Grid testing of Geant4 : **10.4.beta** (== 10.3.ref06)

G. Folger, D. Konstantinov, W. Pokorski, A. Ribon

CERN PH/SFT

Main Changes in Hadronics vs. Ref05

- No changes in FTF, QGS, BERT
- De-excitations
  - Some technical fixes and disable correlated gamma emissions
- Precompound , BIC
  - Minor technical fixes

- Others :
  - RadioactiveDecay
    - Technical fixes

Crashes & Warnings

- No crashes
- No infinite loops
- No warnings

Reproducibility

- Reproducibility OK, also with Radioactive Decay

Pion showers: FTFP_BERT

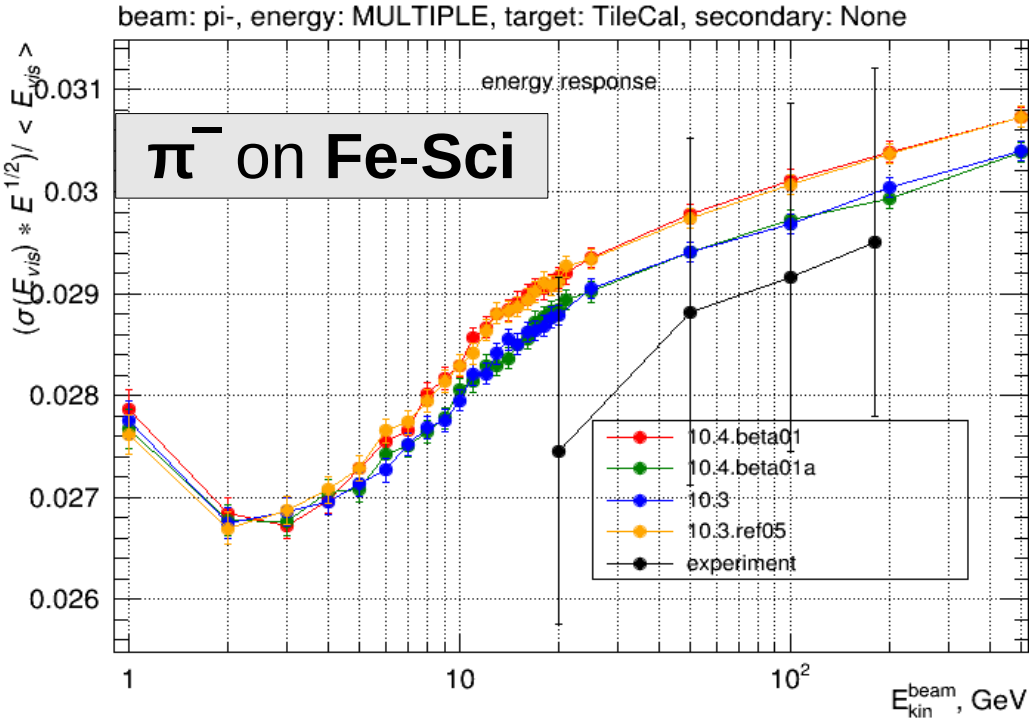
G4 10.4.beta01 ,
10.3.ref05 ,

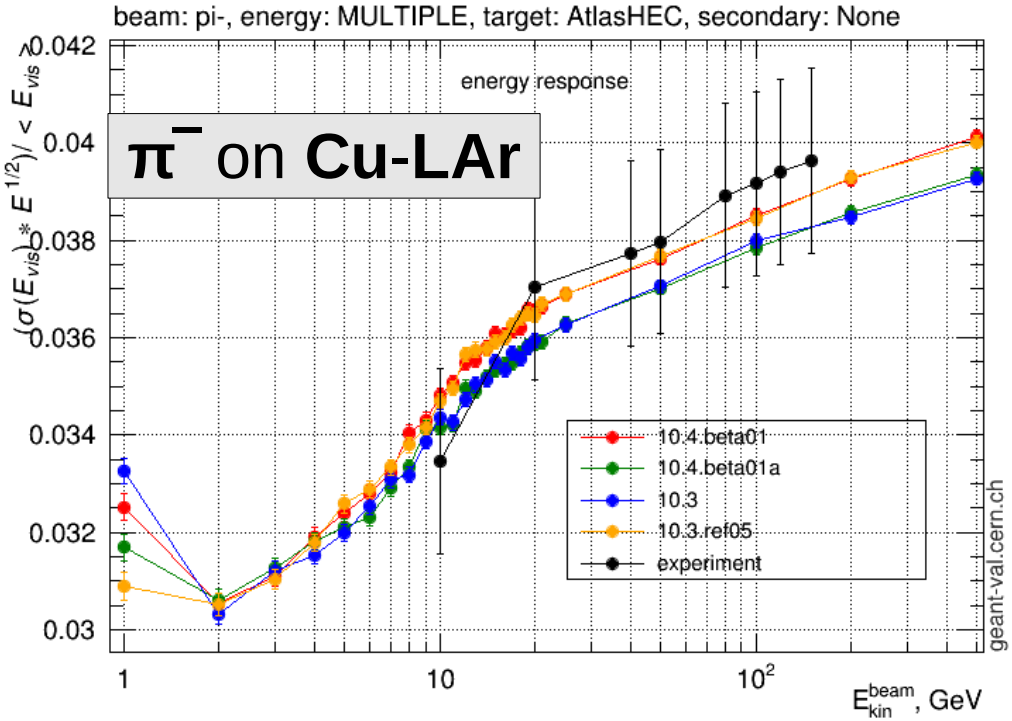
Development FTF

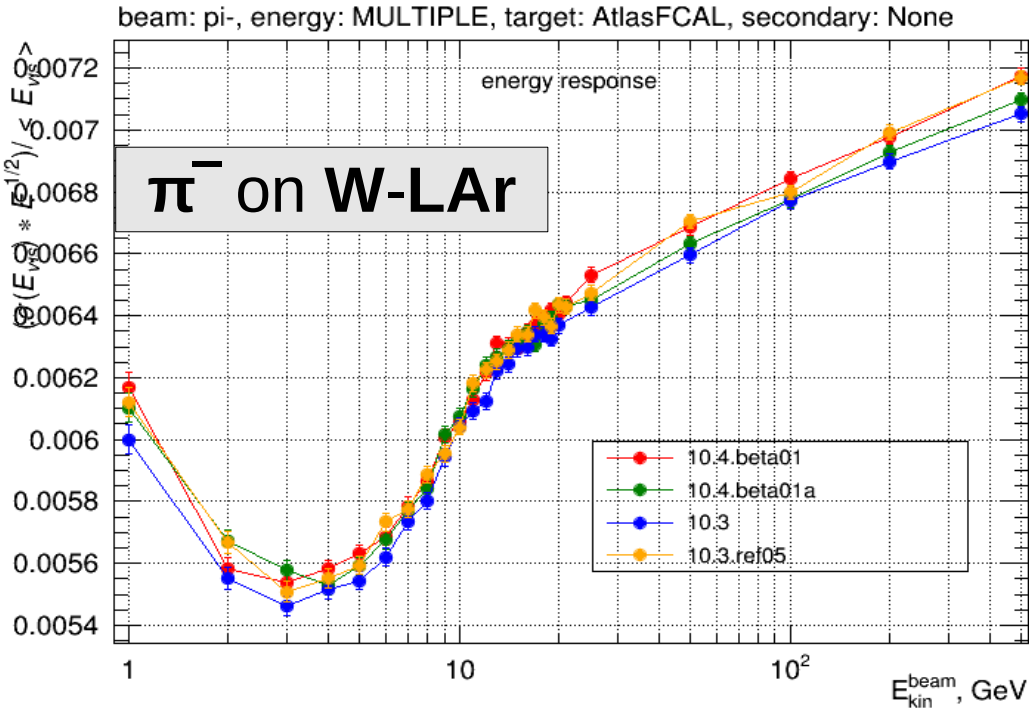
10.4.beta01**a** ,
10.3

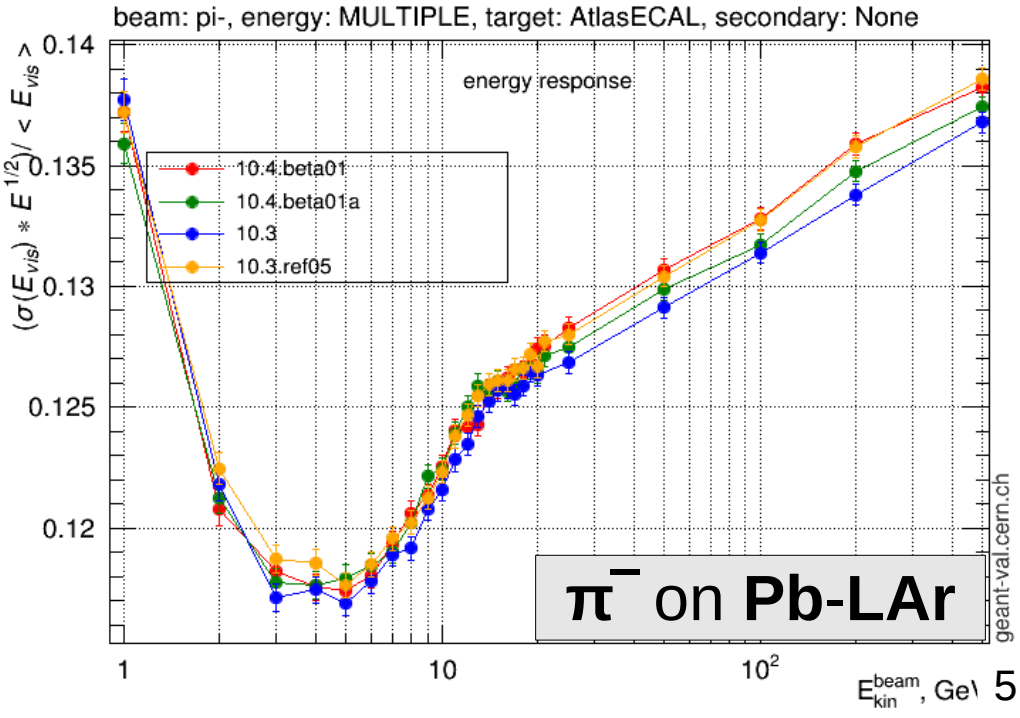
Production FTF

FTFP_BERT : Energy Response

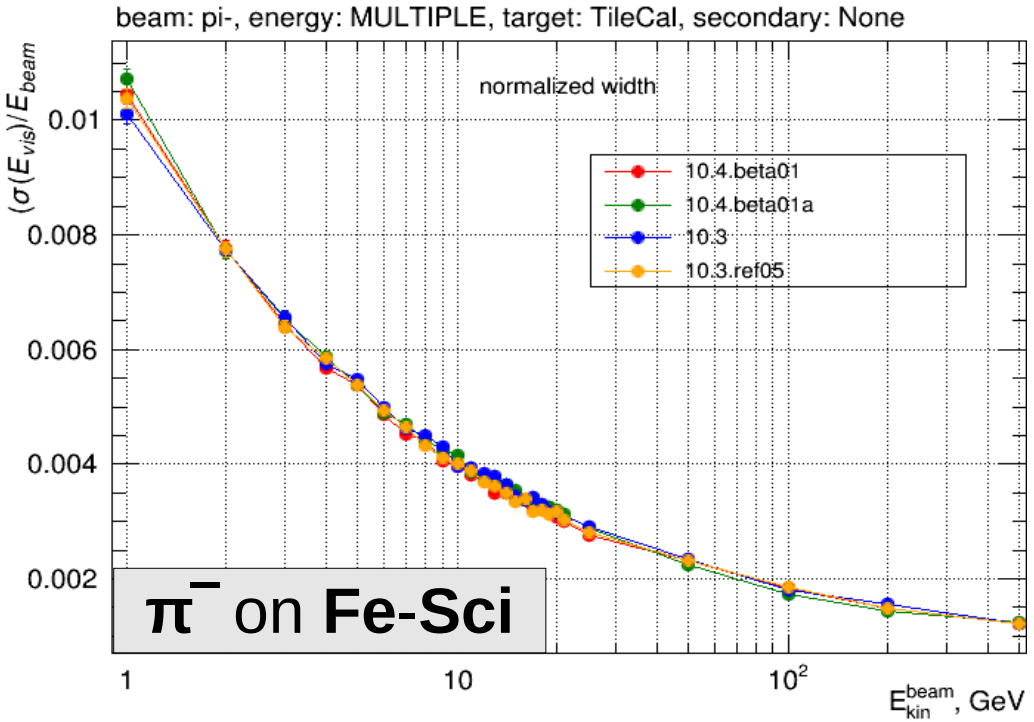


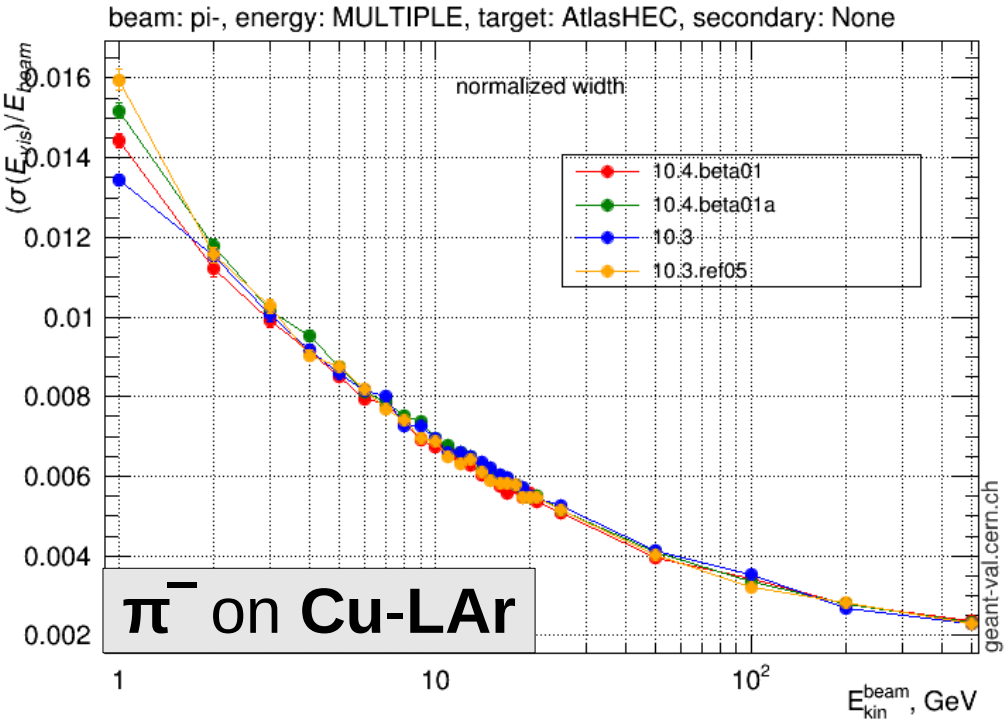


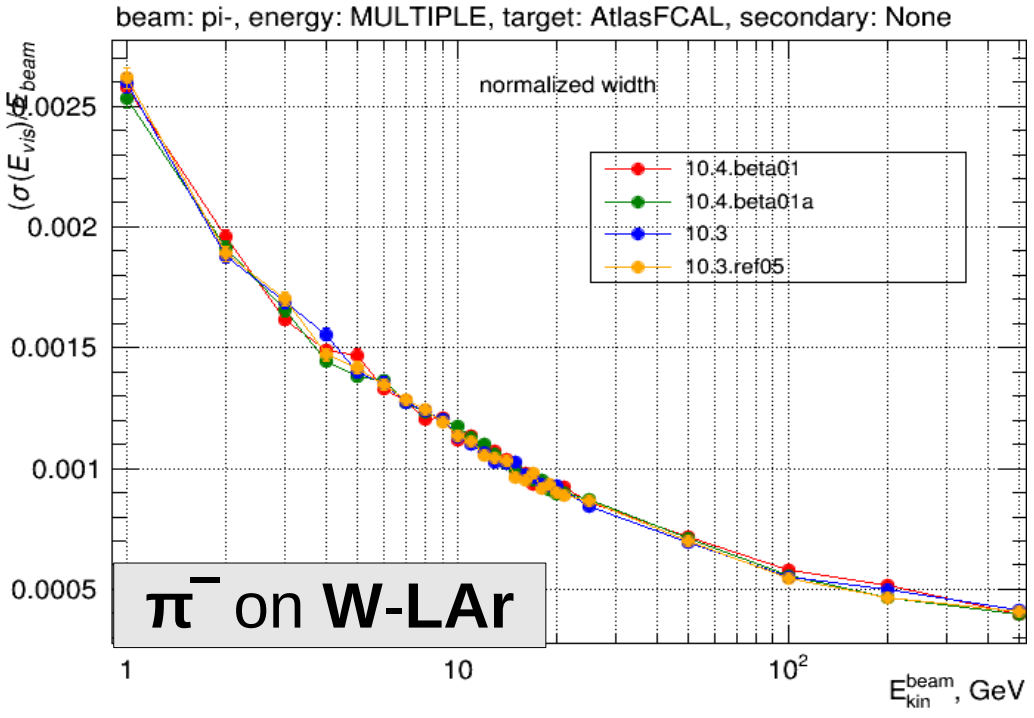


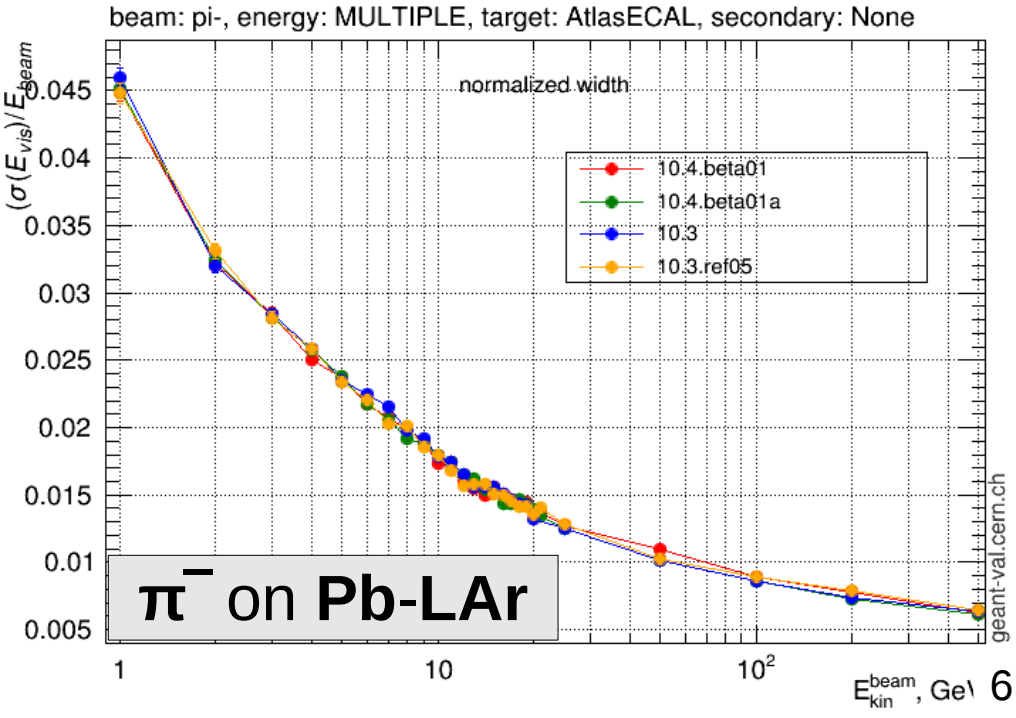


FTFP_BERT : Energy Width

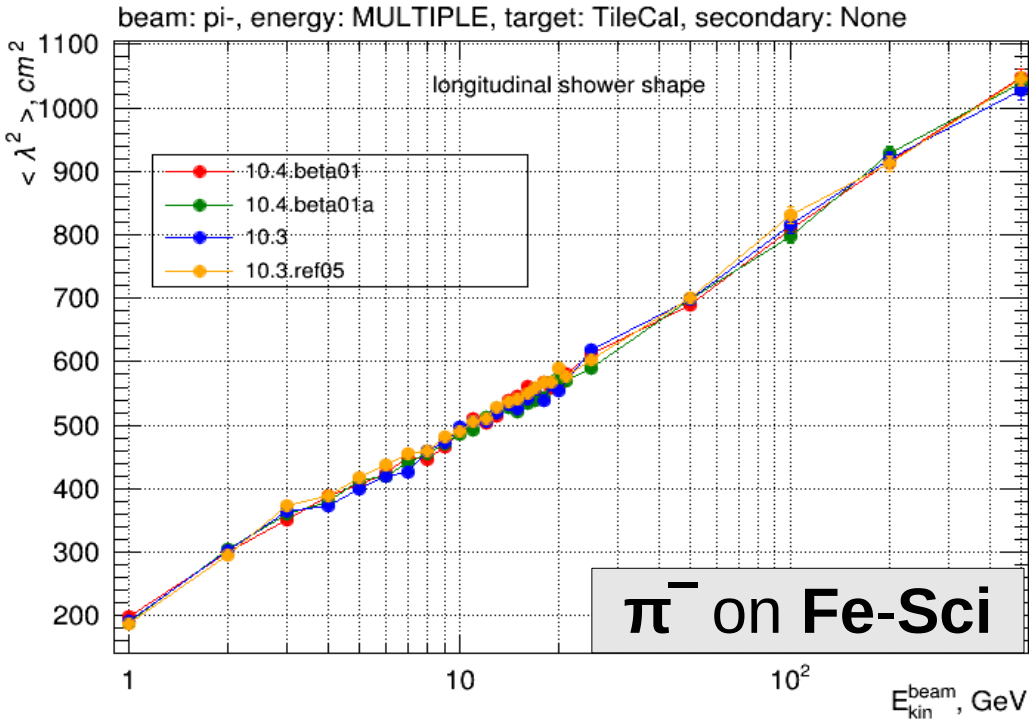


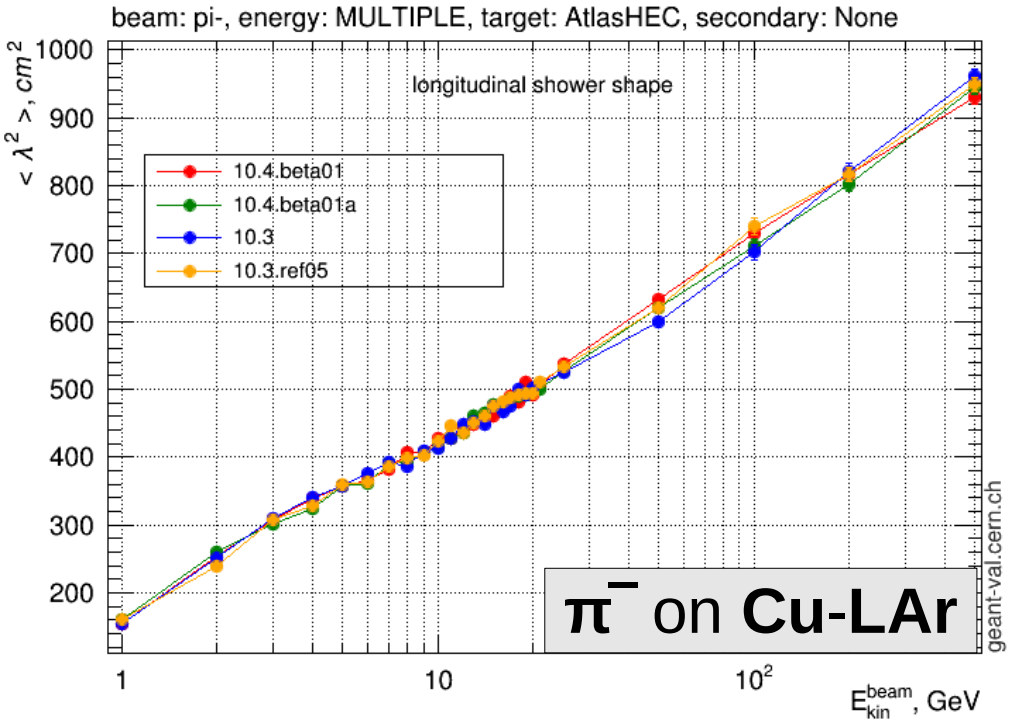


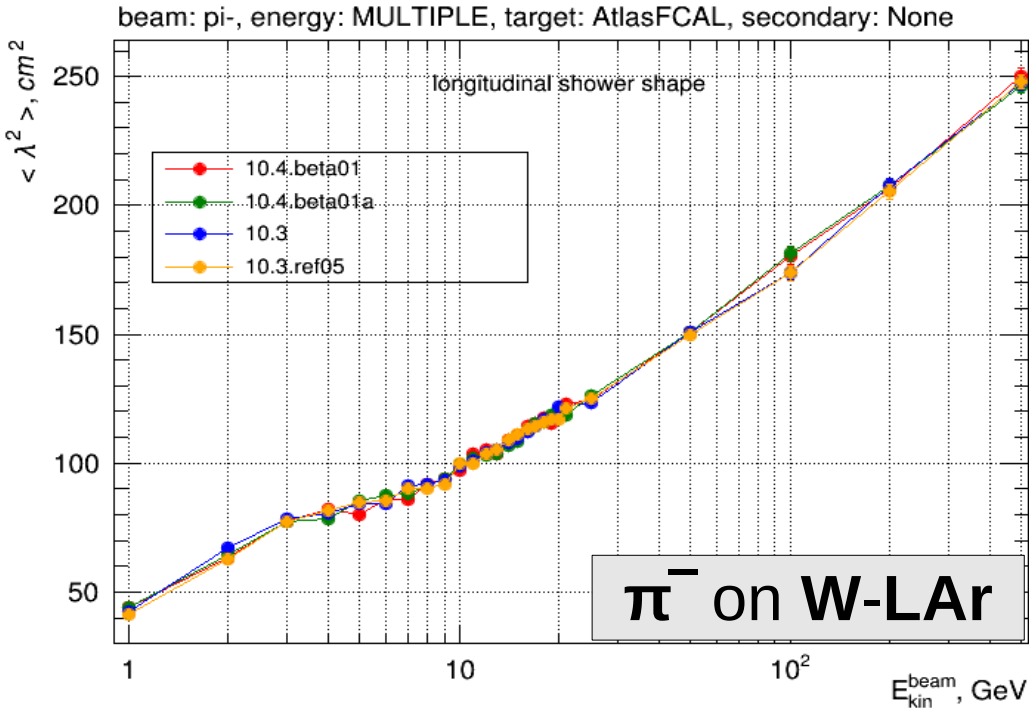


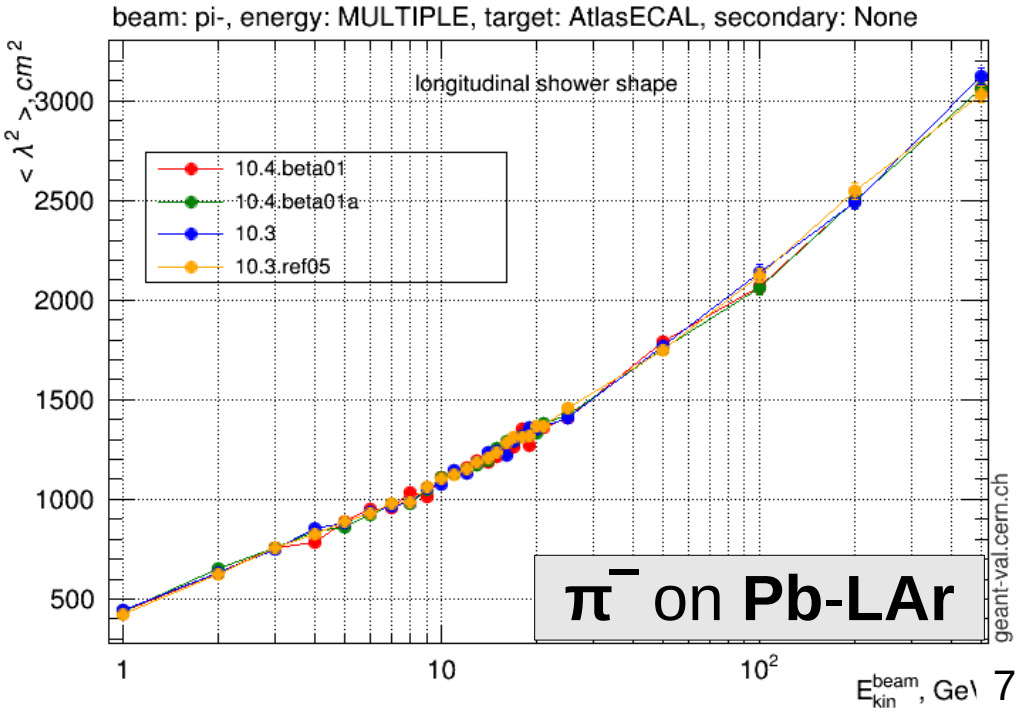


FTFP_BERT : Longitudinal Shape

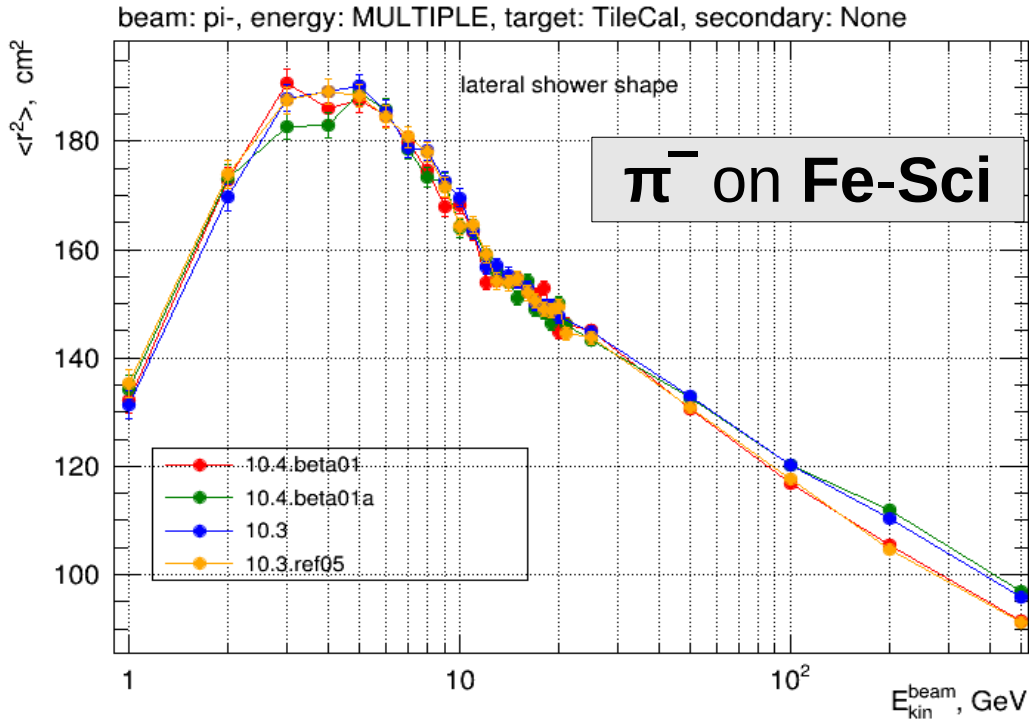


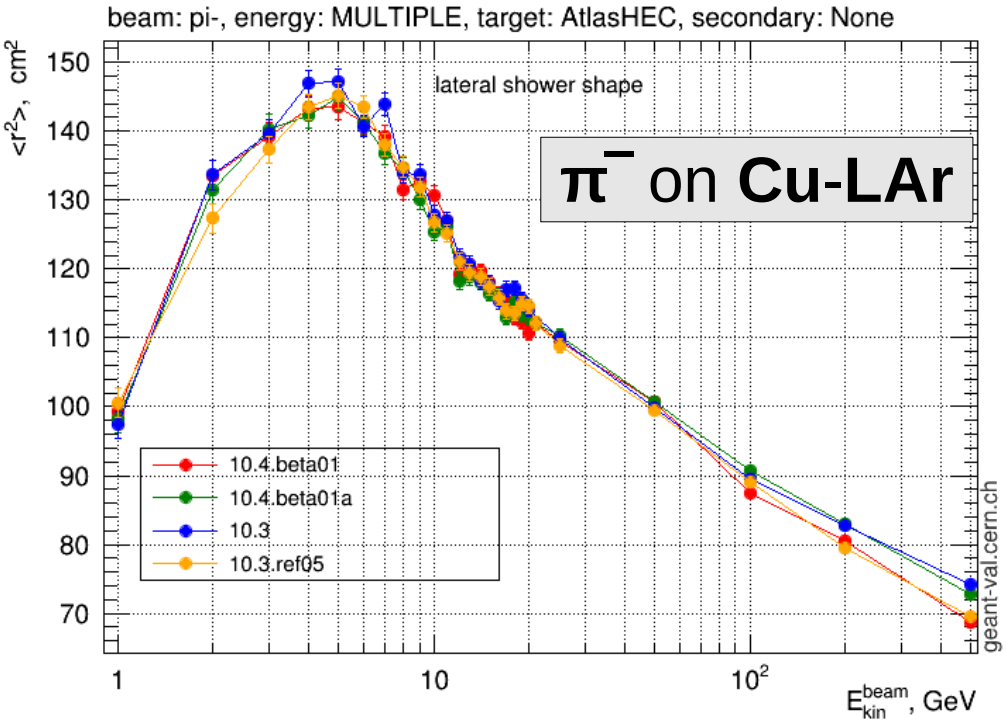


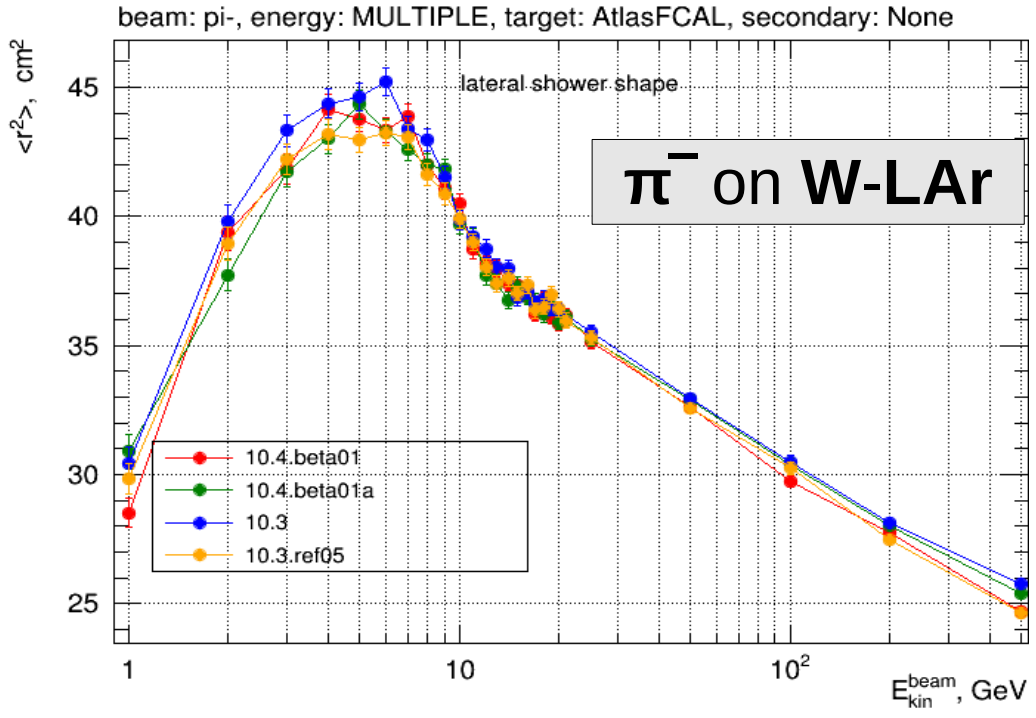


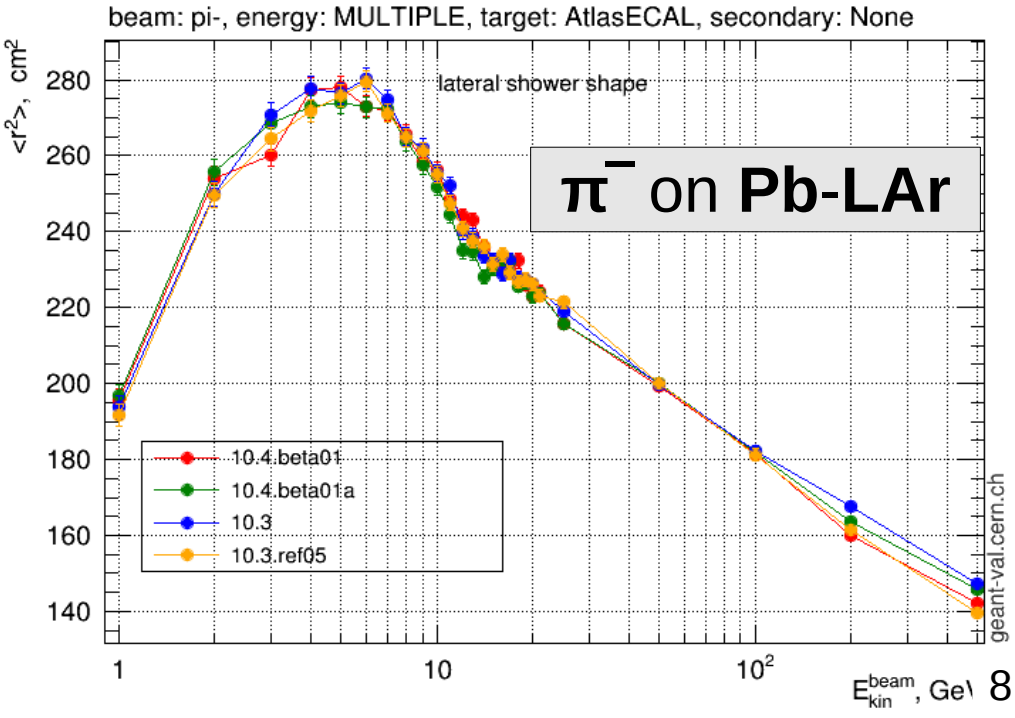


FTFP_BERT : Lateral Shape









Conclusions

- **G4 10.4.beta**
  - No crashes or infinite loops
  - No warnings
  - Reproducibility : ok, also with RadioactiveDecay
  - FTF hadronic showers :
    - For the **development** version of FTF, hadronic showers remain stable, i.e. similar to those of G4 10.3.ref05
    - For the **production** version of FTF, hadronic showers remain similar to those of G4 10.3, except for being narrower in heavy absorbers at low energies, due to the fix in Bertini coalescence
    - Comparing the hadronic showers of the **development** version of FTF *vs.* the **production** version of FTF in G4 10.4.beta, the former have still **higher energy response** and are **narrower** (especially in Fe & Cu) than the latter, **but the differences are less than before** (i.e. in G4 10.3, mainly due to rotating strings)