



GLAST LAT project

Results from the GLAST CERN 2003 experiment Study of hadronic interactions

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Reminder...

Motivation : Background Rejection

- \Rightarrow Algorithms based on simulations...
- Goal : Benchmarking hadronic cascade simulation

 \Rightarrow Compare Geant4 simulations with CERN beam test data !

Data

- Bordeaux MiniCal : 8 Layers \times 6 Logs
- Italian Silicon Tracker : $2 \times (X,Y)$ Layers
- = 21.4X0 of **lead** to simulate GLAST tracker

Simulation

- Geant4 v6.2p01 standalone... using GHEISHA model
- Same geometry
- Gaussian beam on one log

Results 20GeV(1)

Simulation in RED - Threshold 50MeV - Linear Scale



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Results 20GeV(1)



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Results 20GeV(2)

Simulation in RED - Threshold 50MeV - Log Scale

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RMS of longitudinal profiles

RMS =
$$\sqrt{\frac{1}{8} \sum_{i=1}^{i=8} (E_i - \langle E \rangle)^2}$$

- Discrepency between longitudinal profile RMS
- No discrepency found for electrons
- ELayerMax : Maximum Energy Deposit in a layer for a longitudinal profile

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Conclusion

- Geant4 simulation of hadronic cascades reproduces our data well at 20GeV (also true at 10GeV)
- The same simulation also gives good agreement for EM showers
- Main difference : Dispersion in nuclear-cascade energy deposits is greater in data than in simulation... better this way than the other way round!

Further work

- \Rightarrow Any other Geant4 nuclear-cascade package to test ?
- \Rightarrow Testing Geant4 at lower energy : GSI beam test data