Brief Status of MAPS Geometry Simulation

6th June 2006

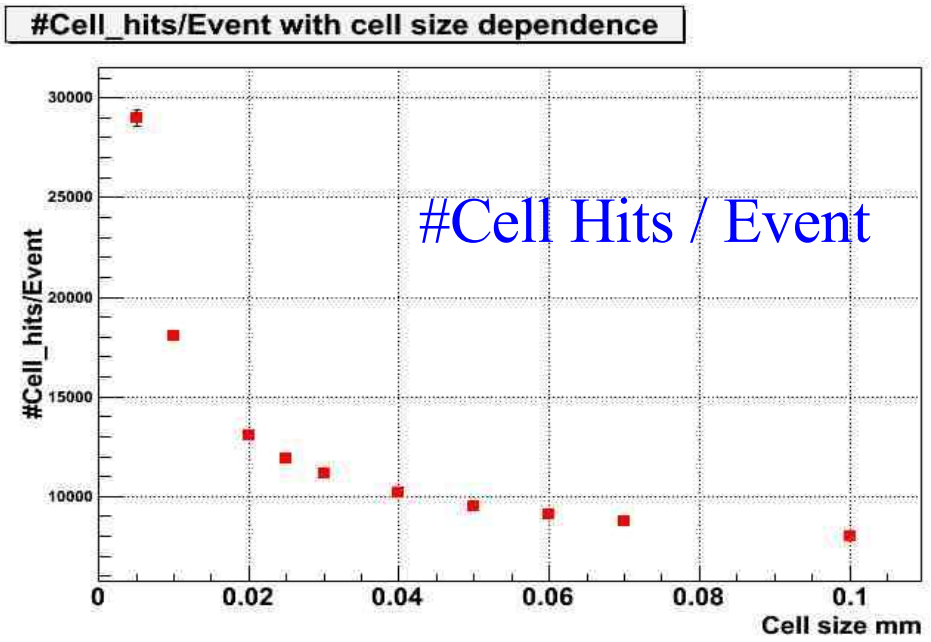
MAPS Meeting at Rutherford Appleton Laboratory

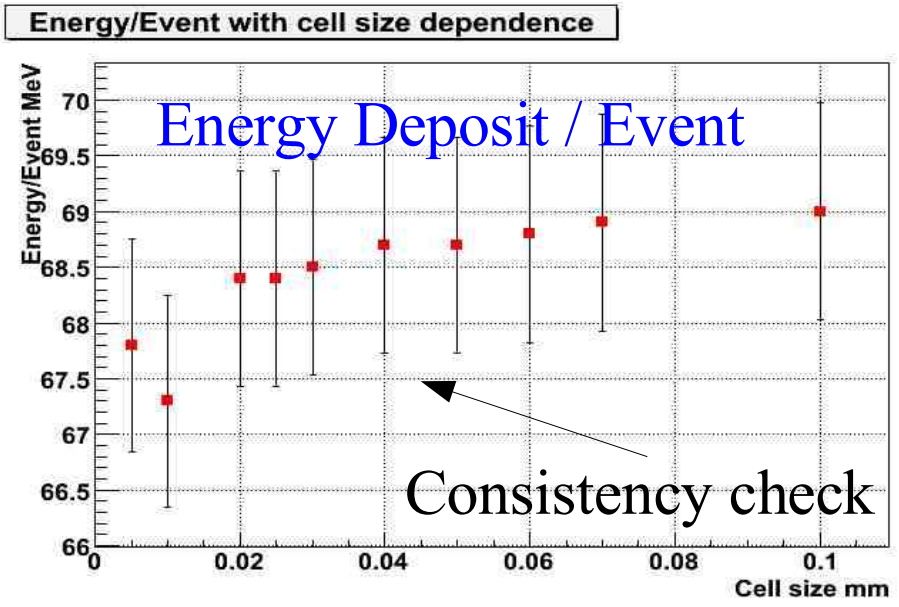
Yoshinari Mikami
University of Birmingham

Outline

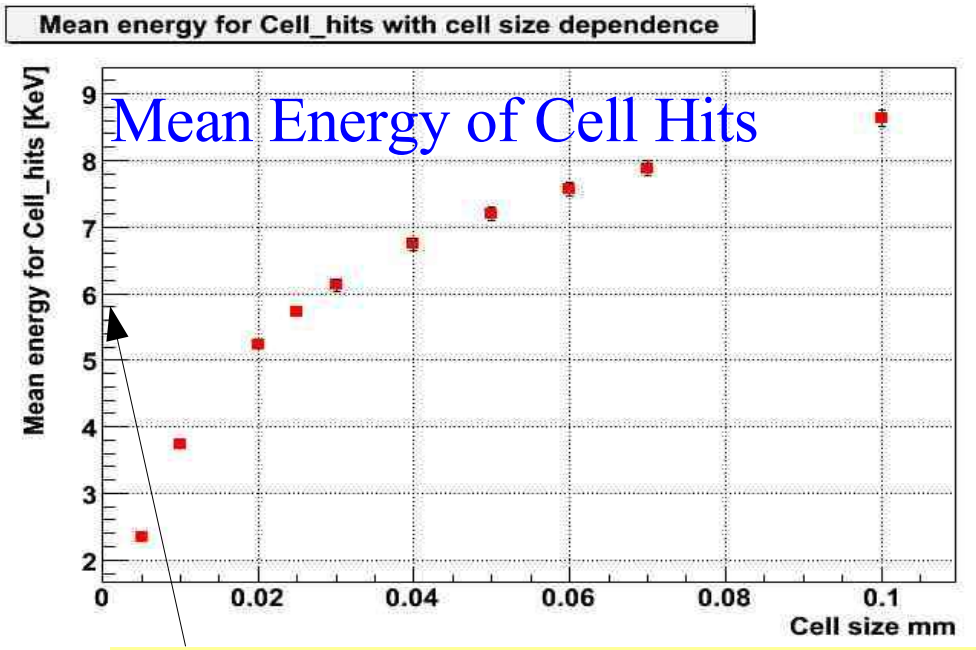
- Cell size dependence
  - 5μm x 5μm ~ 100μm x 100μm cell size
  - In default Encoder64.cc, it allows only up to 20μm cell devision because of its bit assignment.
  - Encoder64.cc code is modified to be available for 5μm.
- Small cell studies with single electron energy dependence
- Single muon energy deposit
  - Last study in 17th MAY 2006 slides contained HCAL hits also.
  - Geometry comparison with Ecal only distributions

Cell size dependence





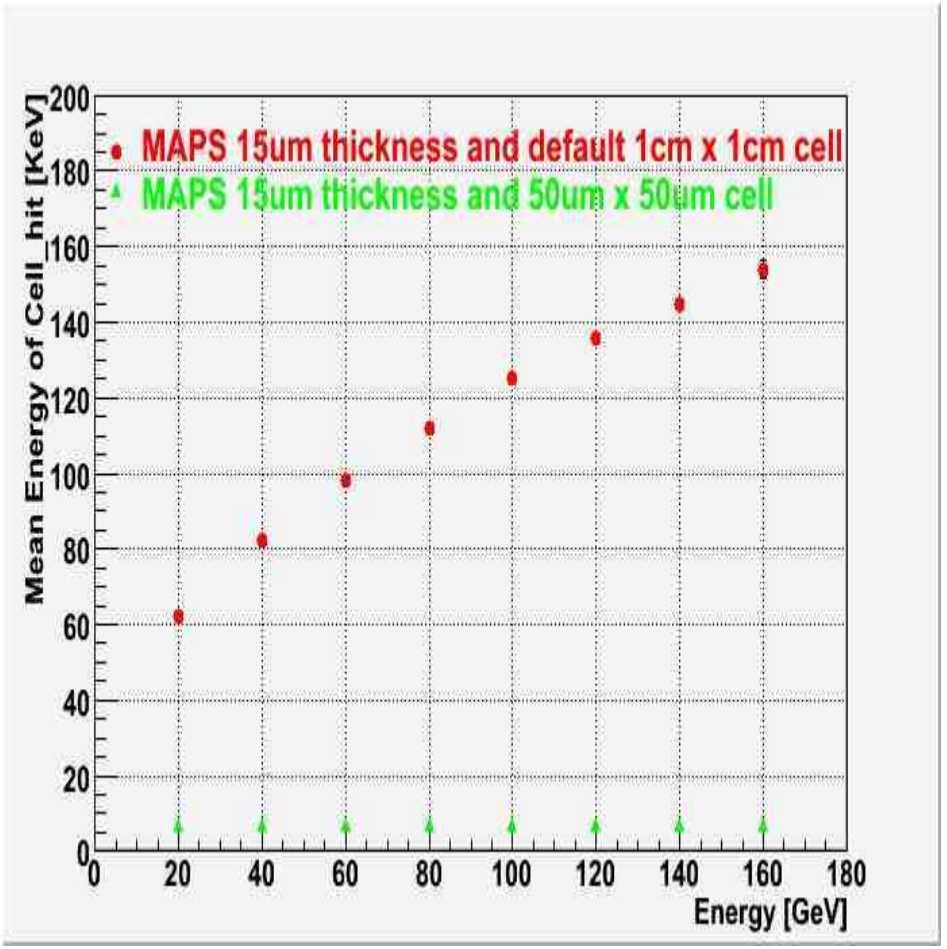
All plots are:
100 GeV Single e- 5,000 events
with sensitive thickness is 15μm.

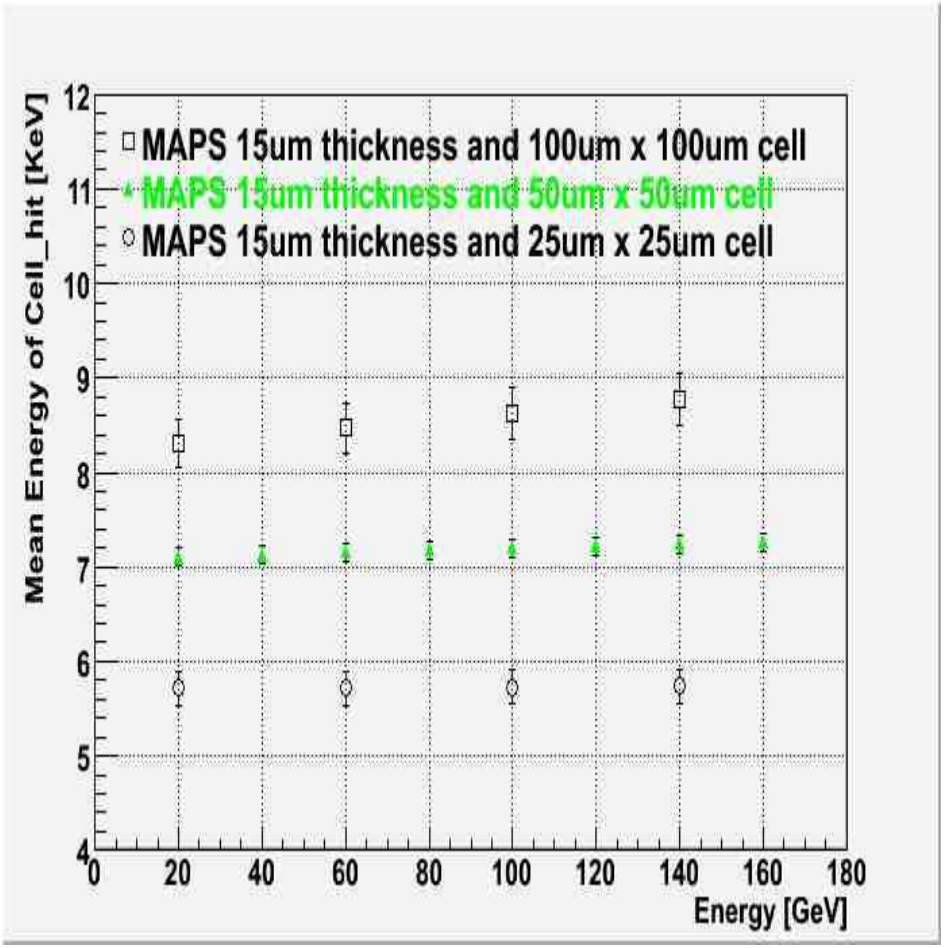


3.88 MeV/cm (Si dE/dx) x 15μm
= 5.82 KeV

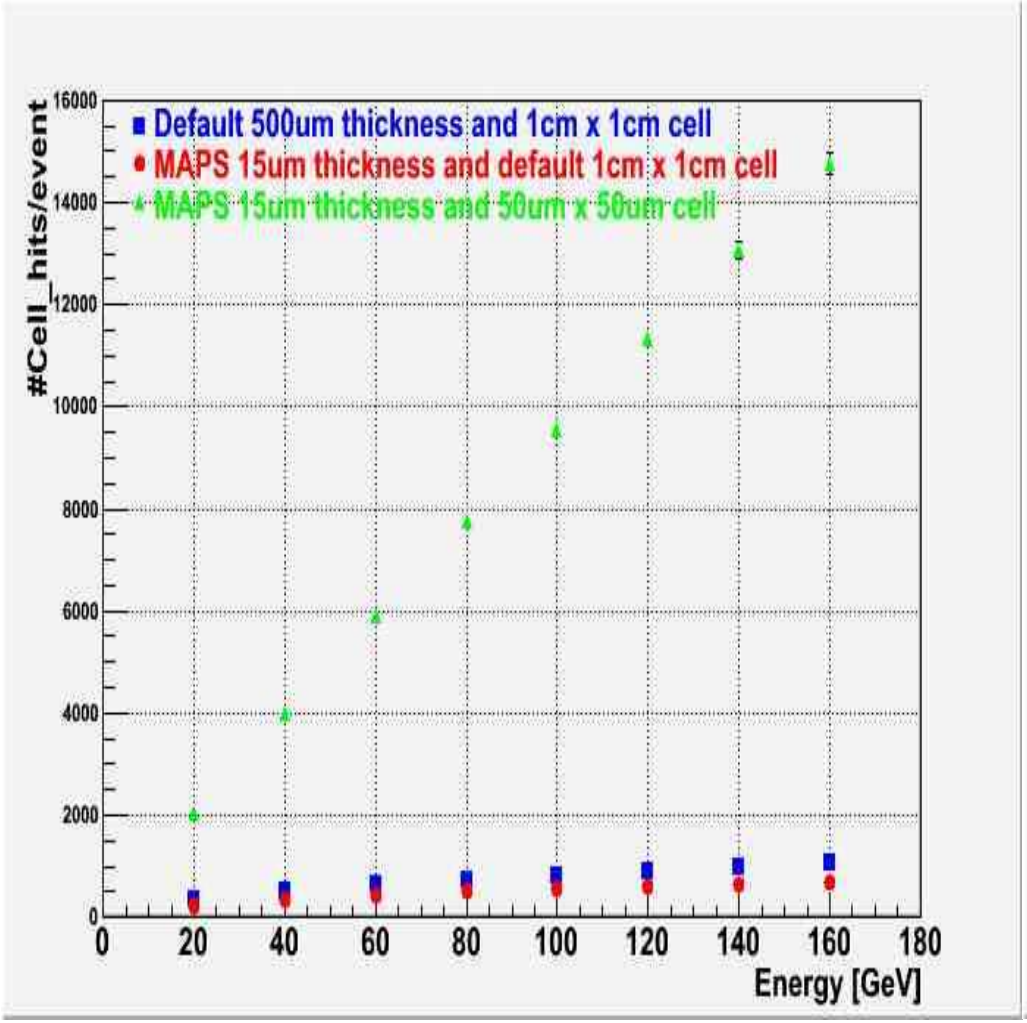
Pass length will be shorter than 15μm.

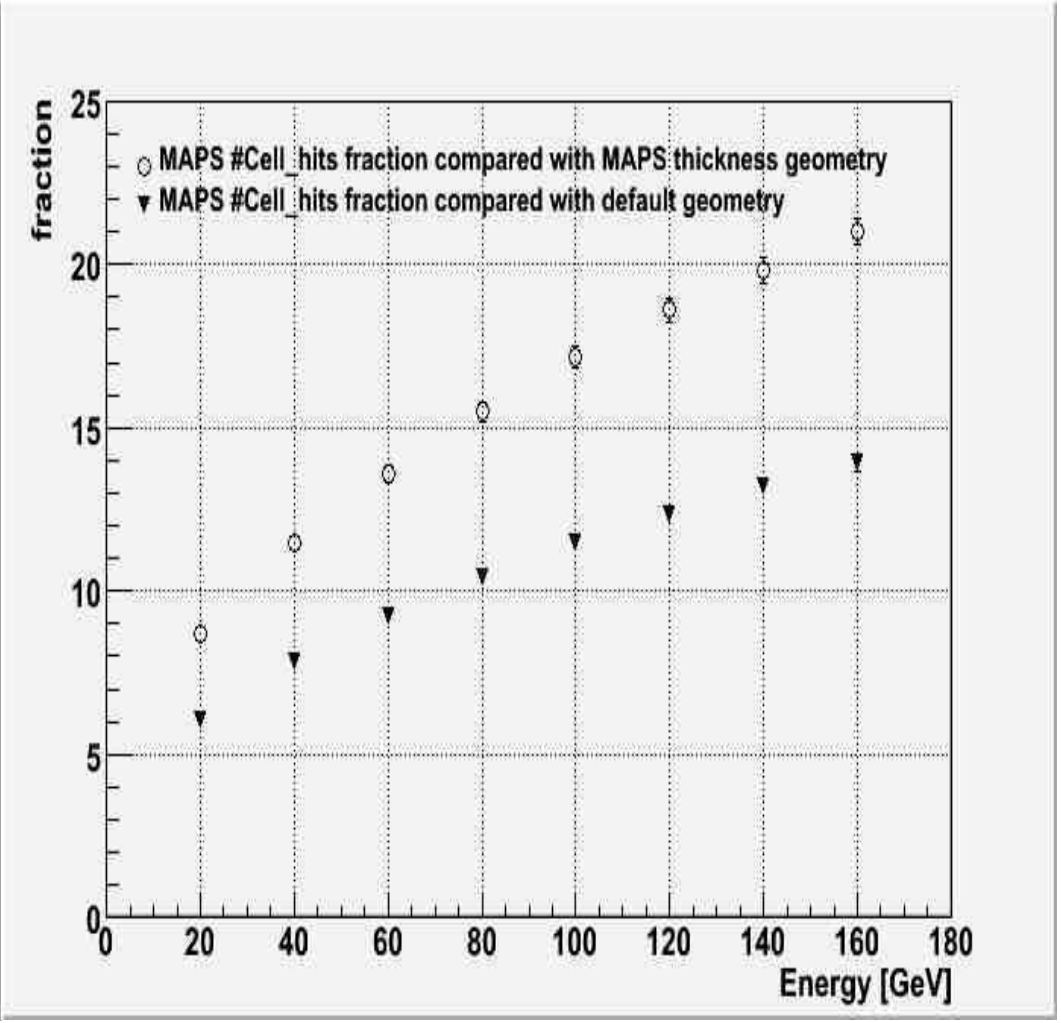
Mean Energy of Cell Hits
with
Incoming Single e- Energy dependence
& Cell size variation



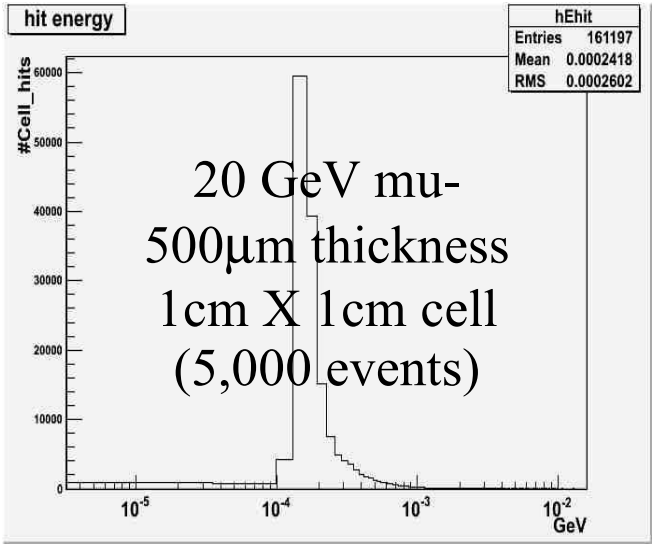


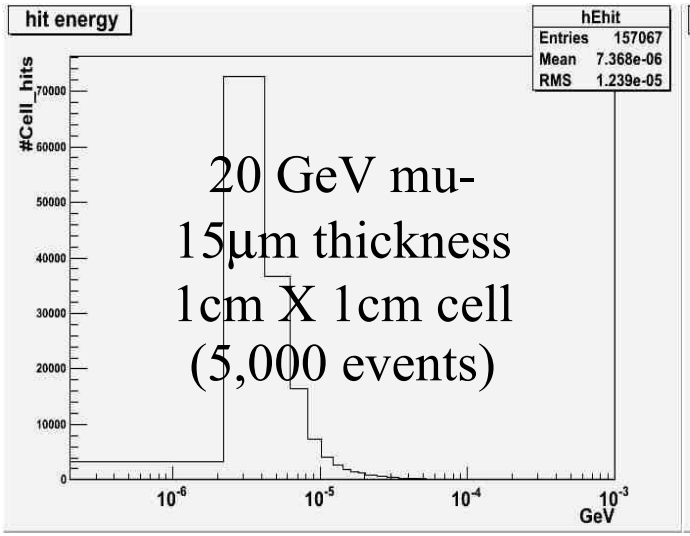
#Cell Hits / Event
with
Incoming Single e- Energy Dependence

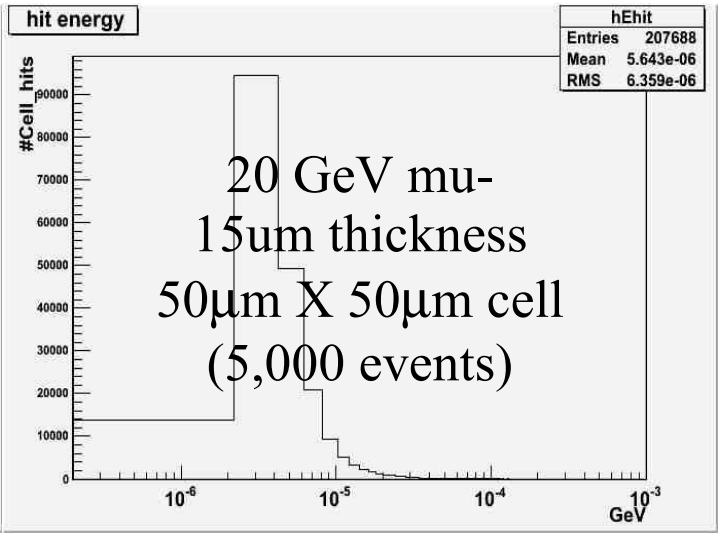




Single Muon Energy Deposit







- #Cell_hits / event

  32.2 +/- 0.5 (stat) 31.4 +/- 0.5 41.5 +/- 0.6

  [Agree with expect from 30 layers.]

- Mean energy of Cell_hits

  242 +/- 3 KeV 7.37 +/- 0.10 KeV 5.64 +/- 0.08 KeV

- Energy deposit / event

  7.79 +/- 0.11 MeV 231 +/- 4 KeV 234 +/- 4 KeV

MAPS_thickness/Default ratio for mean energy of Cell_hits = (3.05 +/- 0.06) %

MAPS/Default ratio for energy deposit per event = (2.97 +/- 0.06) %

Well agree with 3% thickness reduction.

Status and Future Prospects

- Status
  - MAPS Geometry (15μm thickness x 50μm x 50μm cell size) clearly shows single hit energy deposit in each cell.
- Next steps
  - MC study
    - #MIP's hits / cell
    - MIPs efficiency with angle dependenc
    - Pass length in cell.
  - Study with physics events.
- Future Prospect
  - Position/Energy resolutions.