

Grid testing of Geant4 10.5.ref03

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Main Changes in Hadronics vs. 10.5.ref02

No changes in QGS, BERT, BIC, Precompound, RadioactiveDecay, ParticleHP, cross sections, *etc.*

- **FTF**
 - G4FTFModel : Fixed memory leak
- **De-excitation**
 - G4PhotonEvaporation : for nuclear levels without decay modes defined, perform decay to the nearest level (instead to the ground state)
- **Physics Lists : hadron elastic physics constructor**
 - G4HadronElasticPhysics : for deuteron, triton and alpha, use Glauber-Gribov elastic cross-sections (instead of Gheisha ones, which are 0.0)

Crashes & Warnings

- No crashes
- No infinite loops
- No warnings

Reproducibility

- Reproducibility OK

Pion- showers: FTFP_BERT

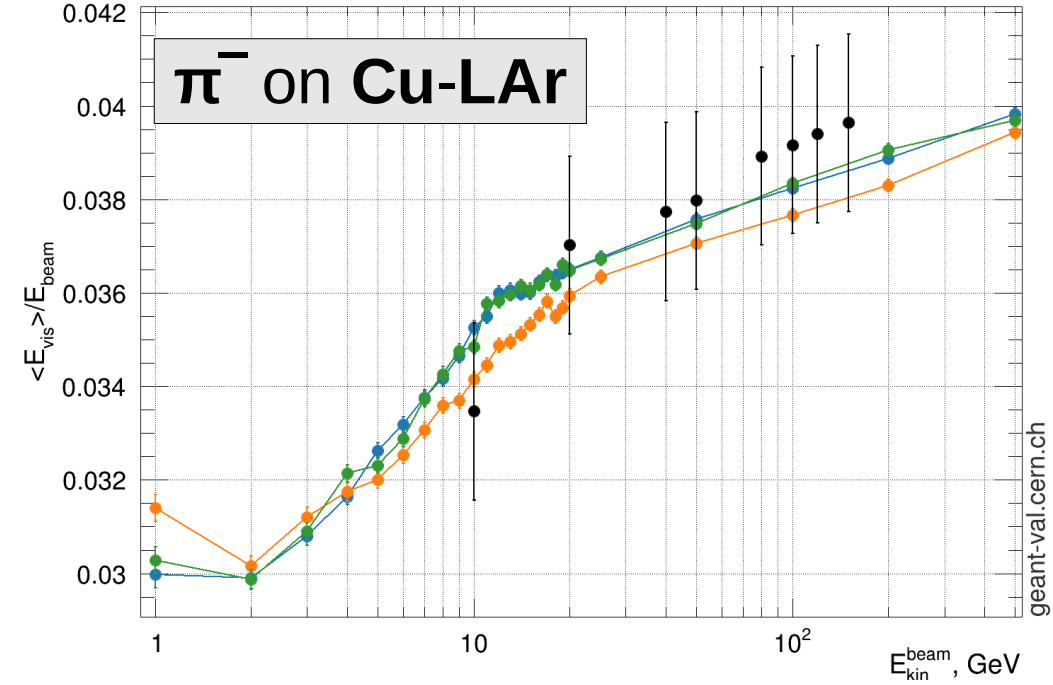
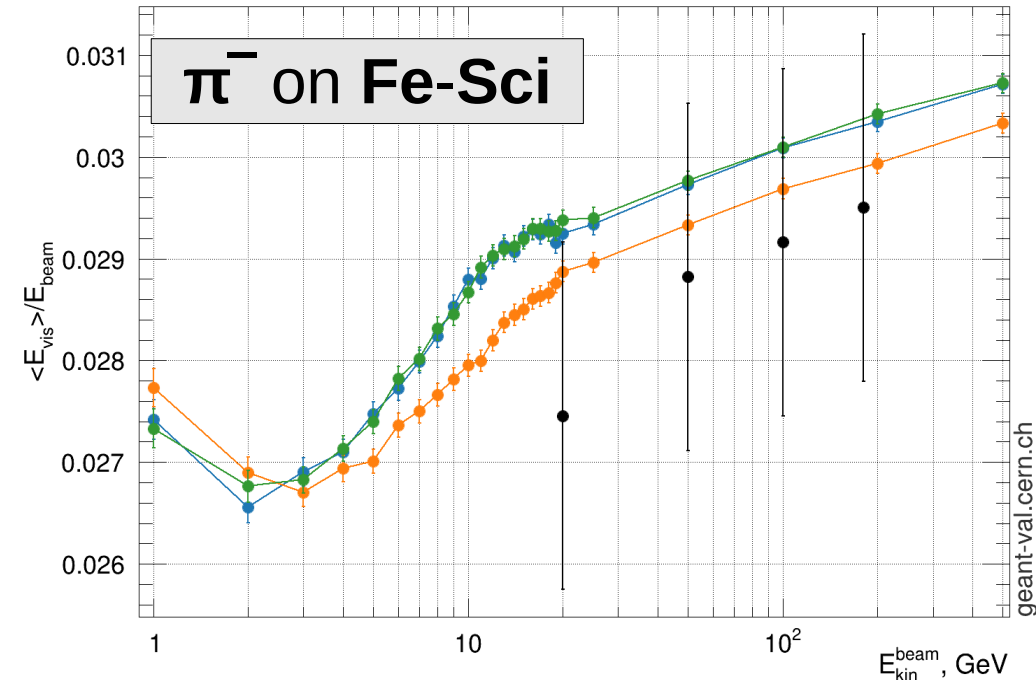
G4 10.5.ref03
10.5.ref02
10.4.p03

*Note : conventional Birks treatment
(easier and no experimental h/e to fit !)*

FTFP_BERT : Energy Response

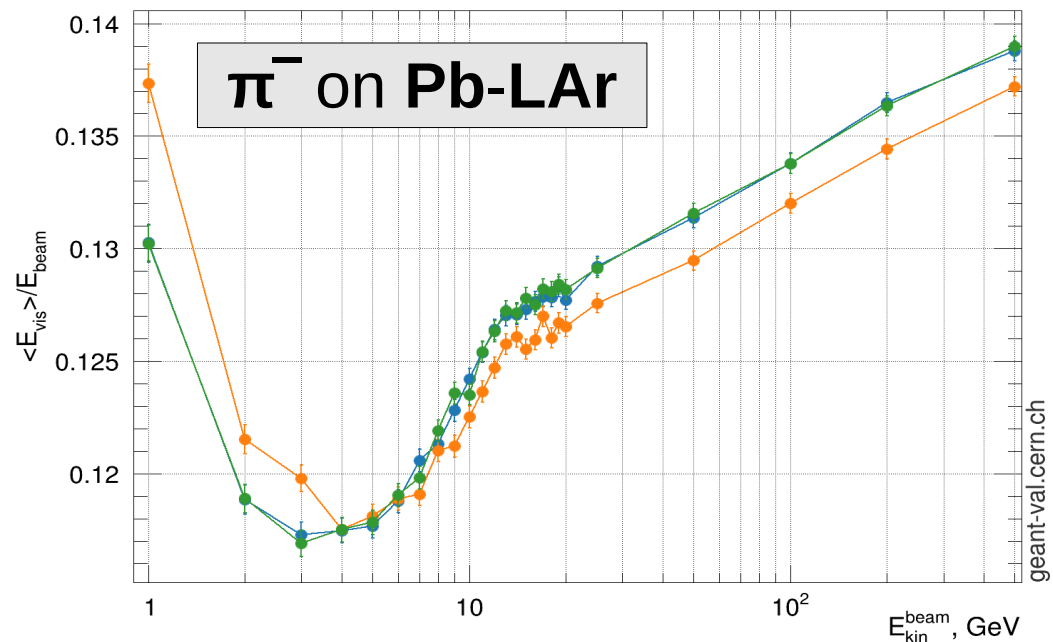
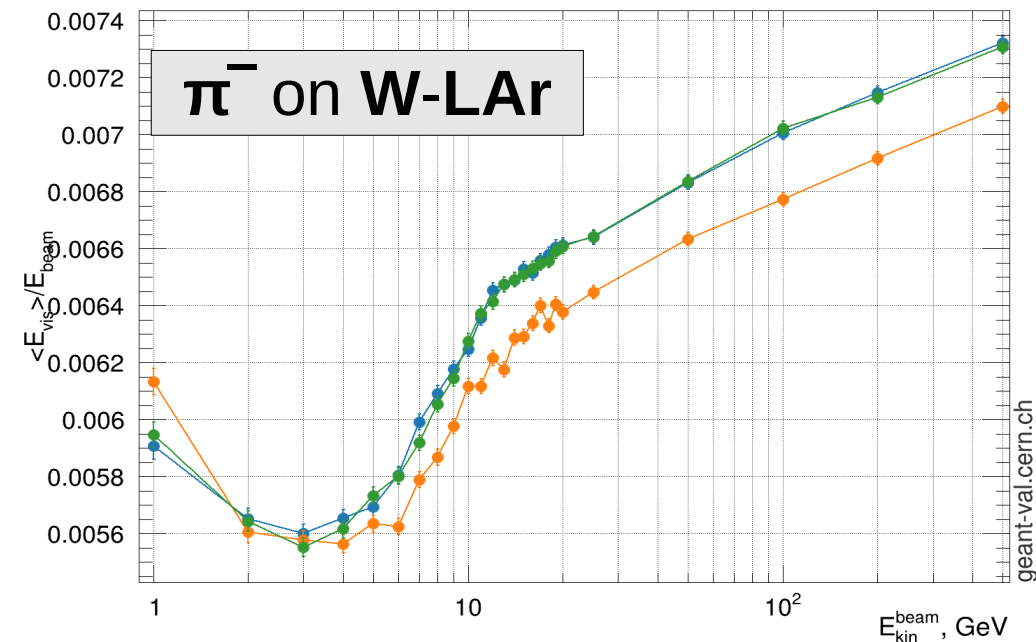
Energy response | Beam: pi- | Target: TileCal

Energy response | Beam: pi- | Target: AtlasHEC



Energy response | Beam: pi- | Target: AtlasFCAL | FTFP_BERT

Energy response | Beam: pi- | Target: AtlasECAL | FTFP_BERT



10.5.ref03 10.4.p03.cand00

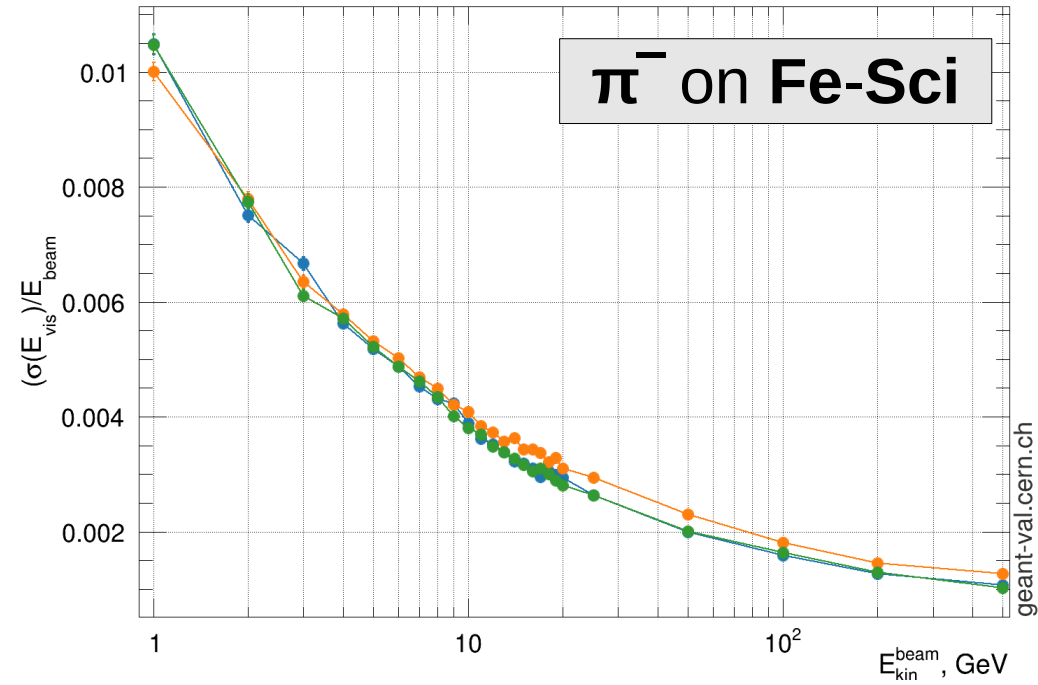
10.5.ref03 10.4.p03.cand00

10.5.ref02

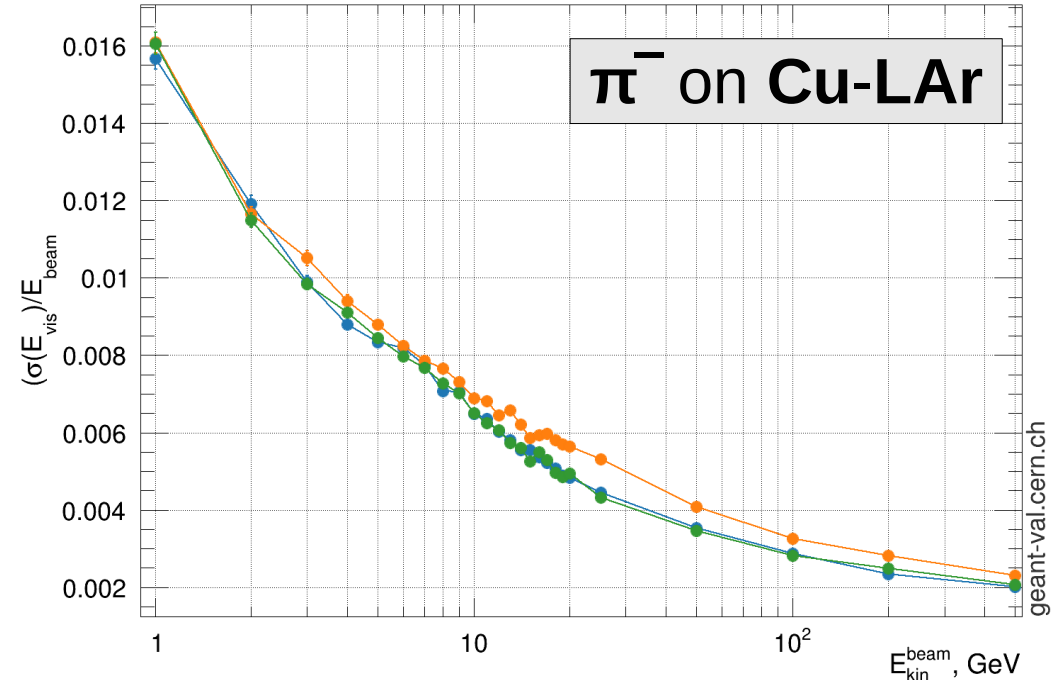
10.5.ref02

FTFP_BERT : Energy Width

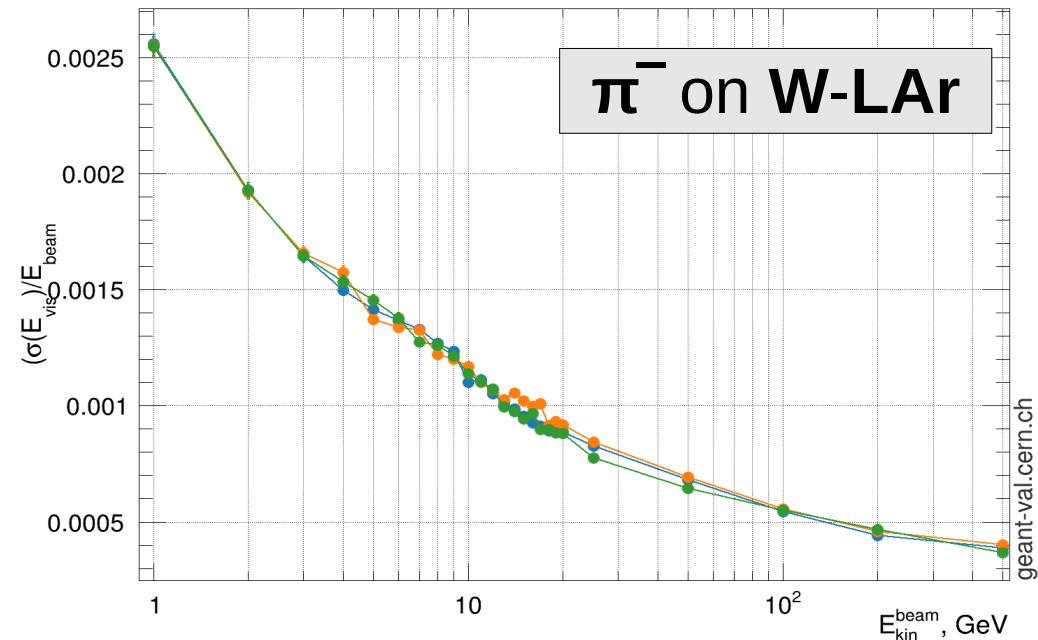
Normalized width | Beam: pi- | Target: TileCal | FTFP_BERT



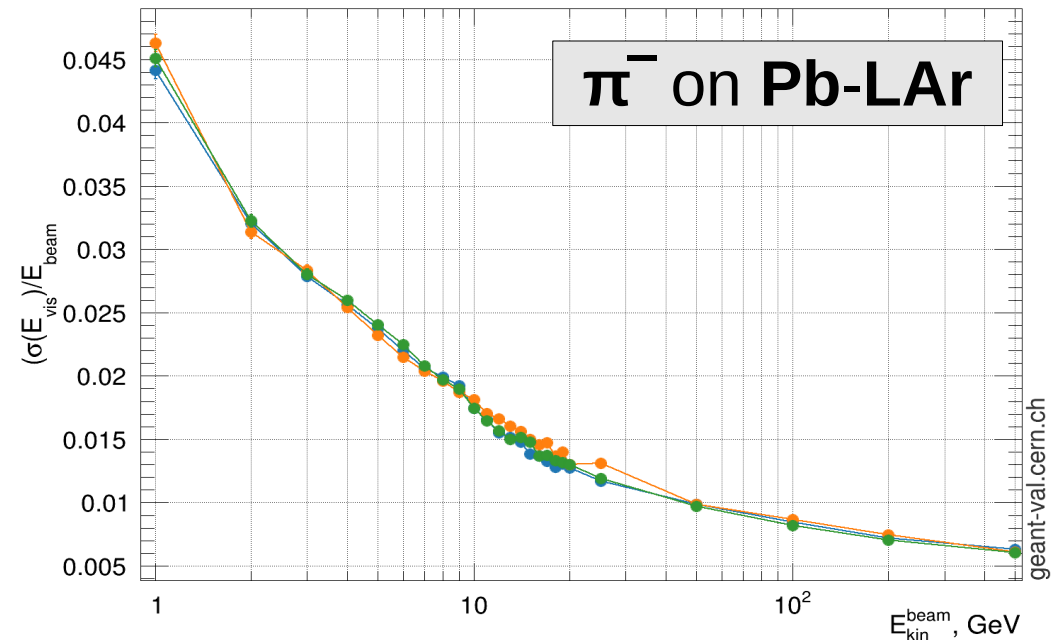
Normalized width | Beam: pi- | Target: AtlasHEC | FTFP_BERT



Normalized width | Beam: pi- | Target: AtlasFCAL | FTFP_BERT



Normalized width | Beam: pi- | Target: AtlasECAL | FTFP_BERT

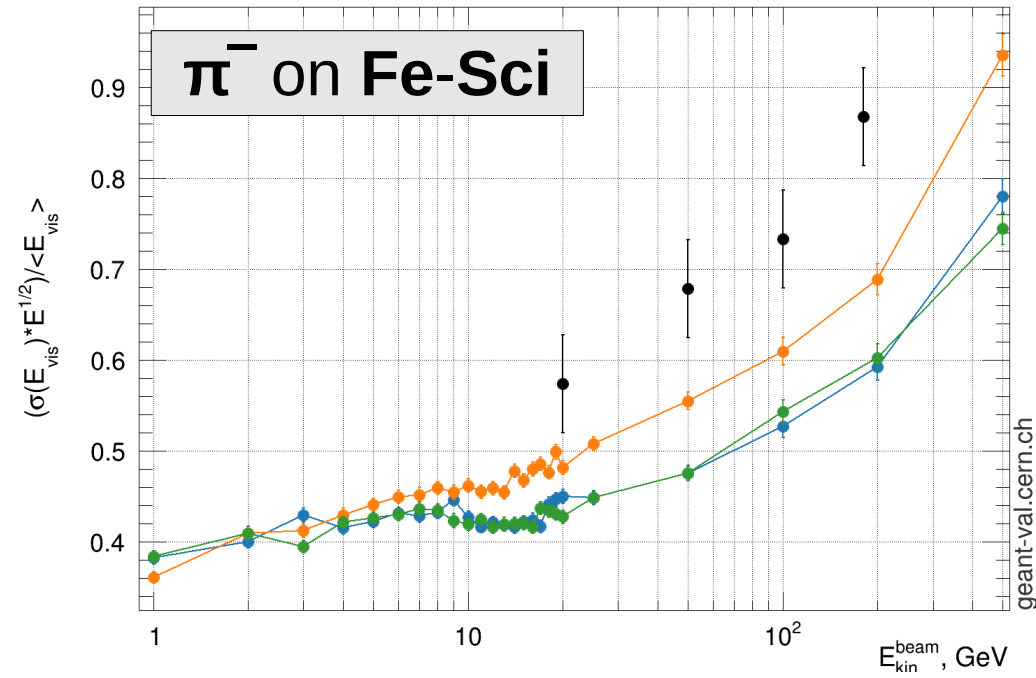


10.5.ref03 (blue), 10.5.ref02 (green), 10.4.p03.cand00 (orange)

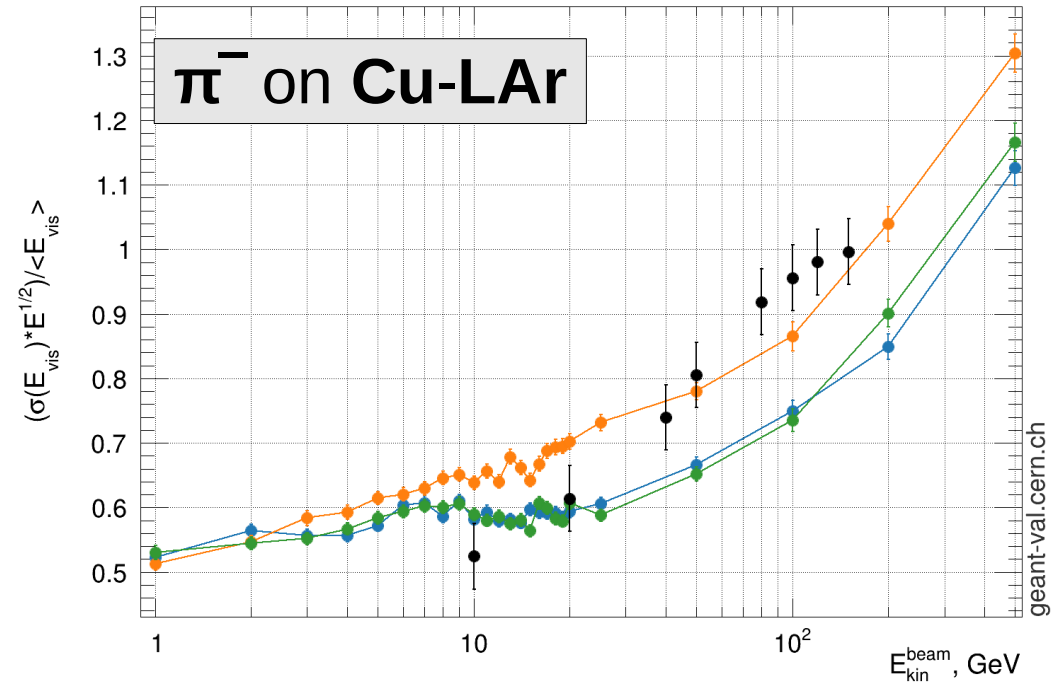
10.5.ref03 (blue), 10.5.ref02 (green), 10.4.p03.cand00 (orange)

FTFP_BERT : Energy Resolution

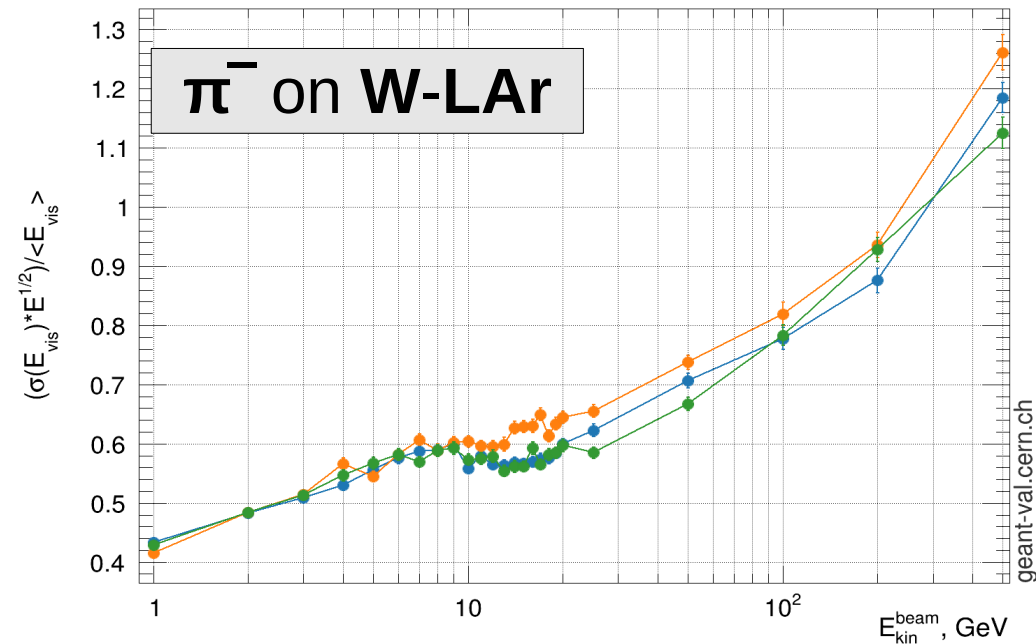
Energy resolution | Beam: pi- | Target: TileCal



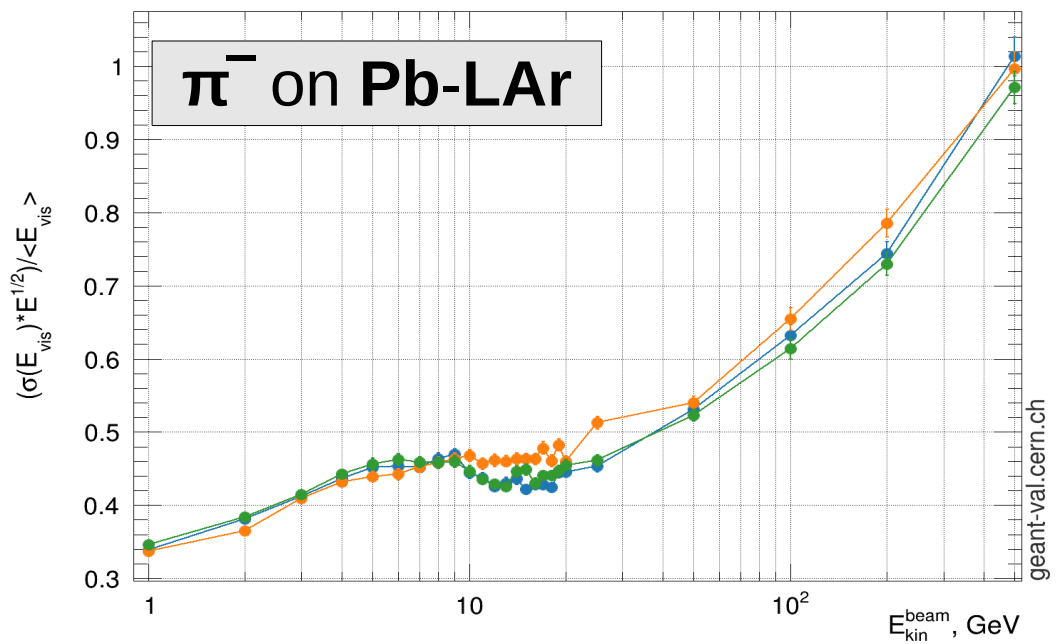
Energy resolution | Beam: pi- | Target: AtlasHEC



Energy resolution | Beam: pi- | Target: AtlasFCAL | FTFP_BERT



Energy resolution | Beam: pi- | Target: AtlasECAL | FTFP_BERT

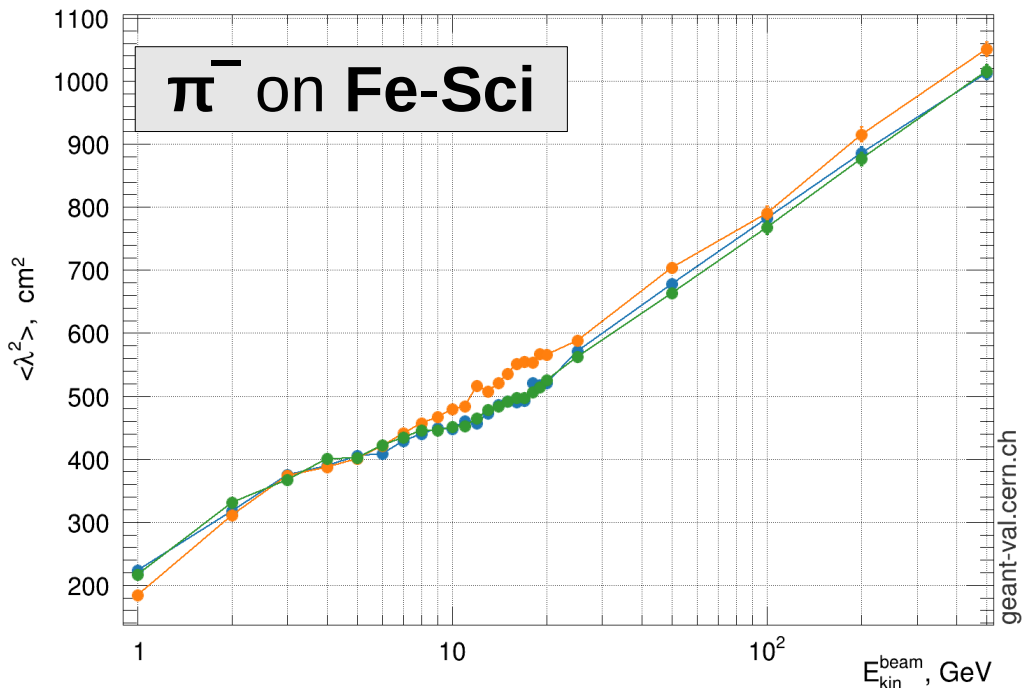


10.5.ref03 (blue), 10.5.ref02 (green), 10.4.p03.cand00 (orange)

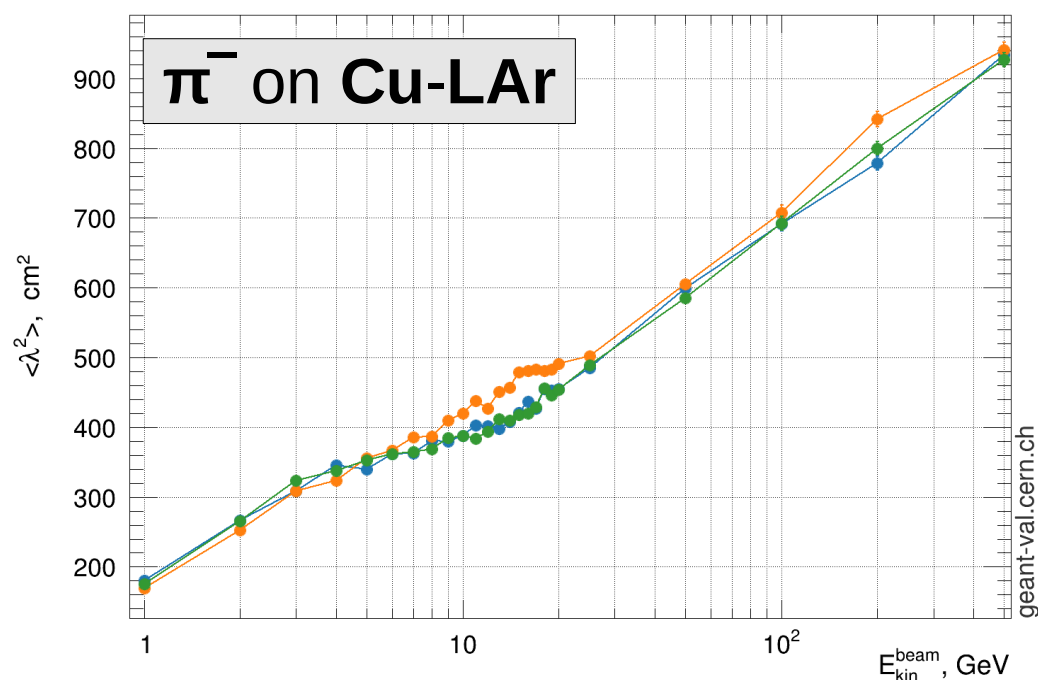
10.5.ref03 (blue), 10.5.ref02 (green), 10.4.p03.cand00 (orange)

FTFP_BERT : Longitudinal Shape

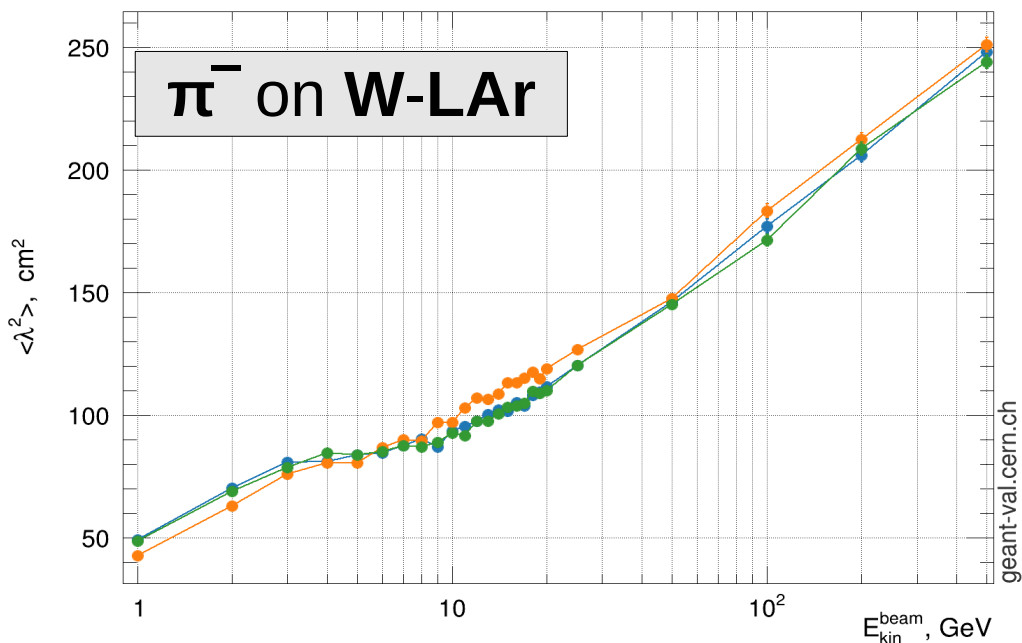
Longitudinal shower shape | Beam: pi- | Target: TileCal | FTFP_BERT



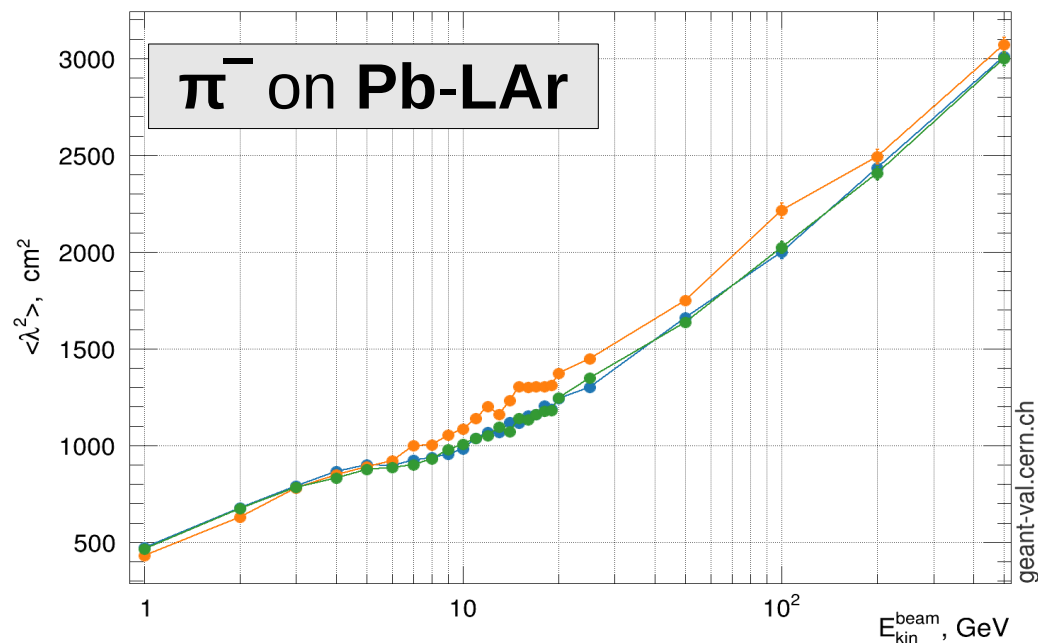
Longitudinal shower shape | Beam: pi- | Target: AtlasHEC | FTFP_BERT



Longitudinal shower shape | Beam: pi- | Target: AtlasFCAL | FTFP_BERT



Longitudinal shower shape | Beam: pi- | Target: AtlasECAL | FTFP_BERT

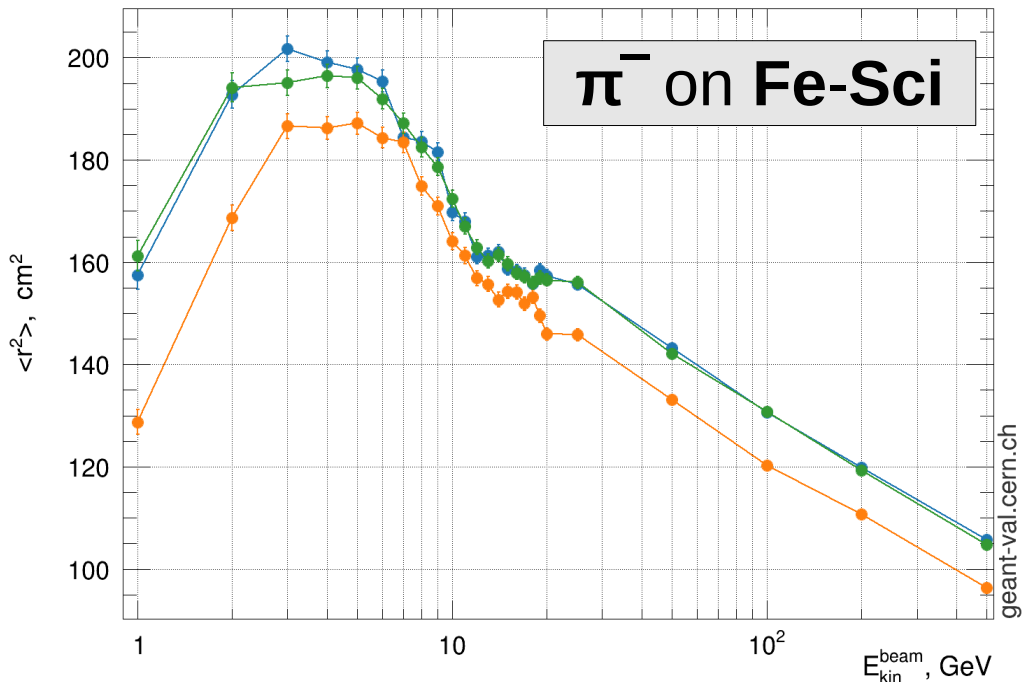


10.5.ref03 (blue circle) 10.4.p03.cand00 (orange circle)

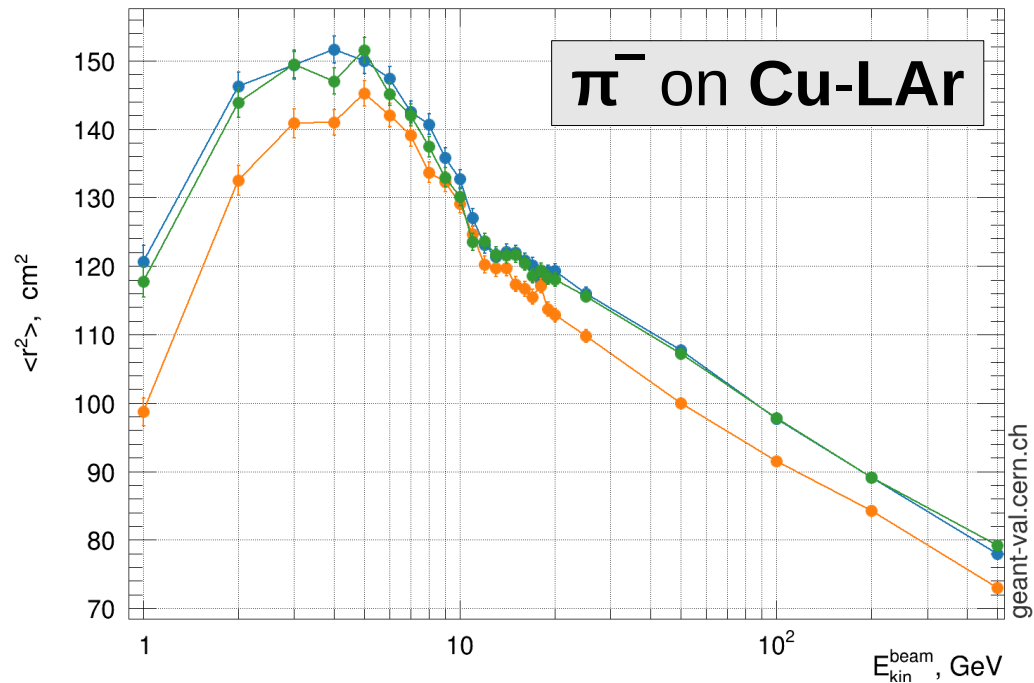
10.5.ref03 (blue circle) 10.5.ref02 (green circle)

FTFP_BERT : Lateral Shape

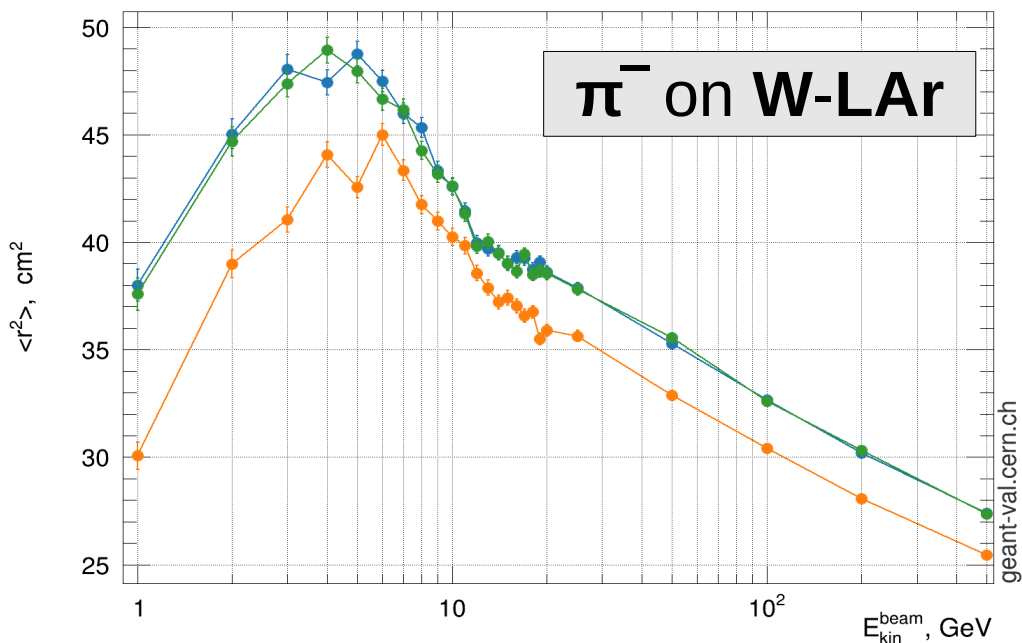
Lateral shower shape | Beam: pi- | Target: TileCal | FTFP_BERT



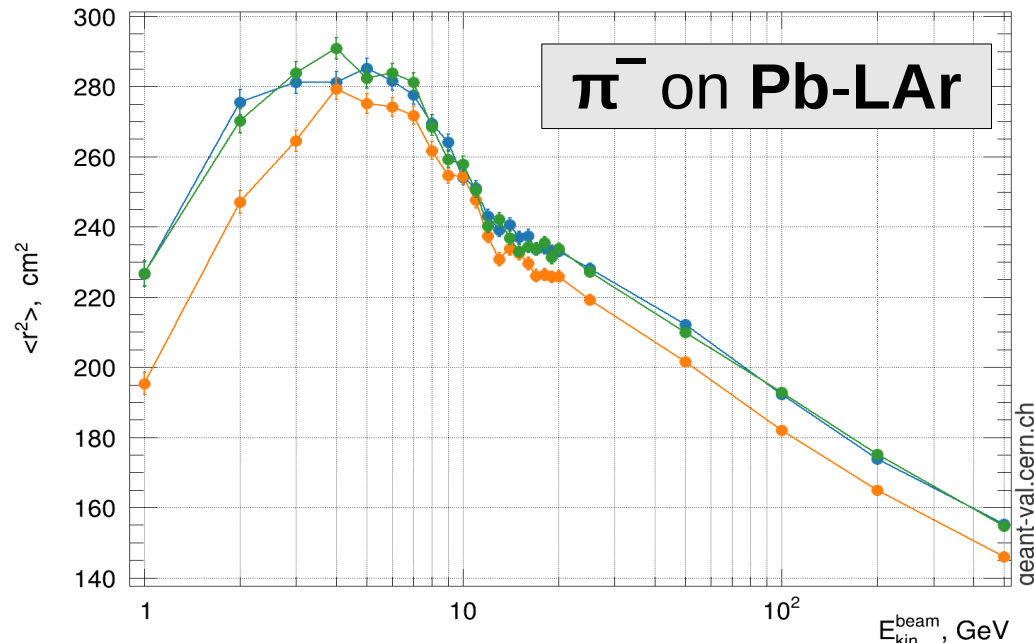
Lateral shower shape | Beam: pi- | Target: AtlasHEC | FTFP_BERT



Lateral shower shape | Beam: pi- | Target: AtlasFCAL | FTFP_BERT



Lateral shower shape | Beam: pi- | Target: AtlasECAL | FTFP_BERT



10.5.ref03 (blue), 10.5.ref02 (green), 10.4.p03.cand00 (orange)

10.5.ref03 (blue), 10.5.ref02 (green), 10.4.p03.cand00 (orange)

Conclusions

- **G4 10.5.ref03**
 - No crashes, warnings, infinite loops
 - Reproducibility OK
 - Similar hadronic showers as in G4 10.5.ref02