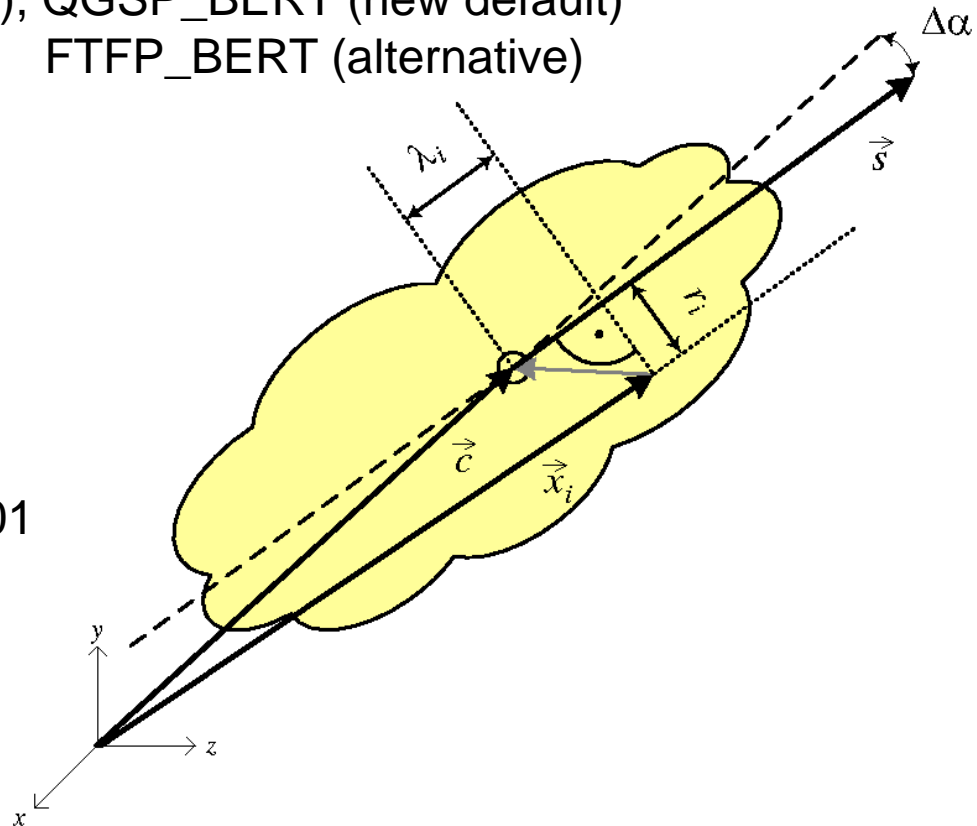


Comparisons of Topological Cluster Moments in the Barrel CTB

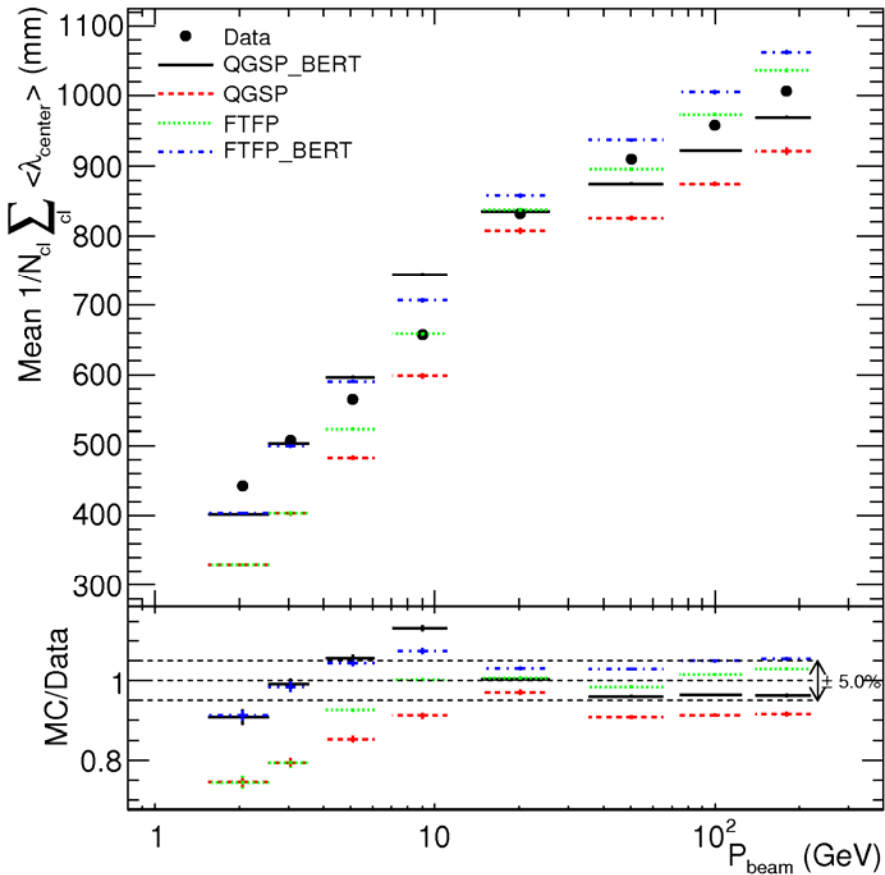
- Atlas Barrel Detector (Pixel, SCT, TRT, Lar, Tile) pions from 2-180 GeV (protons mixed in according to fraction measured by TRT)
- Models considered: QGSP (old default), QGSP_BERT (new default)
FTFP FTFP_BERT (alternative)
- Longitudinal shower development
- Radial shower development
- Energy density

All results from: ATL-COM-CAL-2009-001

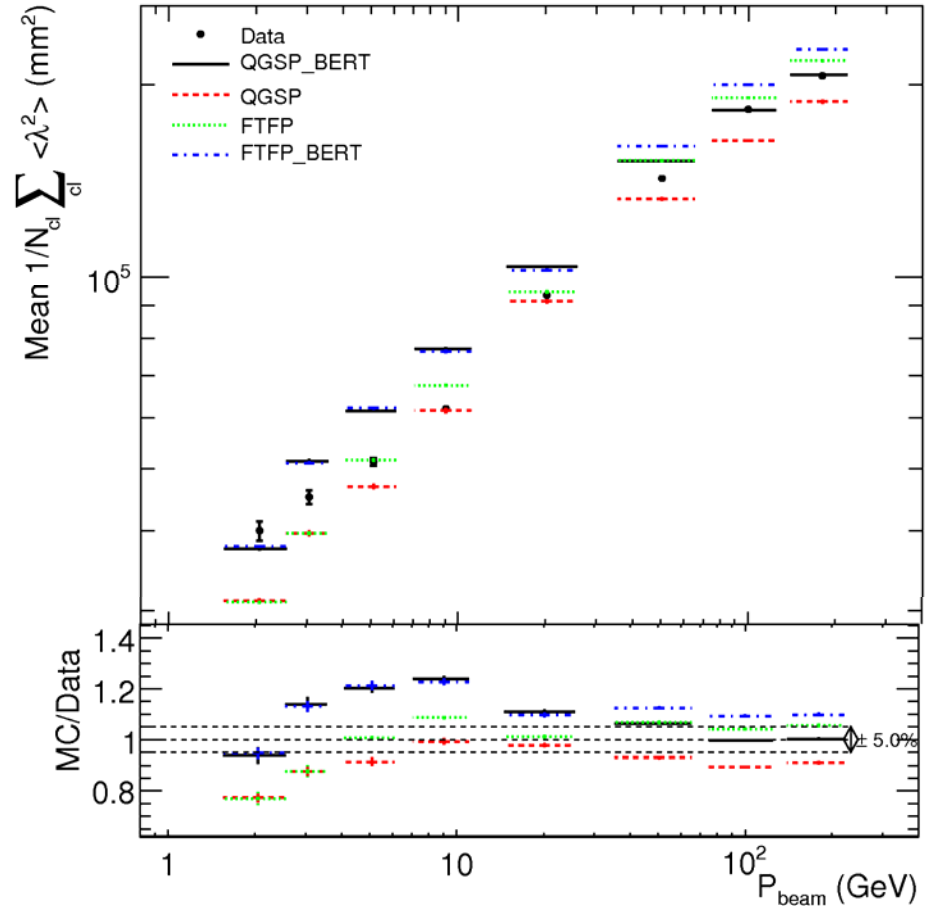


Longitudinal Topo-Moments

Shower Depth



Shower width:



$E > 10$ GeV:

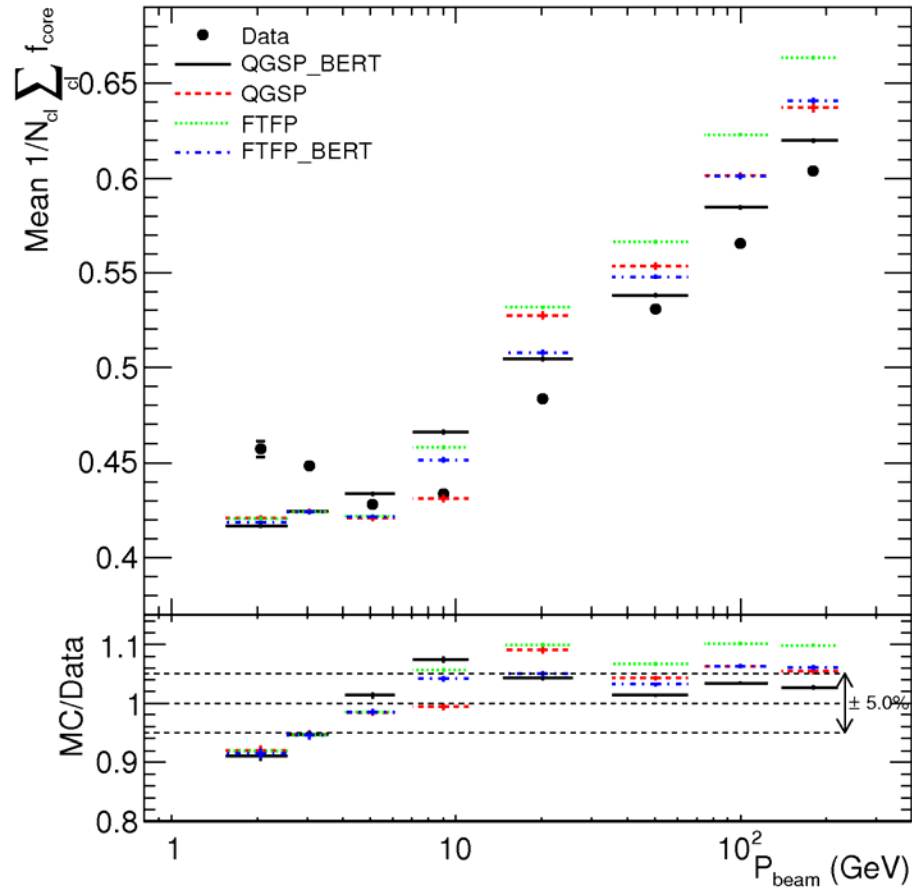
Shower penetrates deeper with Bertini, but not as much as in data for QGSP
too deep for FTFP

Same for shower width

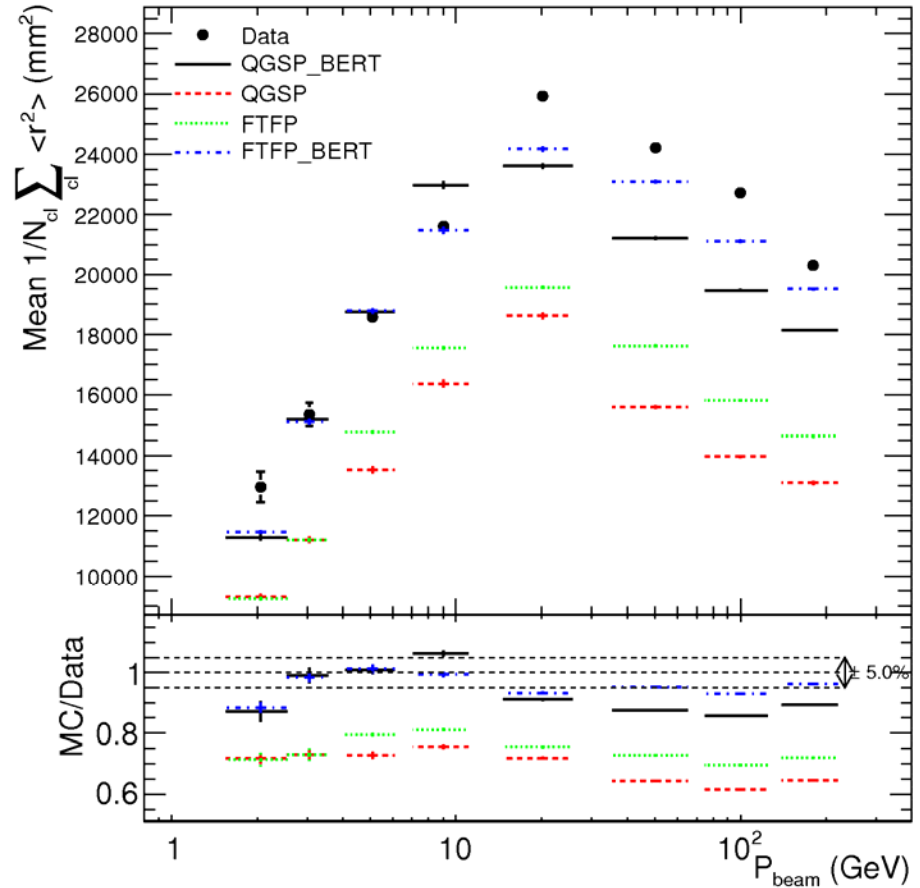
$E < 10$ GeV: strange behaviour

Radial Topo-Moments

Energy Fraction in cells close to shower axis:



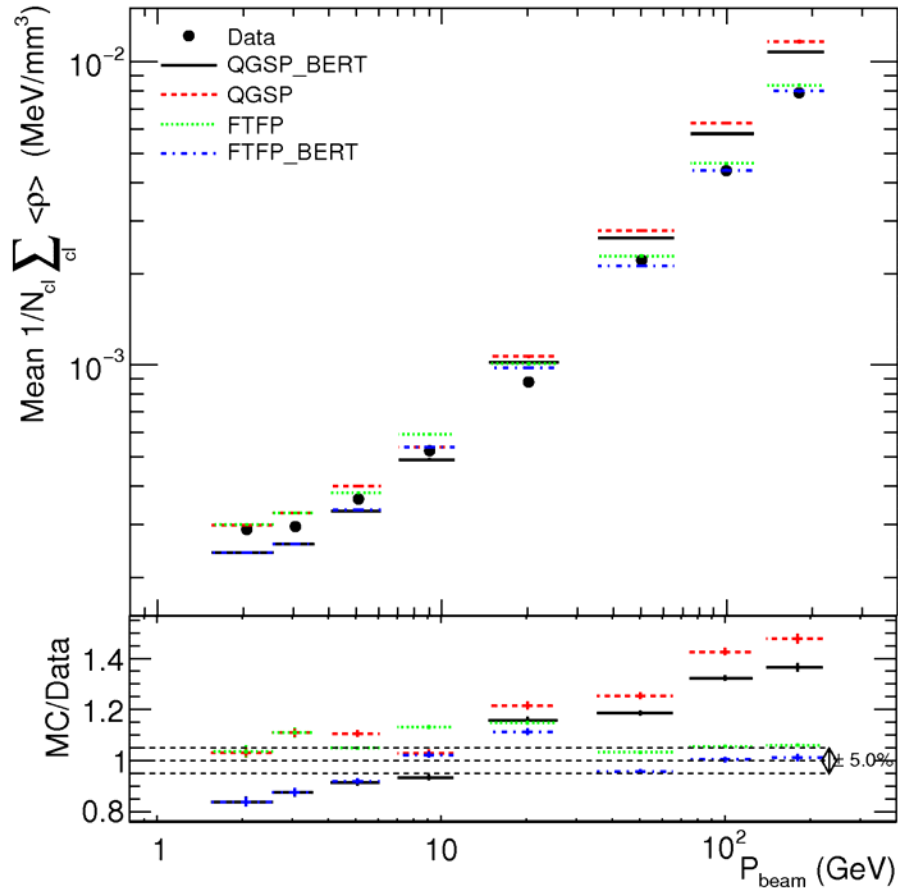
Second radial moment
Radial shower width



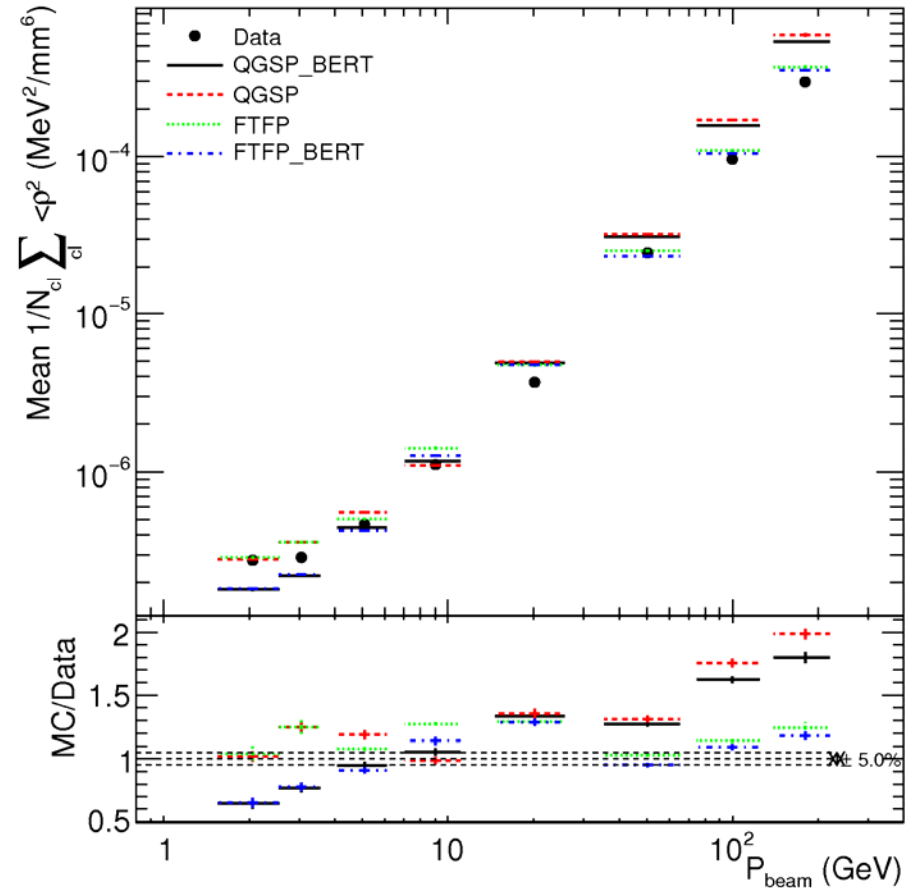
Bertini make shower wider, but data still wider

Energy Density

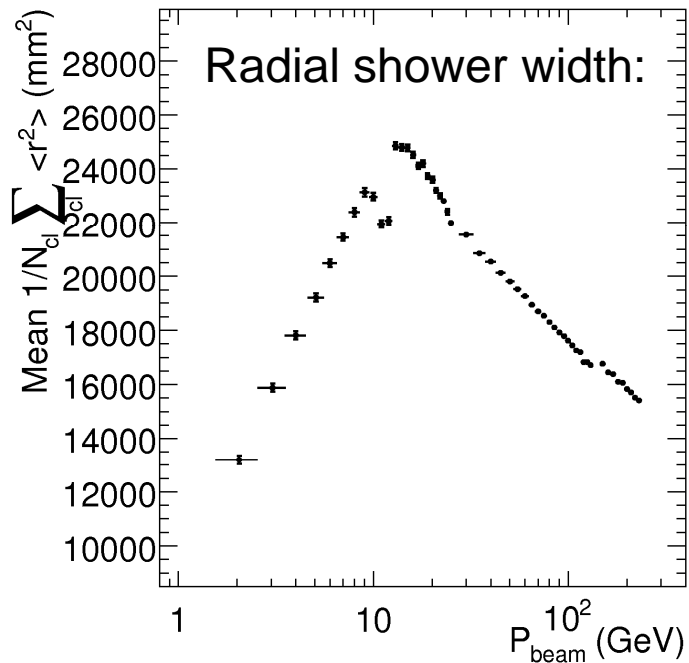
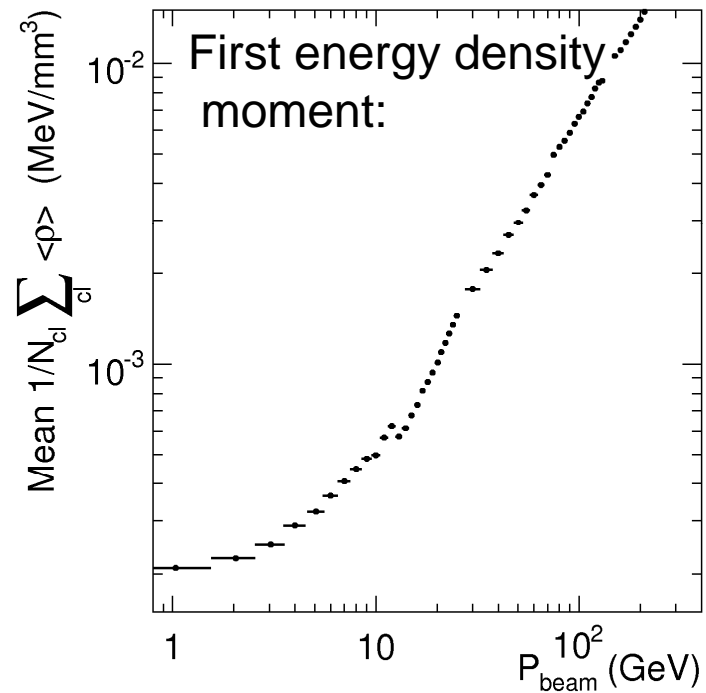
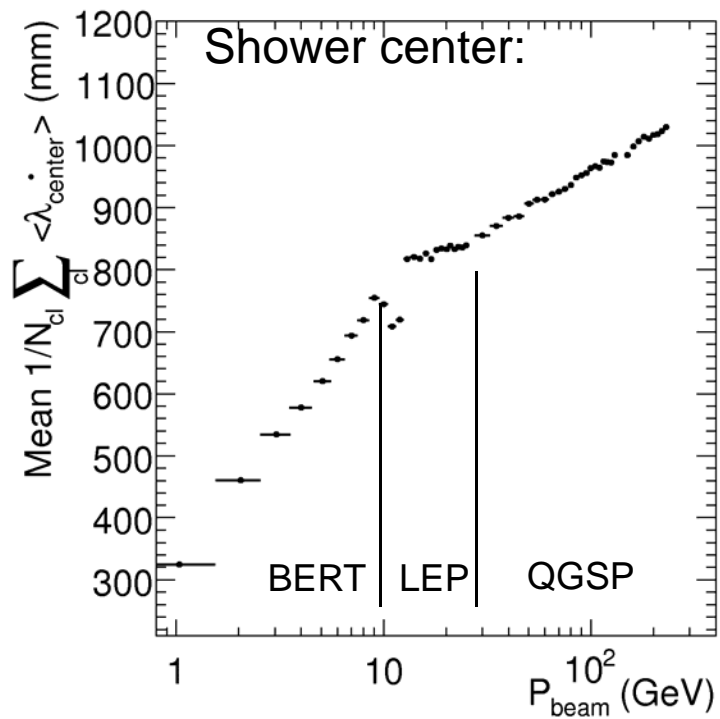
First energy density moment:



Second energy density moment:



Energy density is mostly influenced by fragmentation (QGSP/FTFP)
Fritiof model gives better description for high pion energies
Bertini model has problems to describe data at low pion energies



Uncertainty in shower shapes
at model boundaries