Grid testing of Geant4 10.4.**p02**

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Main Changes in Hadronics *vs.* 10.4.**p01**

- No physics change in any of the main hadronic models

- ParticleHP :

  - G4ParticleHPFissionFS: protect against very rare cases of division by zero

- RadioactiveDecay :

  - A few fixes important for biasing

Crashes & Warnings

- No crashes

- No infinite loops

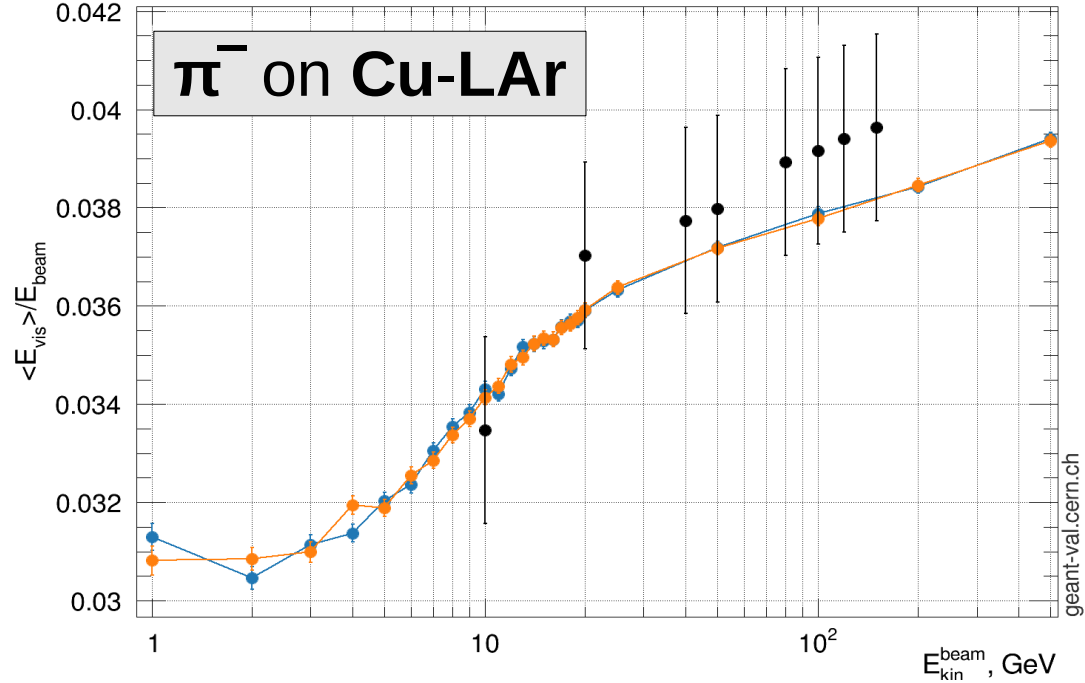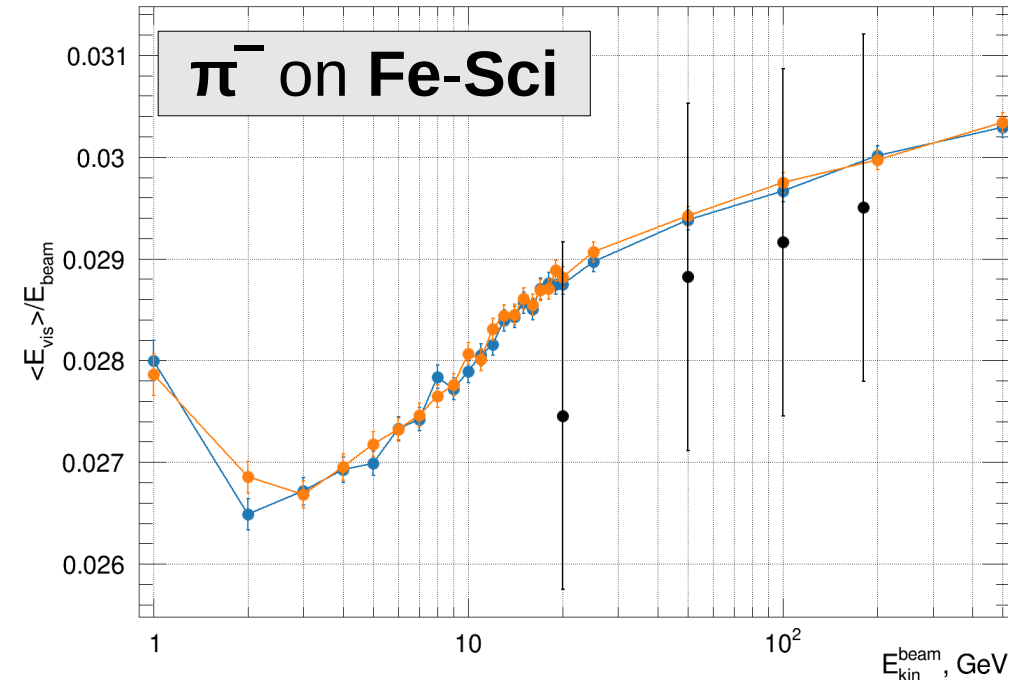- No warnings

Reproducibility

- Reproducibility OK

Pion showers: FTFP_BERT
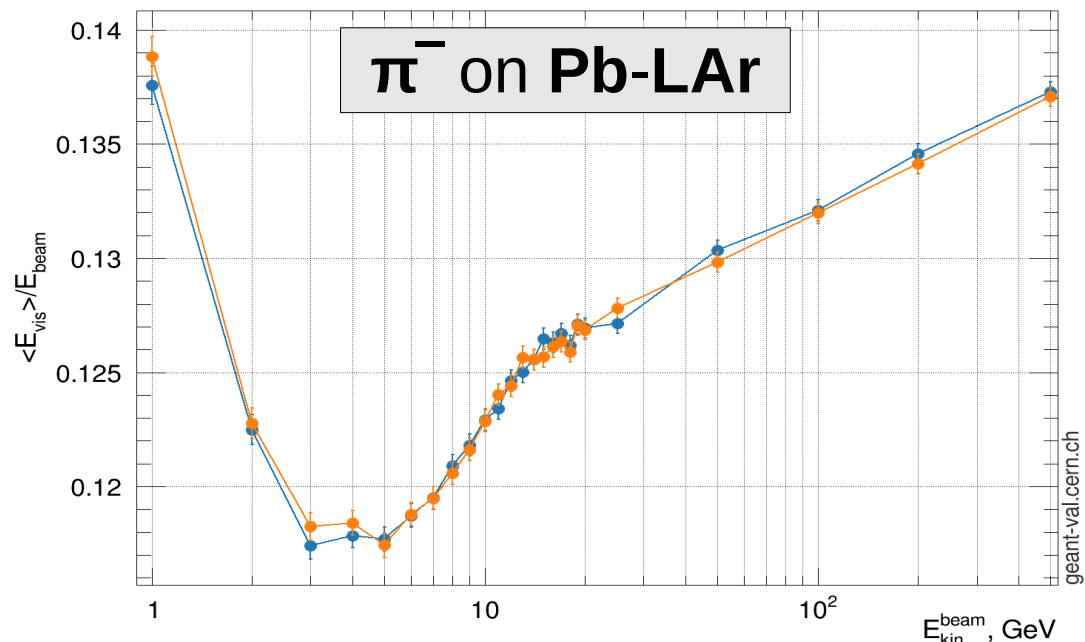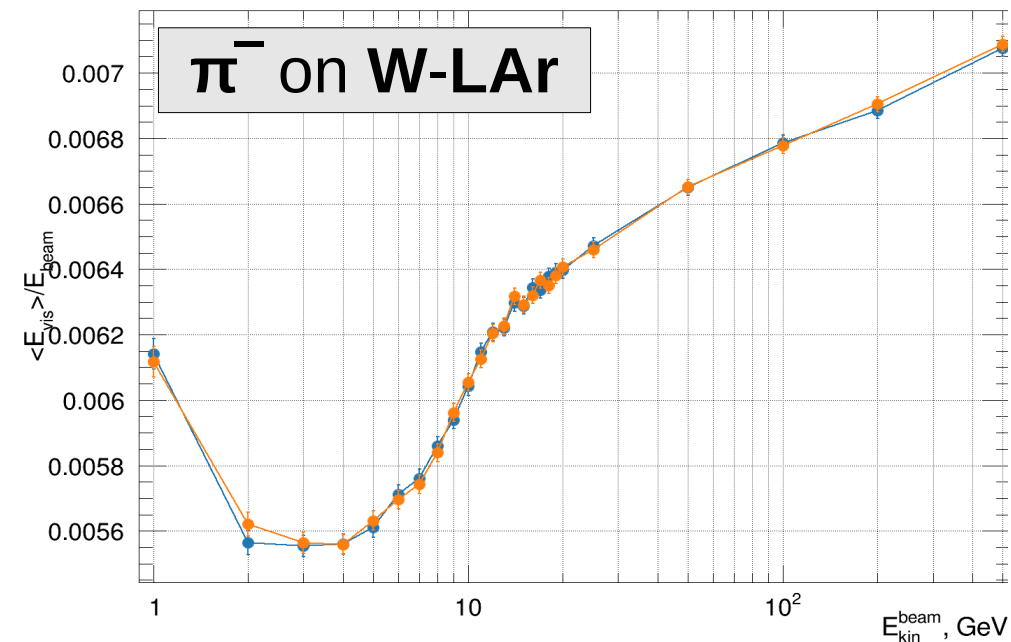
G4 10.4.p02
10.4.p01

FTFP_BERT : Energy Response

Energy response | **Beam**: pi- | **Target**: TileCal

π^- on **Fe-Sci**

Energy response | **Beam**: pi- | **Target**: AtlasHEC

π^- on **Cu-LAr**

Energy response | **Beam**: pi- | **Target**: AtlasFCAL | **Physics list**: FTFP_BERT

π^- on **W-LAr**

Energy response | **Beam**: pi- | **Target**: AtlasECAL | **Physics list**: FTFP_BERT

π^- on **Pb-LAr**

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FTFP_BERT : Energy Width

Normalized width | **Beam**: pi- | **Target**: TileCal | **Physics list**: FTFP_BERT
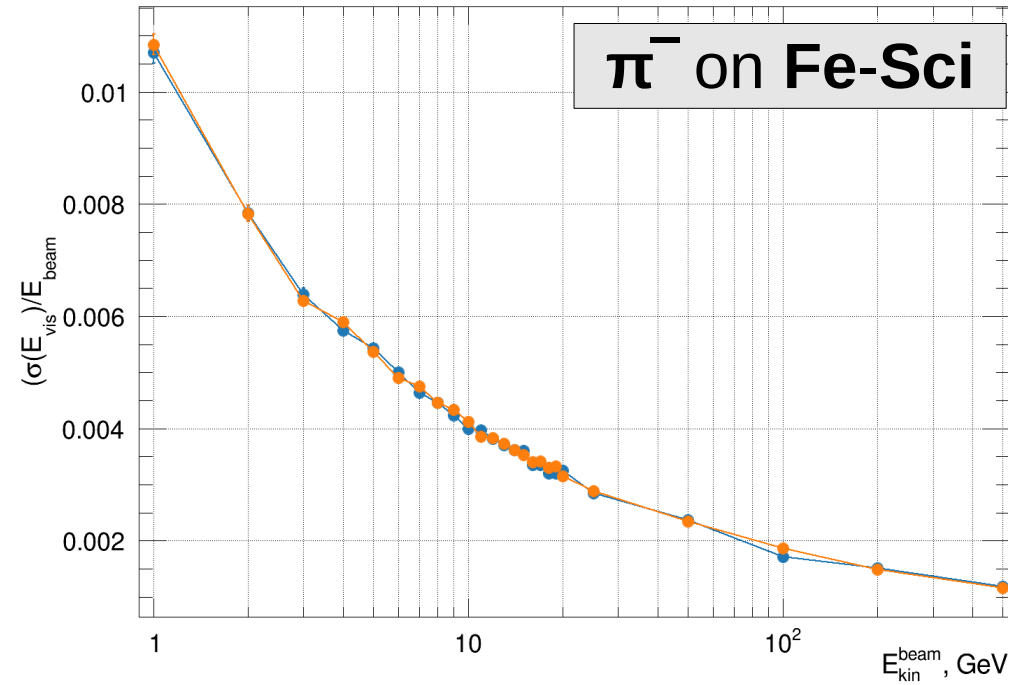
π^- on **Fe-Sci**

Normalized width | **Beam**: pi- | **Target**: AtlasHEC | **Physics list**: FTFP_BERT

π^- on **Cu-LAr**

Normalized width | **Beam**: pi- | **Target**: AtlasFCAL | **Physics list**: FTFP_BERT

π^- on **W-LAr**

Normalized width | **Beam**: pi- | **Target**: AtlasECAL | **Physics list**: FTFP_BERT

π^- on **Pb-LAr**

$(\sigma(E_{vis})/E_{beam}$

E_{kin}^{beam}, GeV

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FTFP_BERT : Energy Resolution

Energy resolution | **Beam**: pi- | **Target**: TileCal

π^- on **Fe-Sci**

Energy resolution | **Beam**: pi- | **Target**: AtlasHEC

π^- on **Cu-LAr**

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Energy resolution | **Beam**: pi- | **Target**: AtlasFCAL | **Physics list**: FTFP_BERT

π^- on **W-LAr**

Energy resolution | **Beam**: pi- | **Target**: AtlasECAL | **Physics list**: FTFP_BERT

π^- on **Pb-LAr**
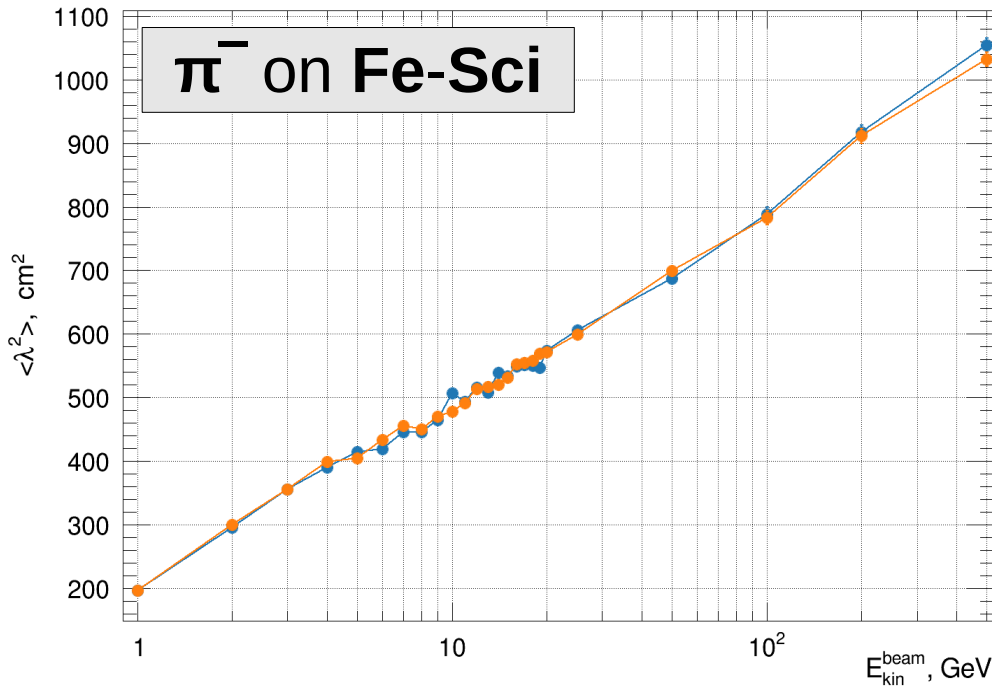
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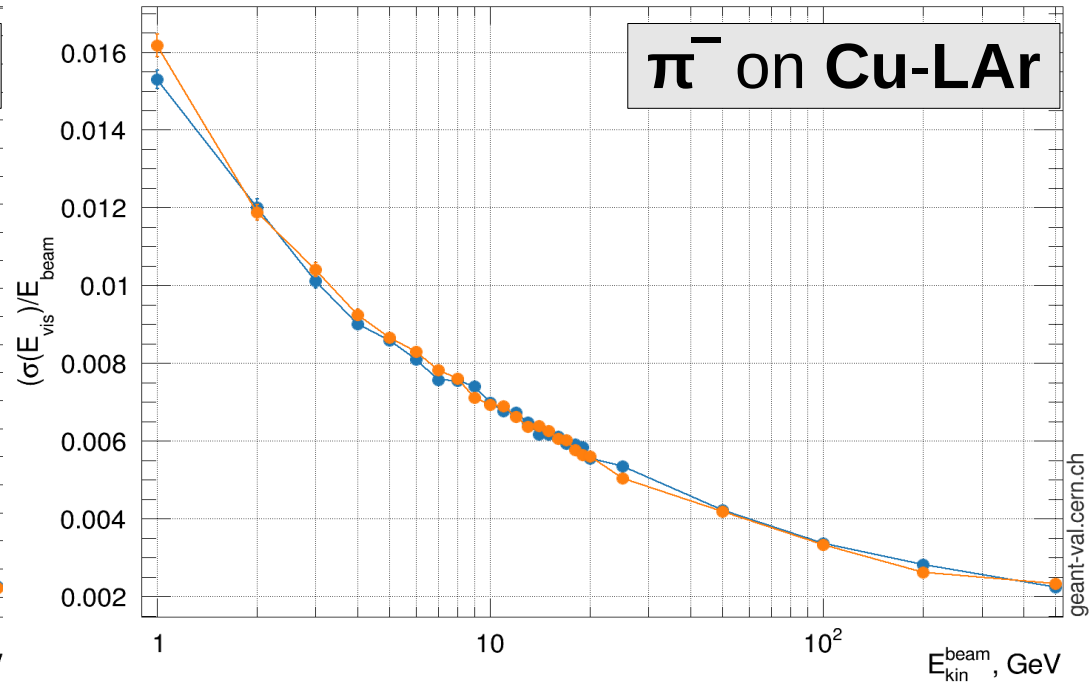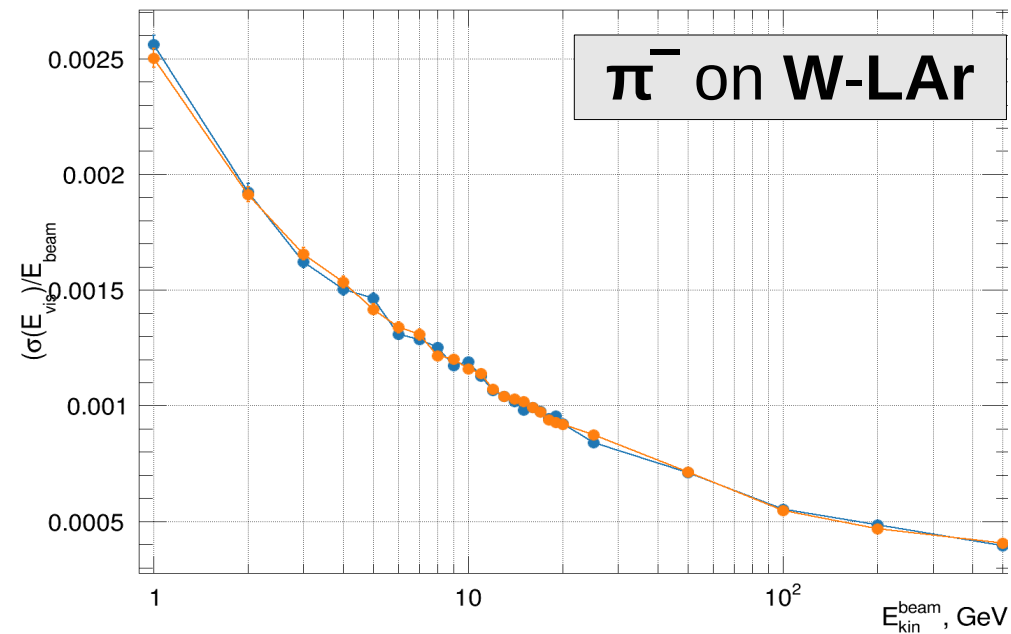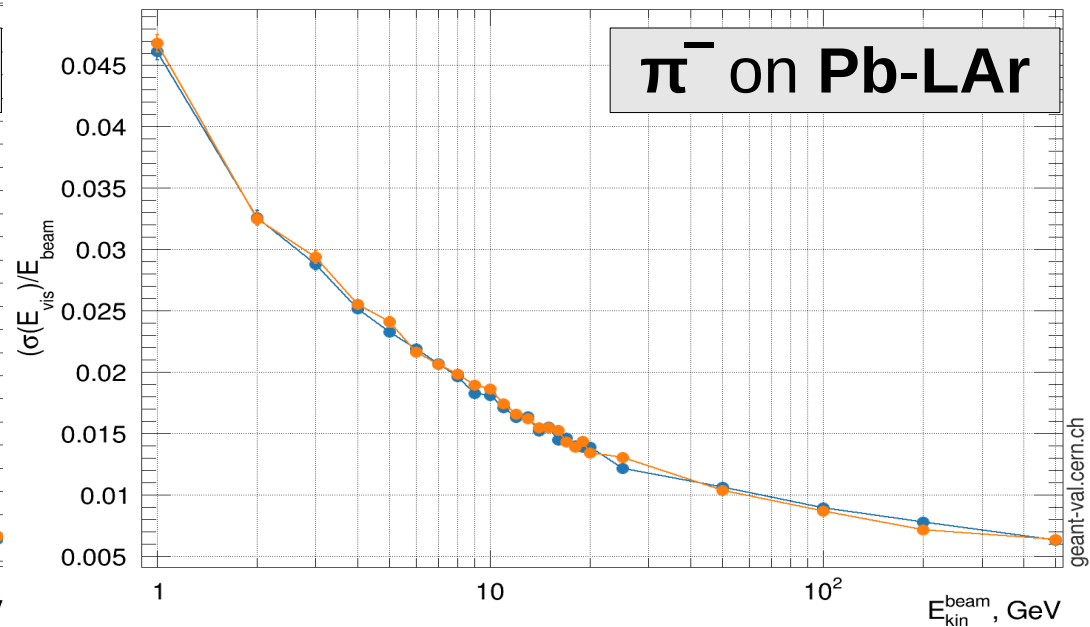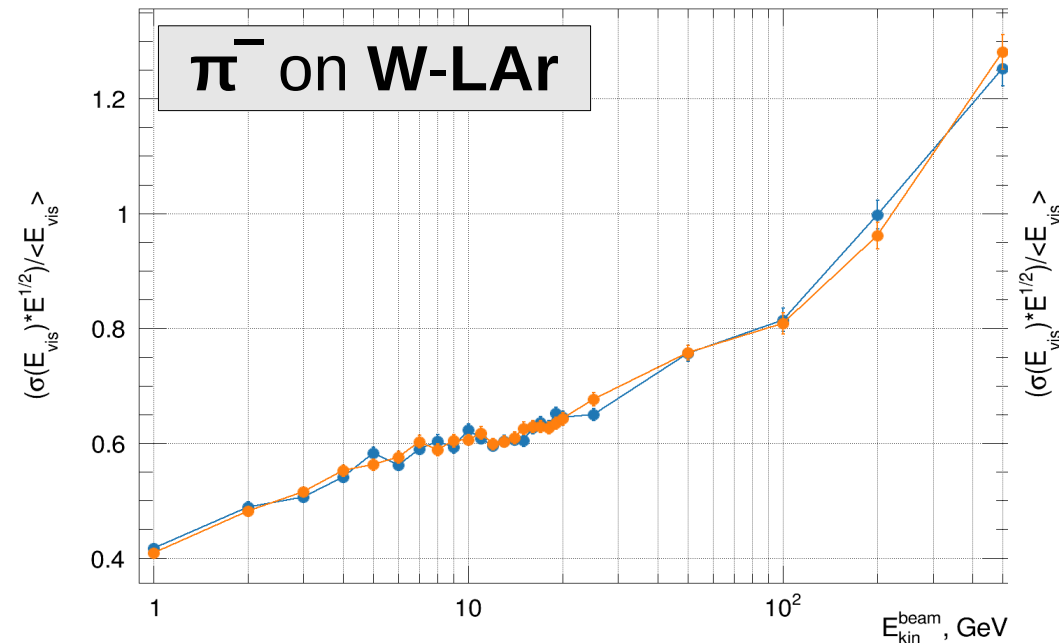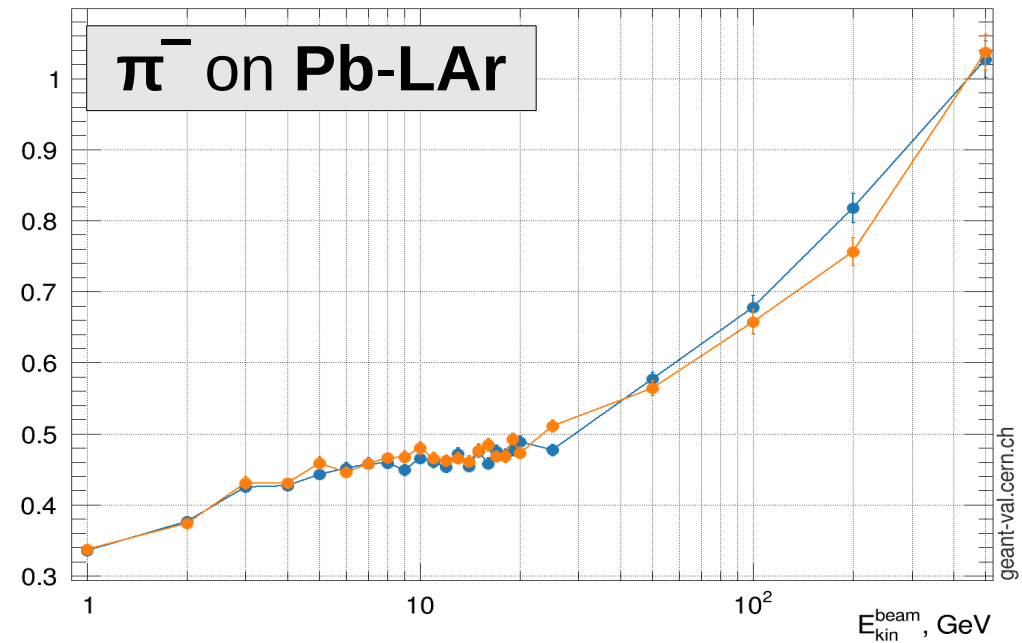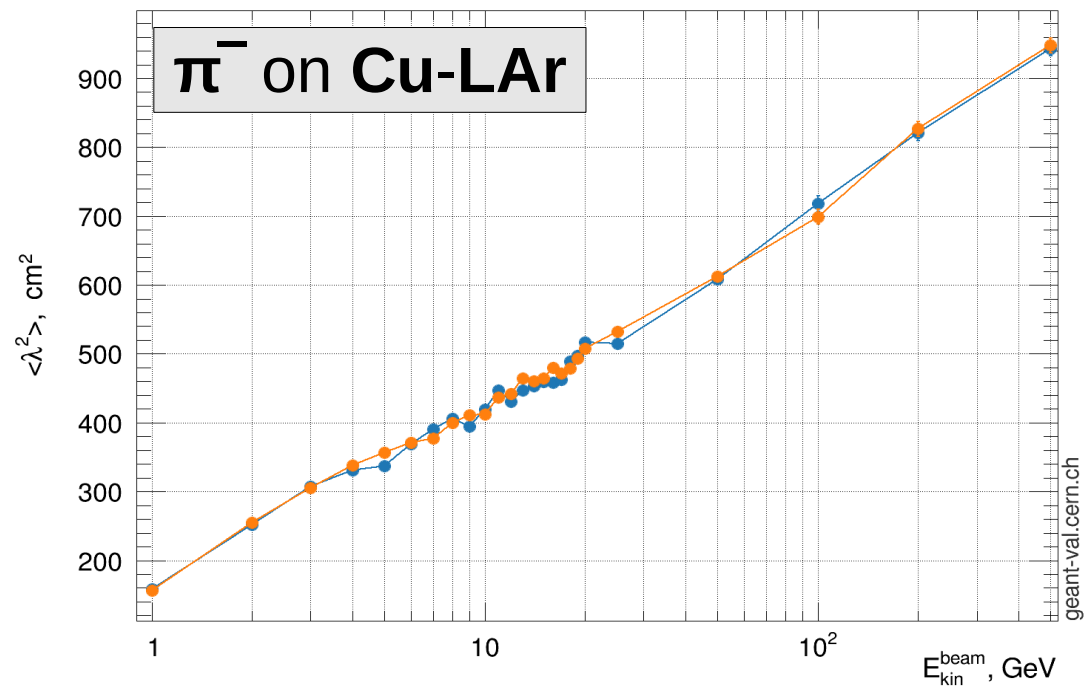
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FTFP_BERT : Longitudinal Shape

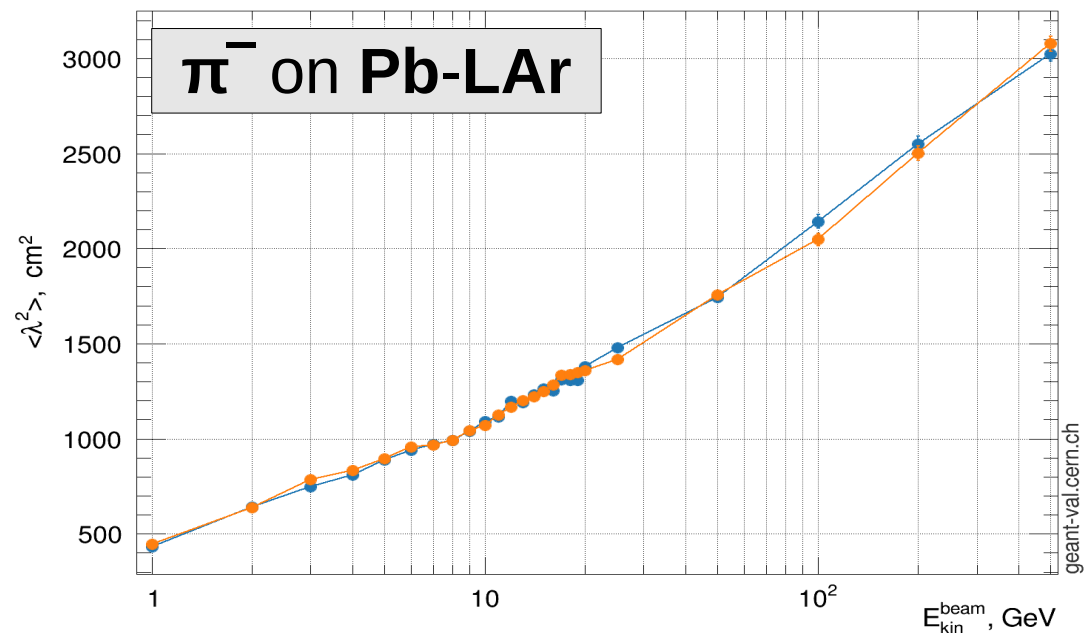**Longitudinal shower shape** | **Beam**: pi- | **Target**: TileCal | **Physics list** : FTFP_BERT

π^- on **Fe-Sci**

Longitudinal shower shape | **Beam**: pi- | **Target**: AtlasHEC | **Physics list** : FTFP_BERT

π^- on **Cu-LAr**

Longitudinal shower shape | **Beam**: pi- | **Target**: AtlasFCAL | **Physics list** : FTFP_BERT

π^- on **W-LAr**

Longitudinal shower shape | **Beam**: pi- | **Target**: AtlasECAL | **Physics list** : FTFP_BERT

π^- on **Pb-LAr**
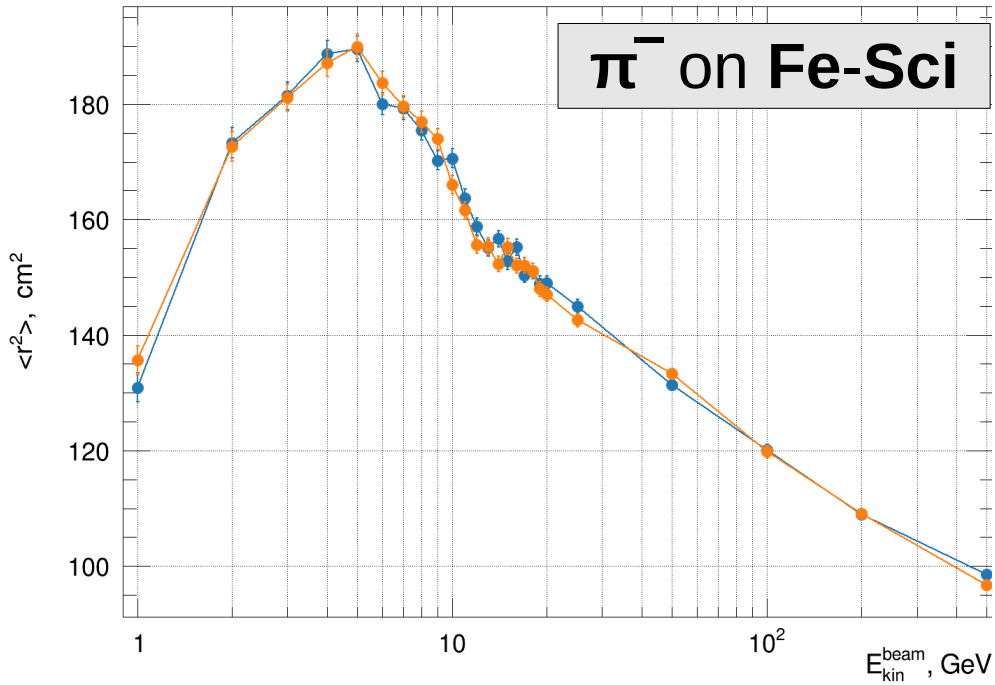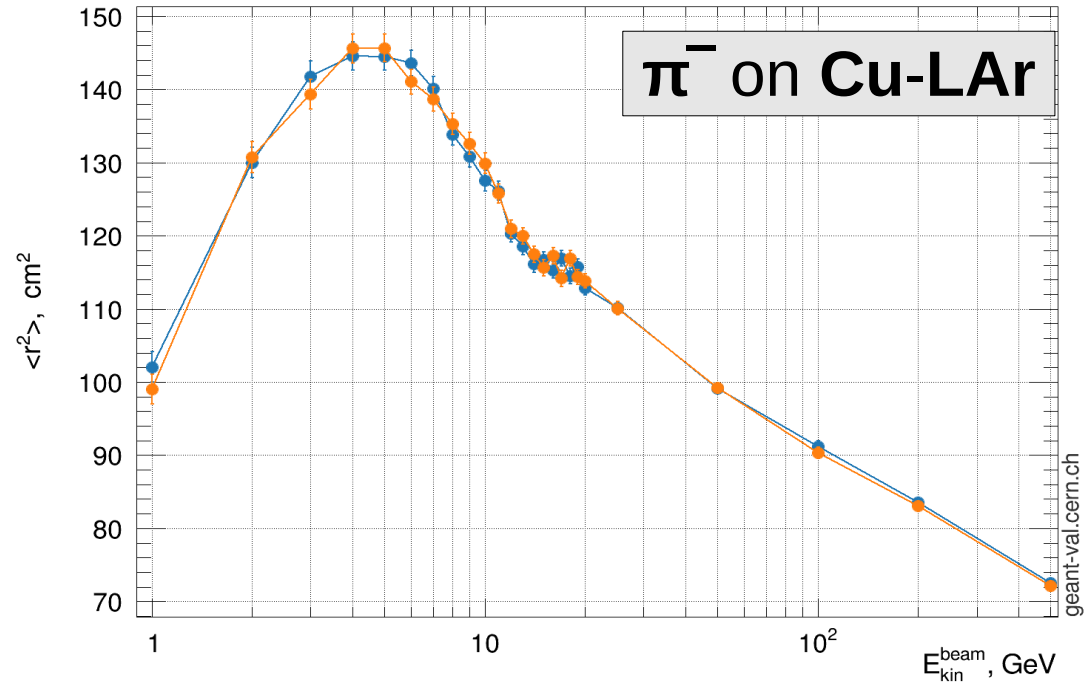

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FTFP_BERT : Lateral Shape

Lateral shower shape | **Beam** : pi- | **Target** : TileCal | **Physics list** : FTFP_BERT

π^- on **Fe-Sci**

Lateral shower shape | **Beam** : pi- | **Target** : AtlasHEC | **Physics list** : FTFP_BERT

π^- on **Cu-LAr**

Lateral shower shape | **Beam** : pi- | **Target** : AtlasFCAL | **Physics list** : FTFP_BERT

π^- on **W-LAr**

Lateral shower shape | **Beam** : pi- | **Target** : AtlasECAL | **Physics list** : FTFP_BERT

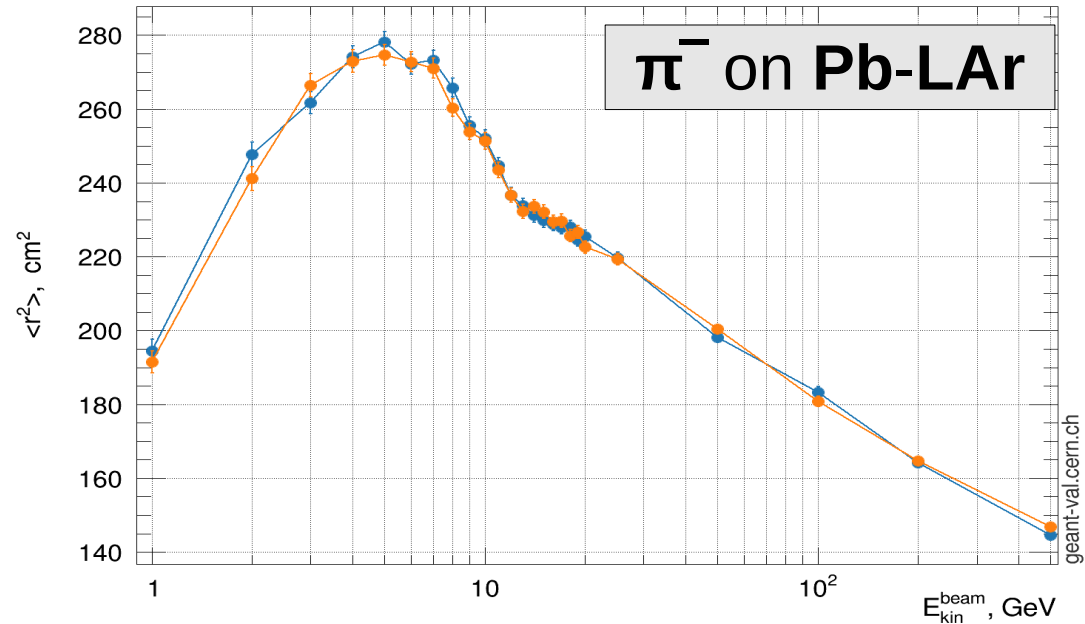π^- on **Pb-LAr**

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Conclusions

- **G4 10.4.p02**
  - No crash, infinite loop, warning
  - Reproducibility OK
  - FTF hadronic showers : stable *w.r.t.* 10.4