Muons in Atlas TileCal

G4 vs G3 vs TB

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Geant4 vs Geant3 and TB

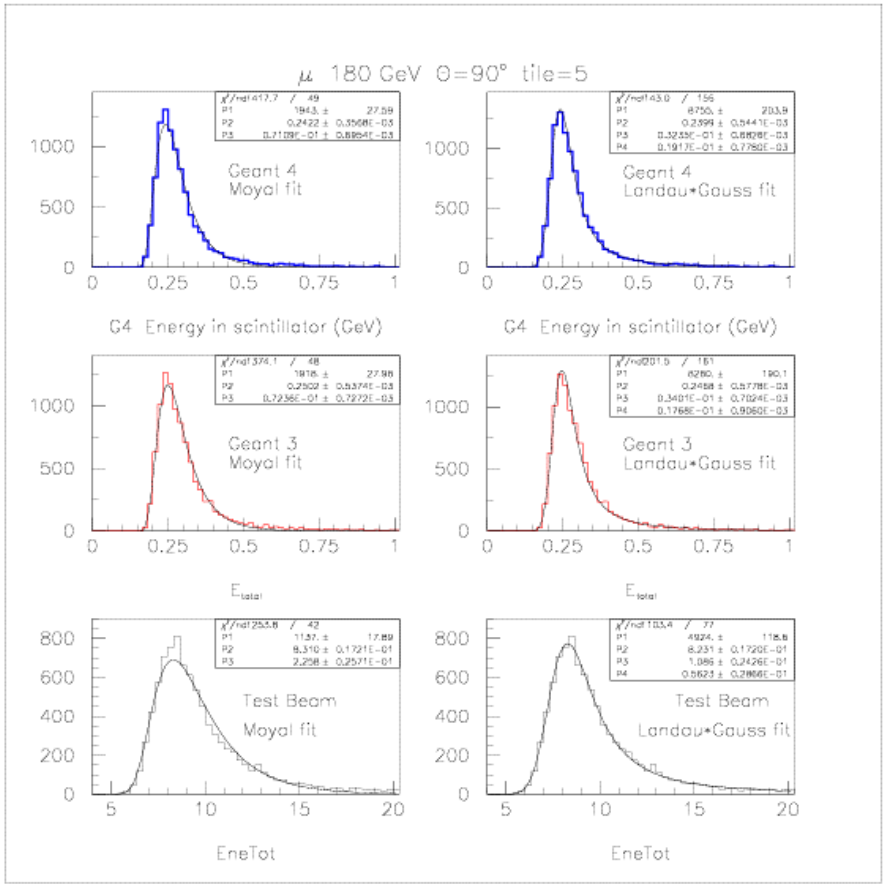
- **G4 version** : Geant4.4.1 (QGSP_1)
- **G4 range cut** : 0.1 mm
- **G3** : from Tomas Davidek
- Data calibration was performed using electrons (both MC and TB)

  and Landau*Gauss fit (which is better than Moyal fit)

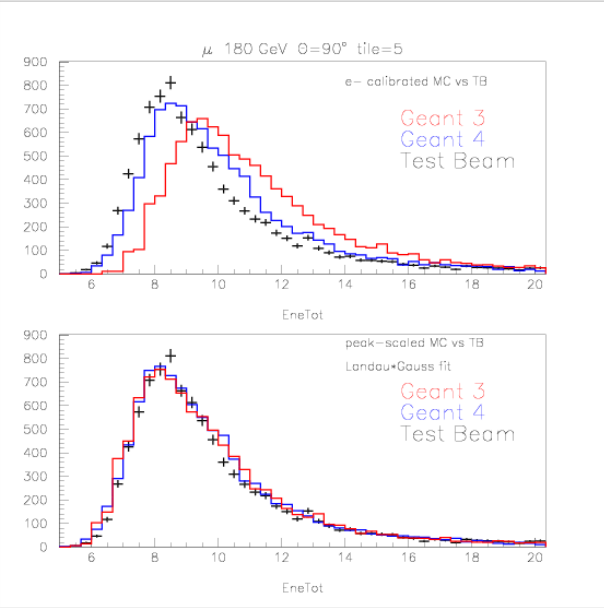
Muons at $\theta = -90$ deg

- Energy 180 GeV
- Tilerow 5
- Photostatistics effects: 40 pe/GeV
  (in production barrel cells)

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



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

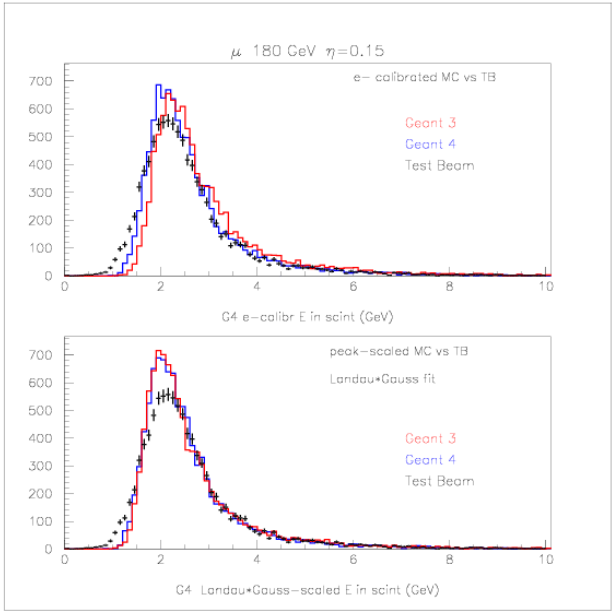
G4 better predicts TB data

Muons: eta-scan

- Energy 180 GeV

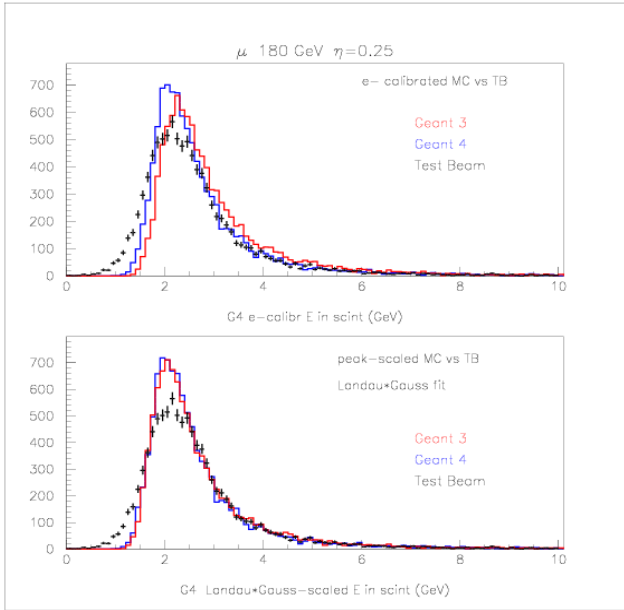
η= 0.15, 0.25, 0.35, 0.55, 0.65, 0.75

- Photostatistics effects: 53 pe/GeV
- Next slides:
  - Top plot – normalization with 20 GeV electrons
  - Bottom plot – normalization with muons at η= 0.35
  - Fit is made with Landau*Gauss convolution



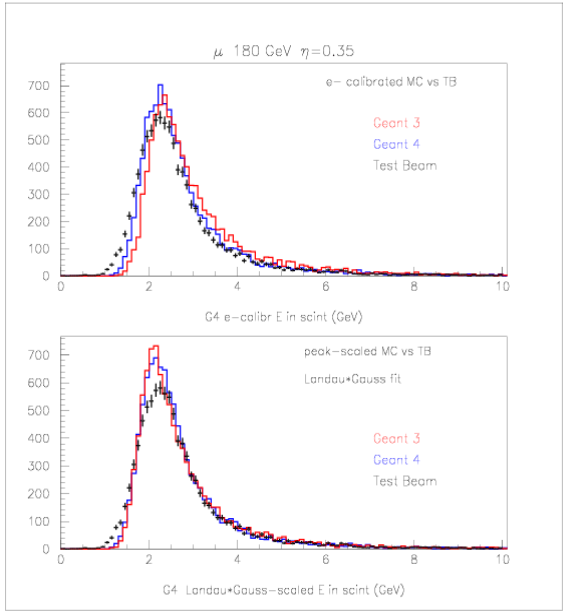
$\eta = 0.15$

- G4 better simulates data



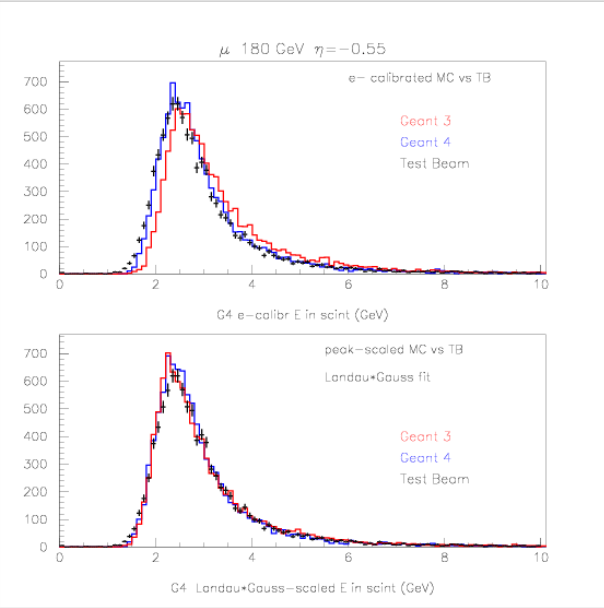
η= 0.25

- G4 is better



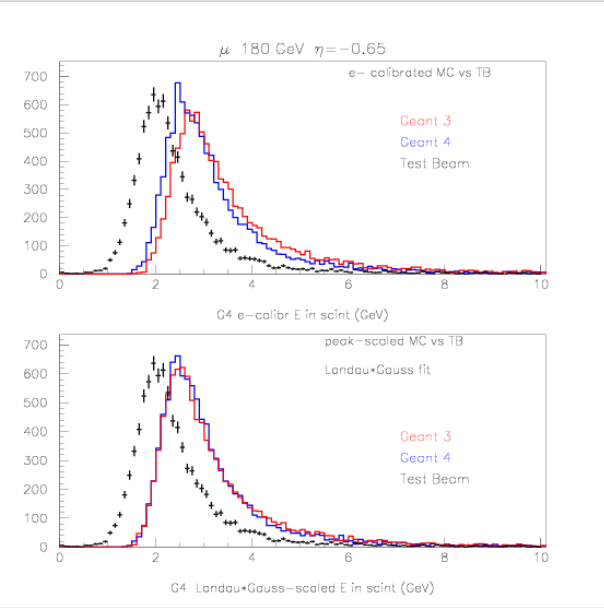
$\eta = 0.35$

- G4 is better



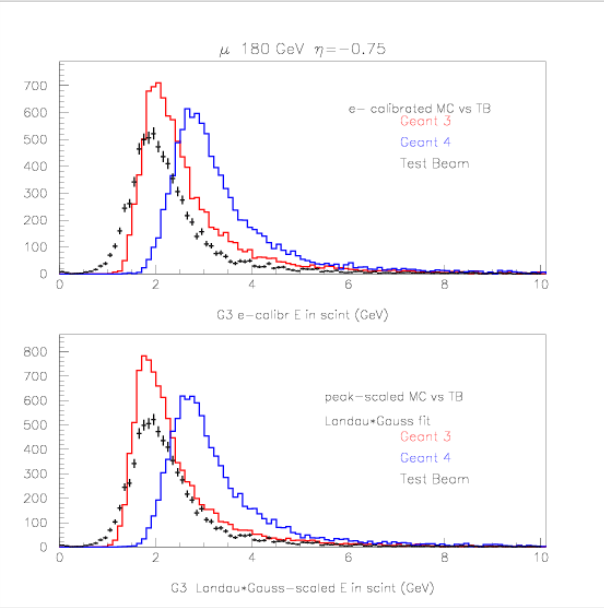
η= 0.55

- G4 is better



η= 0.65

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



η= 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