Pi0 work update

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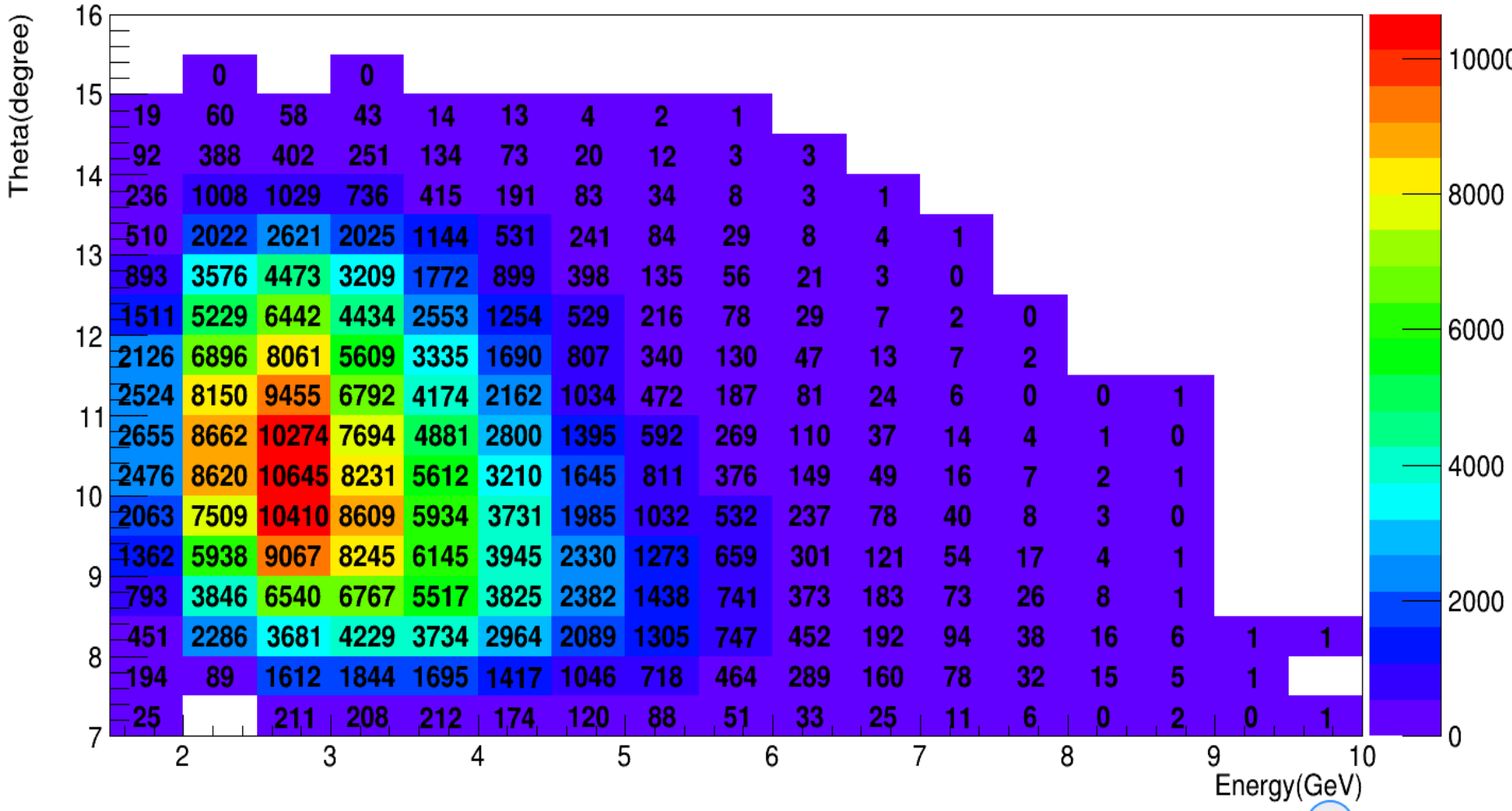
11GeV configuration: kin484

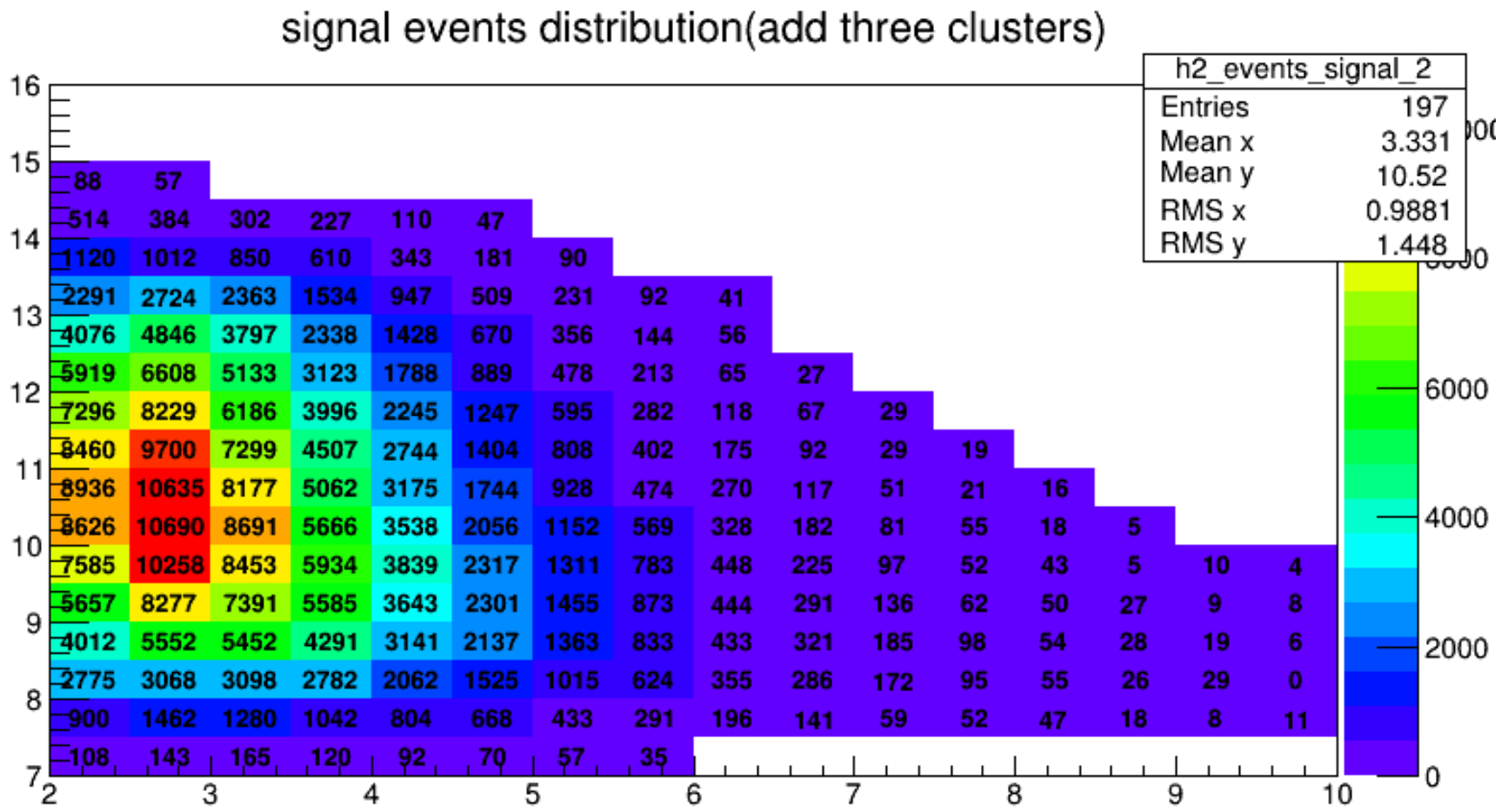
Pi0 events in data distribution(up+LH2+down target)

Run Setting:

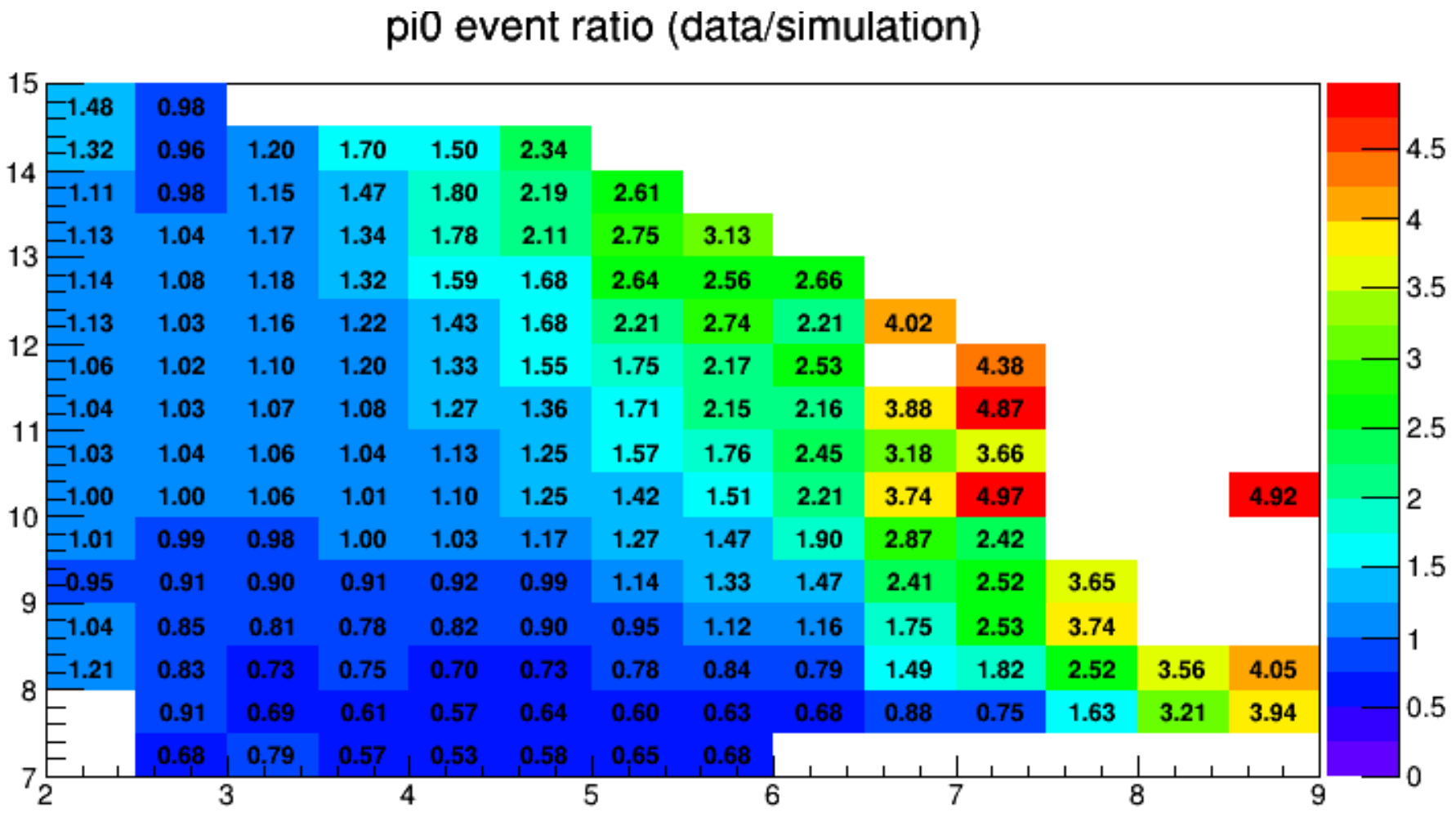
- 11GeV electron beam
- Calorimeter central angle 0.1720
- Distance to target: 2.5m



11GeV pi0 events distribution from run data



Ratio of Pi0 Events in data compared to simulation

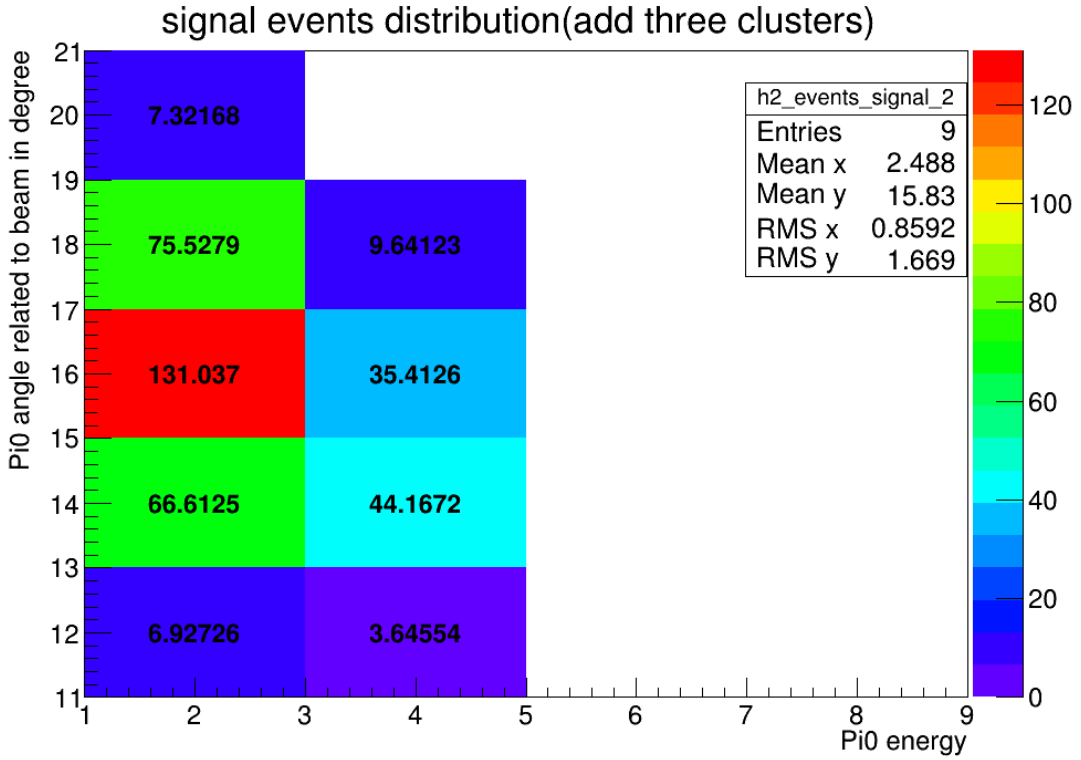


Dummy target data

- Dummy target run only exist in kin482 configuration(8.8GeV)
- Total events in data file: 227k
- Events after selection cut: 81k
- For the data/simulation analysis, all the bremsstrahlung photon created from the upstream window will hit the downstream window, although 15cm gap between two windows

- This work will be adapted to new simulation method and get the result soon. Previous dummy target analysis result shows the pi0 cross section from Al is similar from proton, however, statistic error is large.

Pi0 events distribution from dummy run



Systematic error need to be considered

Error from general event and other cut

- LHRS: LHRS should never influence the inclusive pi0 event (checked, small influence)
  - Vertex cut
  - Electron/pion cut
- Beam:
  - Current/Charge(use DVCS result, charge measurement error)
  - Influence of low current event(low current event is cut in analysis, sometimes it means unstable/worse beam)
- Target:
  - Target vertex uncertainty
  - Target window influence

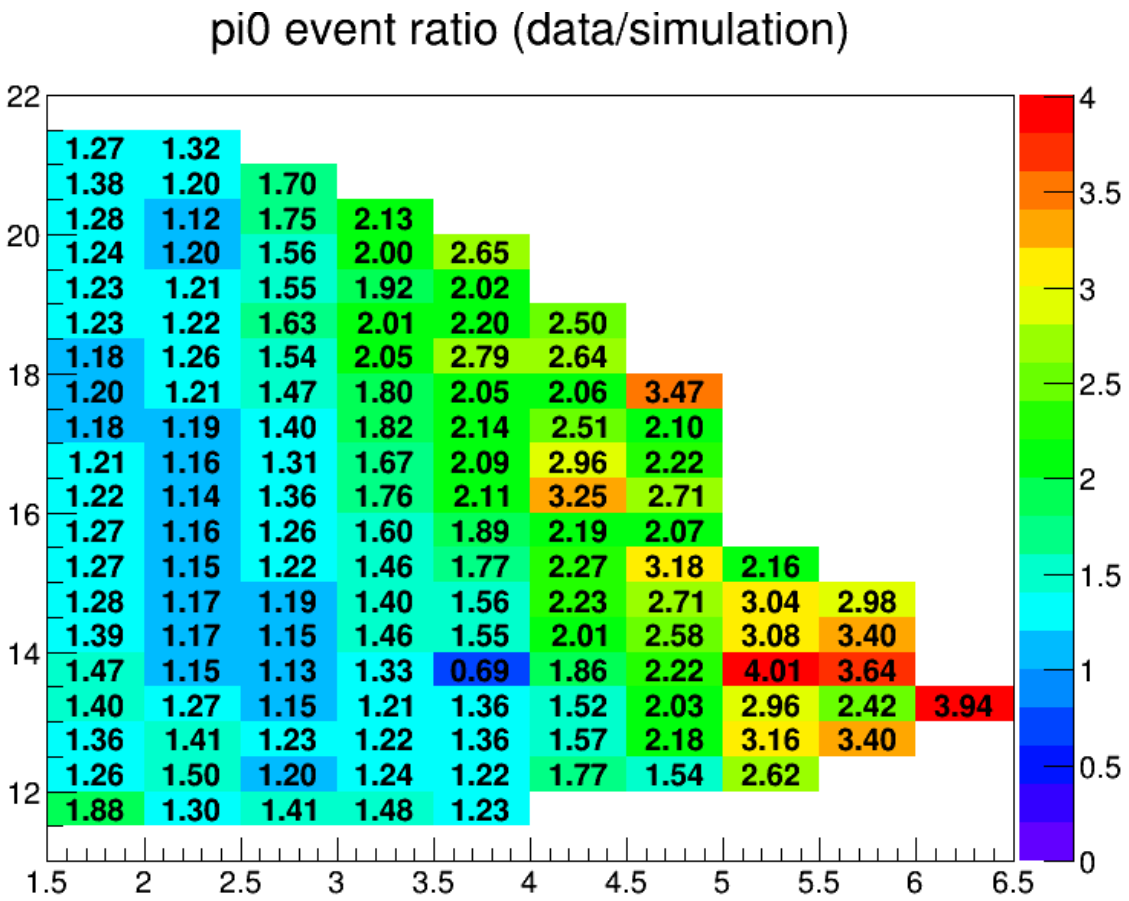
Error from pi0 events reconstruction

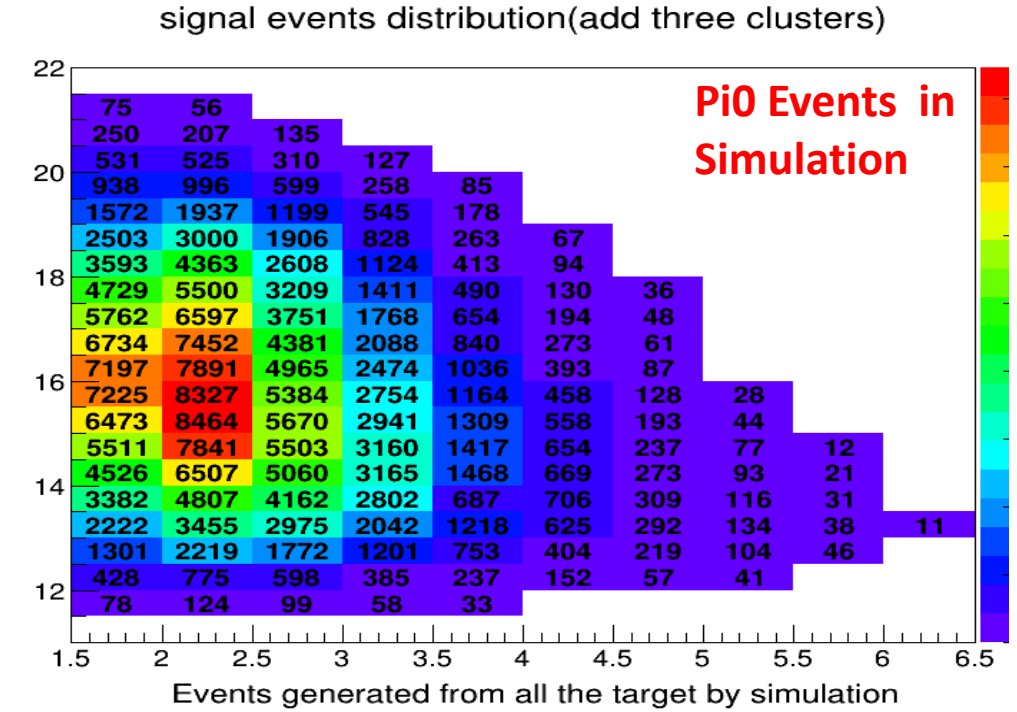
- Calorimeter:
  - Low energy photon and Energy resolution
  - Energy cut: The energy of clusters analyzed in two photons events need above some threshold(0.5GeV now) and the simulation of acceptance of detector also follow this cut. (checked, <1%)
  - Error in pulse reconstruction of each block(low)
  - Error in cluster reconstruction with all blocks
  - Time resolution and interval to separate two beam bunches
  - Time interval cut of two photons (checked, ~1%)
- Fitting error in analysis
- Pi0 events in three clusters events(pi0 events exist in three clusters events may contribute 10% total pi0 events), use more wise method to recognize pi0 events.

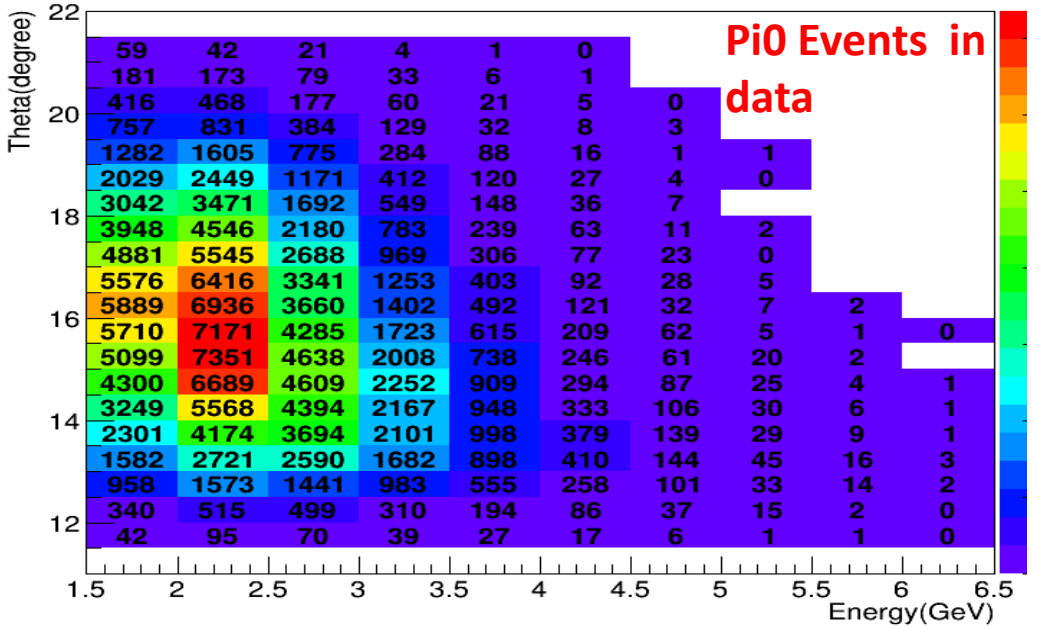
BACK UP

Kin482 pi0 events result

Ratio of Pi0 Events in data compared to simulation







Kin483 pi0 events result

Ratio of Pi0 Events in data compared to simulation