# MAPS Simulation Status

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## Contents

Energy (#cell_hits) resolution without clustering

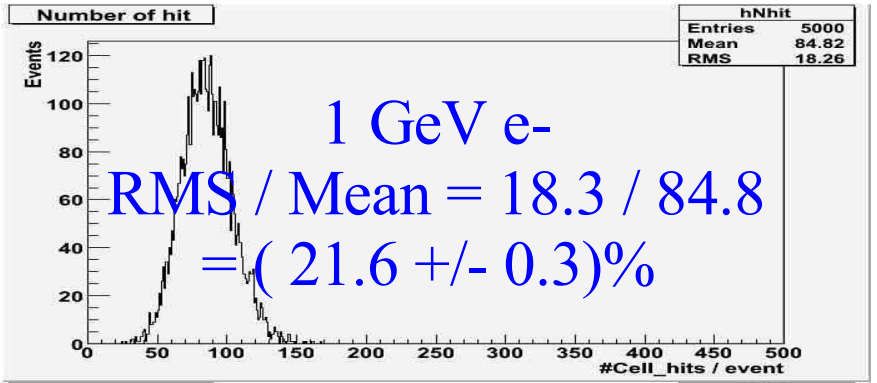
- Incoming energy dependence
- Cell size dependence

Linearity with incoming energy dependence

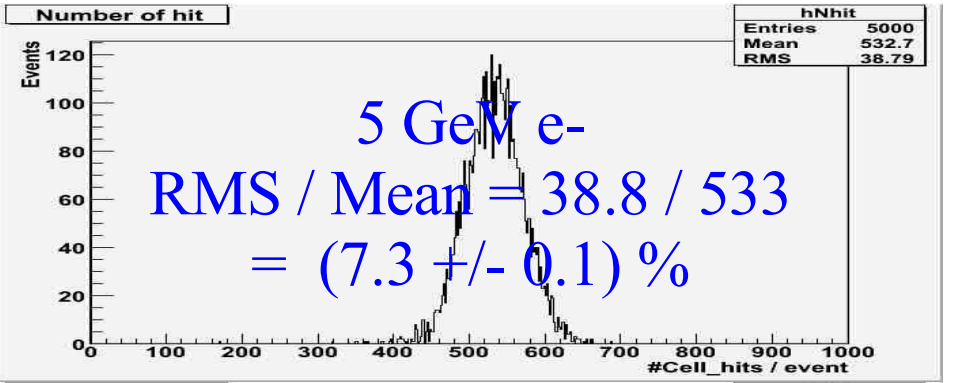
# #Cell_hits/event Resolutions (1)

15um Si sensitive thickness
50um X 50um cell size
5000 events

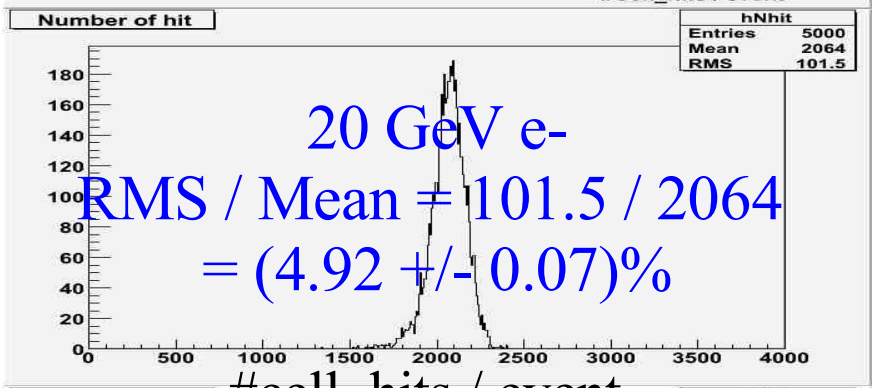
Single electron from IP to zenith with magnet on.




1 GeV e-
RMS / Mean = 18.3 / 84.8
=( 21.6 +/- 0.3)%

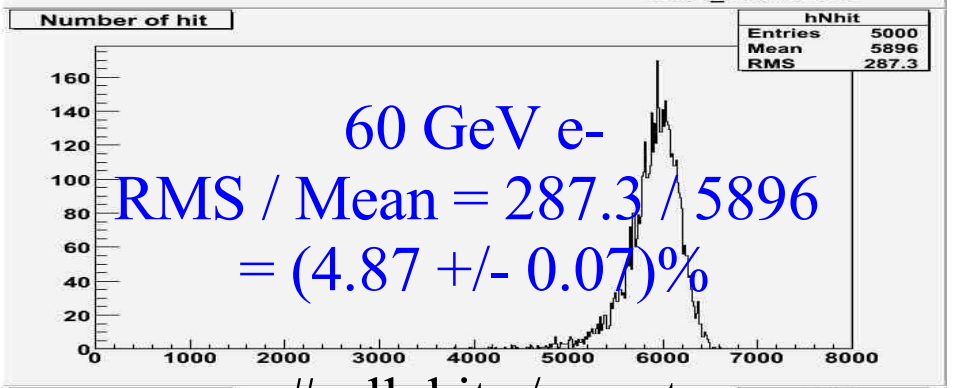



5 GeV e-
RMS / Mean = 38.8 / 533
= (7.3 +/- 0.1) %



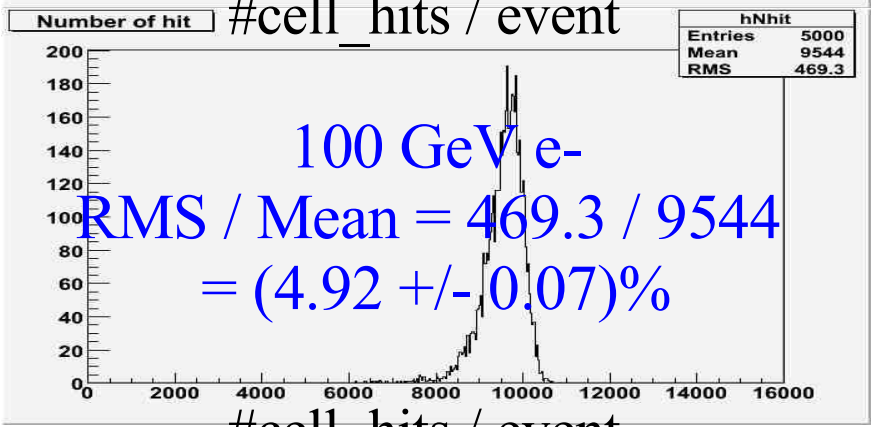

20 GeV e-
RMS / Mean = 101.5 / 2064
= (4.92 +/- 0.07)%

#cell_hits / event



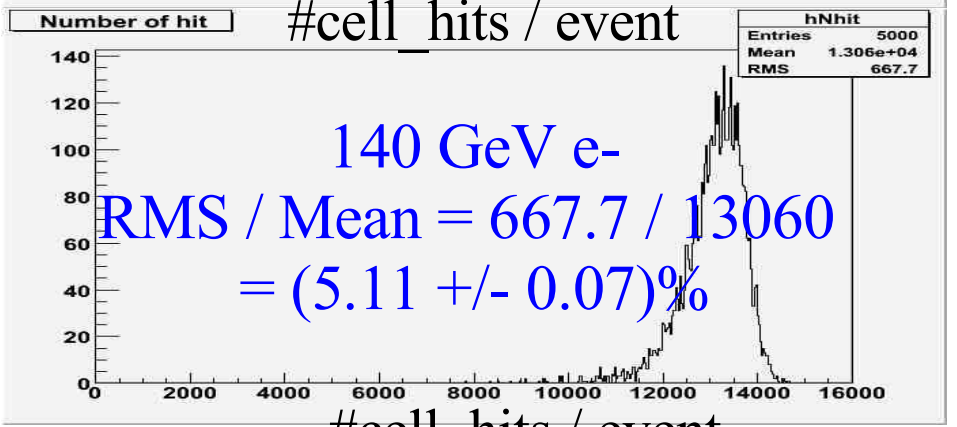

60 GeV e-
RMS / Mean = 287.3 / 5896
= (4.87 +/- 0.07)%

#cell_hits / event




100 GeV e-
RMS / Mean = 469.3 / 9544
= (4.92 +/- 0.07)%

#cell_hits / event



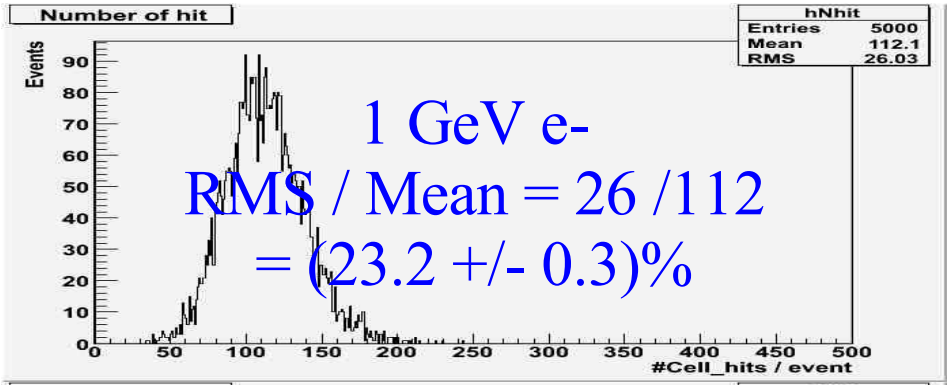

140 GeV e-
RMS / Mean = 667.7 / 13060
= (5.11 +/- 0.07)%

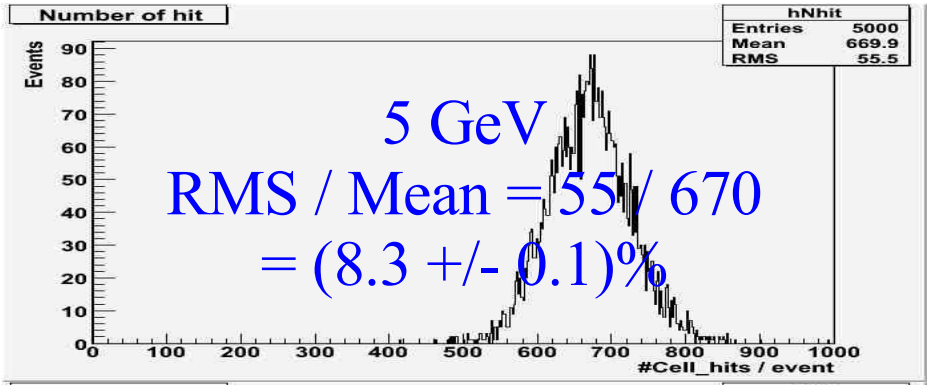
#cell_hits / event

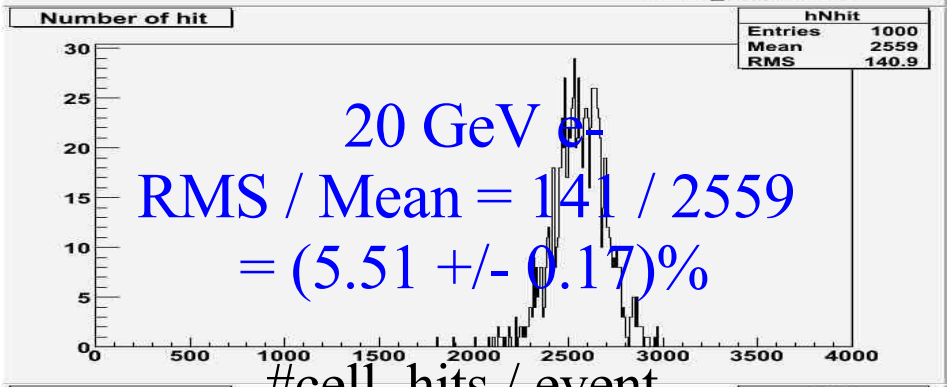
- In the lower incoming energy case, it show clear Gaussian distributions.
- In the higher incoming energy cese, some events has #cell_hits leakage.

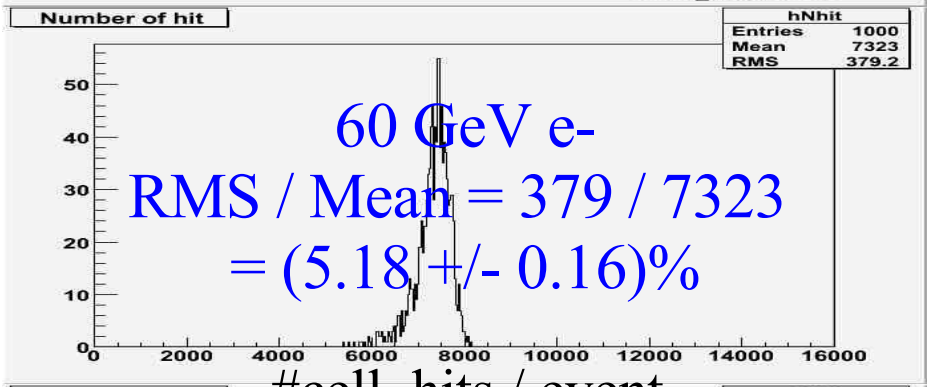
# #Cell_hits/event Resolutions (2)

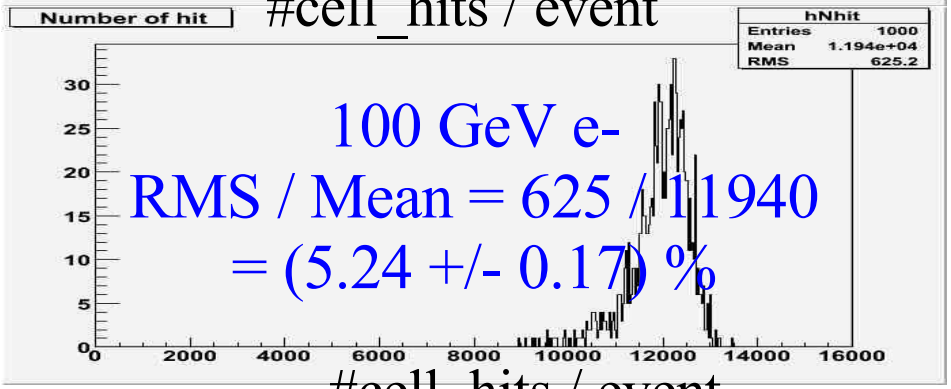
15um Si sensitive thickness
25um X 25um cell size
5000 events or 1000 events

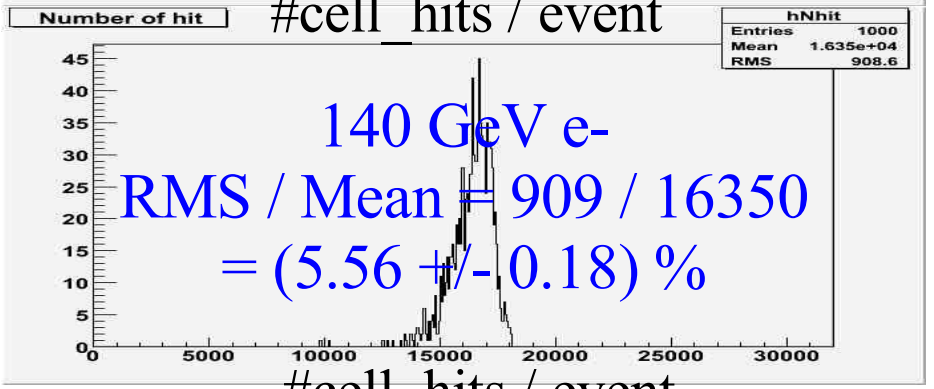


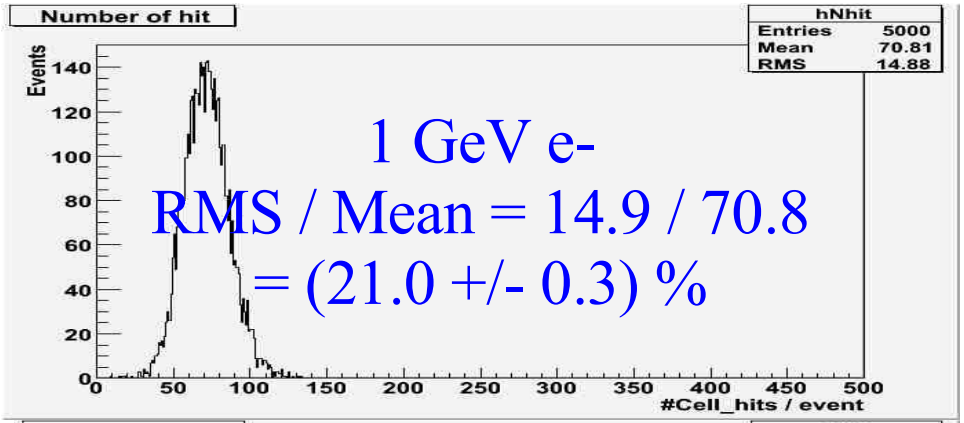



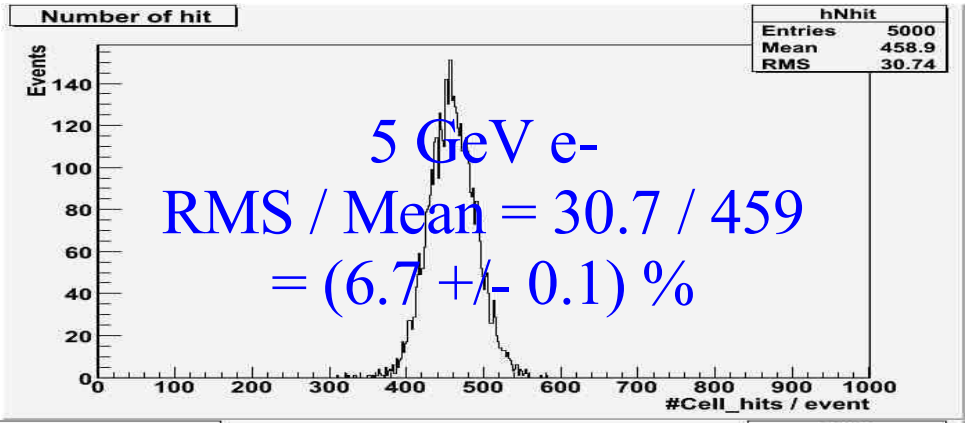



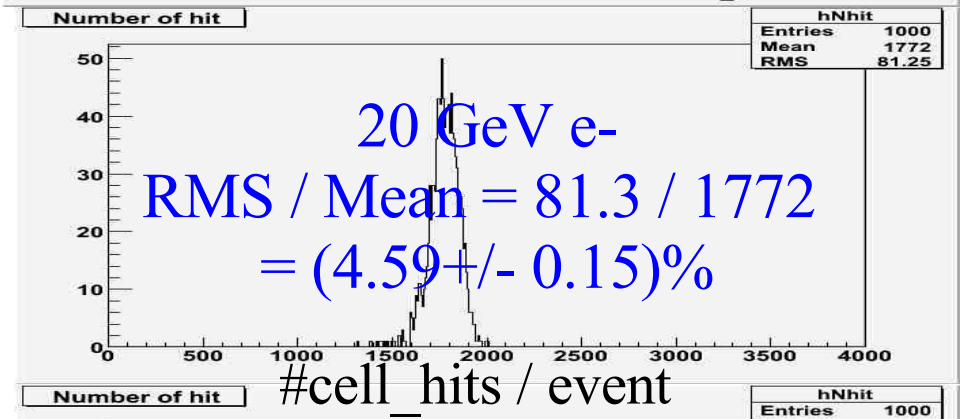

Slightly worse resolution compared with 50um x 50um cell size.

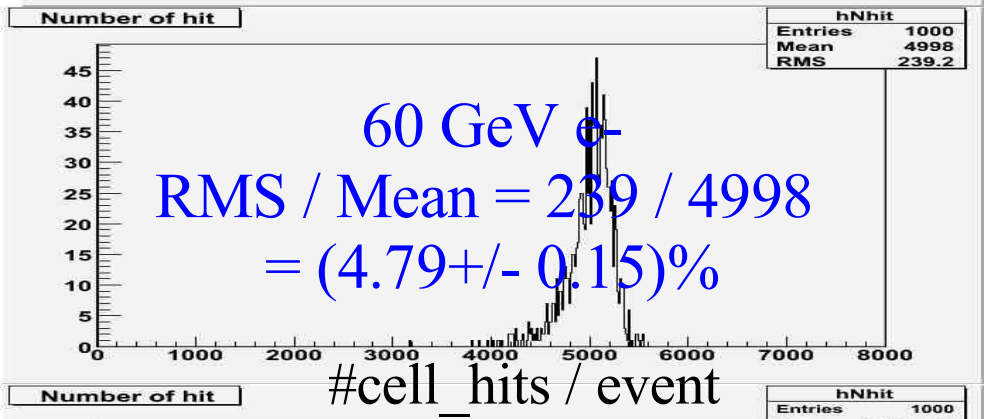
# #Cell_hits/event Resolutions (3)

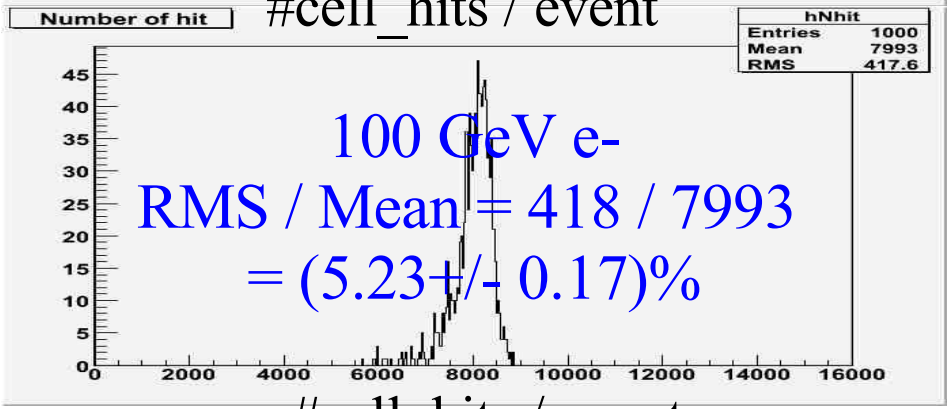
15um Si sensitive thickness
100um X 100um cell size
5000 events or 1000 events

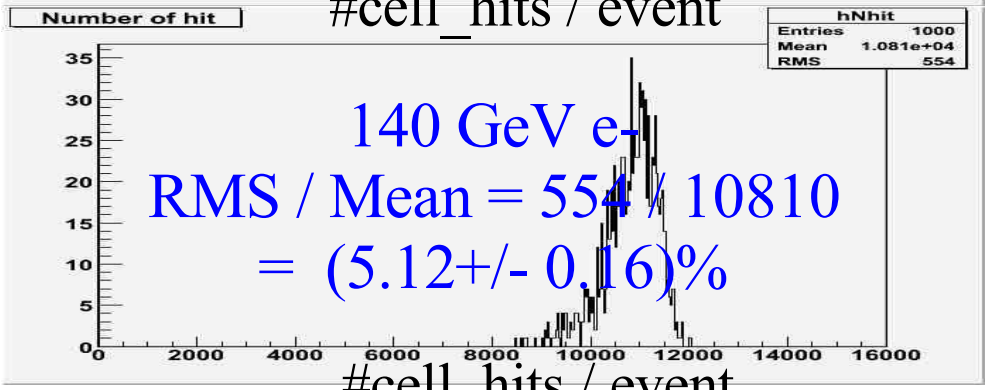


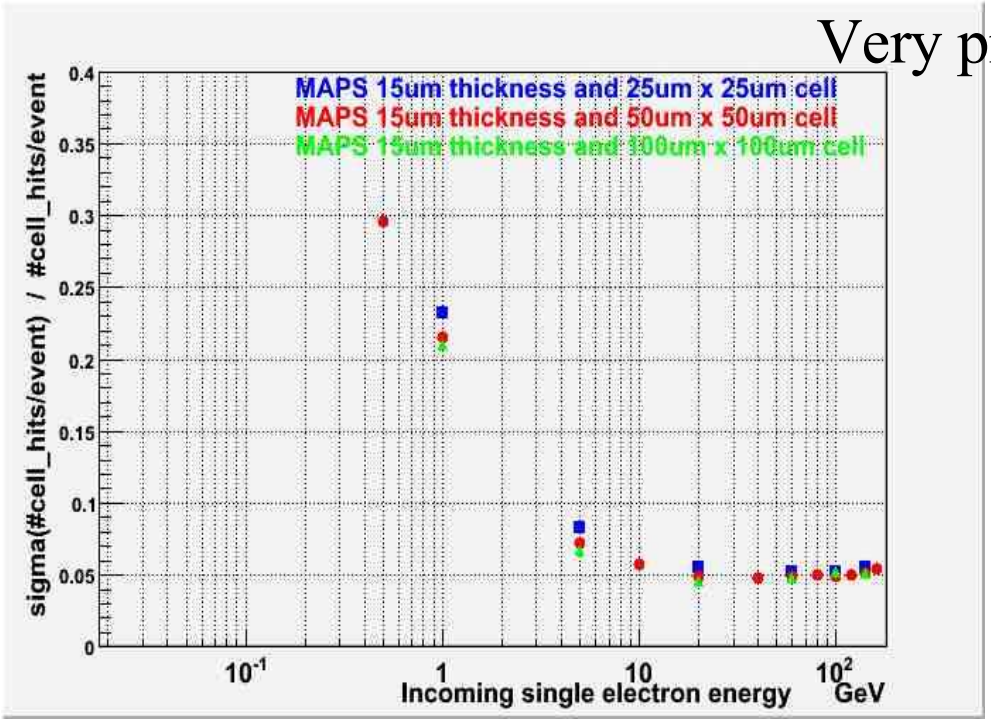

Slightly better resolution compared with 50um x 50um cell size.

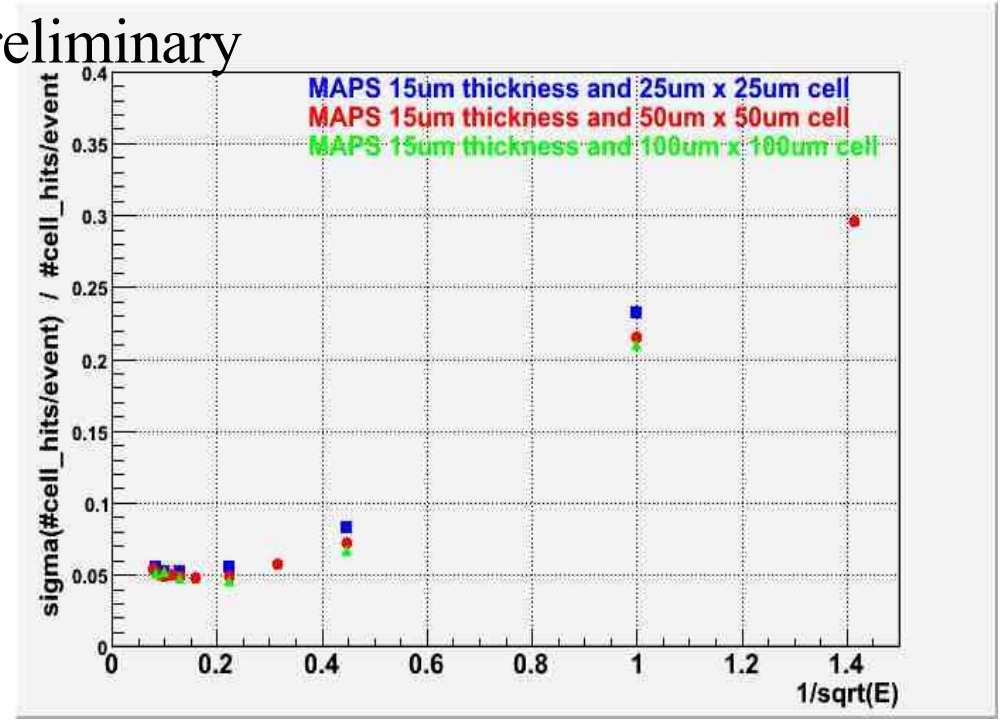
# Single Electron Energy Resolution Without Clustering

- No threthold is applied for cell hit energy
- Counting number of cell hit in a event without clustering.
- LDC01 (first 20 layers: W thickness = 2.1mm
  last 10 layers: W thickness = 4.2 mm)

->We did not use a weighted number at this moment. (Please see next slide)

Very preliminary



LDC01 (first 20 layers: W thickness = 2.1mm
last 10 layers: W thickness = 4.2 mm)

Thicker W thickness

- Effect of absorber
  - → Reduction of incoming energy
  - → Decreasing number of secondary particles
- Effect of radiator
  - → Increasing number of secondary particle

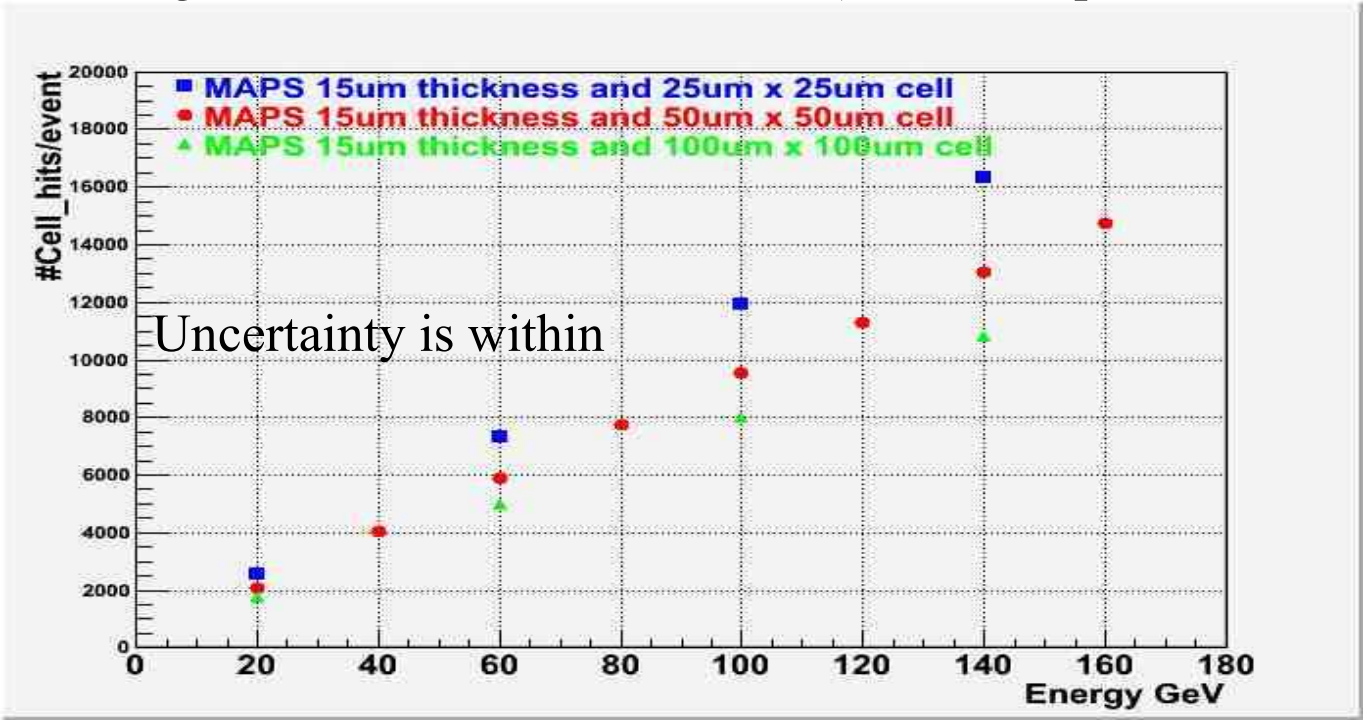
The weighted mean factor is convoltion of the above two effects.

->We did not use a weighted number at this moment.

# Linearity of #Cell hits/event with incoming energy dependence

- No threthold is applied for cell hit energy
- Counting number of cell hit in a event without clustering.
- LDC01 (first 20 layers: W thickness = 2.1mm
  last 10 layers: W thickness = 4.2 mm)

->We did not use a weighted number at this moment. (Please see previous slides)




- In the higher incoming energy case, the linearity is slightly saturated.

➔It agrees with the leakage in lower tail of #cell_hits/event distribution.
(Please see page 2, 3 and 4.)

# Summary of status

- 36 and 48 contiguous cell hits pattern study
  - -Fixed a minor bug in double count removing
  - -Cell size dependence
  - -Incoming energy dependence

- Resolution study
  - -Using a wighted mean for different W thickness layers
  - -Consistency check with the same thickness for all layers
  - -Sensitivity for clustering methods

- Clustering
  - -Demonstration with a simple method is started just recently.