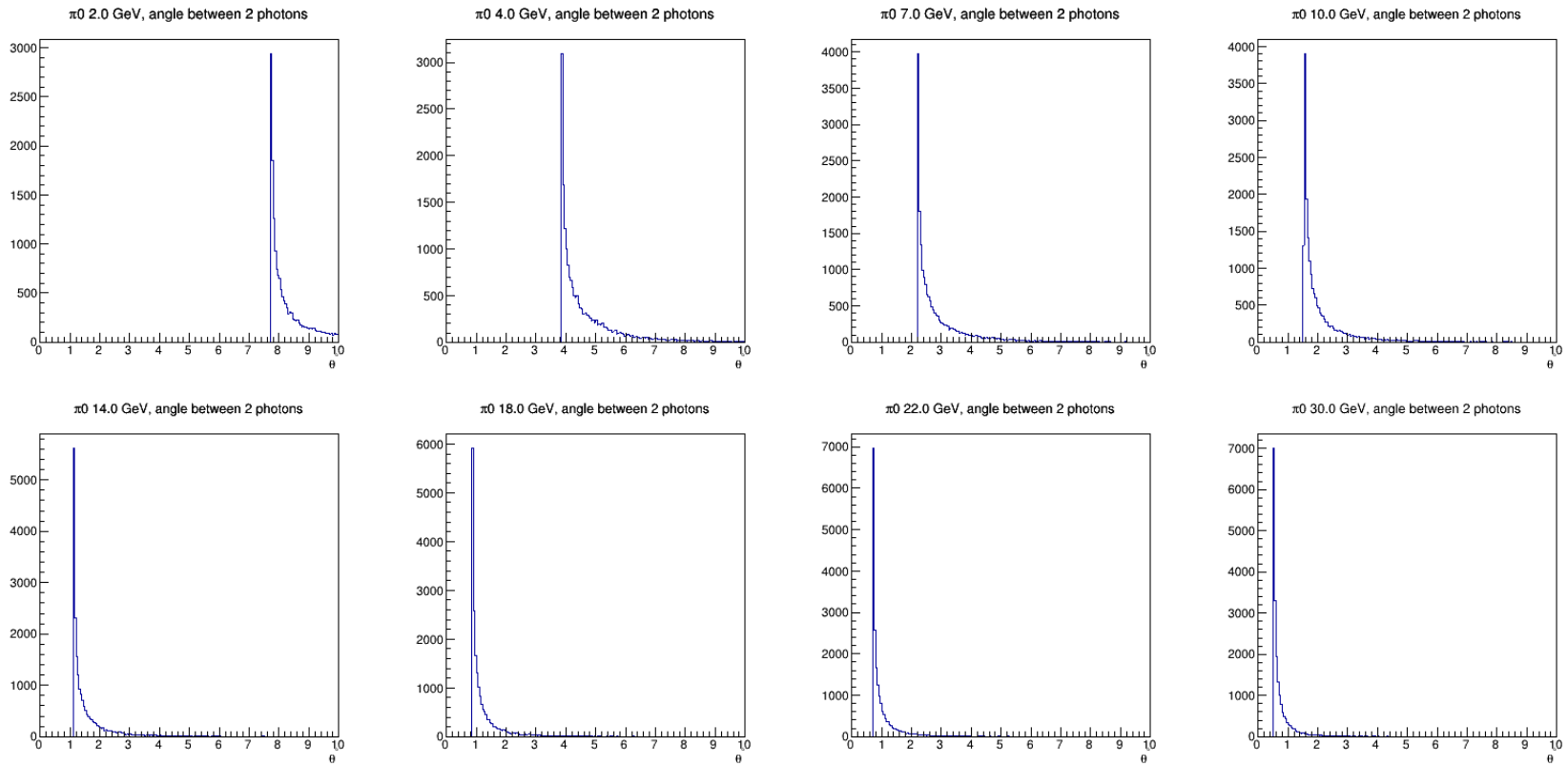
- Mixed Energy case reach ~100% efficiency after 1.2° (~4cm)
- Huge energy difference(1 and 10 GeV case) has worse separation in small angle case.





pi0 generator

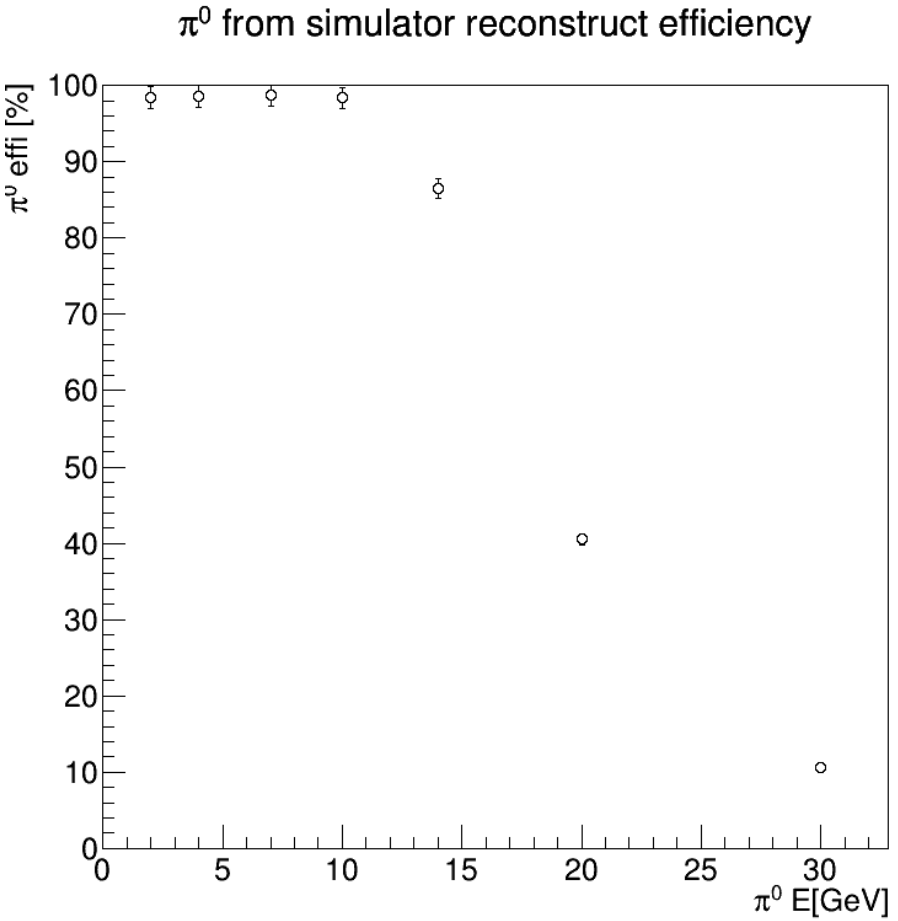
- Simulate pi0->2g and make sure both photons can hit good region of End-cap, not too close to the edge.



The angle between 2 photons

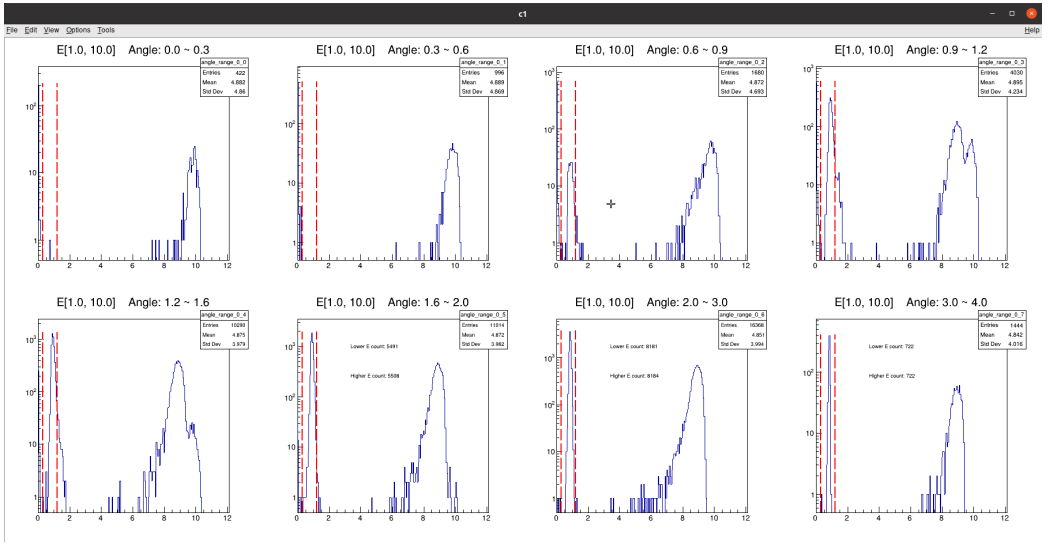
pi0 efficiency

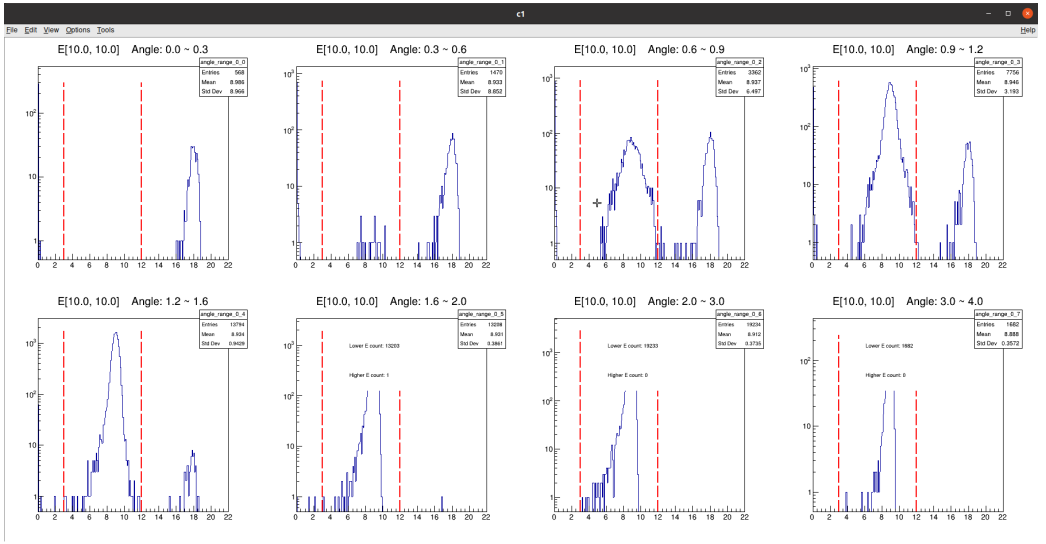
- 2 ~ 30 GeV given energy pi0
- pi0 efficiency:
  #(2 clusters events) / #events pass the cuts
- efficiency isn't 100% in 2 ~ 10 GeV bin, because photon energy are so small that is indistinguishable from the noise in few cases, like
  2GeV (pi0) -> 1.9 + 0.1 GeV (gg)
- Efficiency start decreasing as angle between 2 photons getting smaller after 10GeV (pi0 E become larger)



Backup

- Mix energy cases.





Backup

- Energy cut