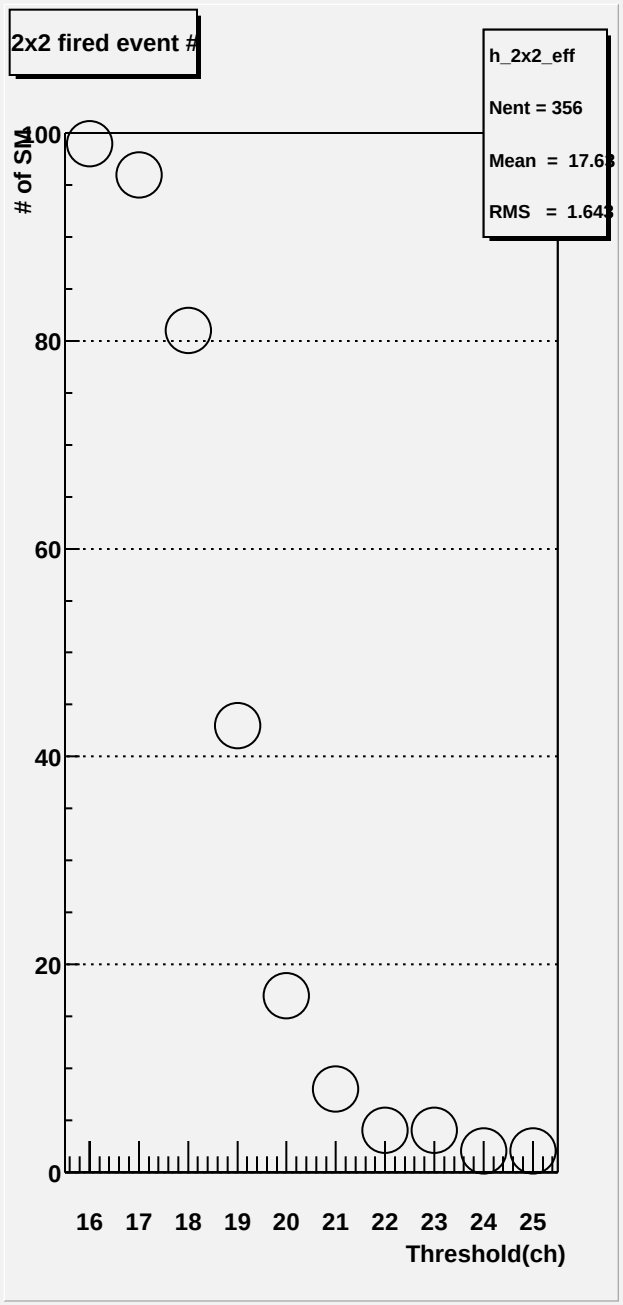
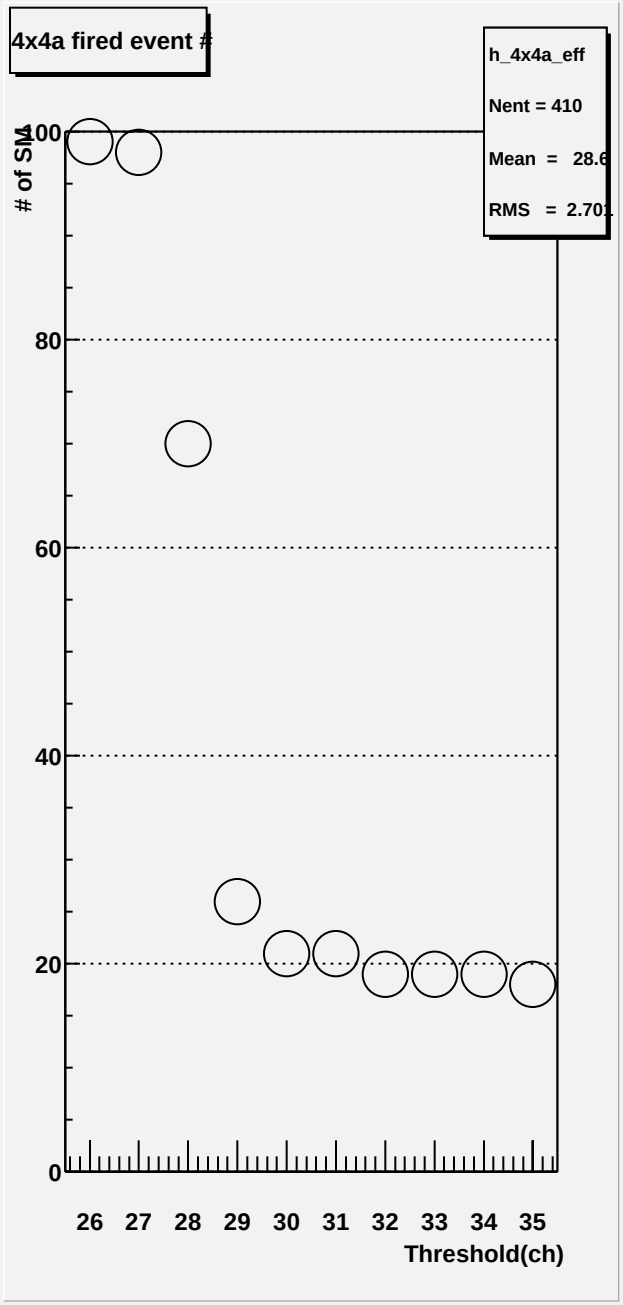
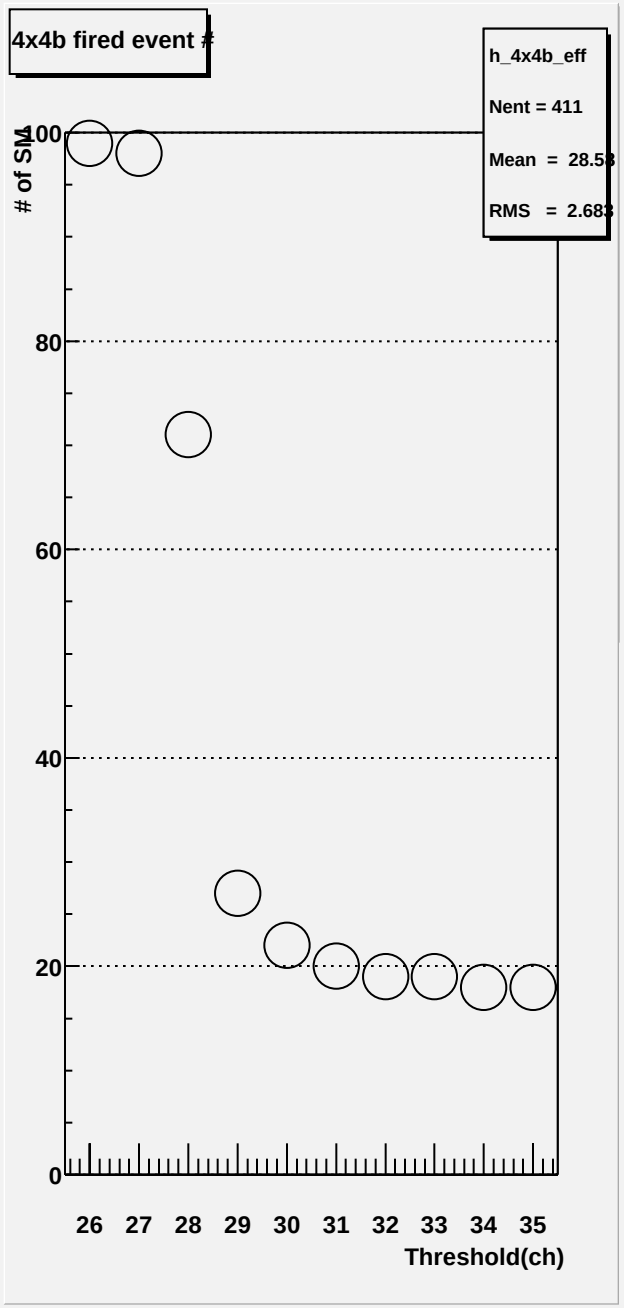
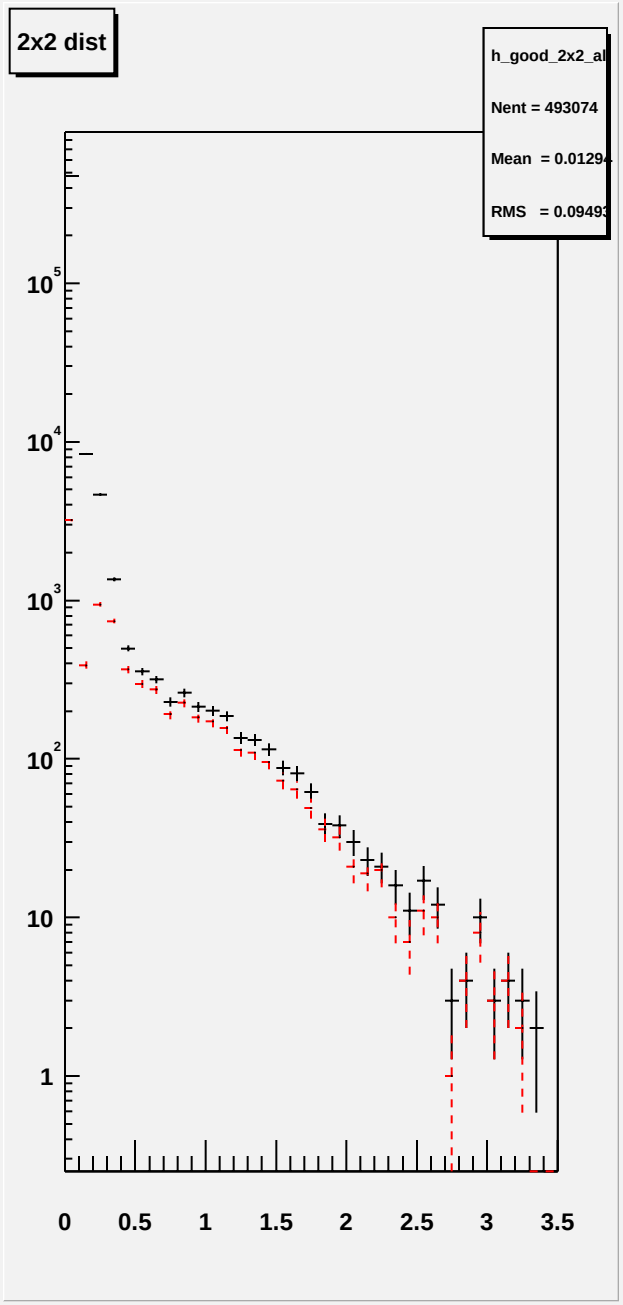
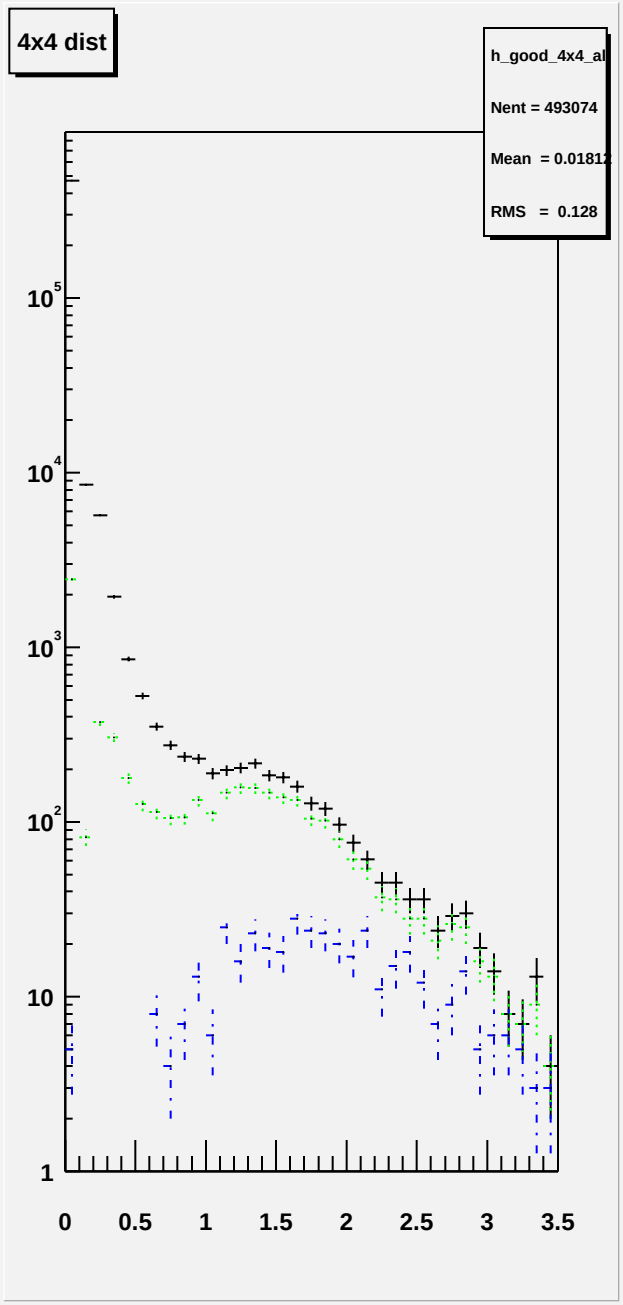
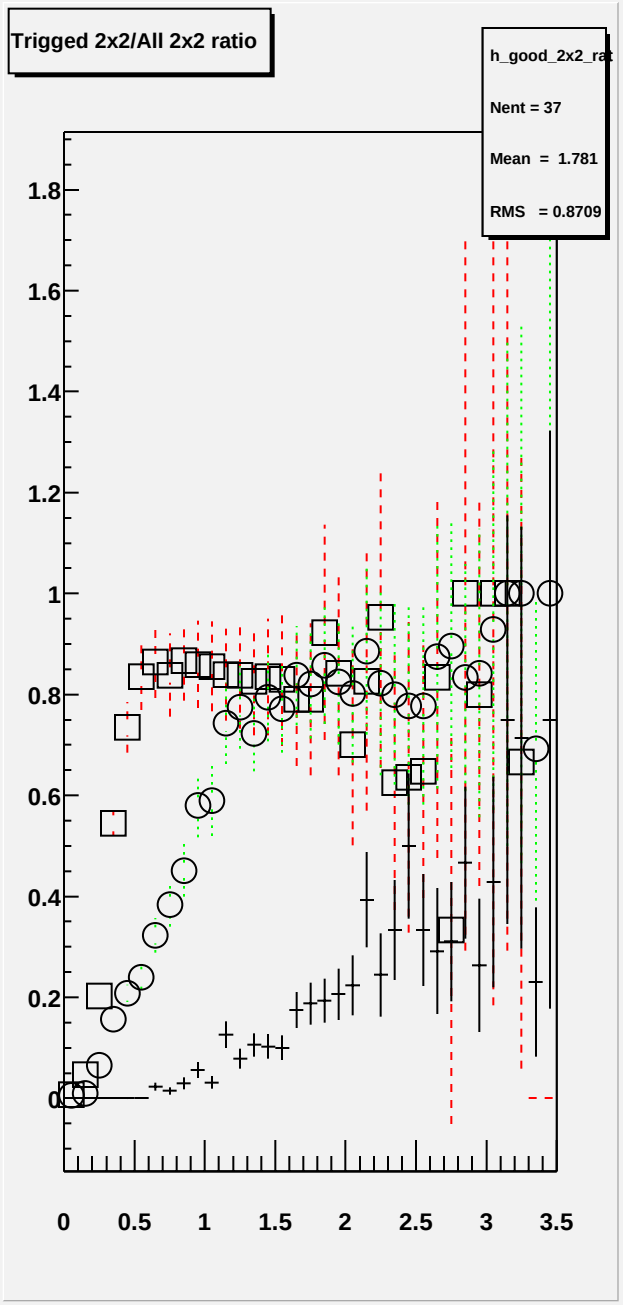

2x2 fired event #
h_2x2_eff
Nent = 356
Mean = 17.63
RMS = 1.643
# of SM
100
80
60
40
20
0
16 17 18 19 20 21 22 23 24 25
Threshold(ch)

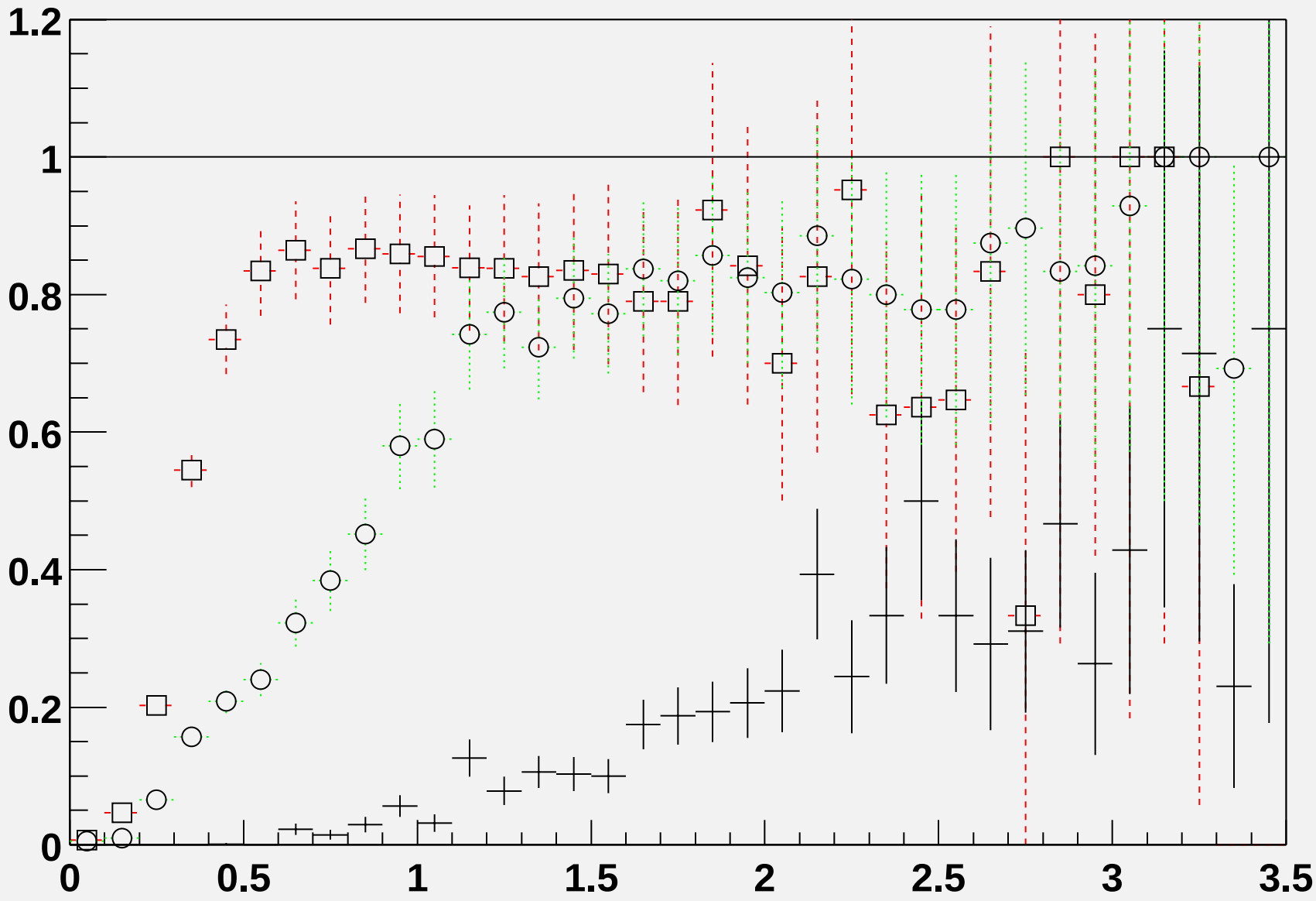

4x4a fired event #
h_4x4a_eff
Nent = 410
Mean = 28.6
RMS = 2.701
# of SM
100
80
60
40
20
0
26 27 28 29 30 31 32 33 34 35
Threshold(ch)


4x4b fired event #
h_4x4b_eff
Nent = 411
Mean = 28.53
RMS = 2.683
# of SM
100
80
60
40
20
0
26 27 28 29 30 31 32 33 34 35
Threshold(ch)


2x2 dist
h_good_2x2_al
Nent = 493074
Mean = 0.01294
RMS = 0.09493
10^5
10^4
10^3
10^2
10
1
0
0.5
1
1.5
2
2.5
3
3.5

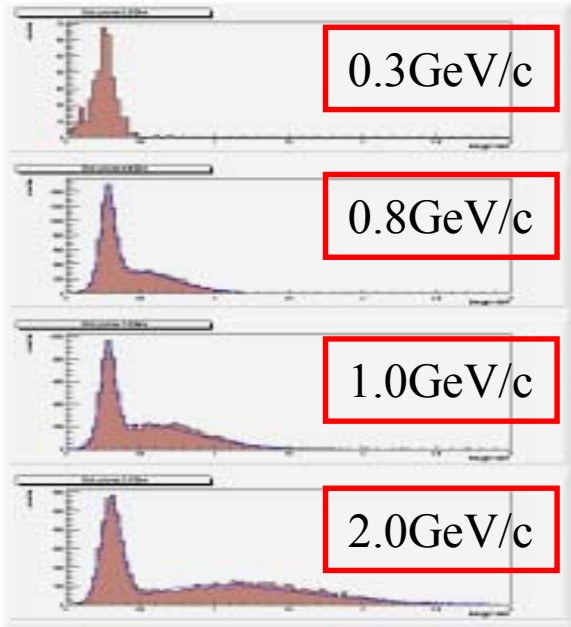

4x4 dist
h_good_4x4_al
Nent = 493074
Mean = 0.01812
RMS = 0.128
10^5
10^4
10^3
10^2
10
1
0
0.5
1
1.5
2
2.5
3
3.5


Trigged 2x2/All 2x2 ratio
h_good_2x2_rat
Nent = 37
Mean = 1.781
RMS = 0.8709
1.8
1.6
1.4
1.2
1
0.8
0.6
0.4
0.2
0
0
0.5
1
1.5
2
2.5
3
3.5


1.2
1
0.8
0.6
0.4
0.2
0
0
0.5
1
1.5
2
2.5
3
3.5

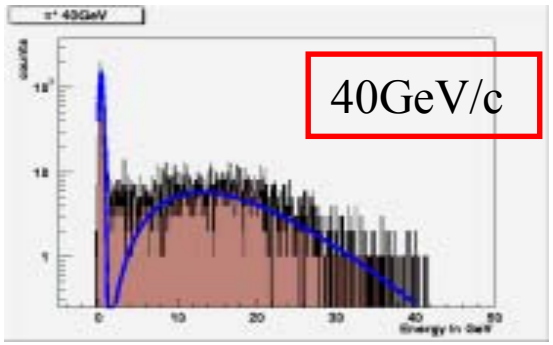
Hadron response in EMCal

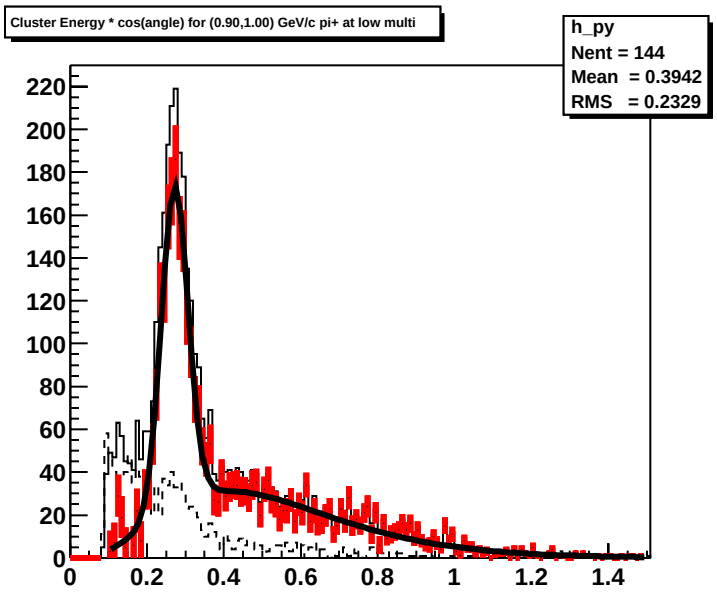
- Measured pion at test beam
  - 0.3, 0.8, 1.0, 2.0 GeV/c @ BNL
  - 40GeV/c @ CERN
- Fitted by empirical fuction

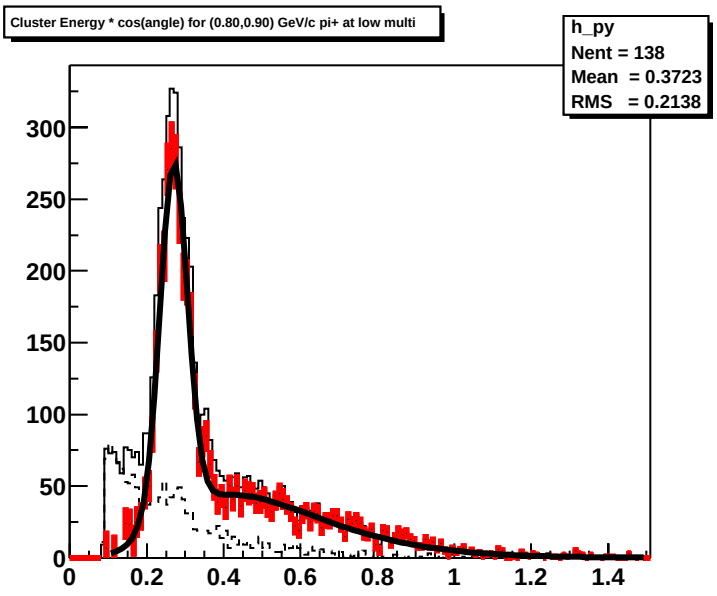


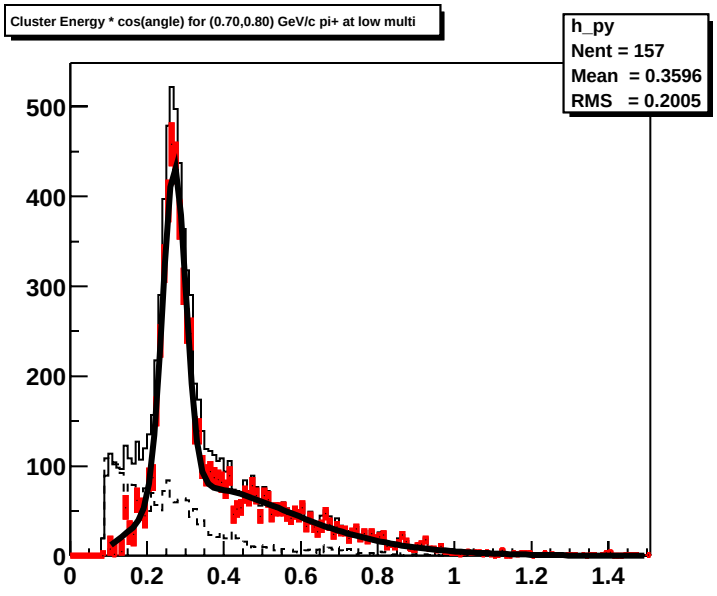
Gaussian(MIP) +

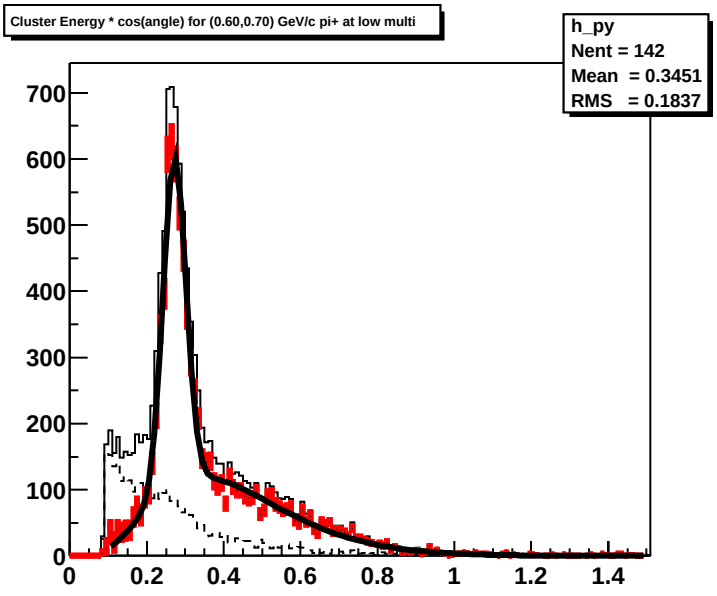
$$A \times (E / E_{beam})^{p-1} \times exp(-b \cdot E / E_{beam})$$

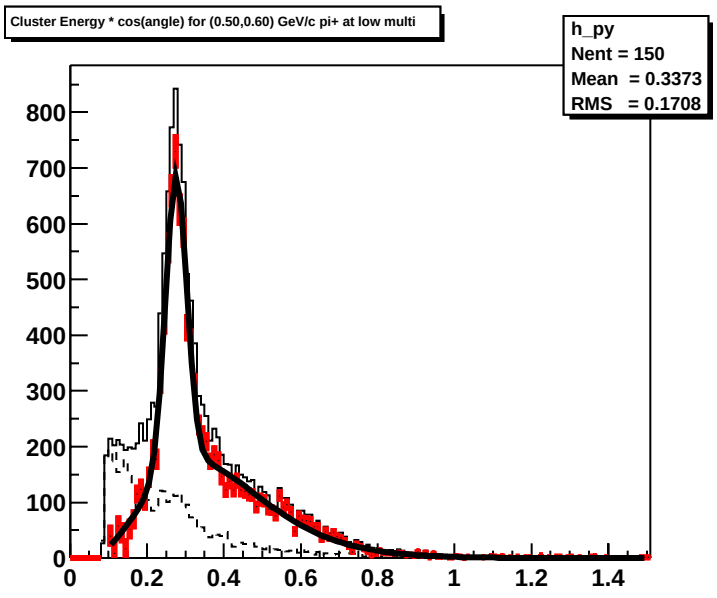


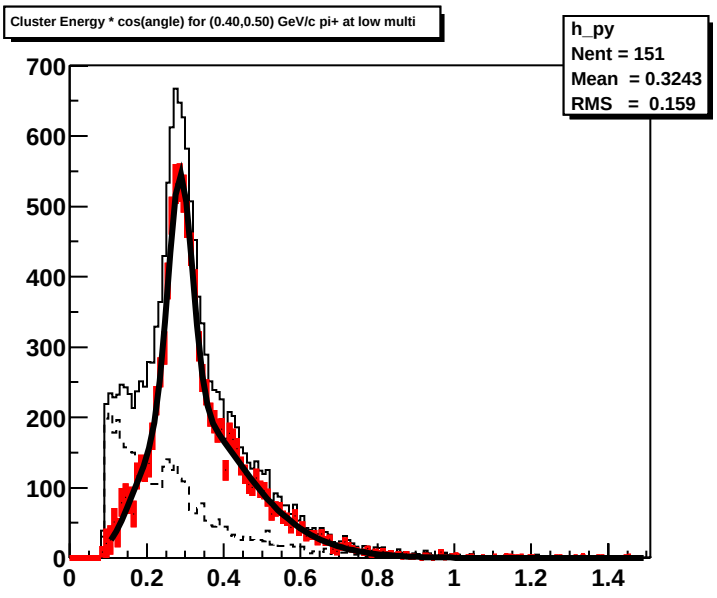

Cluster Energy * cos(angle) for (0.90,1.00) GeV/c pi+ at low multi
h_py
Nent = 144
Mean = 0.3942
RMS = 0.2329


Cluster Energy * cos(angle) for (0.80,0.90) GeV/c pi+ at low multi
h_py
Nent = 138
Mean = 0.3723
RMS = 0.2138


Cluster Energy * cos(angle) for (0.70,0.80) GeV/c pi+ at low multi
h_py
Nent = 157
Mean = 0.3596
RMS = 0.2005

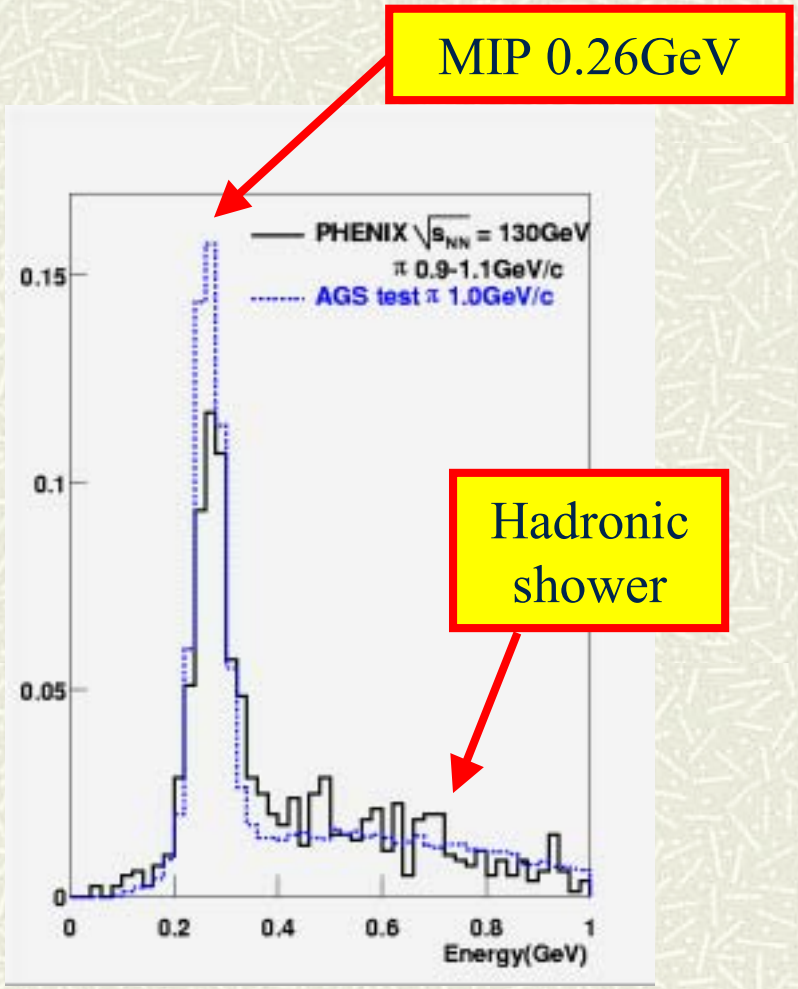

Cluster Energy * cos(angle) for (0.60,0.70) GeV/c pi+ at low multi
h_py
Nent = 142
Mean = 0.3451
RMS = 0.1837

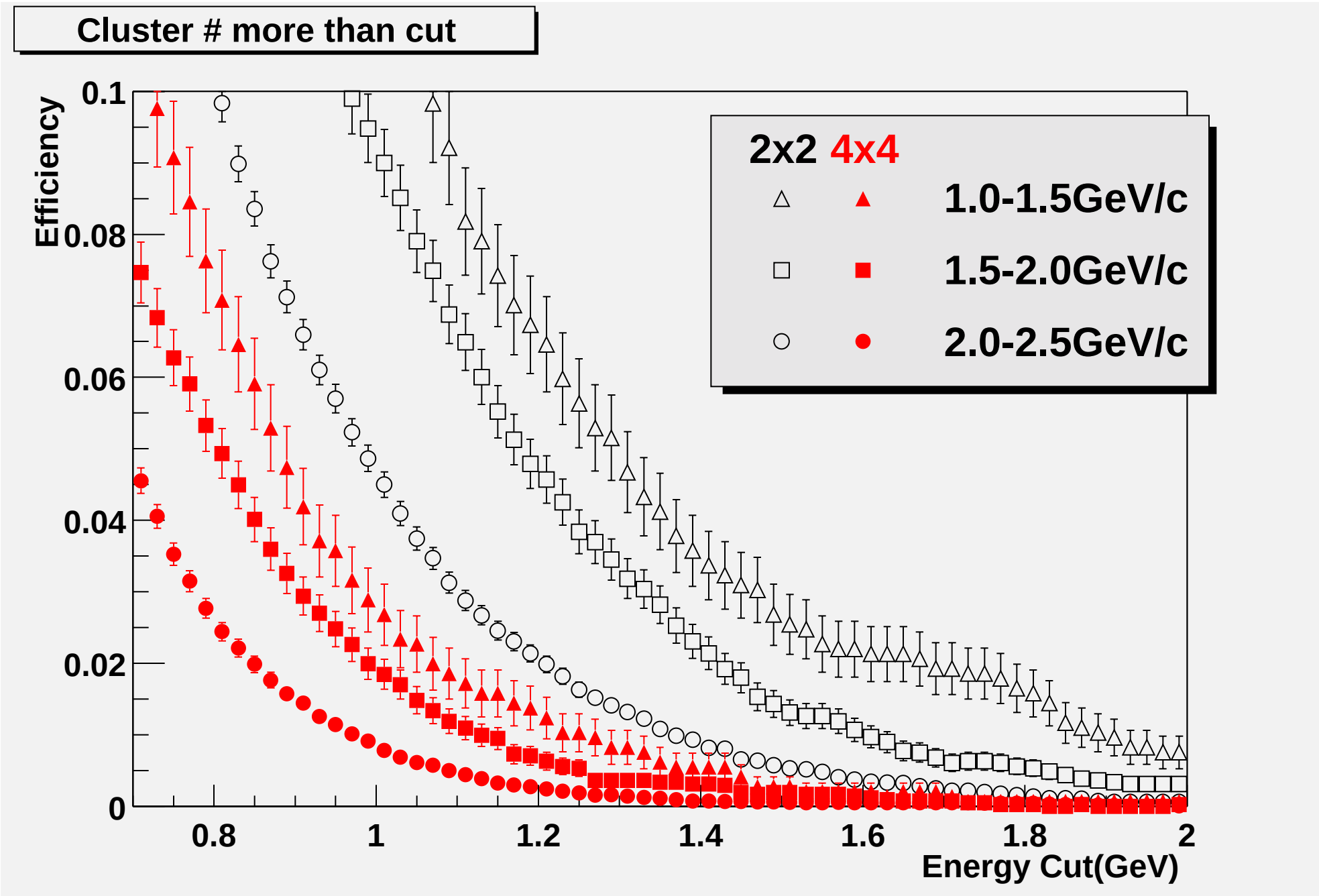

Cluster Energy * cos(angle) for (0.50,0.60) GeV/c pi+ at low multi
h_py
Nent = 150
Mean = 0.3373
RMS = 0.1708


Cluster Energy * cos(angle) for (0.40,0.50) GeV/c pi+ at low multi
h_py
Nent = 151
Mean = 0.3243
RMS = 0.159

MIP Energy

- Comparison with
  AGS test results: π 1.0GeV/c.
  PHENIX $\sqrt{s_{NN}}$ = 130GeV:
  0.9-1.1GeV/c π± at lower multiplicity.
  - minimum Ionization Particle at 0.26GeV.
  - The spectrums of hadronic shower between 0.26 ñ 1.0GeV are very similar.
- Relative energy of every towers are calibrated by using ionization energy of 0.6-1.0GeV/c $\pi^{\pm}$ at lower multiplicity. The accuracy of this calibration is 3% accuracy which is dominated by statistical error.




Cluster # more than cut
Efficiency
0.1
0.08
0.06
0.04
0.02
0
0.8
1
1.2
1.4
1.6
1.8
2
Energy Cut(GeV)
2x2 4x4
1.0-1.5GeV/c
1.5-2.0GeV/c
2.0-2.5GeV/c