

Geant4 requirements from LHC

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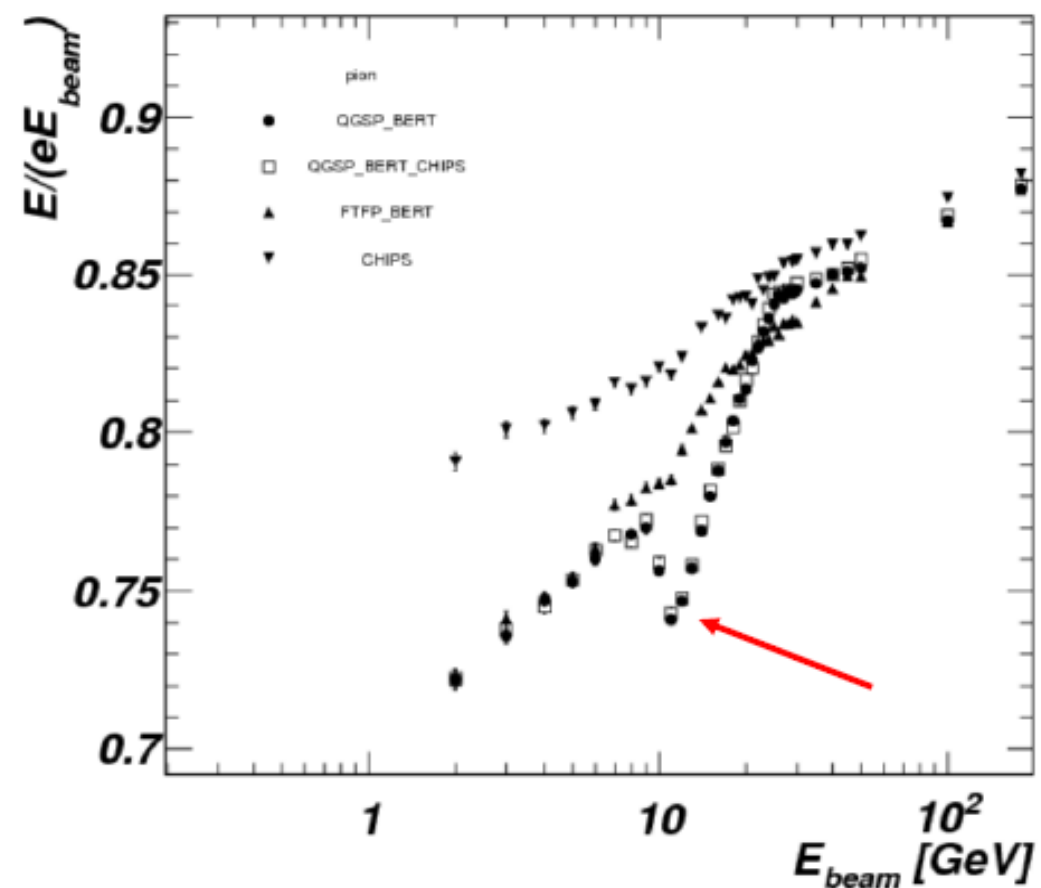
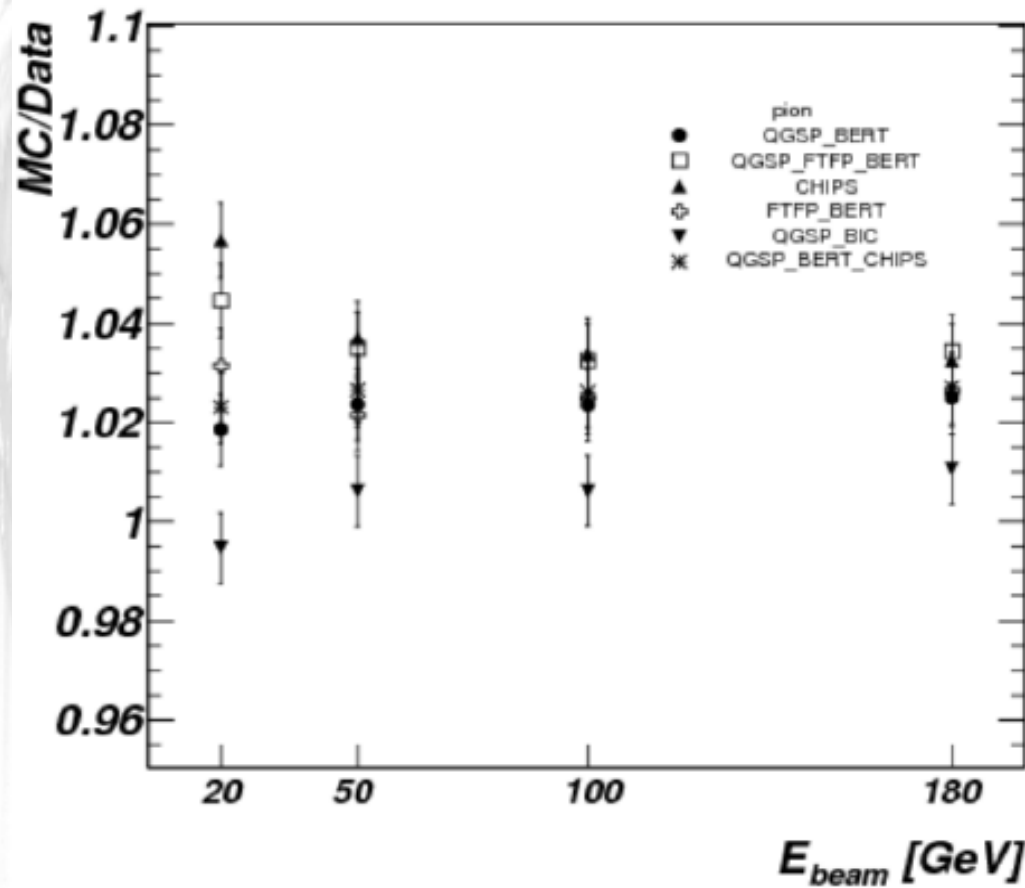
CERN PH/SFT

Geant4 Collaboration meeting, SLAC, 21-Sep-2011

Calorimeter observables

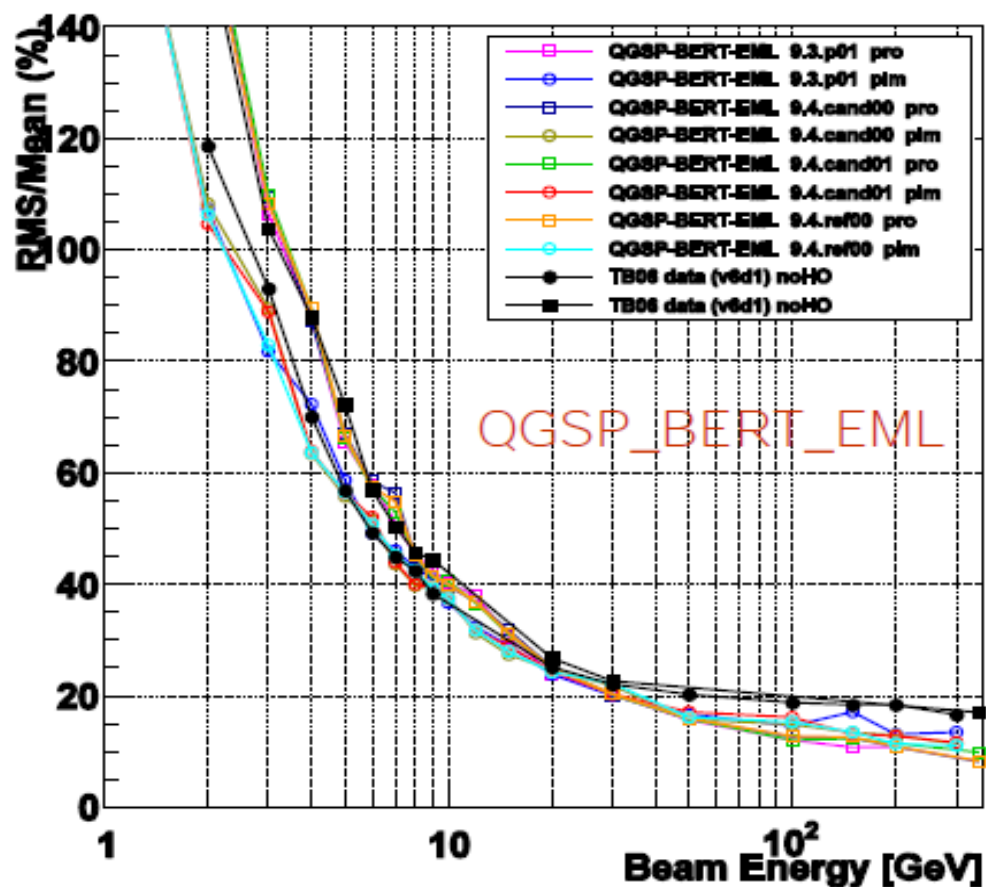
- Energy response: within **few %**
 - Energy resolution: too optimistic (narrower) by **~ 10%**
 - Longitudinal shower profile: **~ 10%** shorter / longer for pions for QGSP_BERT / FTFP_BERT ; worse (**~20%**) for protons
 - Lateral shower profile: narrower than data by **10 ÷ 20 %**
- NB) Electromagnetic showers: **few %** narrower than data

ATLAS TileCal test-beam energy response, G4 9.4

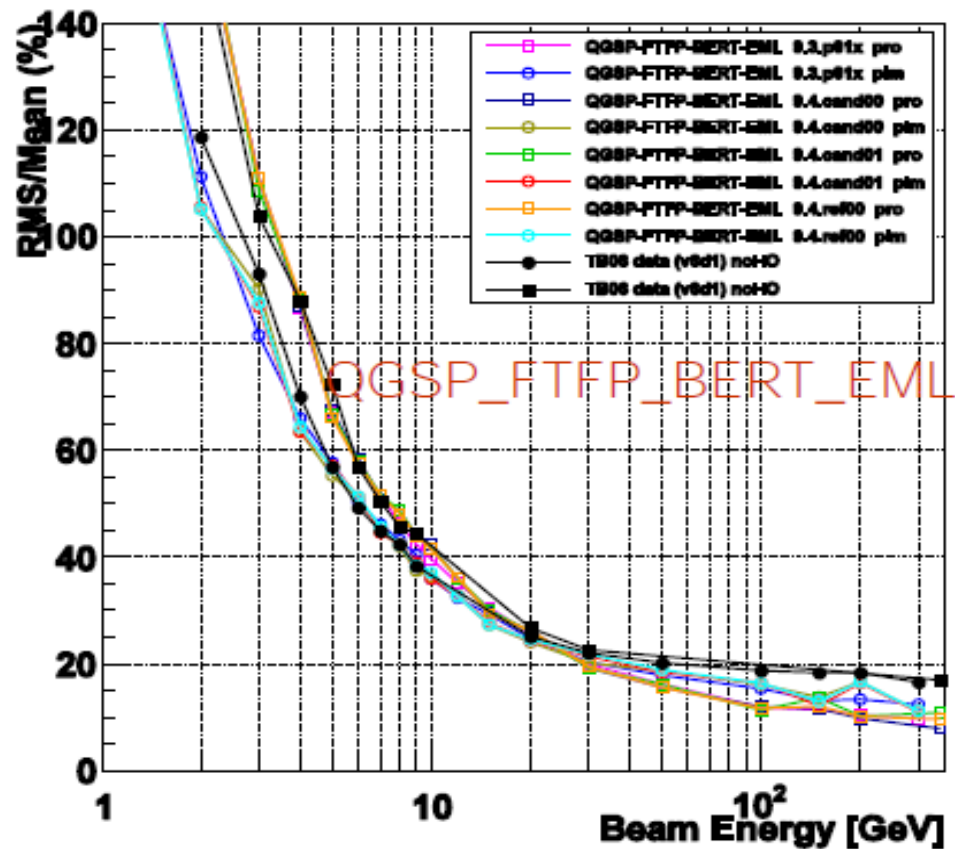


CMS test-beam: HCAL energy resolution, G4 9.4

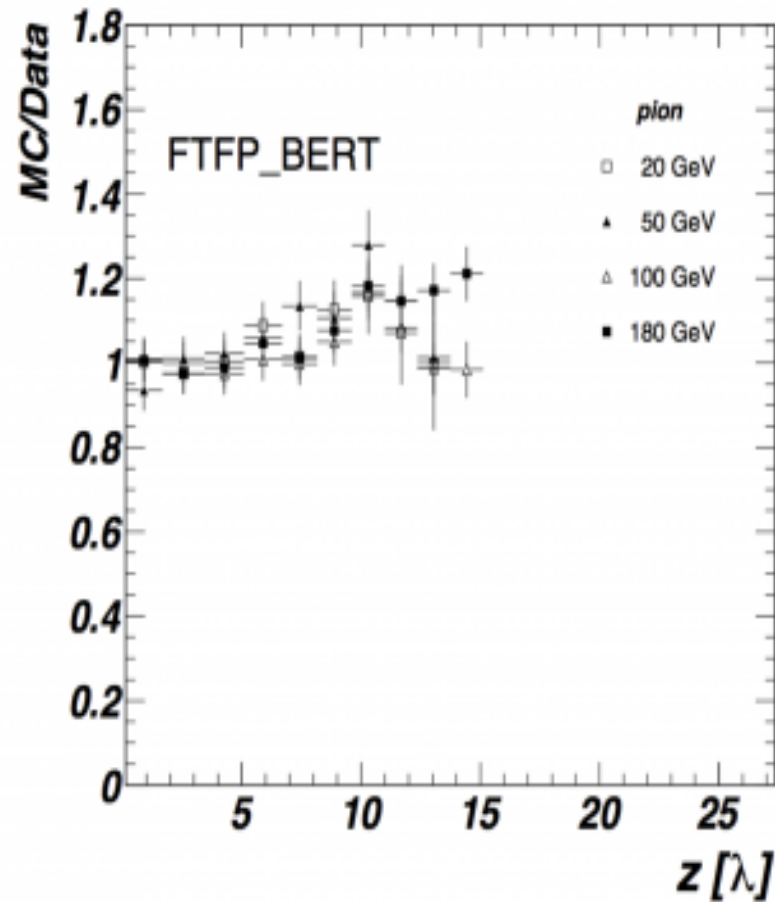
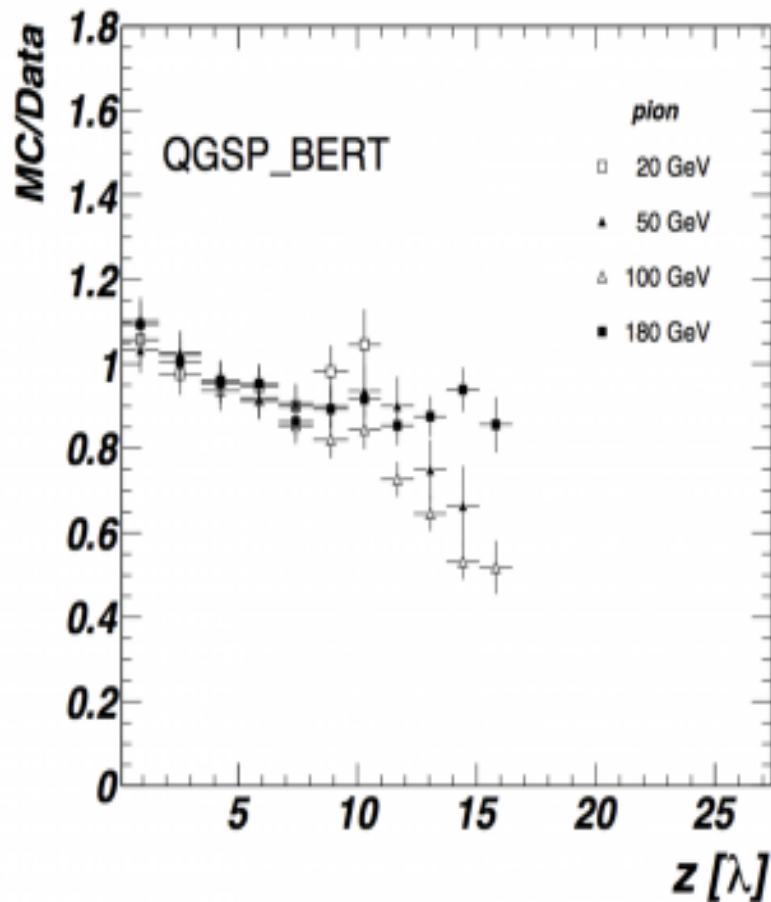
Calo Resolution (MCidealMIP)



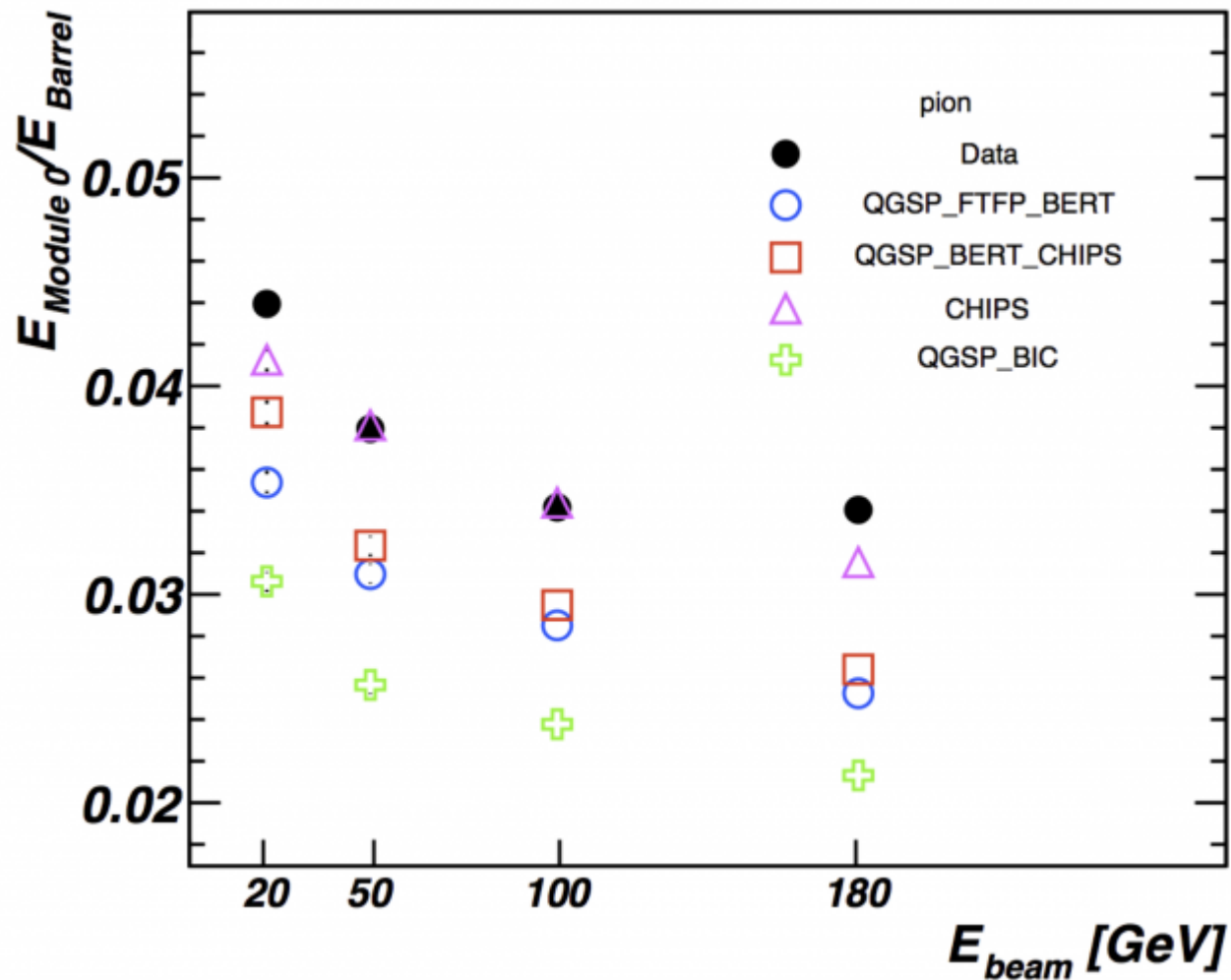
Calo Resolution (MCidealMIP)



ATLAS TileCal test-beam pion longitudinal shower profile, G4 9.4



ATLAS TileCal test-beam pion lateral shower shape, G4 9.4



Others observables

- **Hadronic interactions in thin layers** : both cross sections and final states. Differences between K^+ and K^-
- **Multiple scattering** : need improvements (for LHCb)
- **Nuclear reactions of antibaryons and light anti-nuclei** : available in FTF-based physics lists; expected feedback from ALICE