Status of MAPS study

CALICE-UK MAPS ECAL Meeting

at Rutherford Appleton Laboratory

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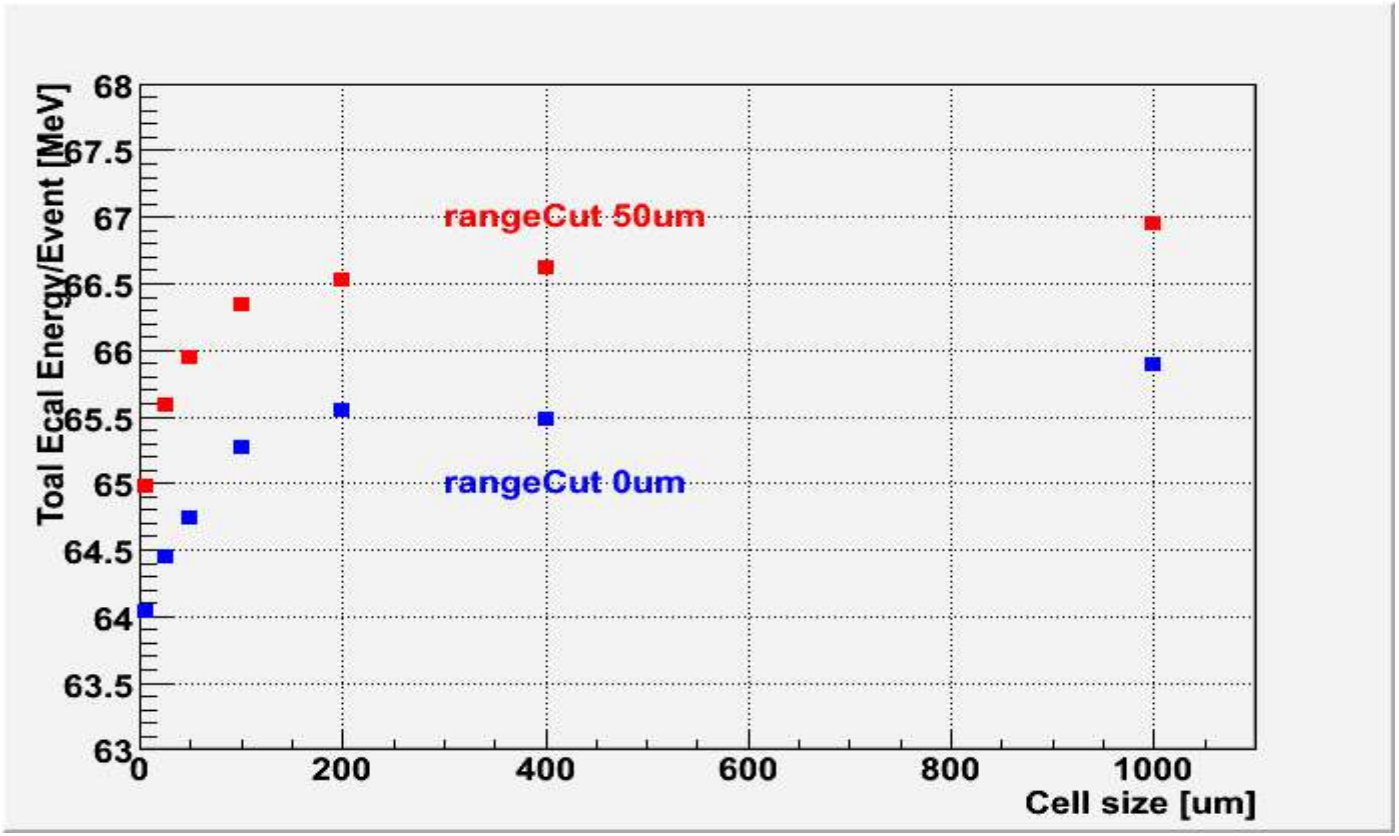
Check of Mokka rangeCut effects

Steer file; /Mokka/init/rangeCut 0.050 mm
#/Mokka/init/rangeCut 0.005 mm
specifies the production Geant4 range cut
[default is 0.005 mm]

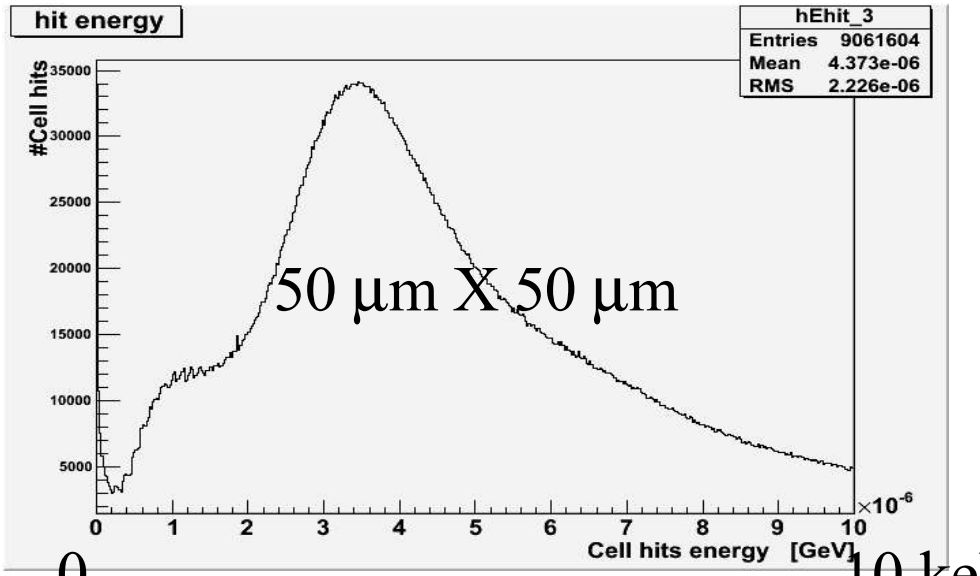
All are 100GeV e-,
with epitaxial layer is 15um,
Mokka06-00 and geant4.8.0.p01



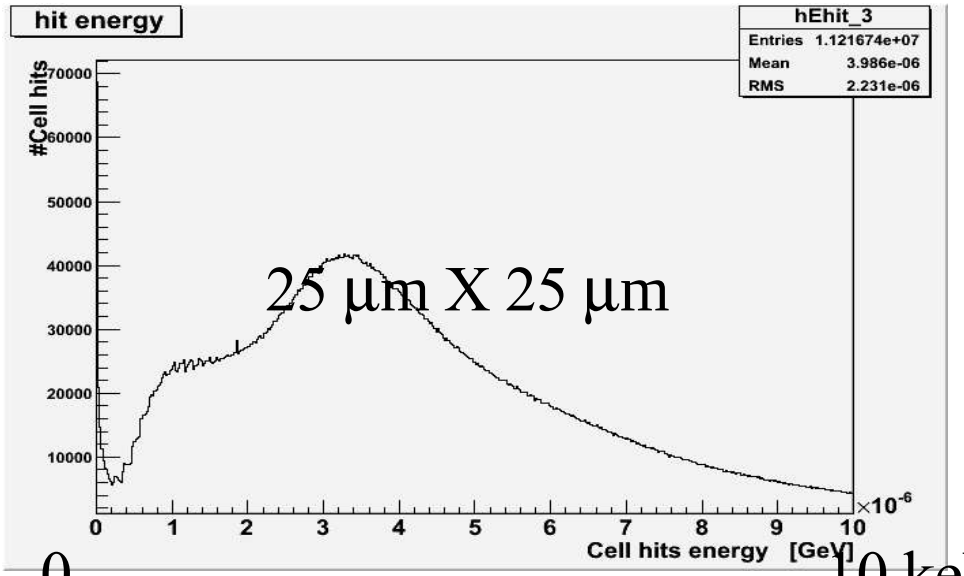
Still 2~3% bias exist at smaller cell case -> It was not due to Mokka rangeCut.
What is the error source ?

Comparison of cell hits energy distribution

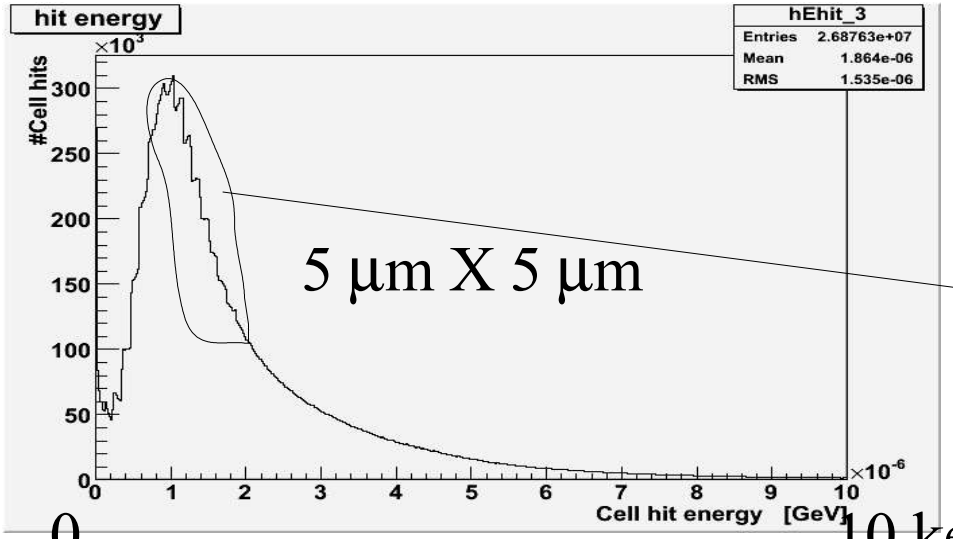
All are 100GeV e-,
with epitaxial layer is 15um,
Mokka06-00 and geant4.8.0.p01



0 10 keV



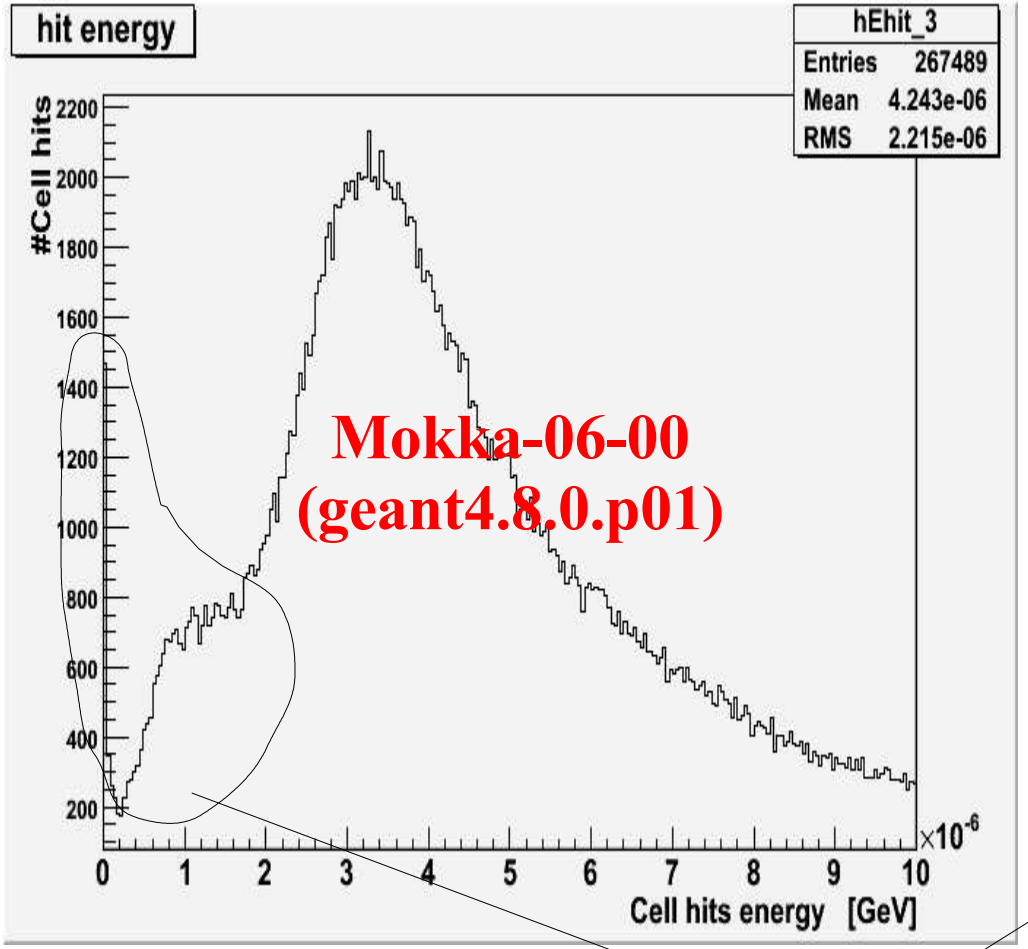
0 10 keV

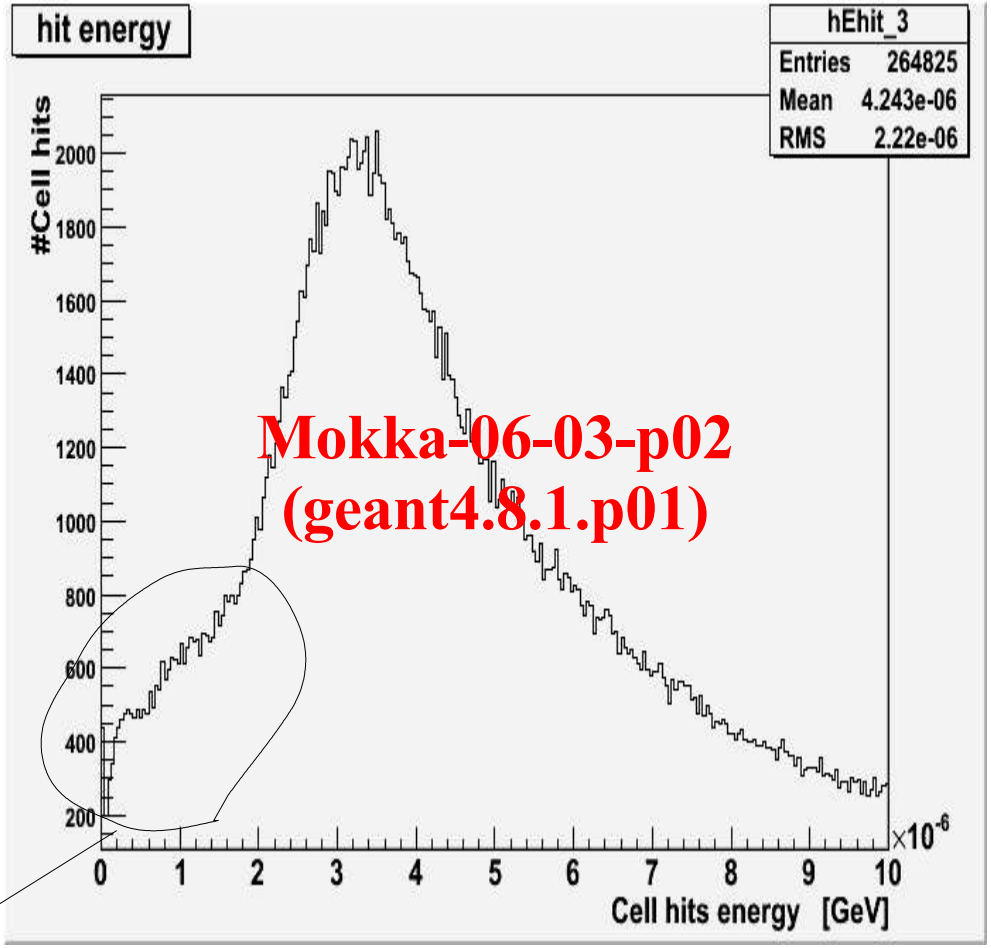


0 10 keV

Is this step structure related on the reason of 2-3% bias ?

Comparison of Mokka version



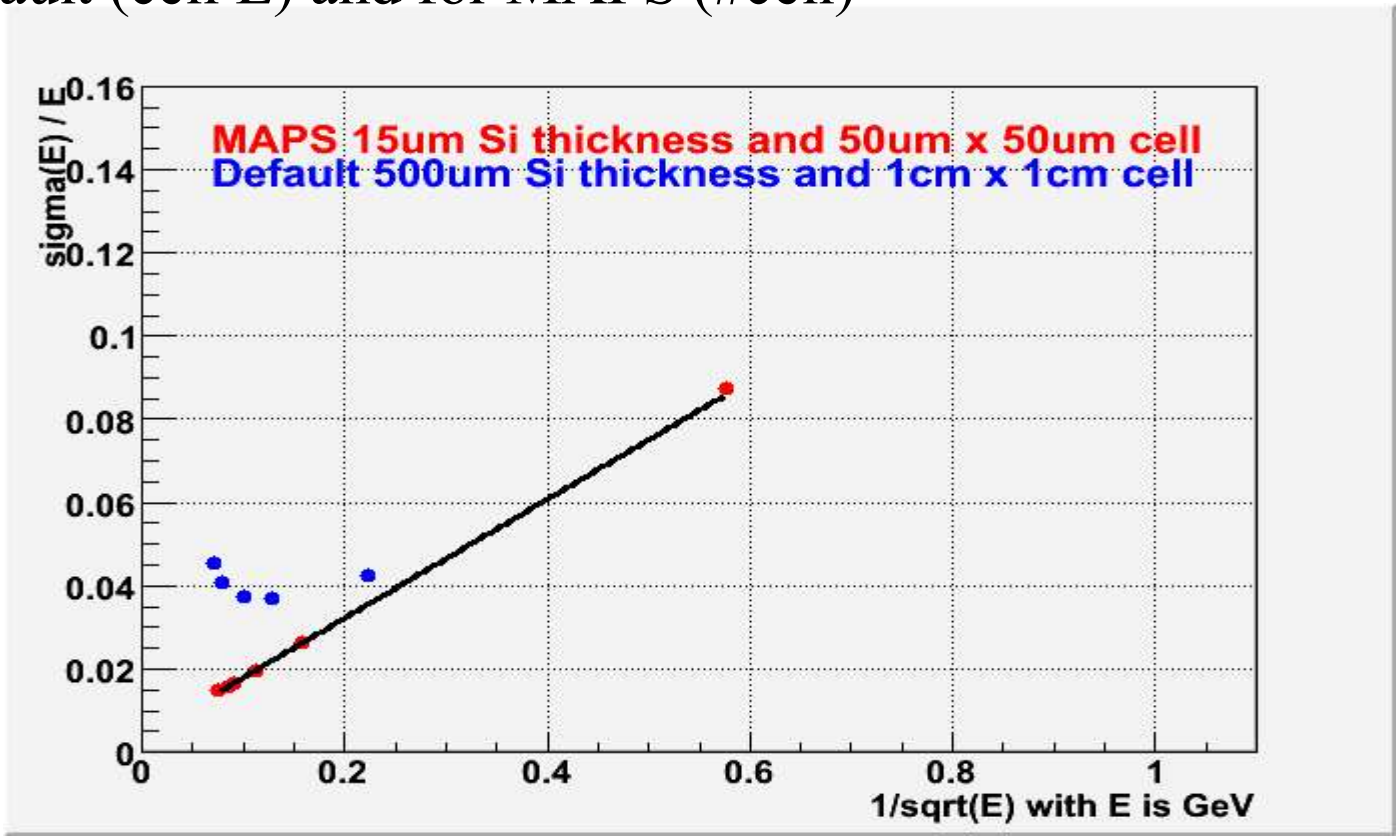


Clearly the bump was smoothed in the latest version.

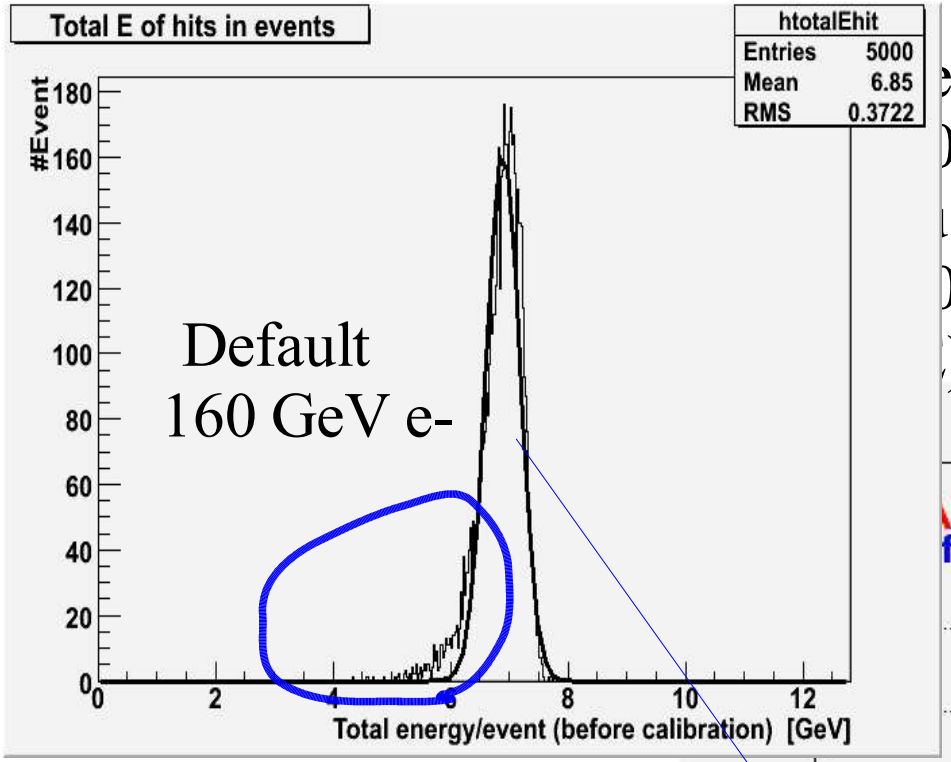
Energy resolution of default v.s. MAPS

- B fields is on (radiated photon are included)
- It's still Mokka-06-00.
- Weighted energy is used for different tungstens thickness.

Namely 1:2 = layer<20 : layer>20,
both for default (cell E) and for MAPS (#cell)



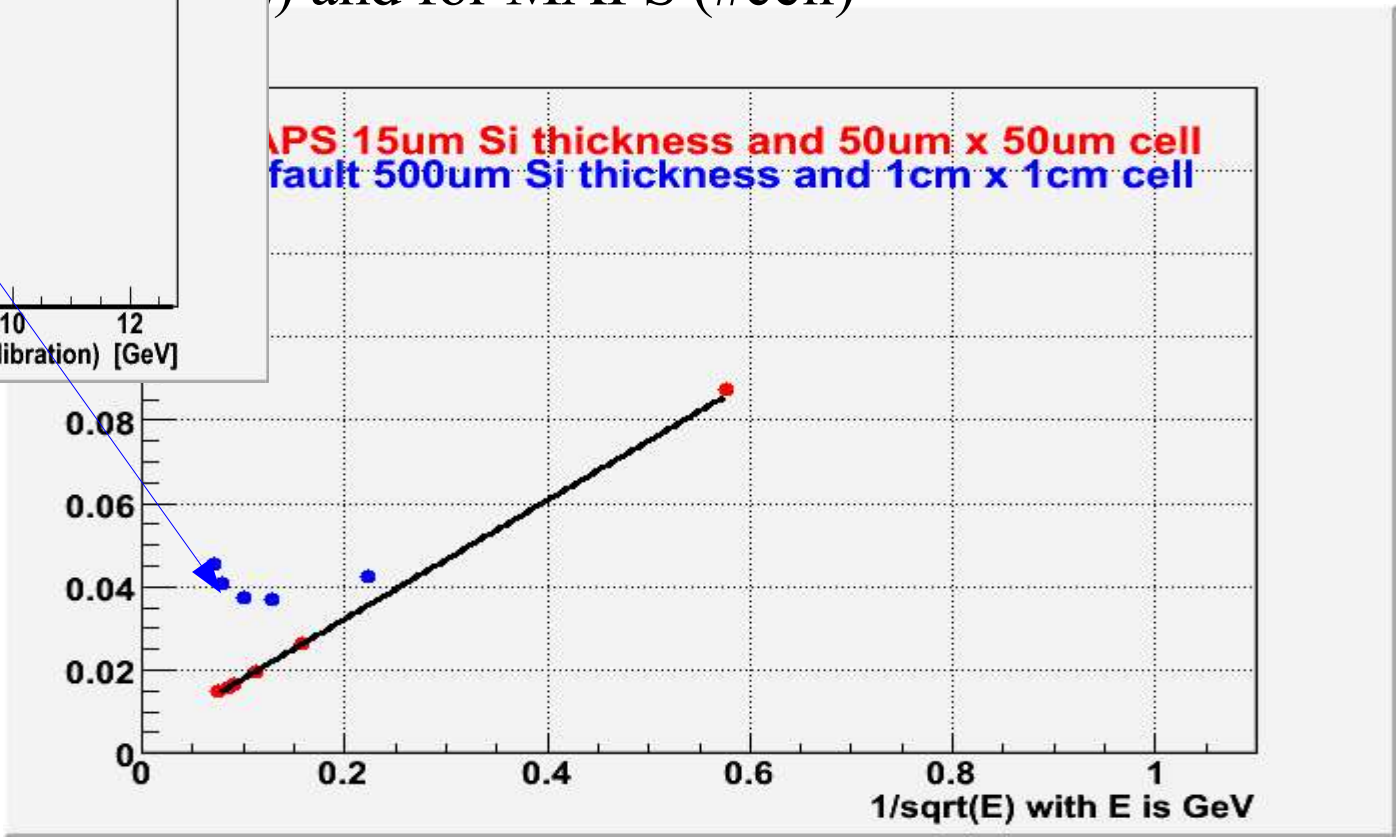
Energy resolution of default v.s. MAPS



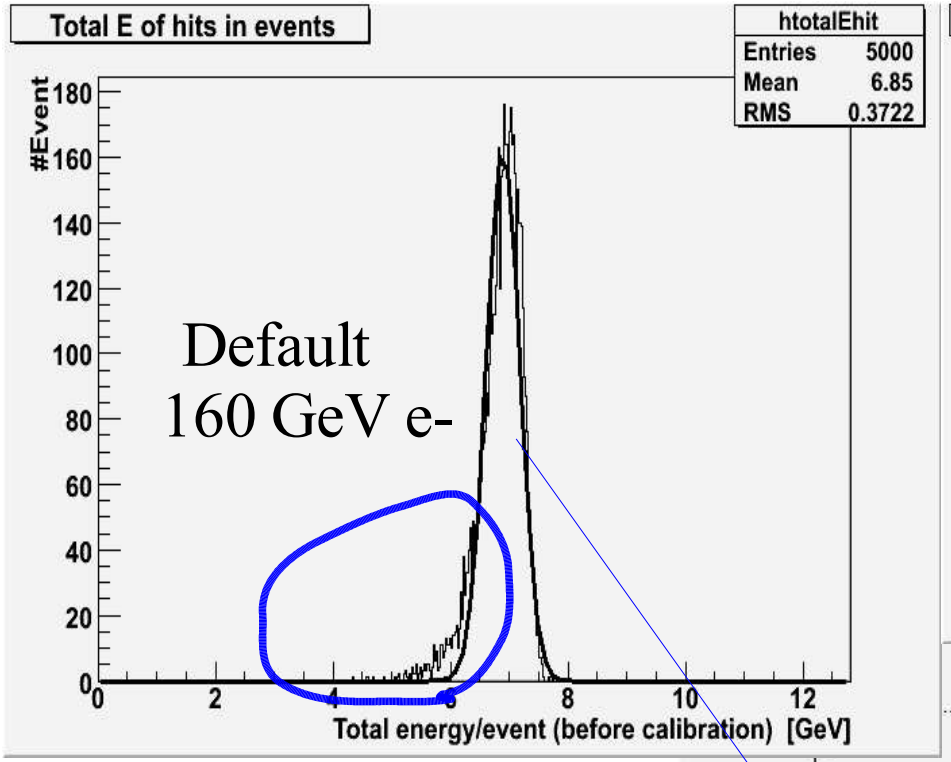
Default
160 GeV e-

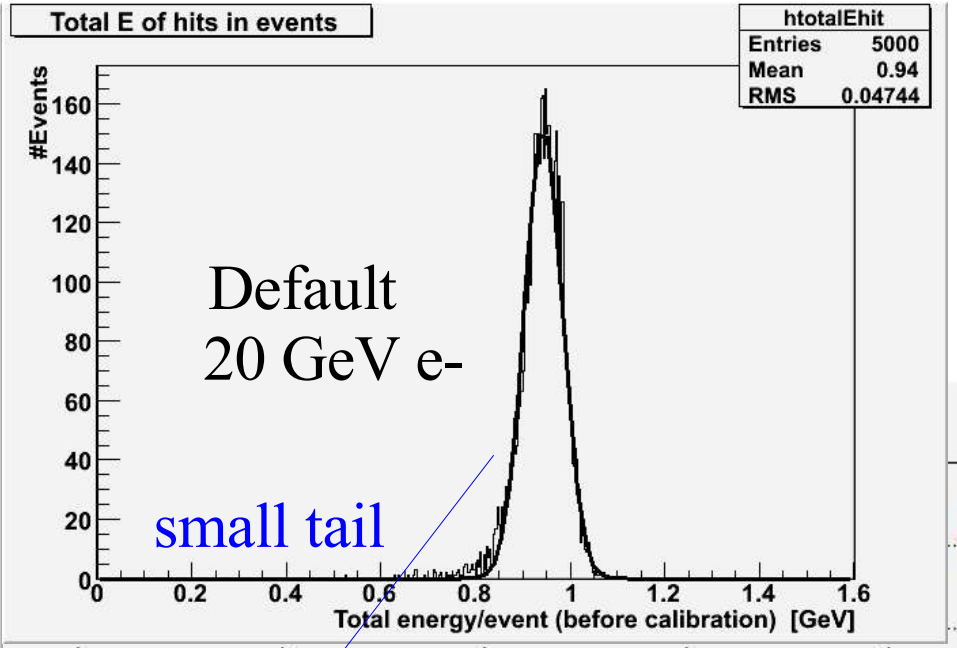
Significant tail

ed photon are included)
).
sed for different tungstens thickness.
) : layer>20,
) and for MAPS (#cell)

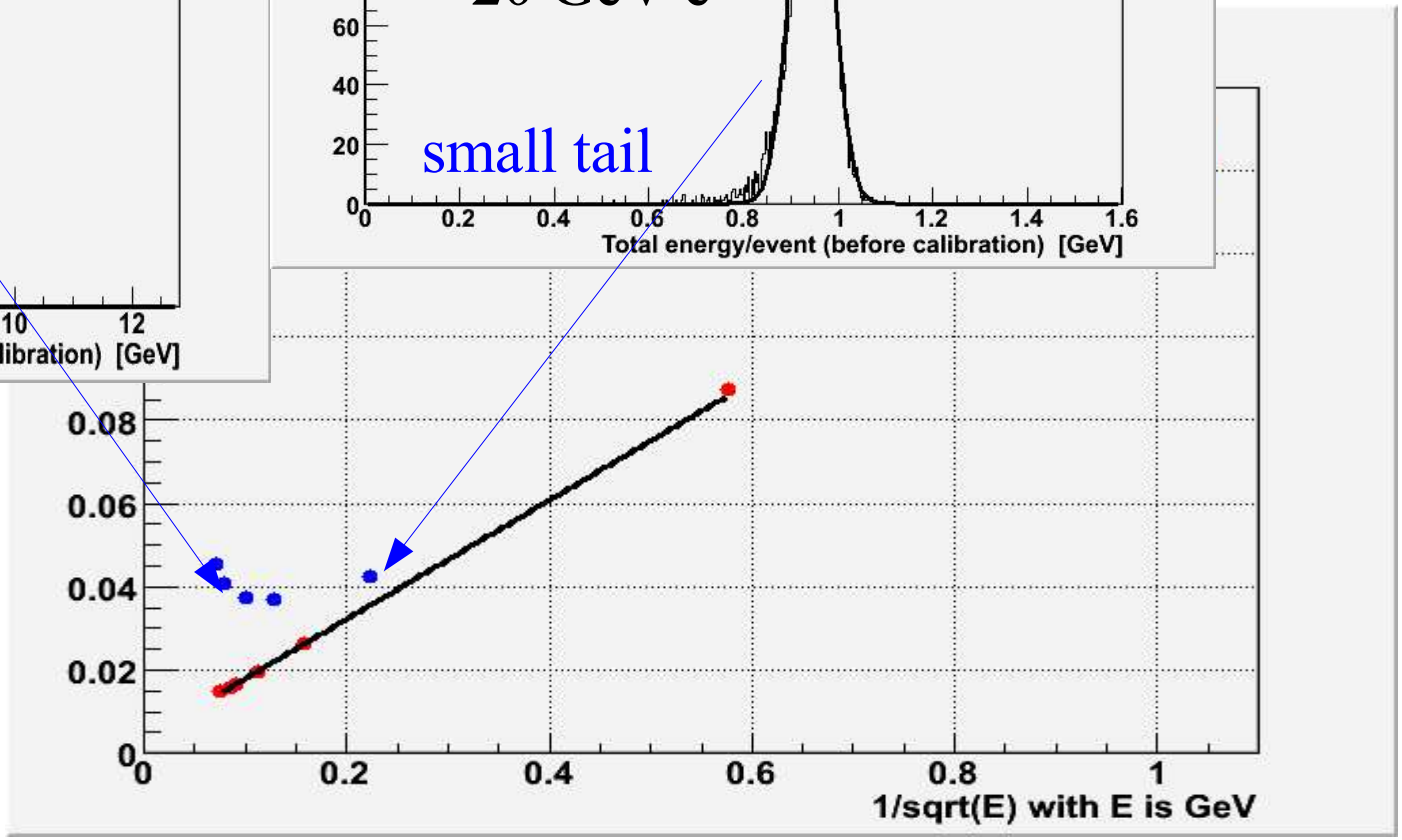


Energy resolution of default v.s. MAPS

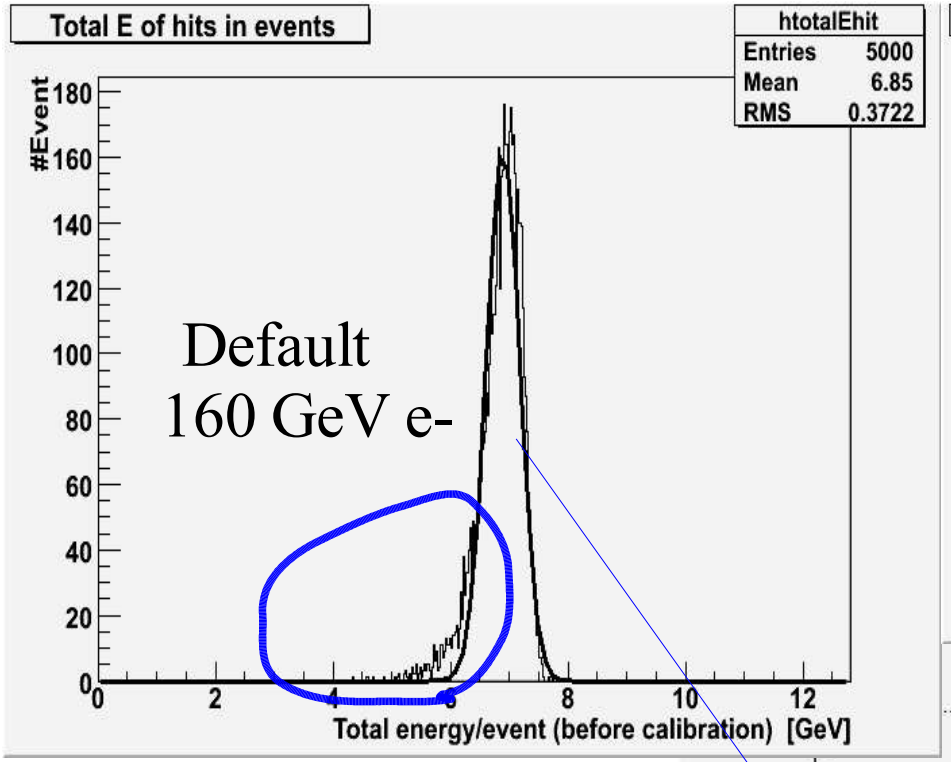




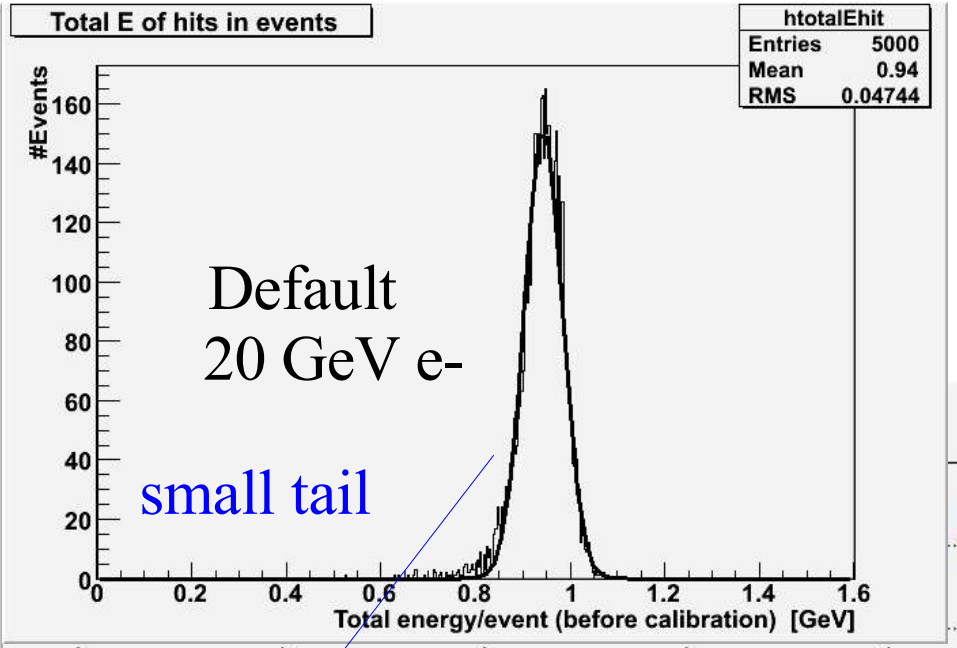
Significant tail

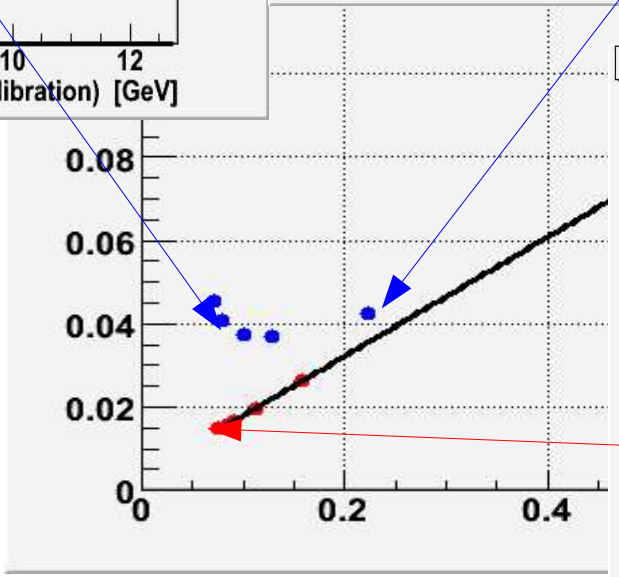


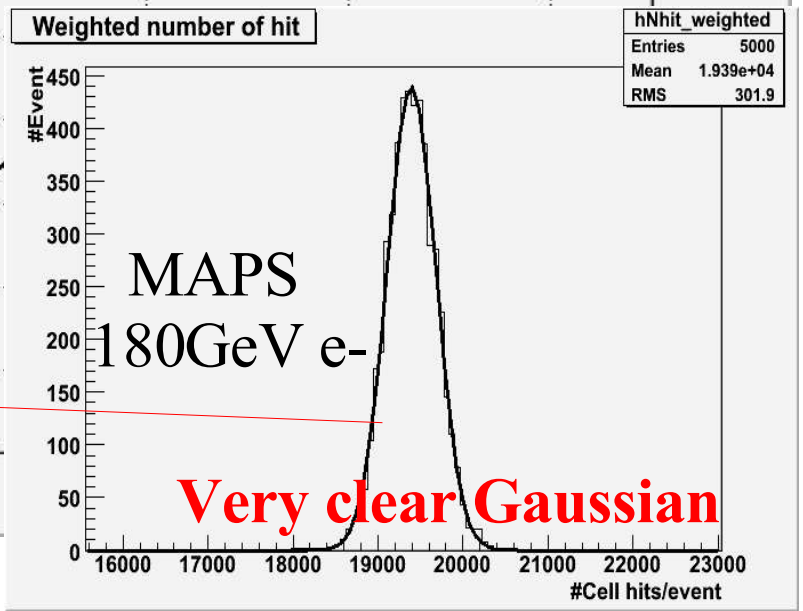
Energy resolution of default v.s. MAPS



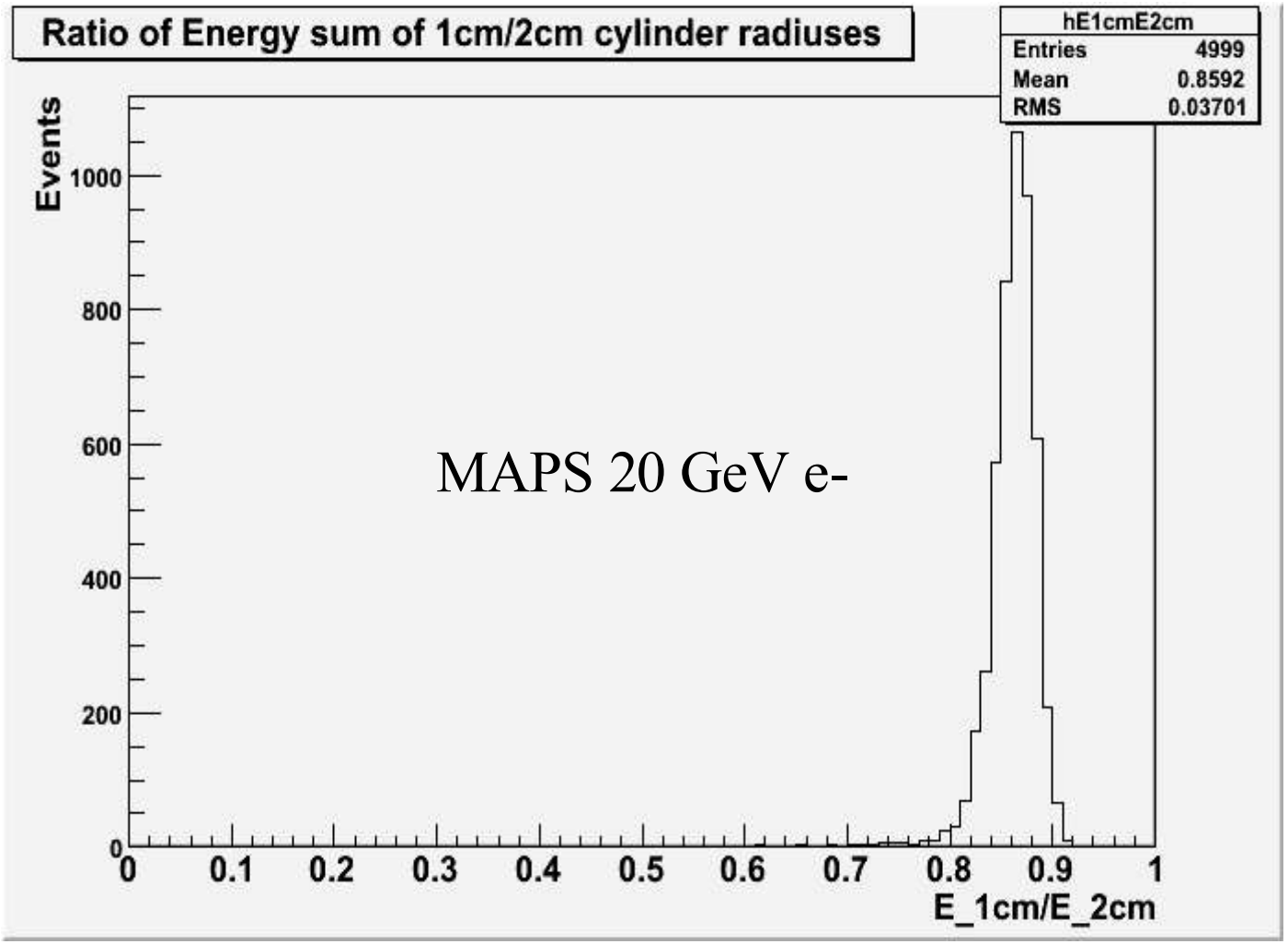
Significant tail







Transverse shower shape variable



->It can provide one PID variable. -> Will study with photon and hadrons.

Summary and comment

- Mokka-06-03-p02 MAPS Ecal02.cc is available.
  - Which is using hard-coded Si insensitive thickness.
  - Need database modification to make it parameter.
- The 2-3% bias on small cell would be due to Mokka or geant4 old version.
  - In order to confirm, events of small cell with latest Mokka is now generating.
- Energy resolution comparison between default v.s MAPS.

  ->Further study is necessary to understand.
- Personal comment for PFA with MAPS Ecal.
  - PFA = Tracking + Clustering + PID + matching + etc. -> Is it important to provide some likelihood PDF with MAPS ? (e.g. E_5mm/E_1cm, distance between tracks and Ecal cluster, etc.)