Muons in Atlas TileCal

G4 vs G3 vs TB

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Geant4 vs Geant3 and TB

- **G4 version** : Geant4.4.1 (QGSP_1)

- **G4 range cut** :   0.1 mm

- **G3** : from Tomas Davidek

- Data calibration was performed using electrons (both MC and TB)
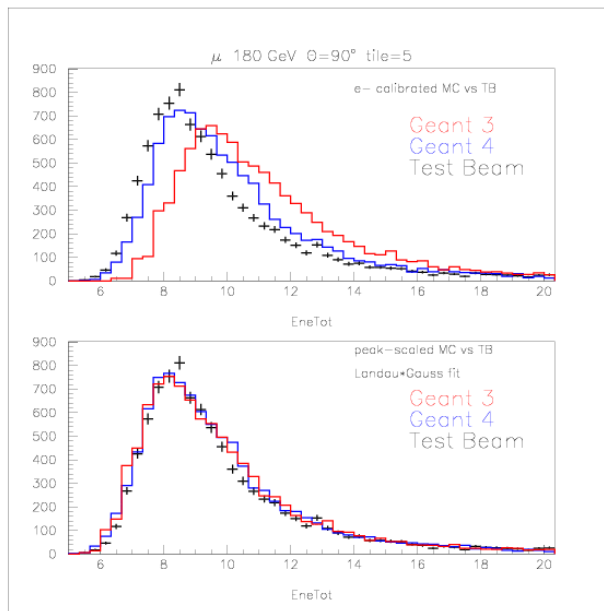
  and Landau*Gauss fit (which is better than Moyal fit)

Muons at $\theta = $ -90 deg

- Energy 180 GeV
- Tilerow 5
- Photostatistics effects: 40 pe/GeV

  (in production barrel cells)

θ = -90 deg , tilerow 5, energy 180 GeV

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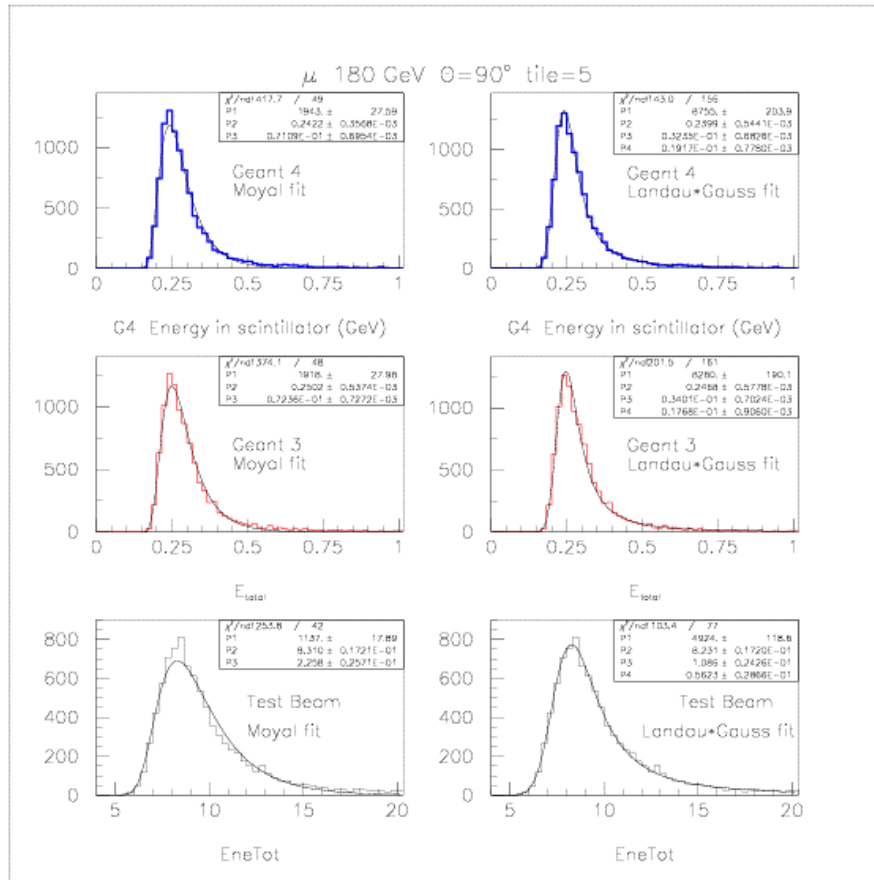
θ = -90 deg , tilerow 5, energy 180 GeV

Muons at 90 degrees

Top plot – normalization with 20
GeV electrons
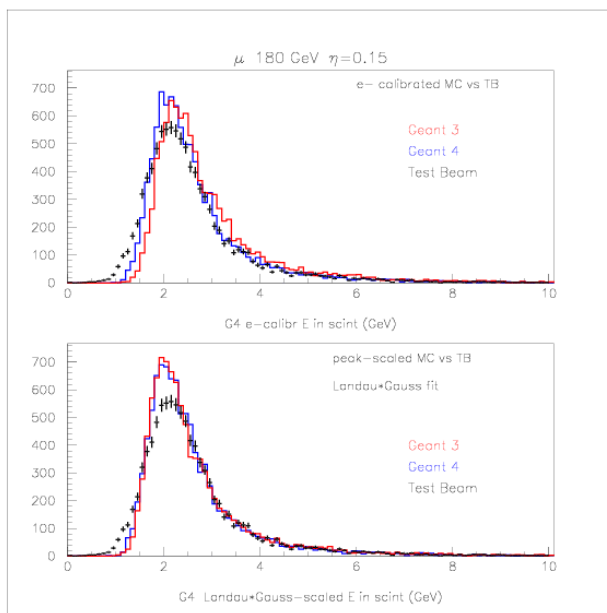
Bottom plot – normalization with
muon peak

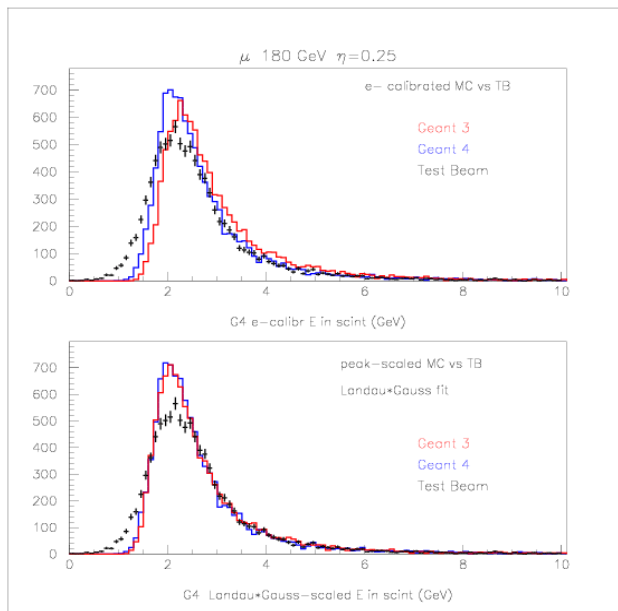G4 better predicts TB data

Muons: eta-scan

- Energy 180 GeV

$\eta = 0.15, 0.25, 0.35, 0.55, 0.65, 0.75$

- Photostatistics effects: 53 pe/GeV

- Next slides:

  - Top plot – normalization with 20 GeV electrons

  - Bottom plot – normalization with muons at $\eta = 0.35$
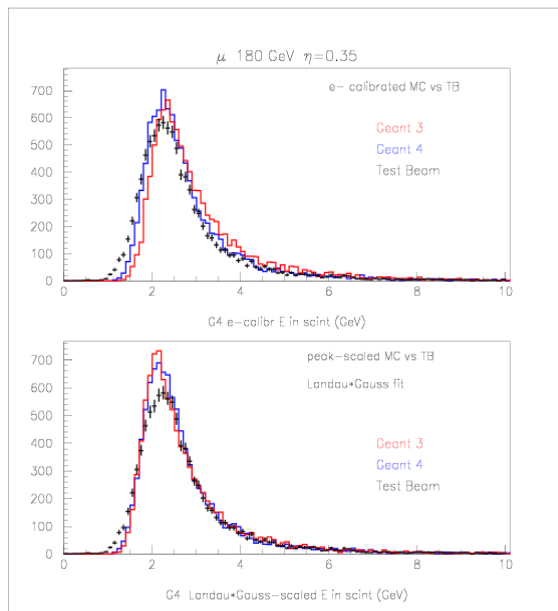
  - Fit is made with Landau*Gauss convolution
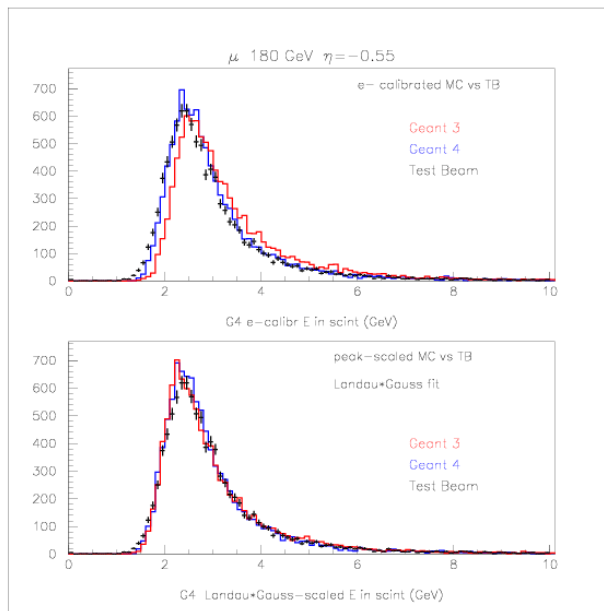
$\eta = 0.15$
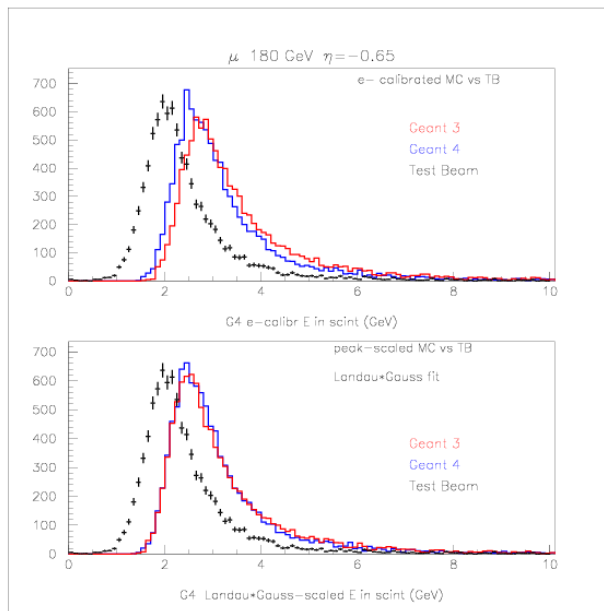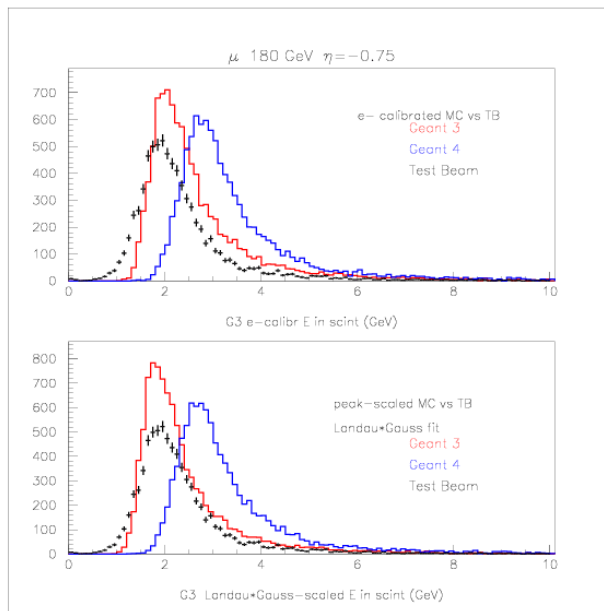
- G4 better simulates data

η= 0.25

- G4 is better

$\eta = 0.35$

- G4 is better

η= 0.55
- G4 is better

$\eta = 0.65$

- Both G4 and G3
  do not succeed in
  predicting TB data,
  but G4 seems to be
   better

$\eta = 0.75$

- G4 fails

Conclusions and Future Plans

- G4 predicts better the TB data

- But situation is unclear at large η

- Problems with e- calibration

- Simulation at different energies & η

- Optimization of range/energy cuts