

Grid testing of Geant4 10.5.p01

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Main Changes in Hadronics vs. 10.5

No changes – except trivial (warnings, printouts, etc.) fixes – in BERT, BIC, Precompound, RadioactiveDecay, xsec, etc.

- **FTF** : fixed memory leak in **G4FTFModel**
- **QGS** : fixed computation of transverse mass in **G4QGSParticipants**
- **INCLXX** : fixed non-reproducibility in MT mode in **G4INCLHFB**
- **De-excitation** : for nuclear levels without decay modes defined, decay to the nearest level (instead to the ground state) in **G4PhotonEvaporation**
- **ParticleHP** : fixed sampling of discrete gamma emissions; replaced **G4Exp** with **std::exp** to avoid crashes observed with **QGSP_BIC_AllHP**
- **Fission** : removed use of **G4Pow** sometimes causing crashes
- **Physics Lists** : for deuteron, triton and alpha, use Glauber-Gribov elastic cross-sections (instead of Gheisha ones, which are 0.0) in the hadron elastic physics constructor (**G4HadronElasticPhysics**)

Crashes & Warnings

- No crashes
- No infinite loops
- No warnings

Reproducibility

- Reproducibility OK

Pion- showers: FTFP_BERT

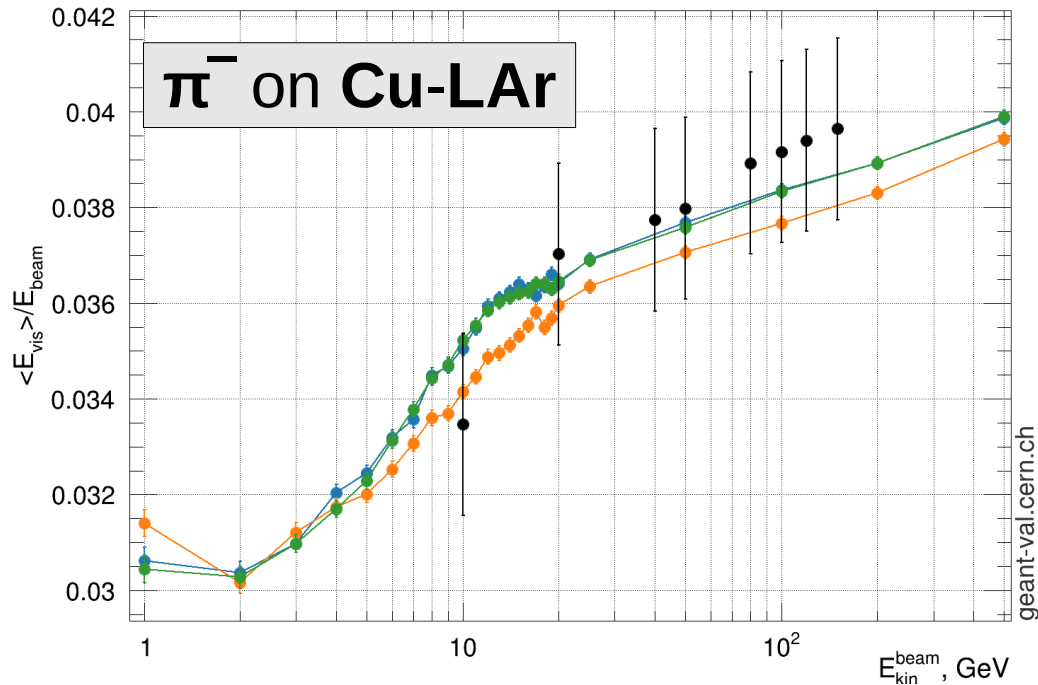
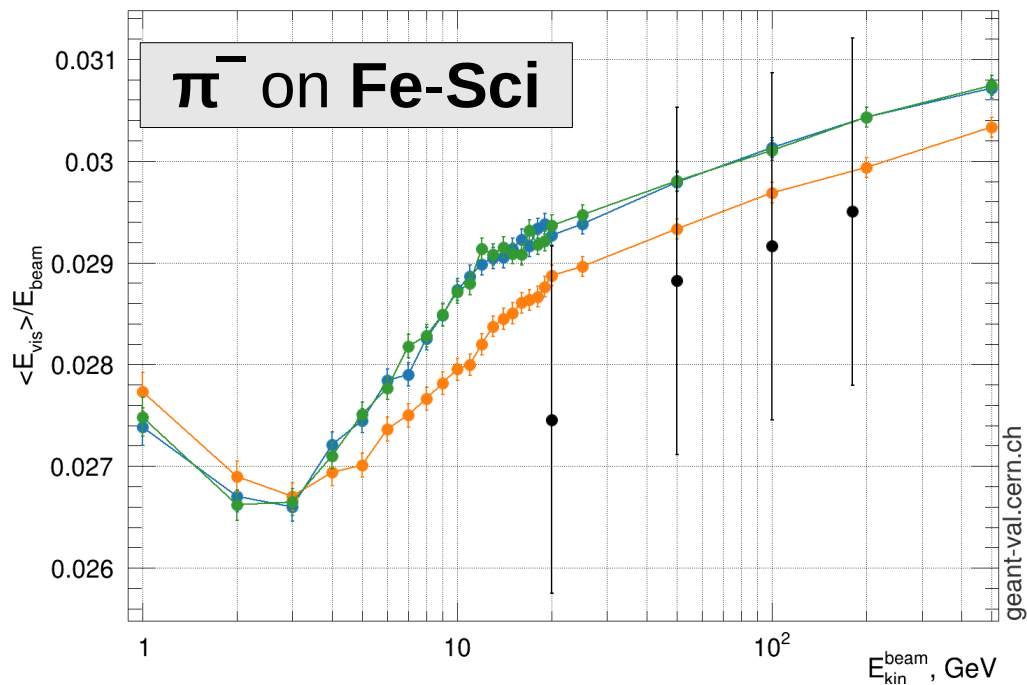
G4 10.5.p01
10.5
10.4.p03

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

FTFP_BERT : Energy Response

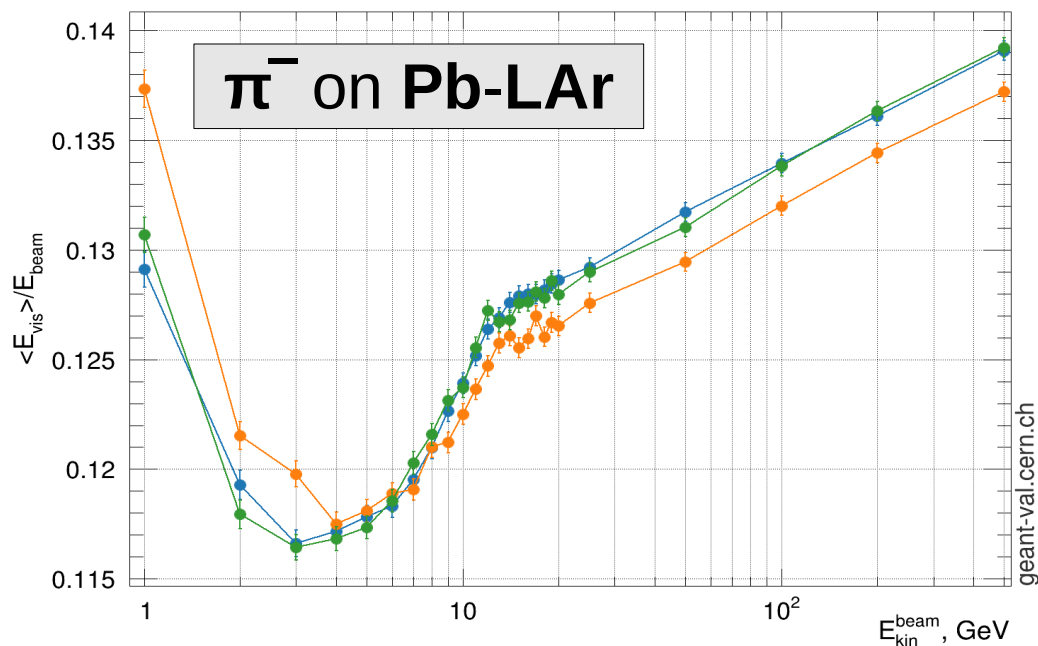
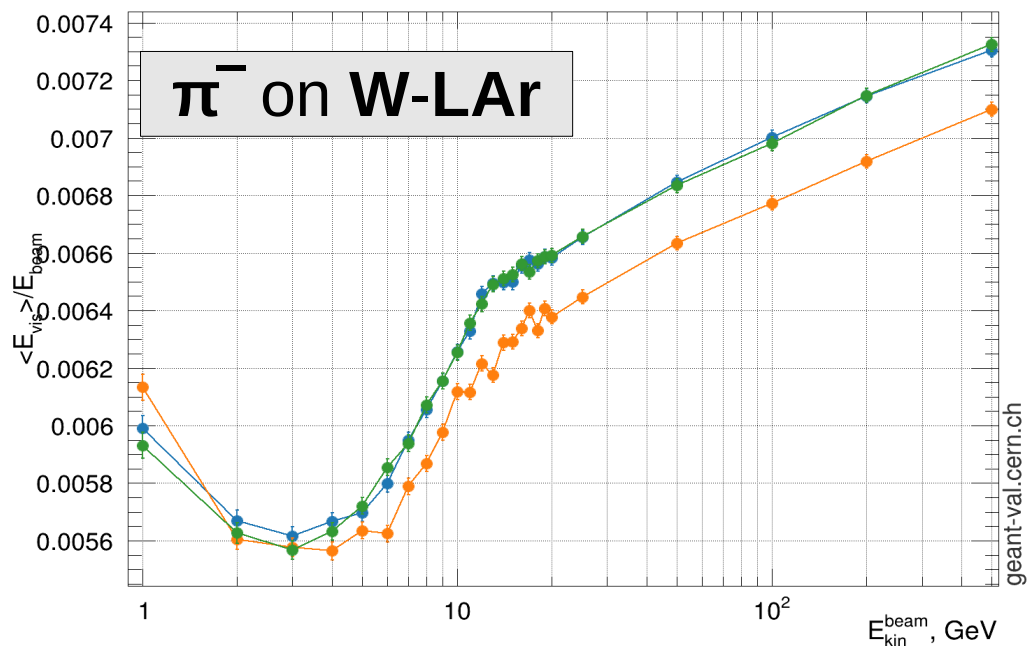
Energy response | Beam: pi- | Target: TileCal

Energy response | Beam: pi- | Target: AtlasHEC



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

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



10.5.p01_cand02
10.5.cand02

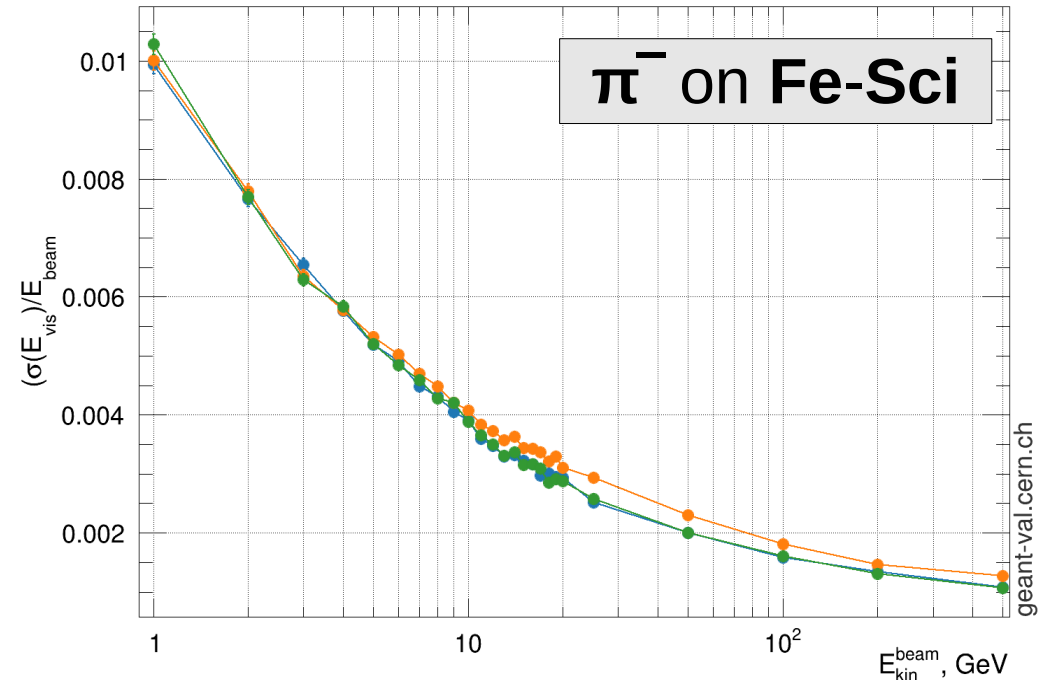
10.4.p03.cand00

10.5.p01_cand02
10.5.cand02

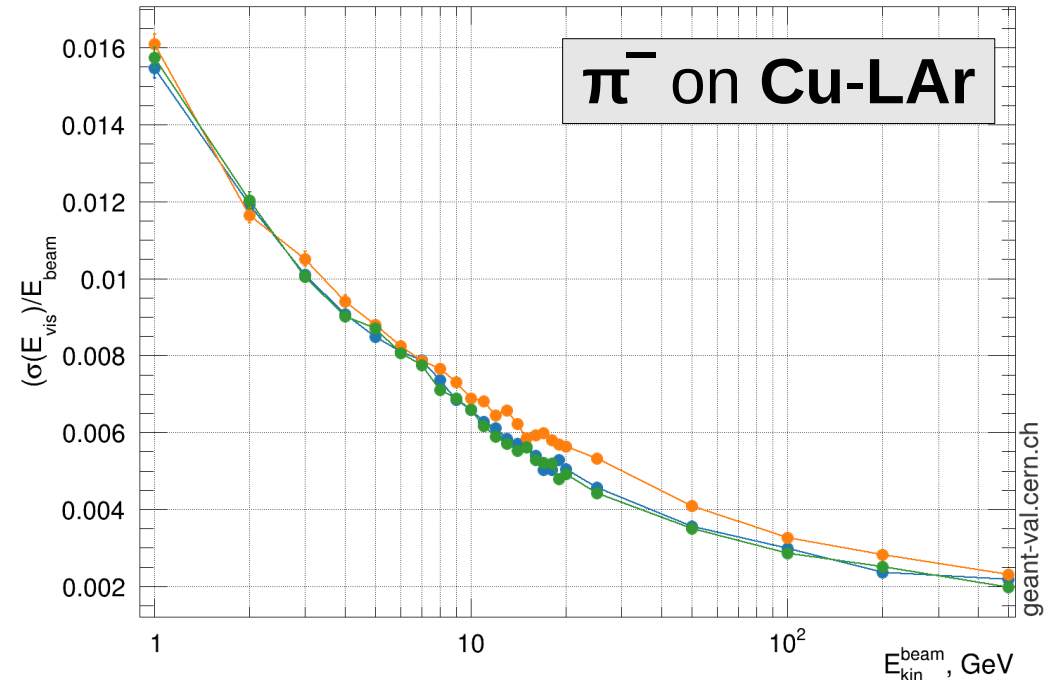
10.4.p03.cand00

FTFP_BERT : Energy Width

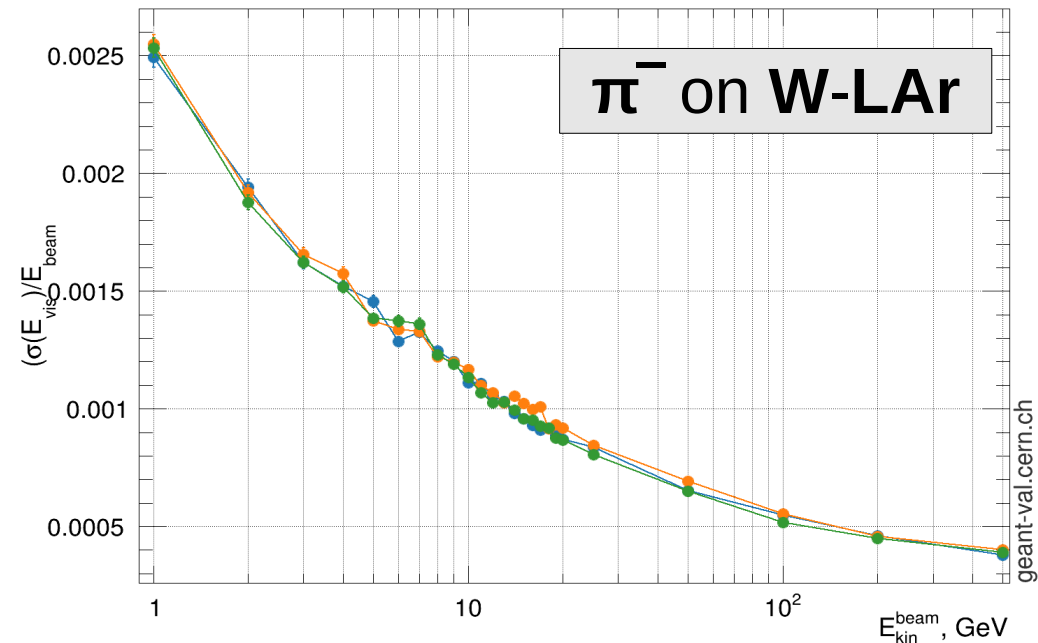
Normalized width | Beam: pi- | Target: TileCal | FTFP_BERT



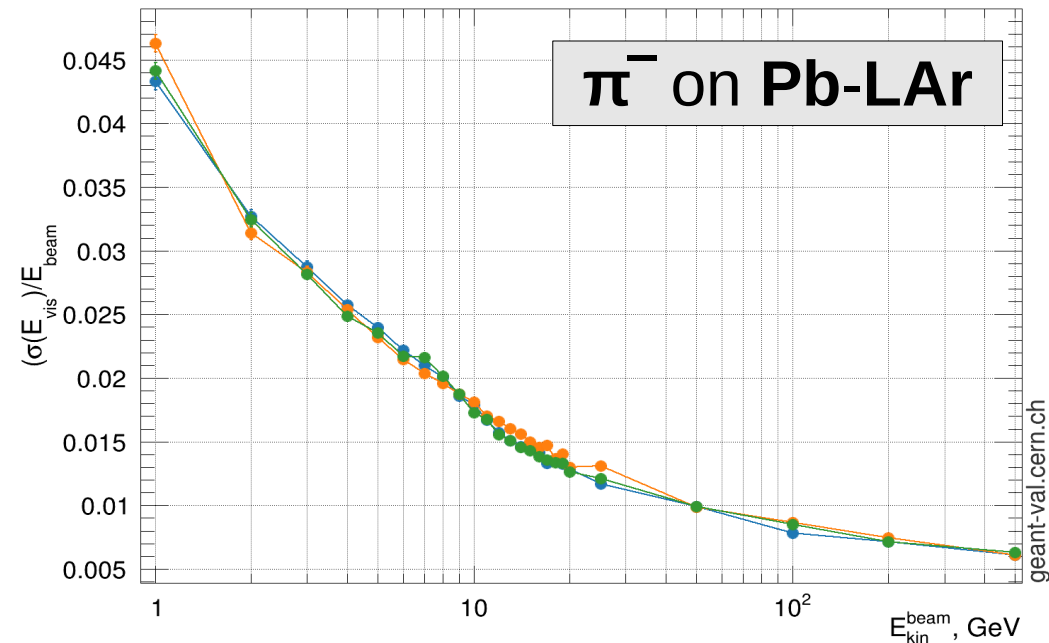
Normalized width | Beam: pi- | Target: AtlasHEC | FTFP_BERT



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



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



10.5.p01_cand02
10.5.cand02

10.4.p03.cand00

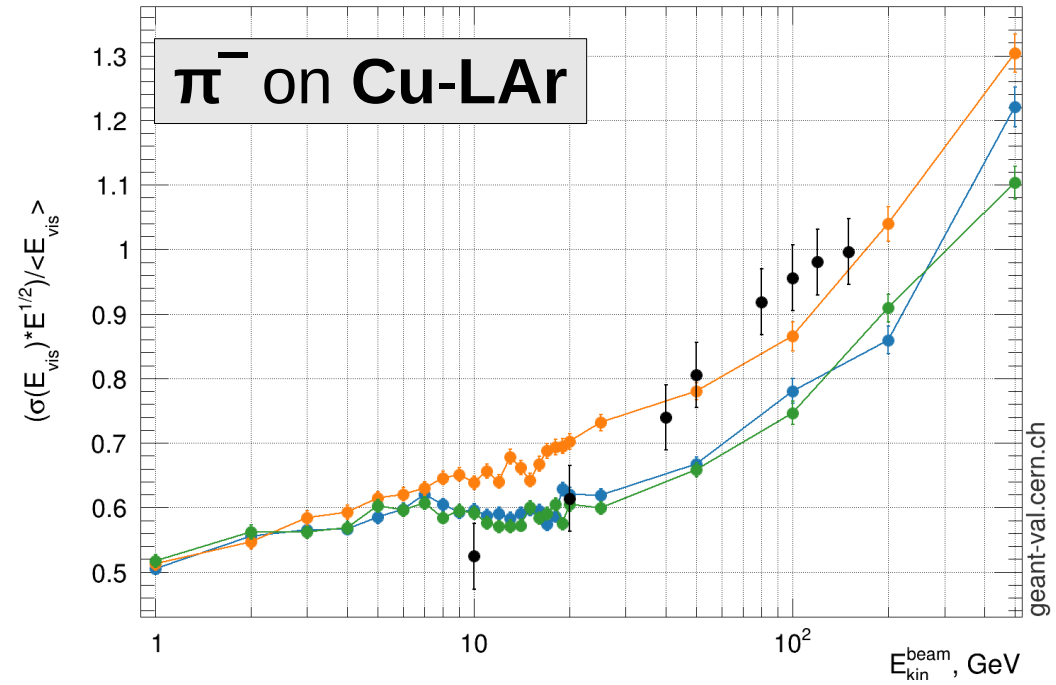
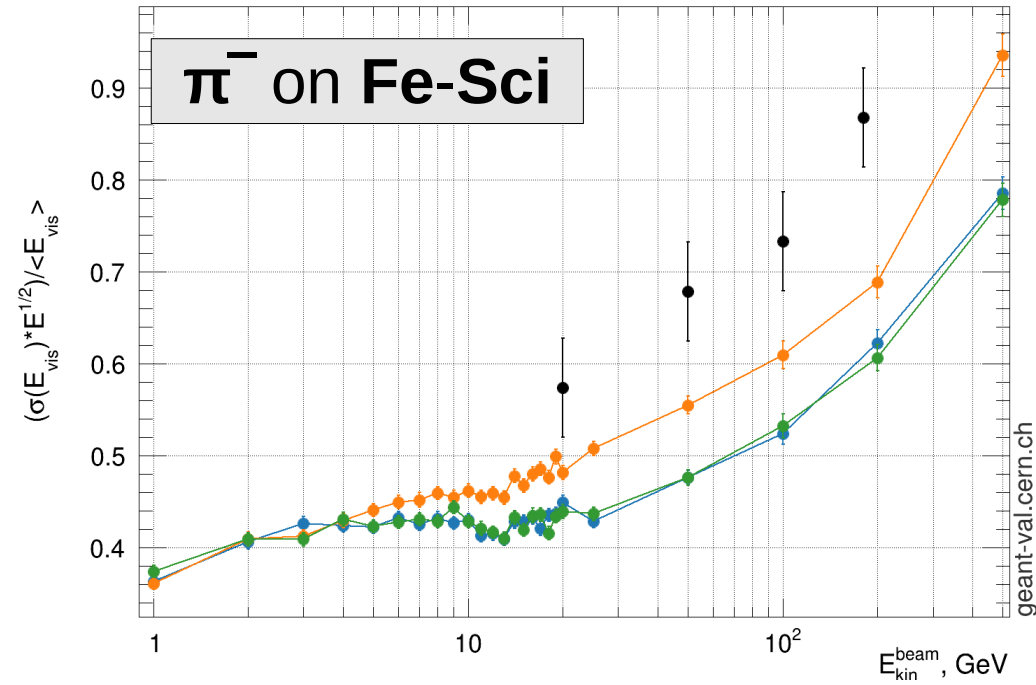
10.5.p01_cand02
10.5.cand02

10.4.p03.cand00

FTFP_BERT : Energy Resolution

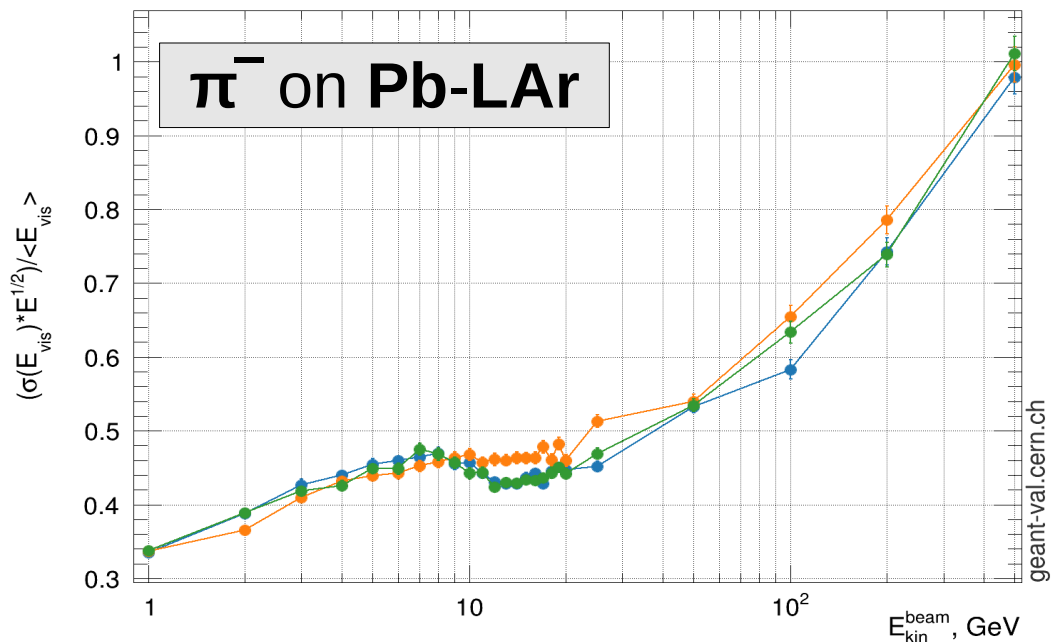
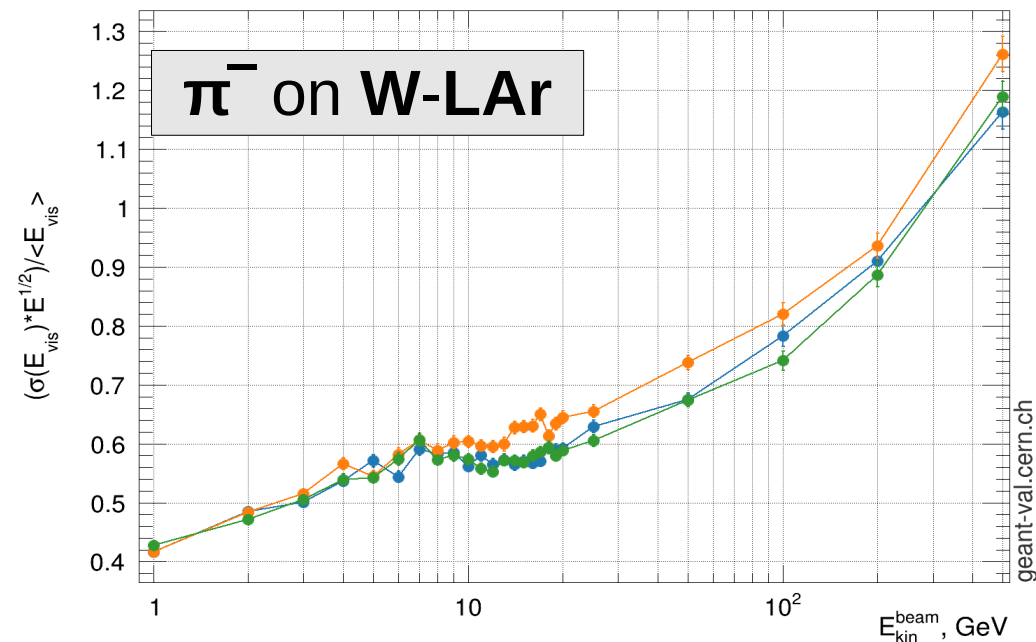
Energy resolution | Beam: pi- | Target: TileCal

Energy resolution | Beam: pi- | Target: AtlasHEC



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

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



10.5.p01_cand02
10.5.cand02

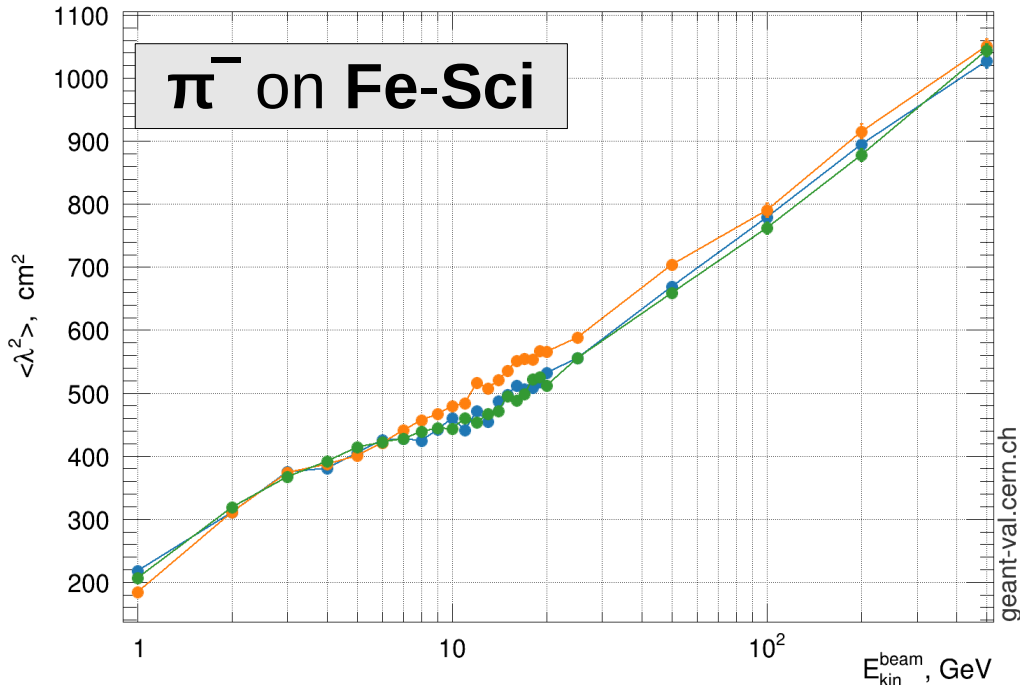
10.4.p03.cand00

10.5.p01_cand02
10.5.cand02

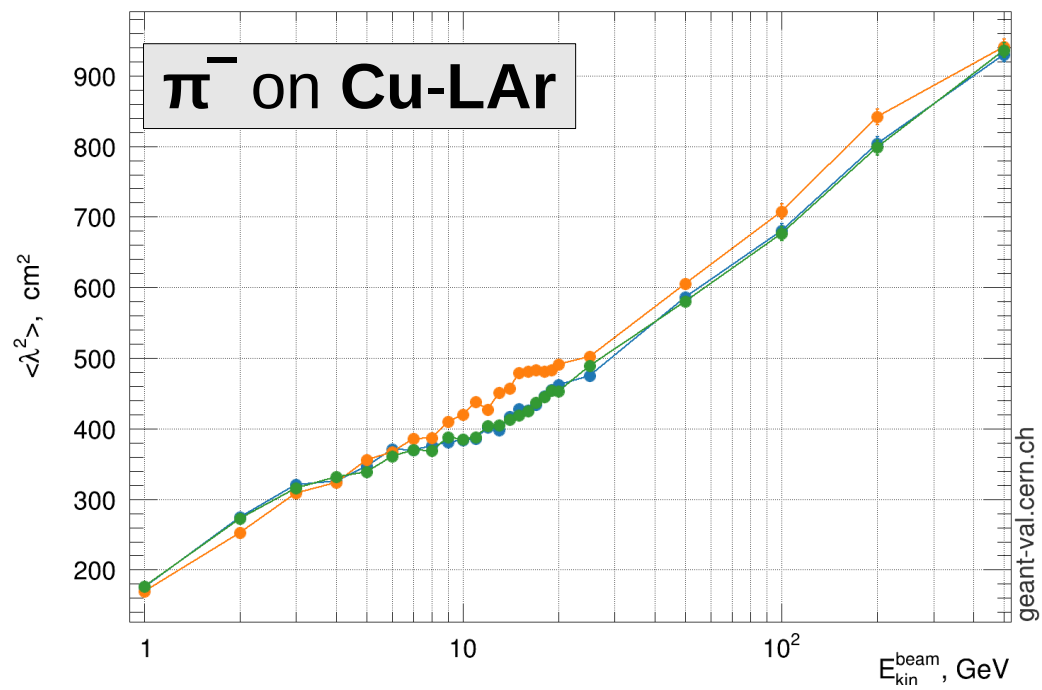
10.4.p03.cand00

FTFP_BERT : Longitudinal Shape

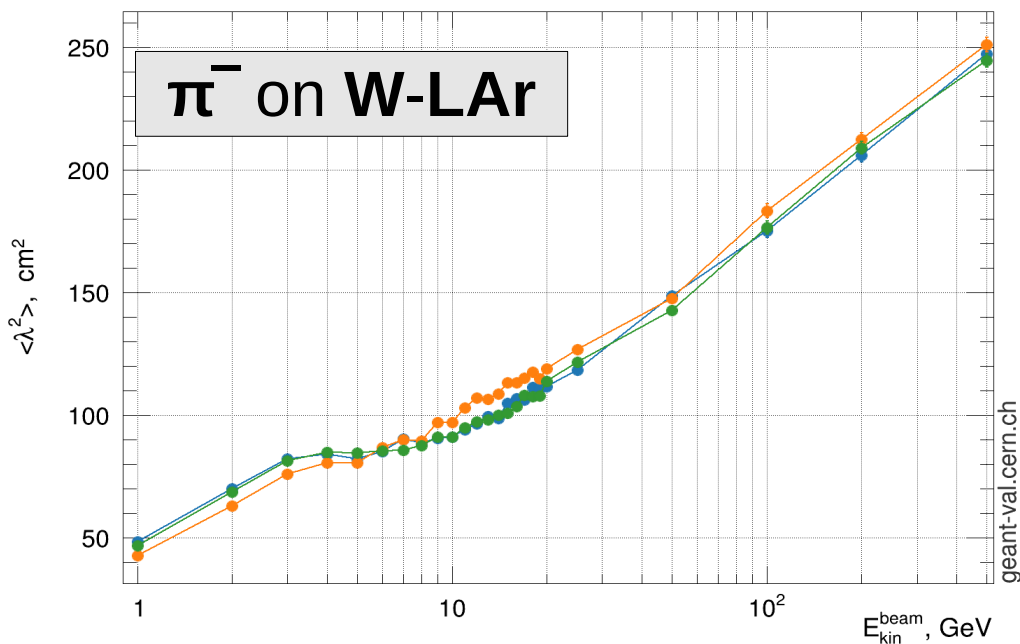
Longitudinal shower shape | Beam: pi- | Target: TileCal | FTFP_BERT



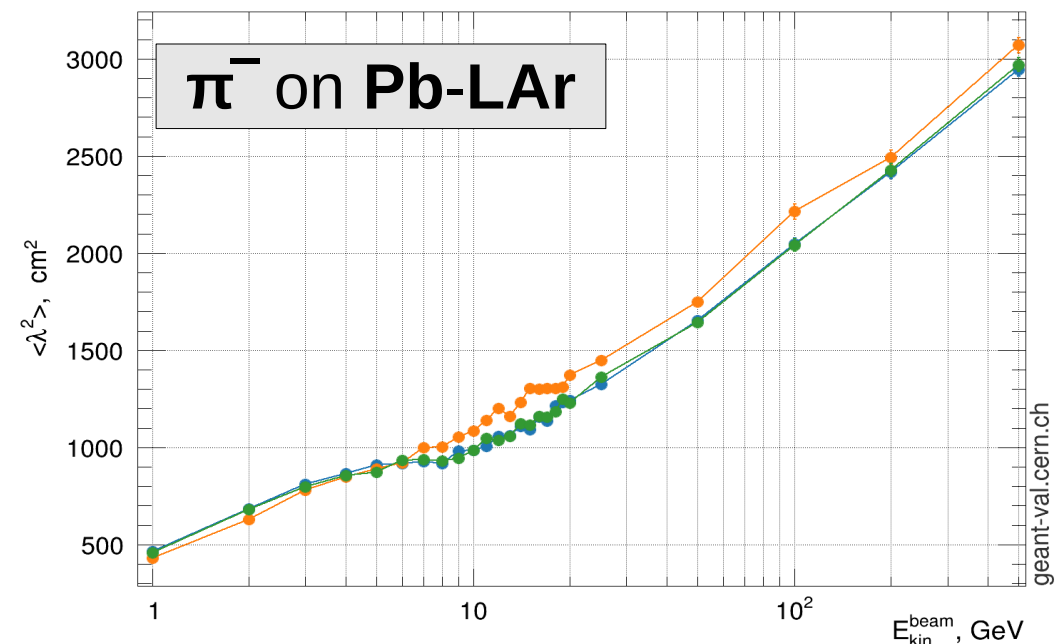
Longitudinal shower shape | Beam: pi- | Target: AtlasHEC | FTFP_BERT



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



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



10.5.p01_cand02
10.5.cand02

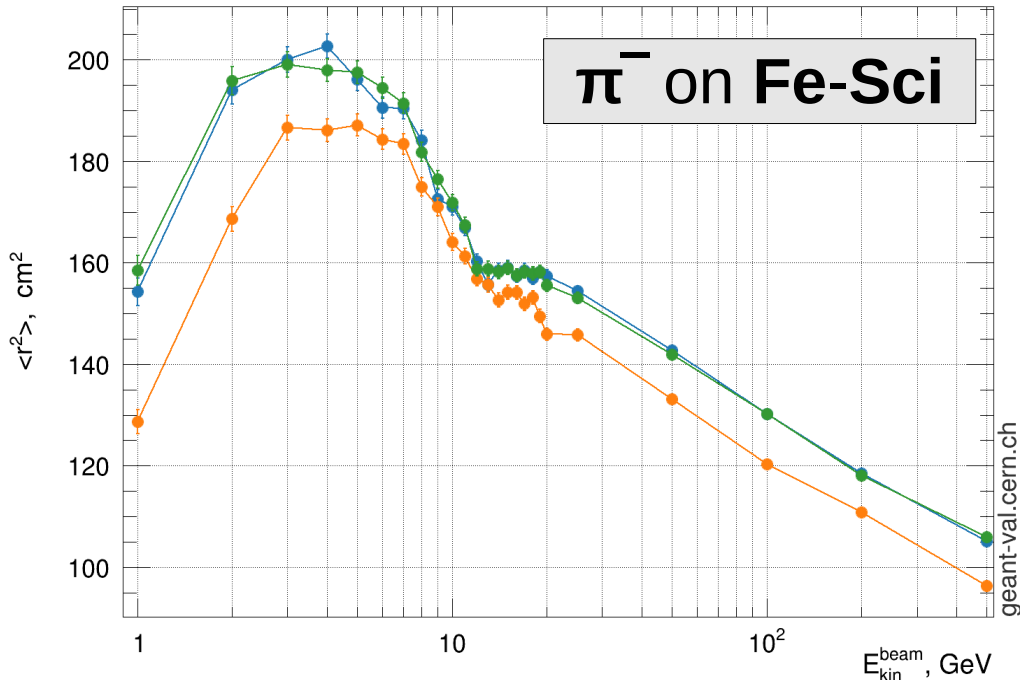
10.4.p03.cand00

10.5.p01_cand02
10.5.cand02

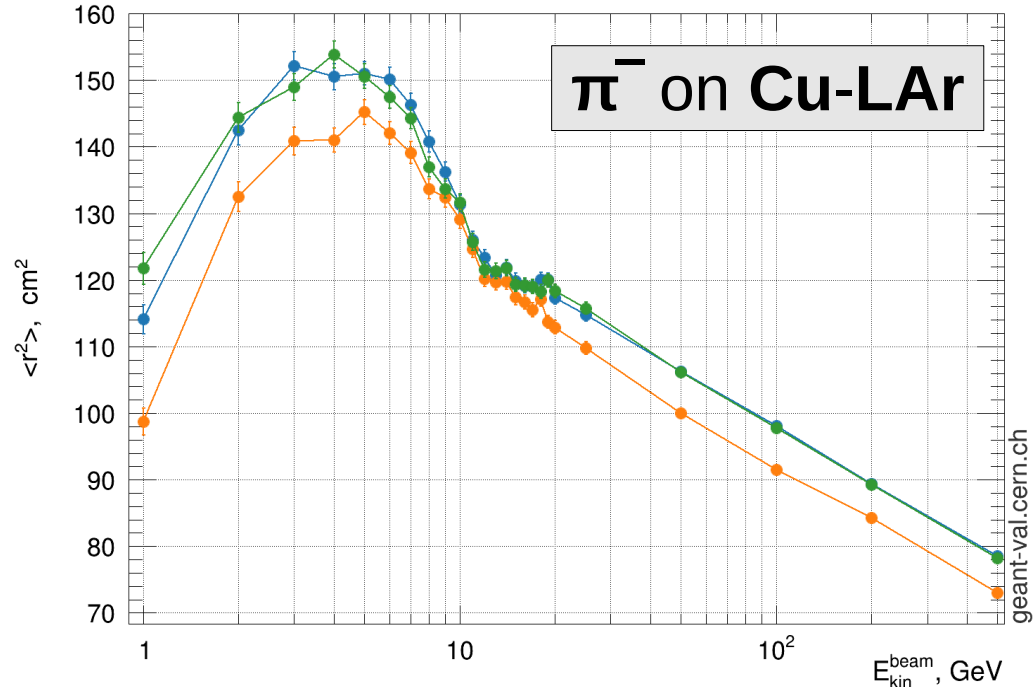
10.4.p03.cand00

FTFP_BERT : Lateral Shape

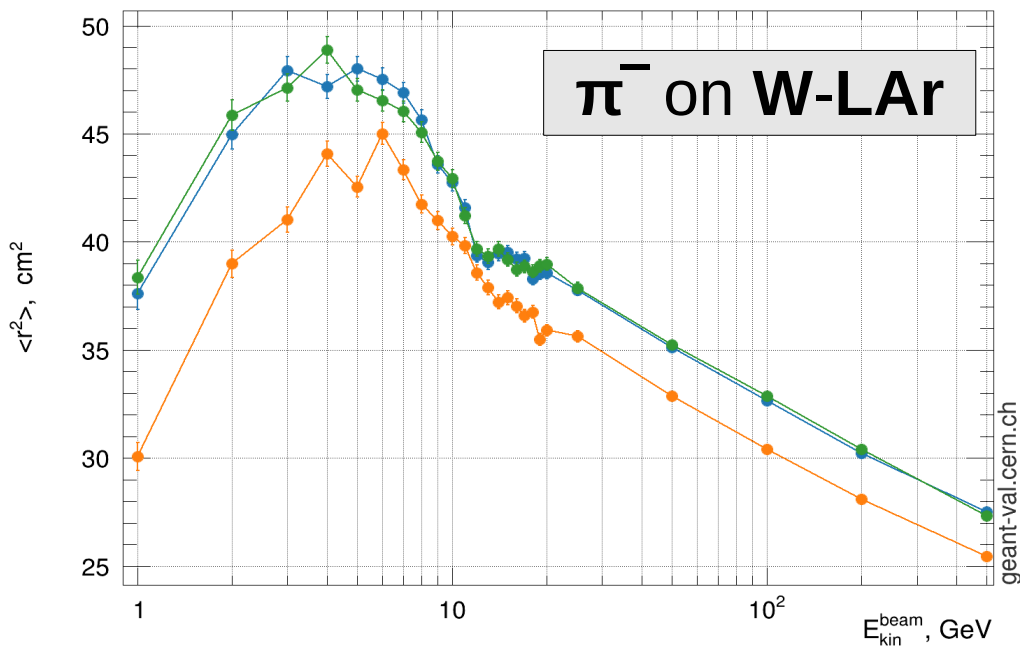
Lateral shower shape | Beam: pi- | Target: TileCal | FTFP_BERT



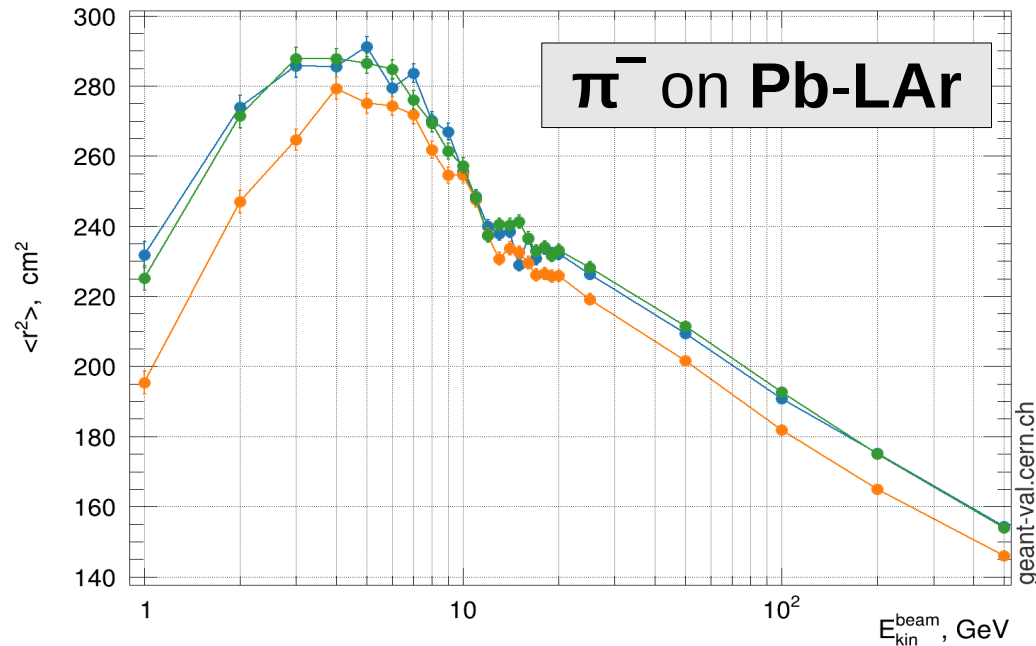
Lateral shower shape | Beam: pi- | Target: AtlasHEC | FTFP_BERT



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



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



10.5.p01_cand02
10.5.cand02

10.4.p03.cand00

10.5.p01_cand02
10.5.cand02

10.4.p03.cand00

Conclusions

- **G4 10.5.p01**
 - No crashes, warnings, infinite loops
 - Reproducibility OK
 - Similar hadronic showers as in G4 10.5
 - ... and similar also to those of 10.5.ref{01,02,03}