Prototype Monte Carlo studies

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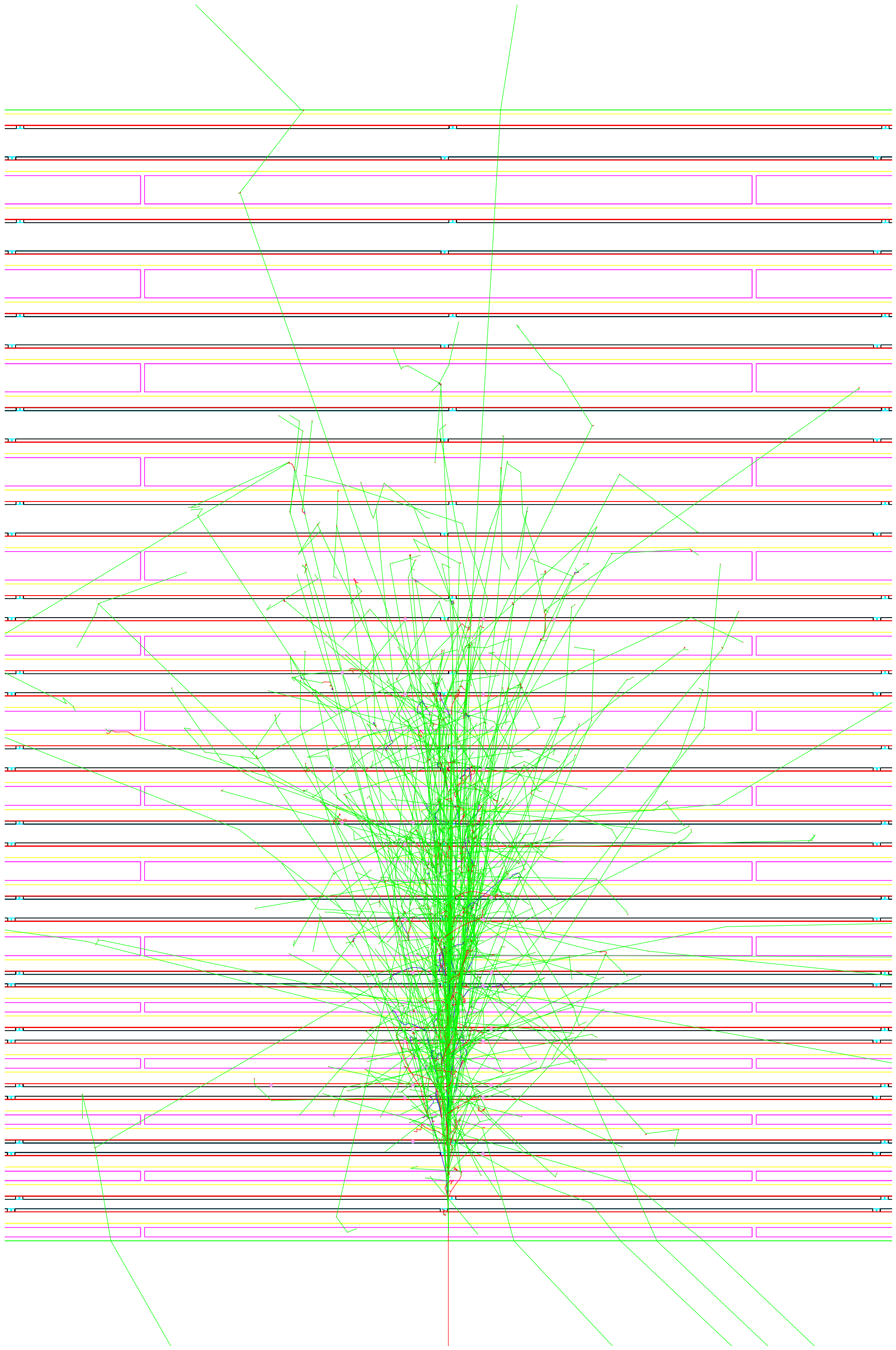
- Running prototype MC – get a feel for the data expected and make estimates of key parameters like event sizes etc.
- Installed Mokka-00-03 and Geant 4.4.0.
- A few problems – mainly related to Geant4 and mysql. Help gratefully received from Paolo Mora de Freitas
- Some problems with Geant4 crashes. Seem to relate to gcc/Linux versions.
- Output format (flat files) convenient and easy to use

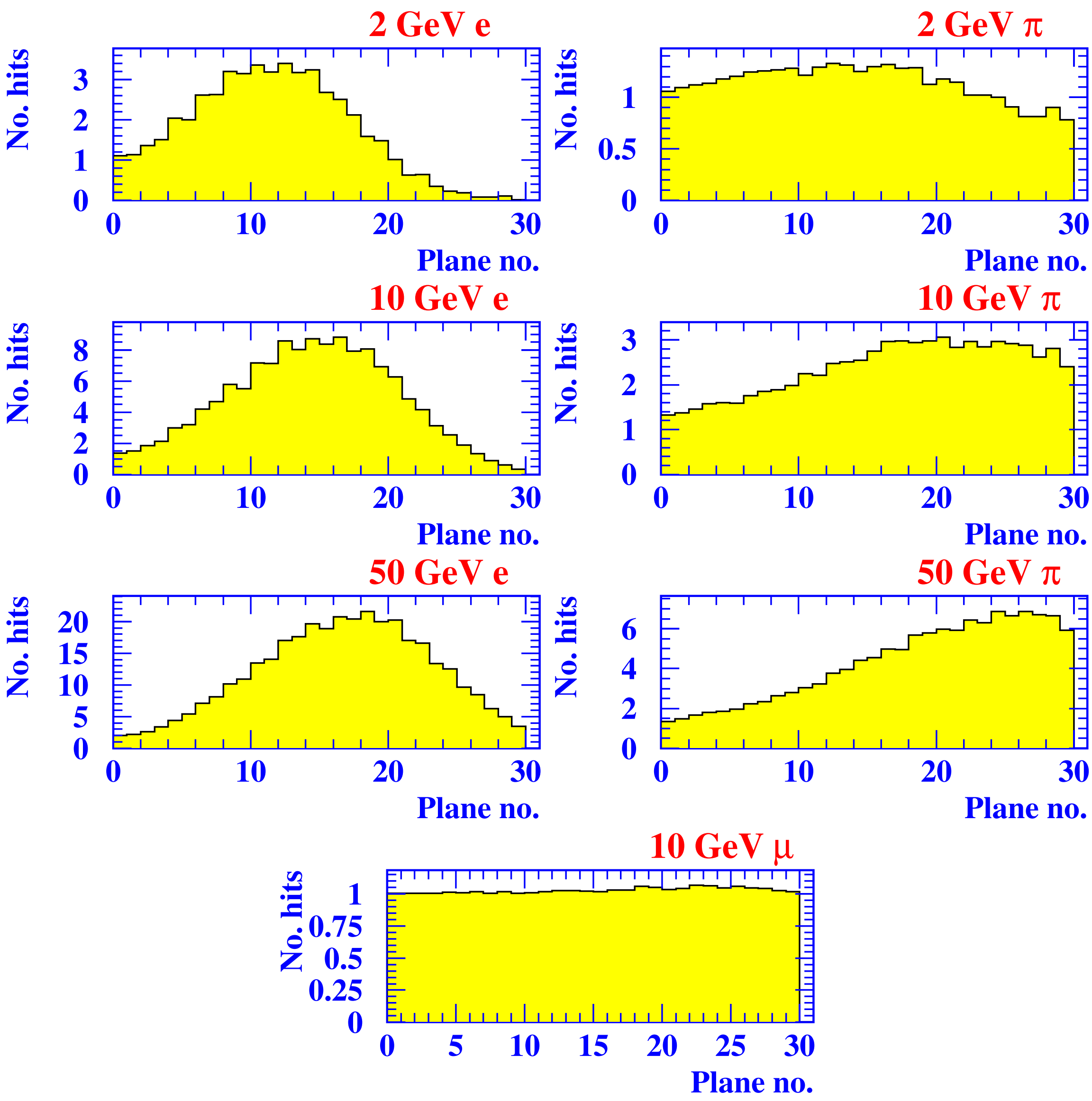
Samples

Generated small samples of 250 showers for e^- and π^- at 2, 10 and 50 GeV, and μ^- at 10 GeV. Model "P66".



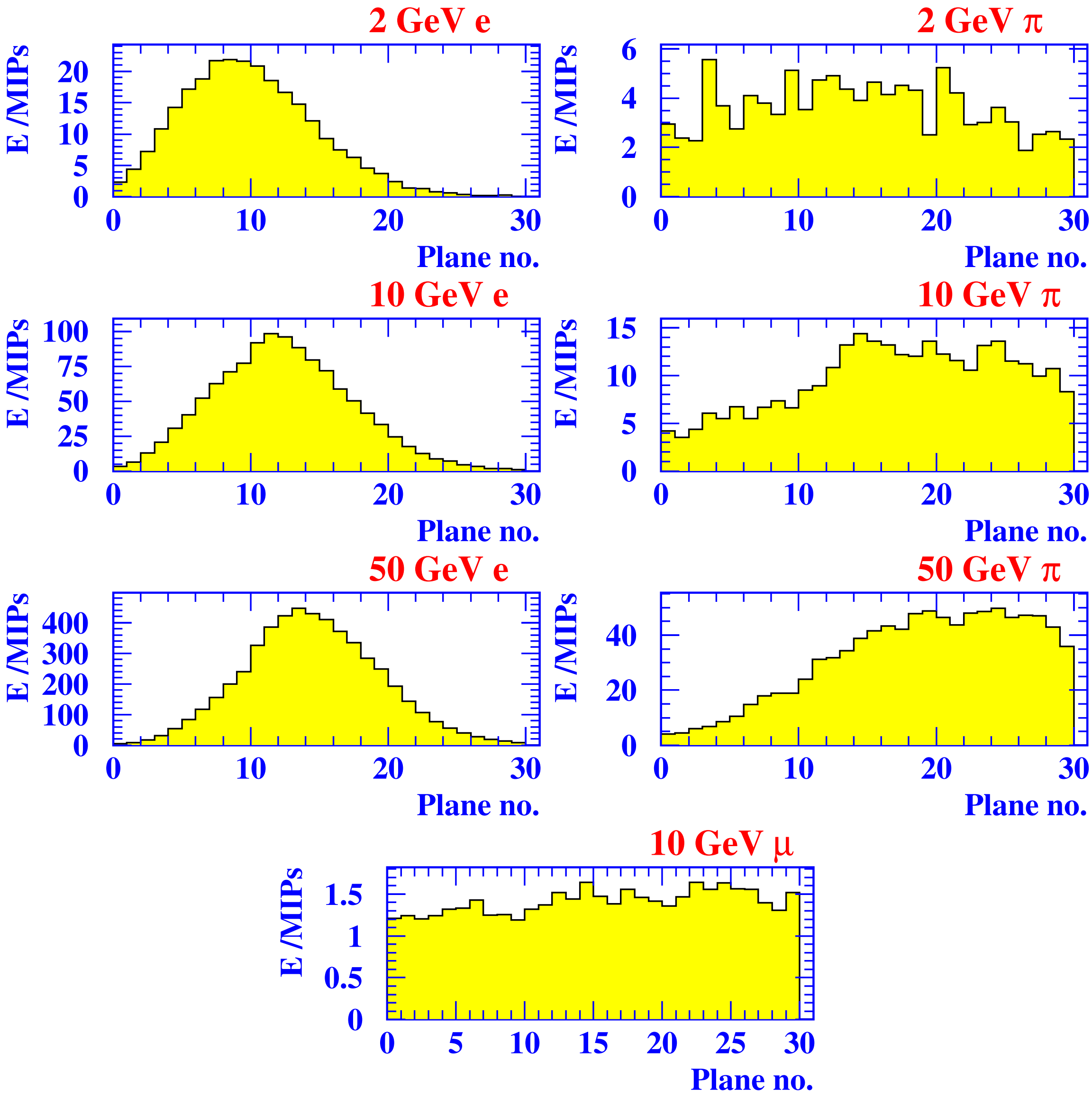
Longitudinal shower profile

$\langle N_{hits} \rangle$ vs. plane number (no threshold on pulse height).



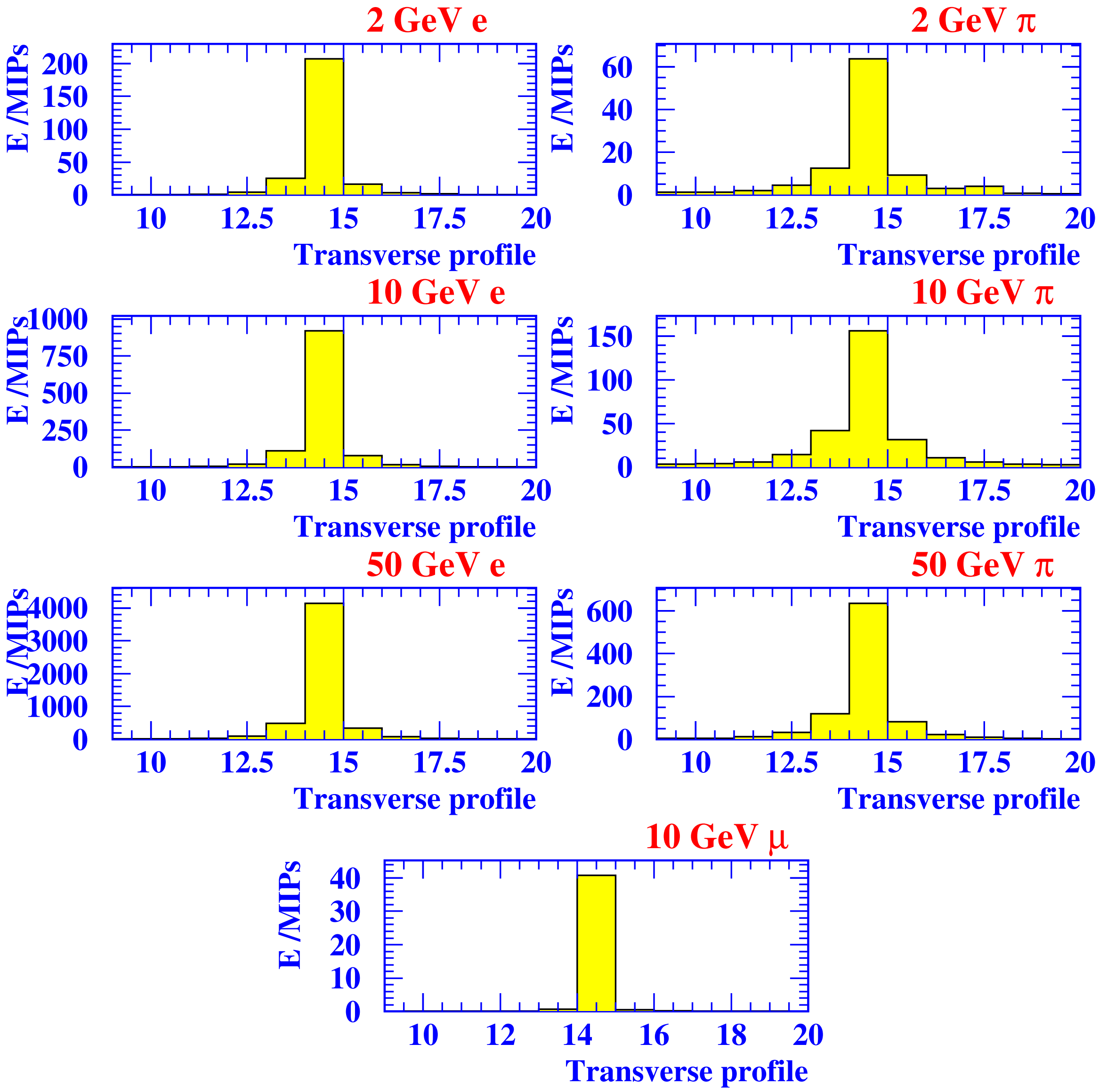
Longitudinal shower profile

$\langle E \rangle$ vs. plane number; normalized by MIPs defined from the peak of the μ^- sample.



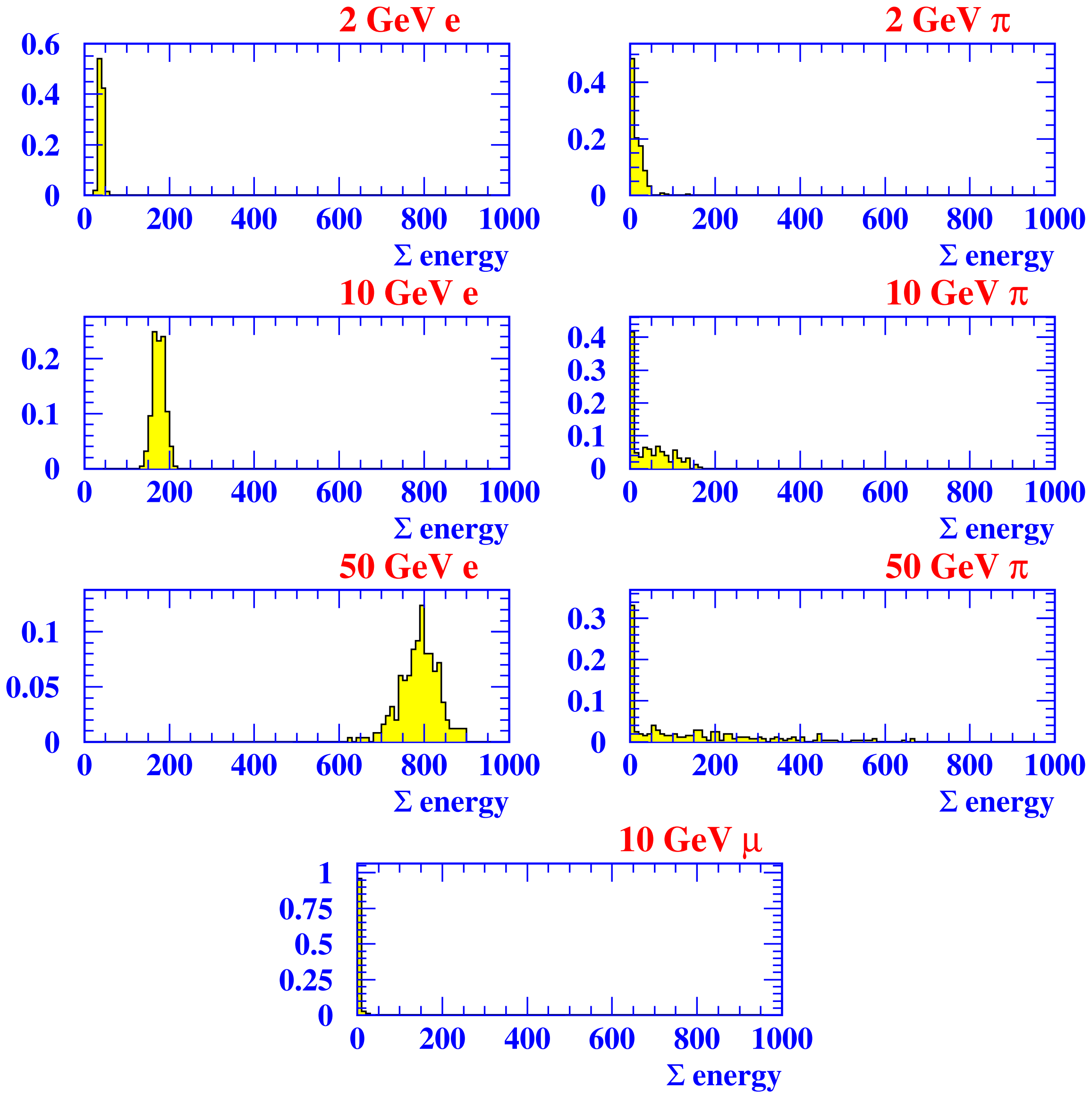
Transverse shower profile

$\langle E \rangle$ vs. transverse (horizontal) diode number; normalized by MIPs defined from the peak of the μ^- sample.



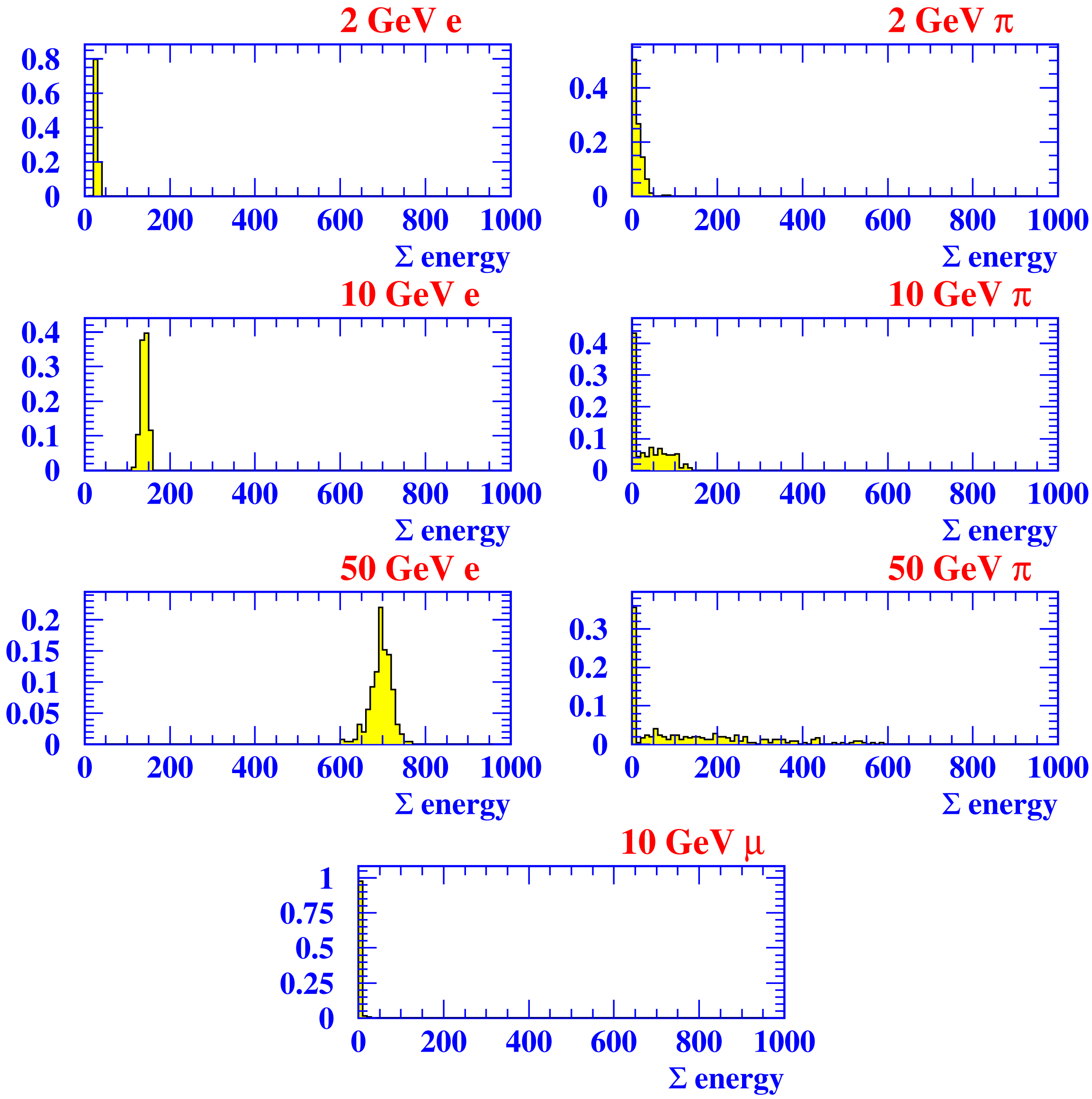
Total energy

Simple sum of energy deposited in diodes. (Units MeV; 1 MIP $\approx$ 0.15 MeV).



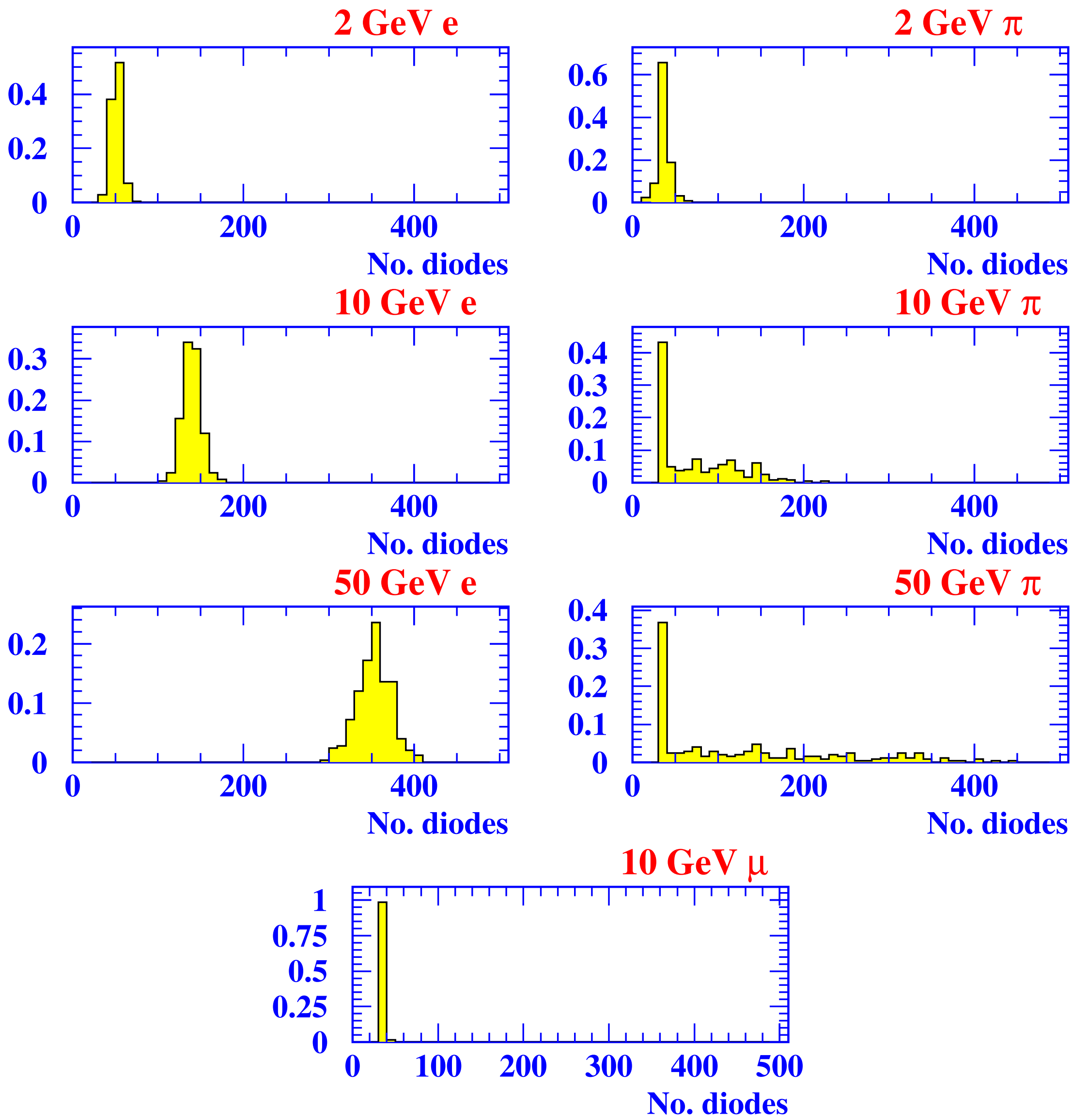
Total energy

Sum of energy deposited giving increased weight to layers 11-30 because of coarser sampling.



Number of hits

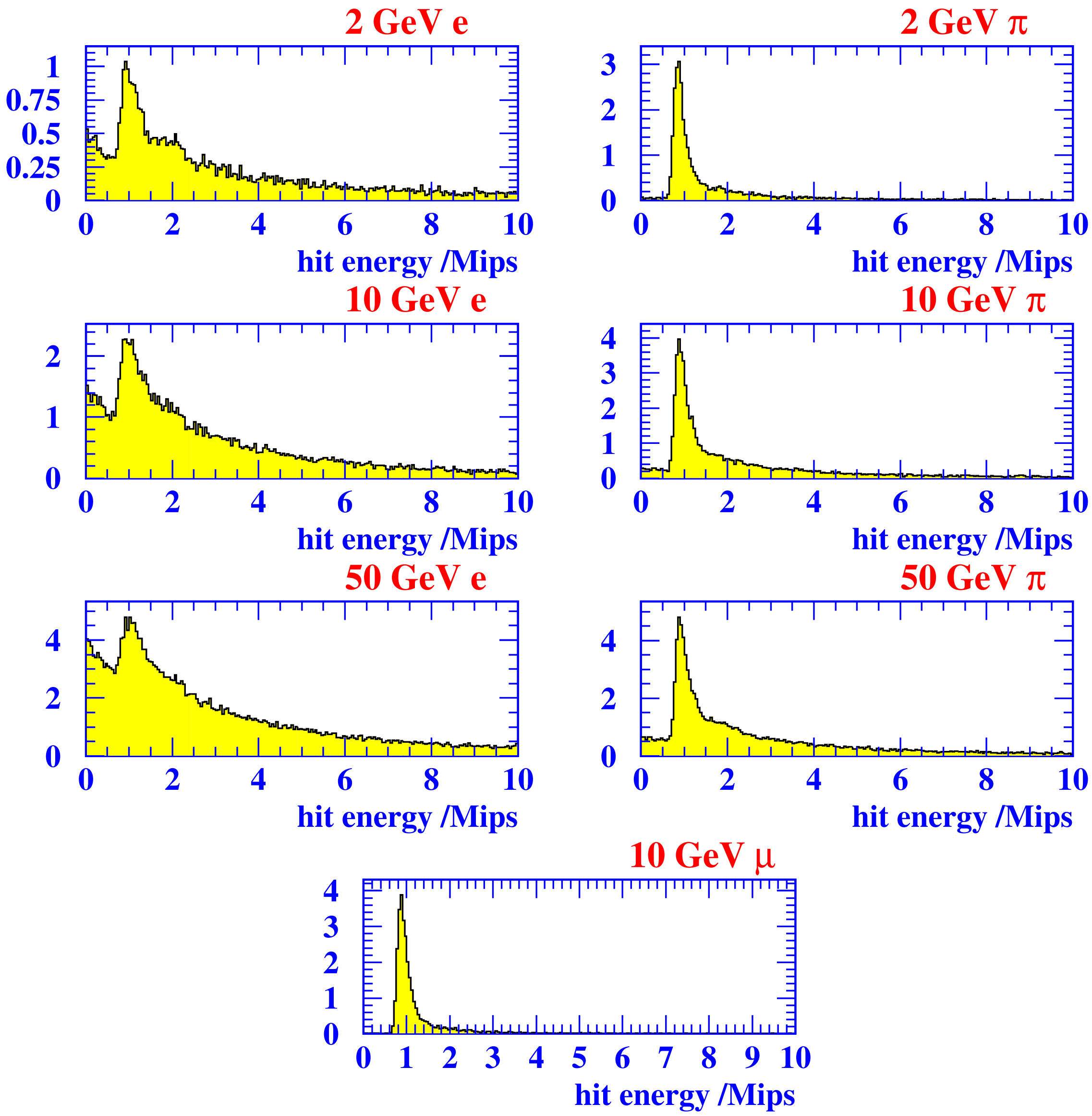
Total number of diodes hit; no threshold cut.



Reduced by up to 5% when making a 0.3 MIP cut (say).

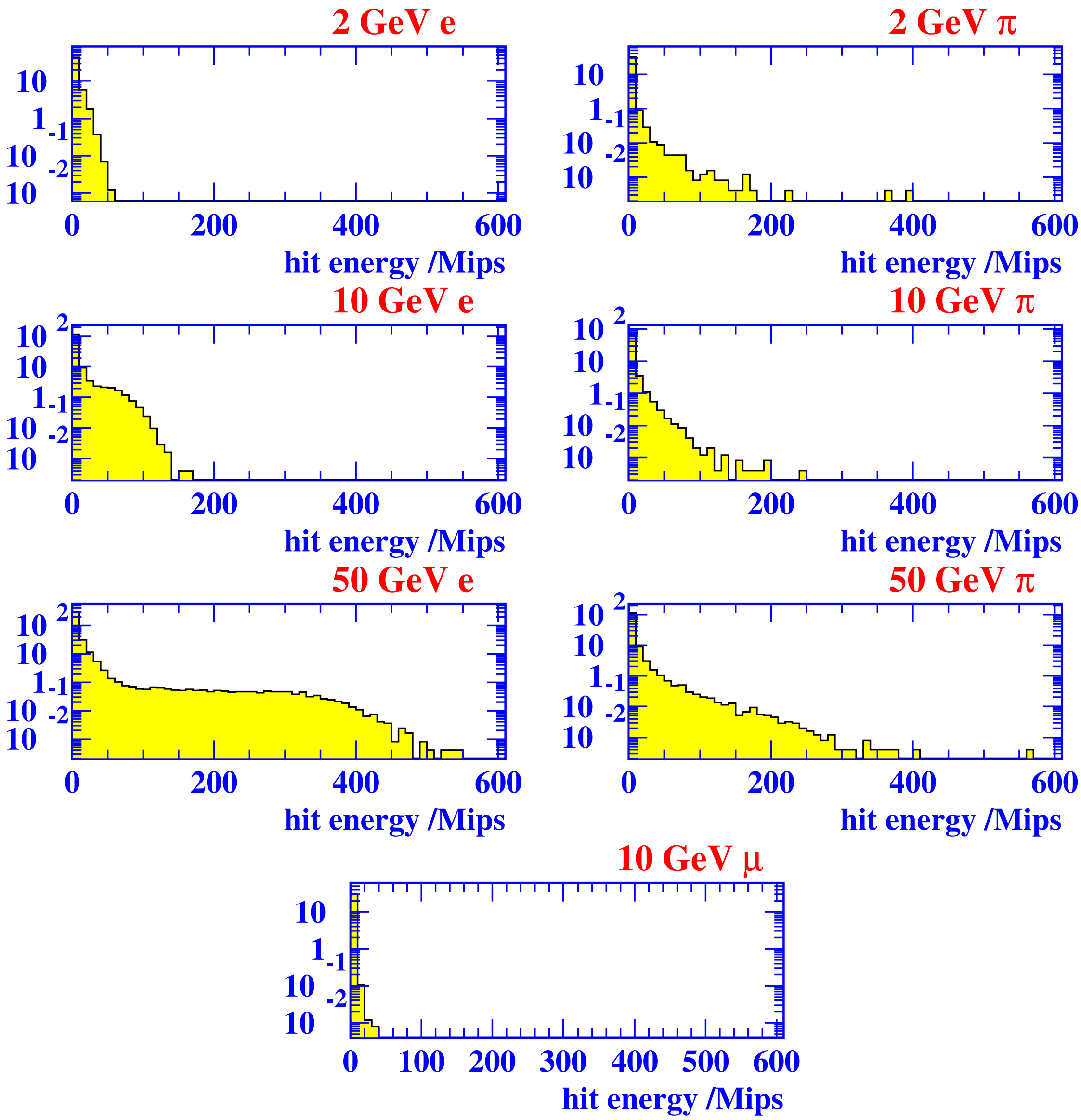
Hit energies

Energies of individual hits, in MIPs (defined from the peak of the μ^- sample).



Hit energies

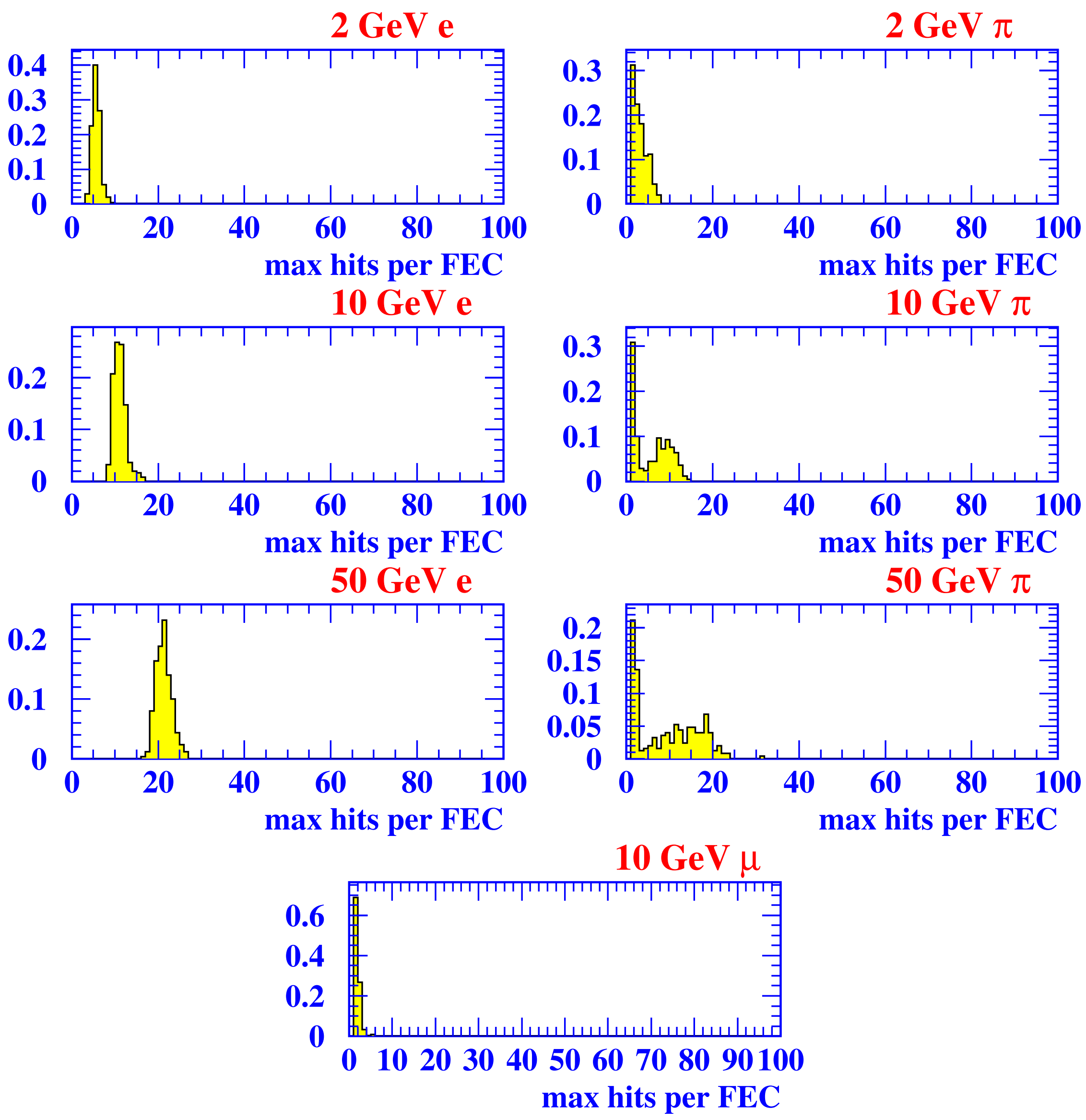
Energies of individual hits, in MIPs. Focussing on tail of distributions.



Need to anticipate signals up to a few hundred MIPs.

Hits per Front End Card

We are assuming each FEC will receive signals from 108 diodes on three wafers. If FECs are read out in parallel, data rate depends on maximum number of hits in any FEC in each event:



Further readout studies

Alternative readout scheme – each LIC reads 15 FECs in parallel; 6 LICs are read sequentially. Rate determined by sum over FECs which have maximum number of hits in each LIC.