

# Grid testing of Geant4: **9.6.p04 and 10.1.ref01**

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# Crashes & Warnings

## G4 9.6.p04

- No crashes
- Warnings
  - Similar numbers for G4 9.6.p03 & p04

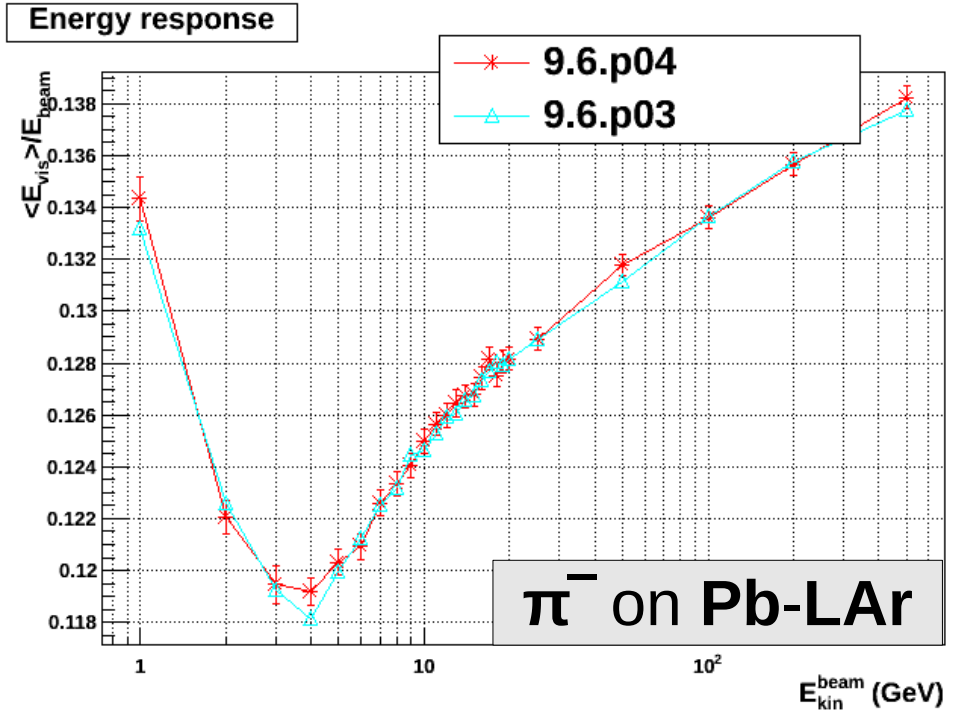
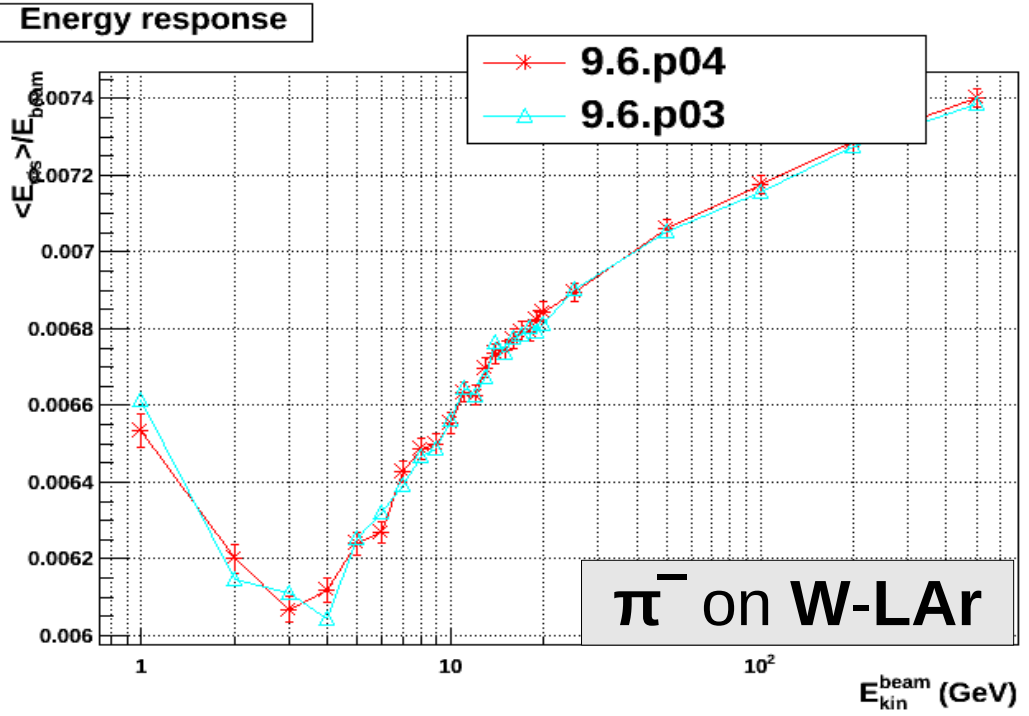
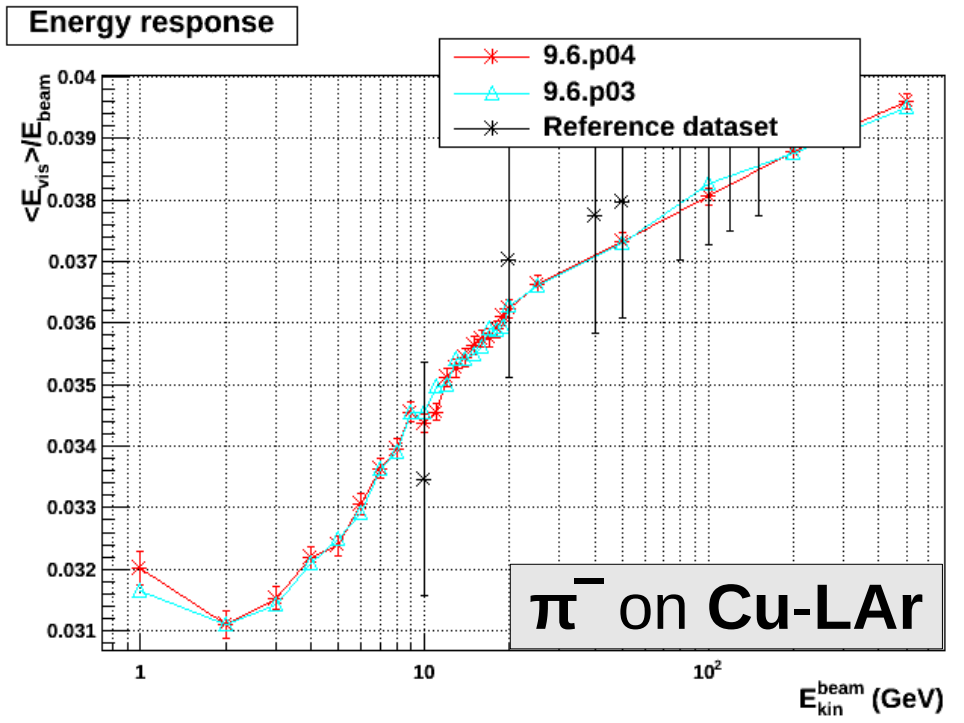
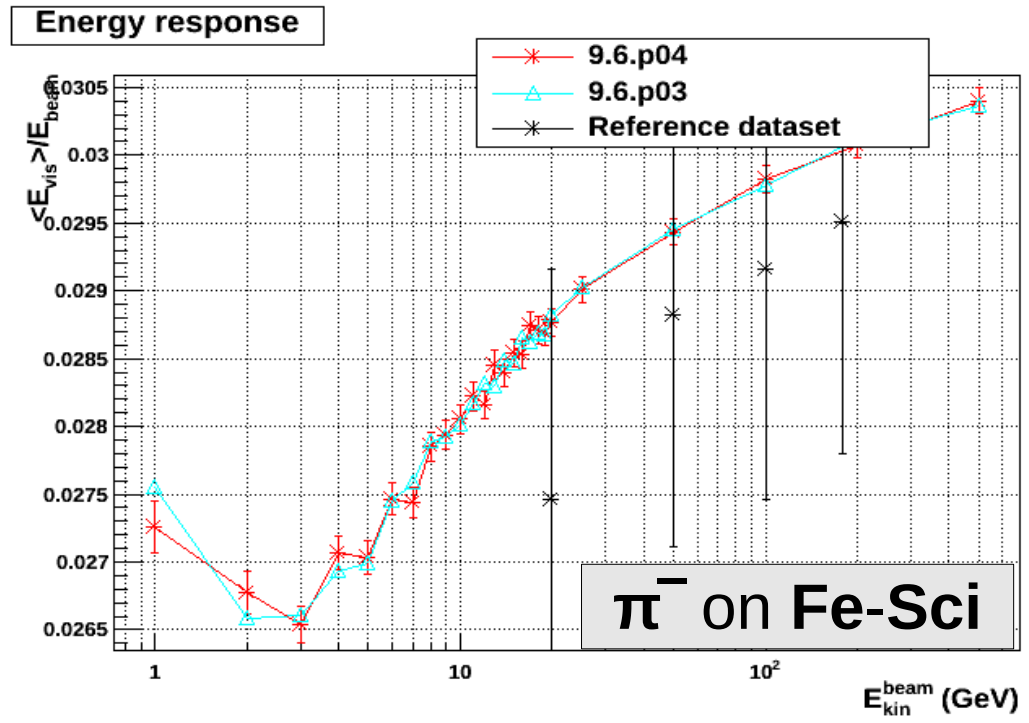
## G4 10.1.ref01

- Not yet available

# Pion showers

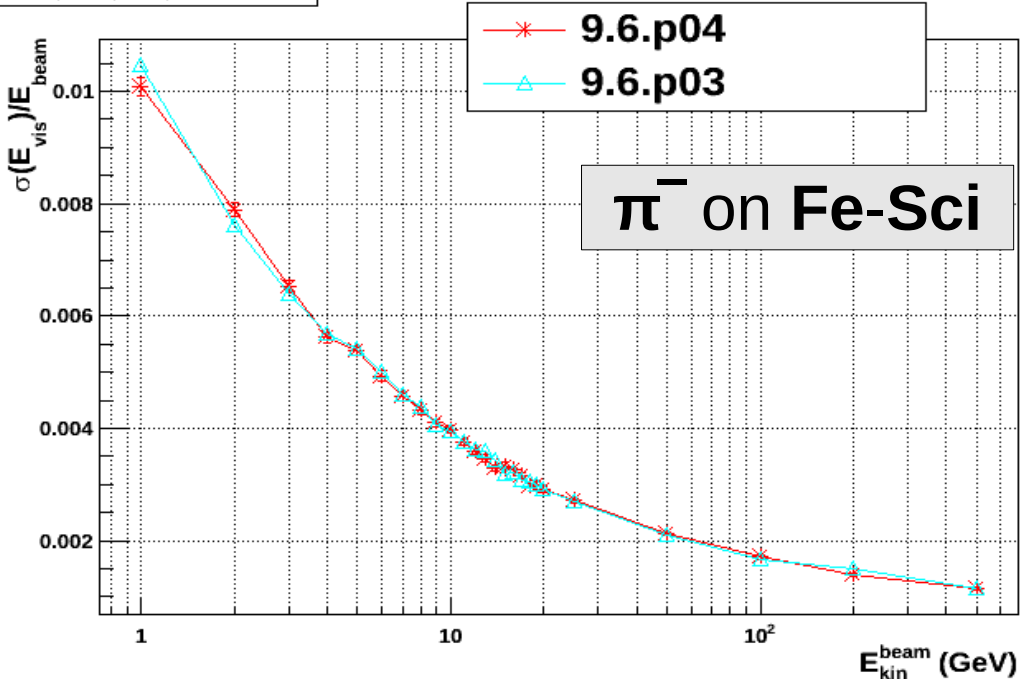
G4 9.6.p04 vs 9.6.p03

# FTFP\_BERT : Energy Response

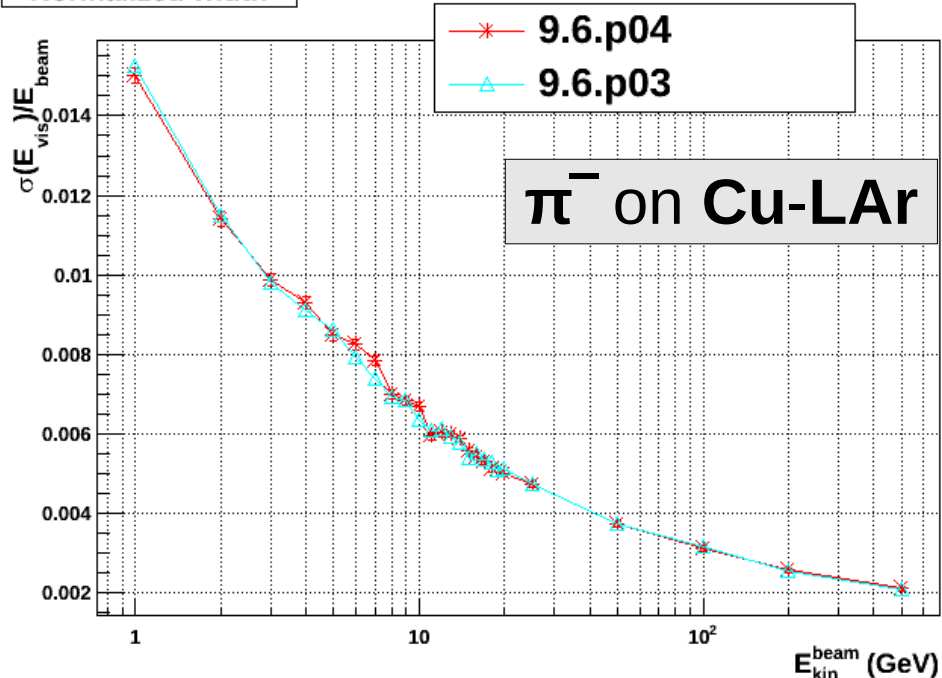


# FTFP\_BERT : Energy Width

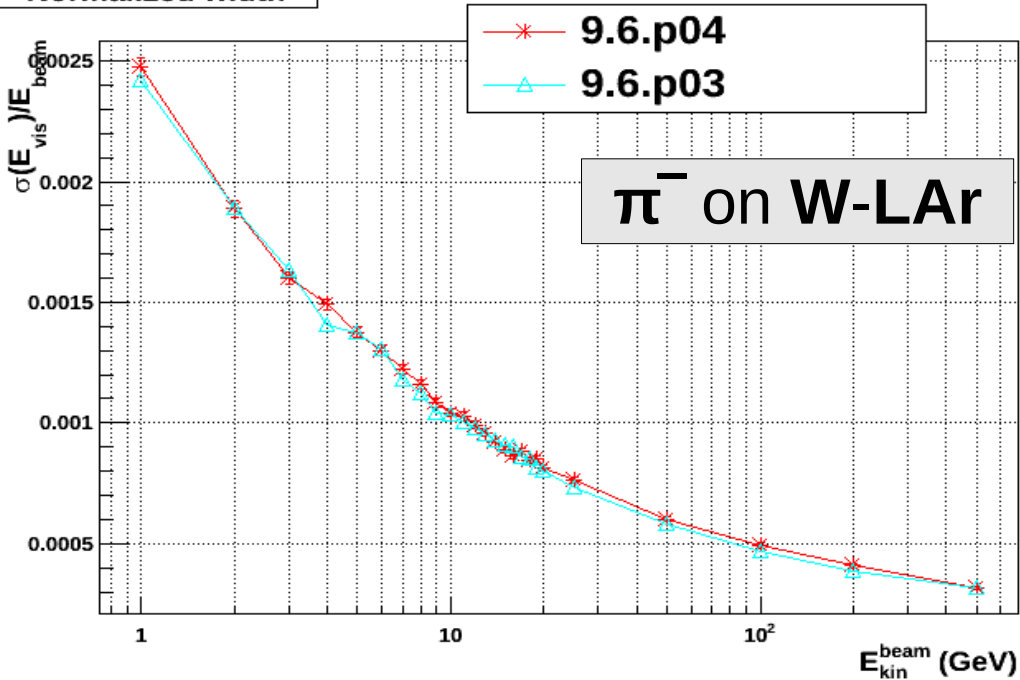
Normalized width



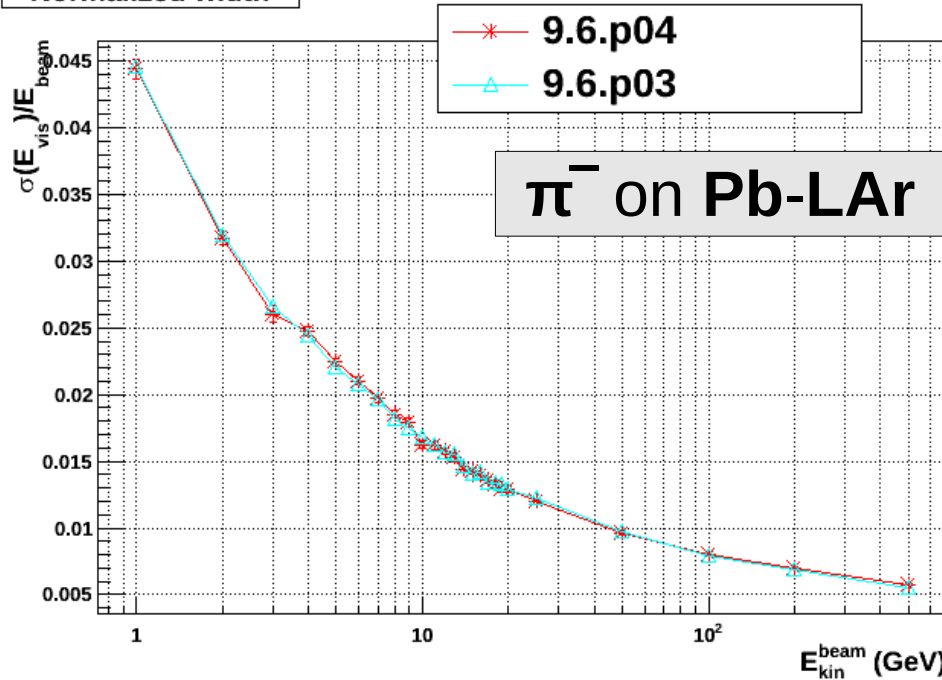
Normalized width



Normalized width

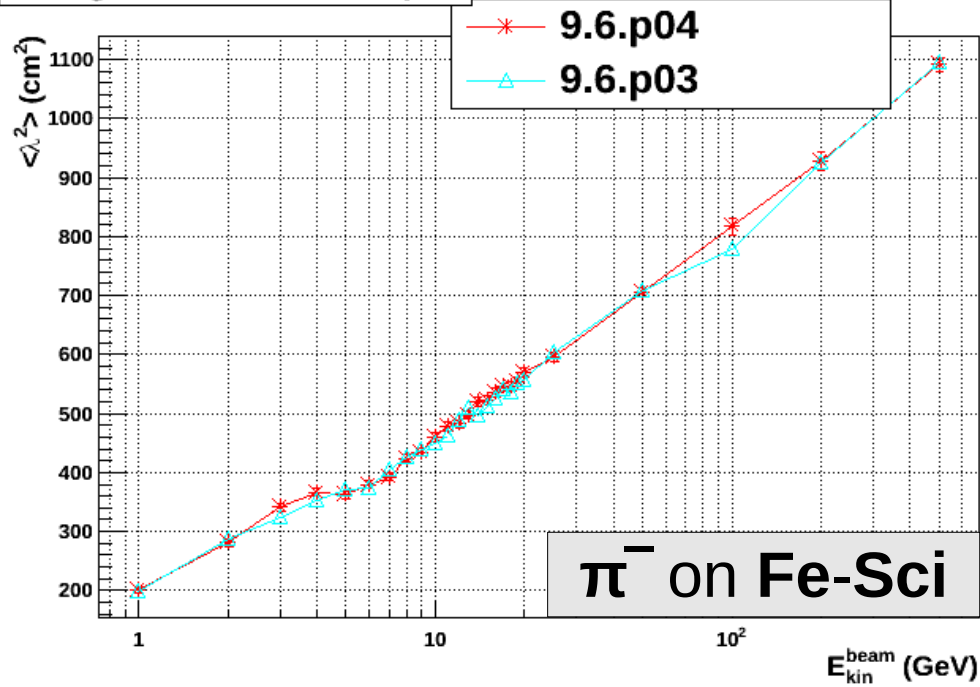


Normalized width

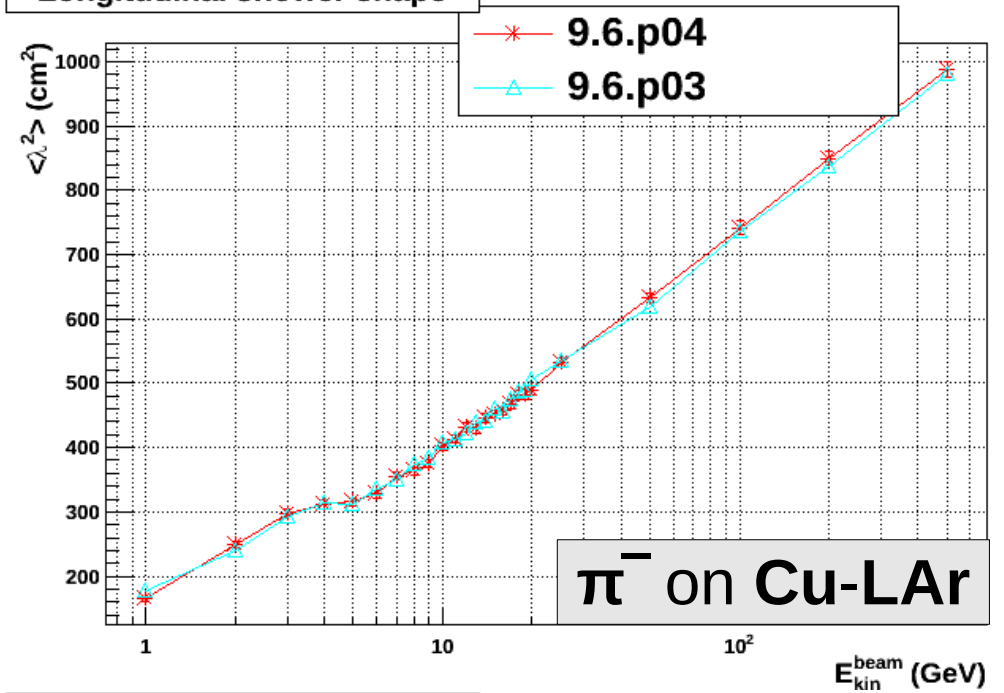


# FTFP\_BERT : Longitudinal Shape

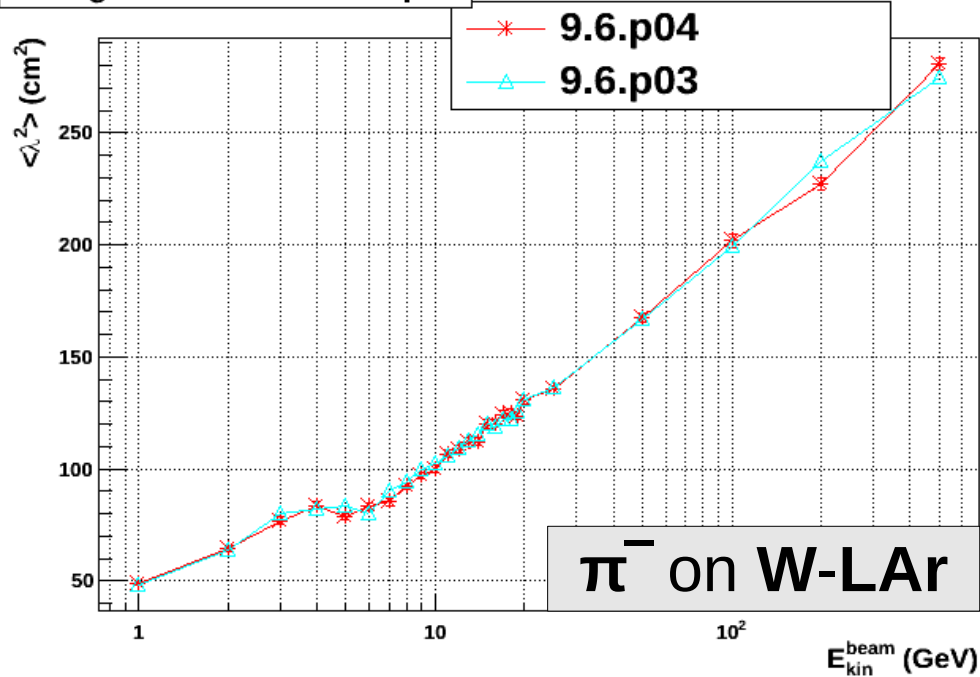
Longitudinal shower shape



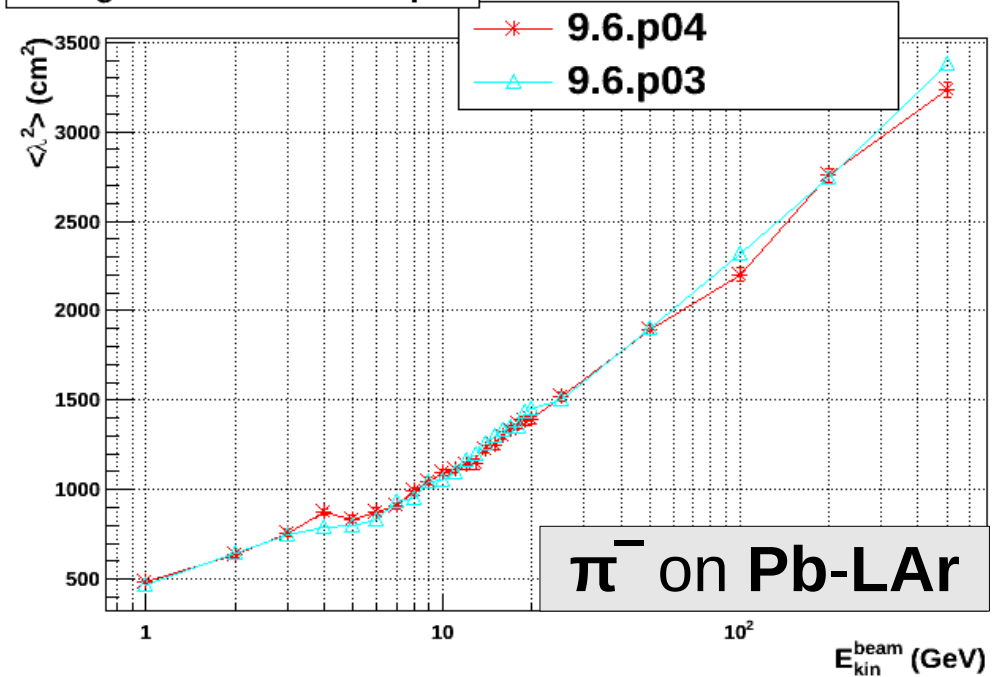
Longitudinal shower shape



Longitudinal shower shape

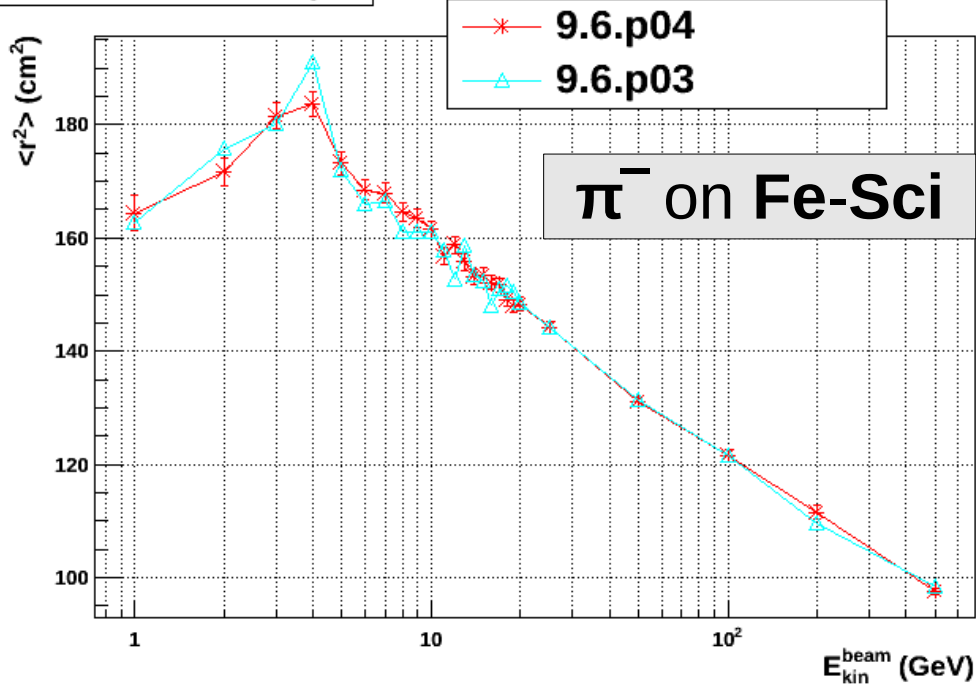


Longitudinal shower shape



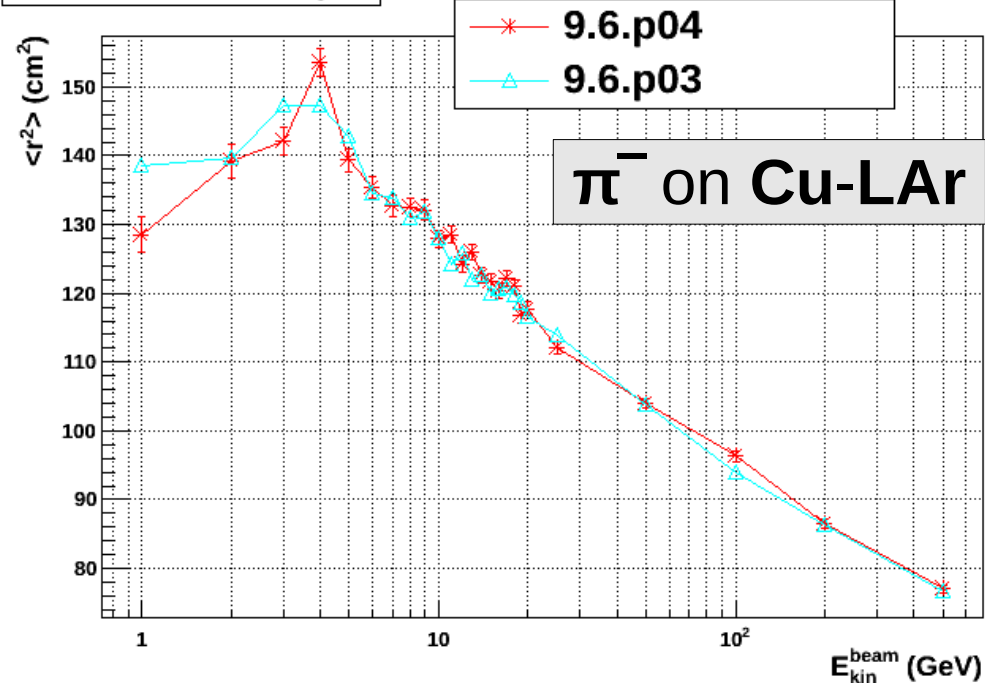
# FTFP\_BERT : Lateral Shape

Lateral shower shape



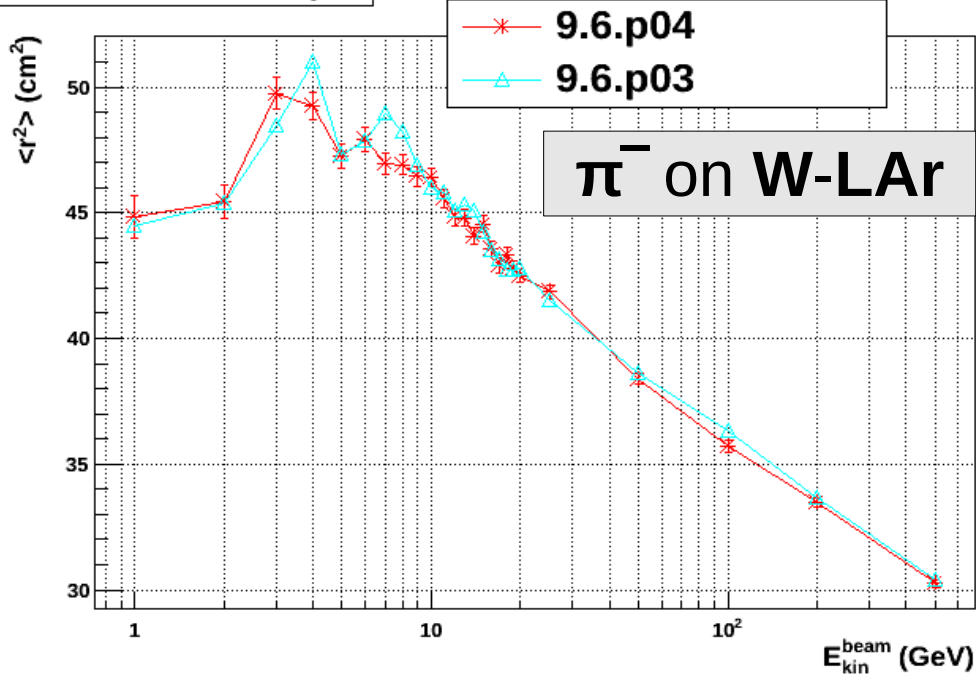
$\pi^-$  on Fe-Sci

Lateral shower shape



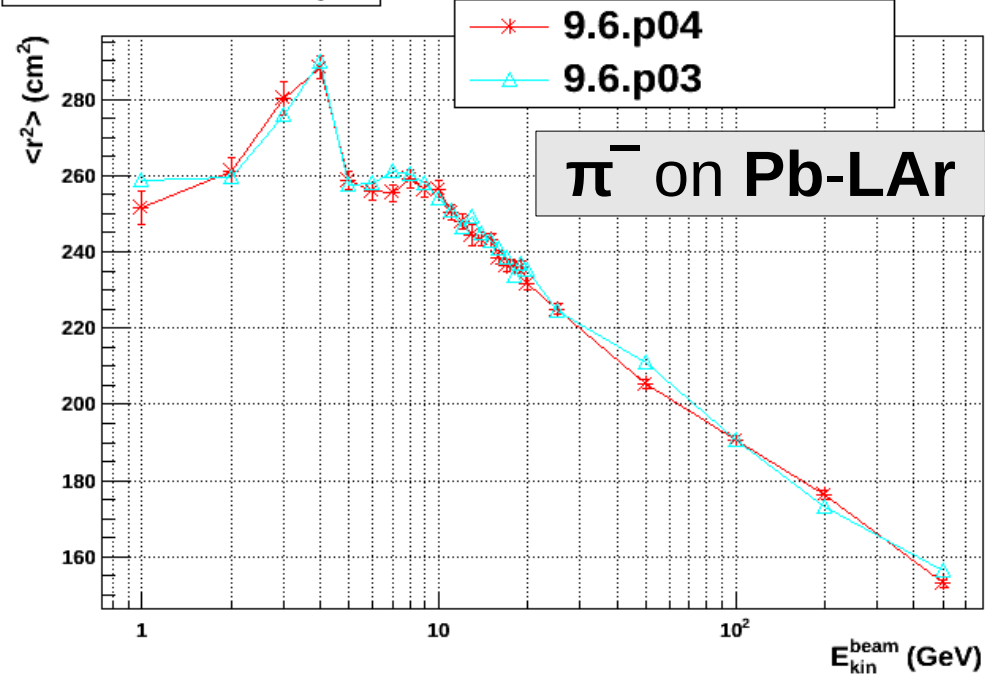
$\pi^-$  on Cu-LAr

Lateral shower shape



$\pi^-$  on W-LAr

Lateral shower shape



$\pi^-$  on Pb-LAr

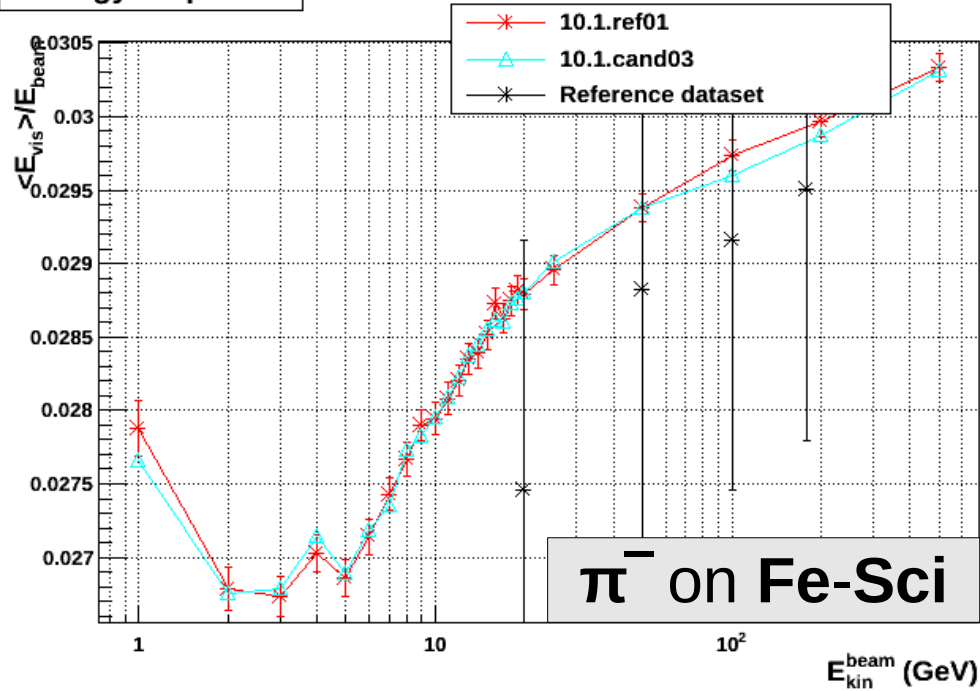
# Pion shower

G4 10.1.ref01 vs 10.1



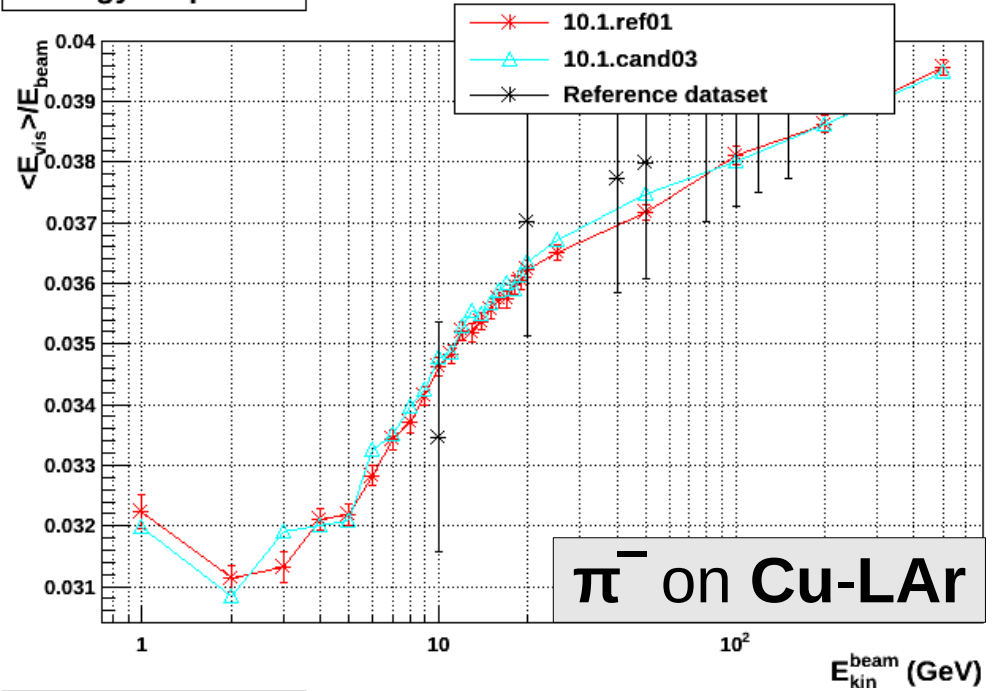
# FTFP\_BERT : Energy Response

Energy response



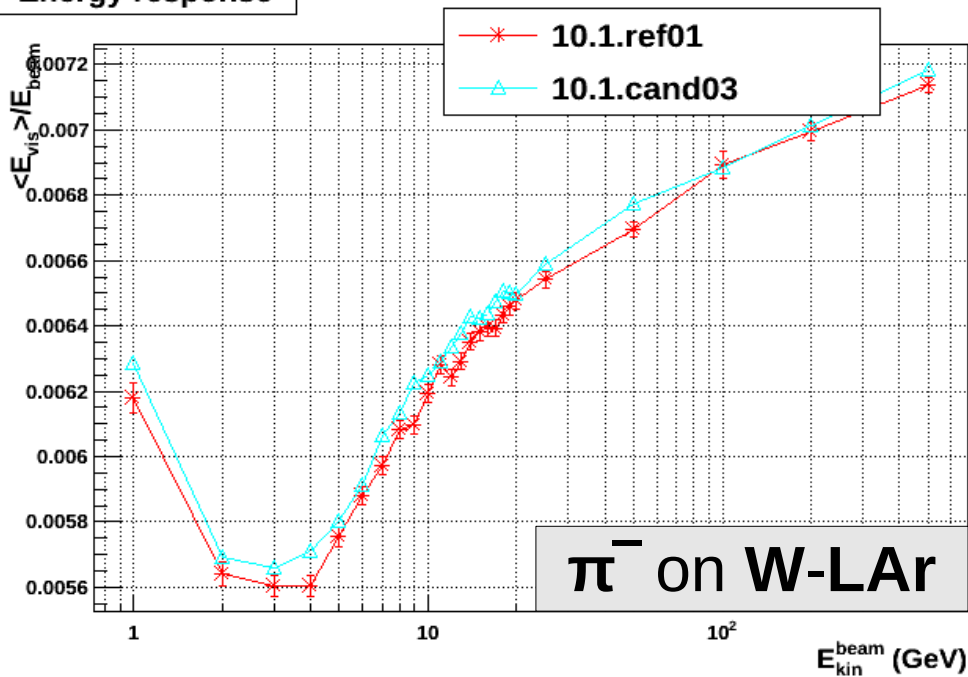
$\pi^-$  on Fe-Sci

Energy response



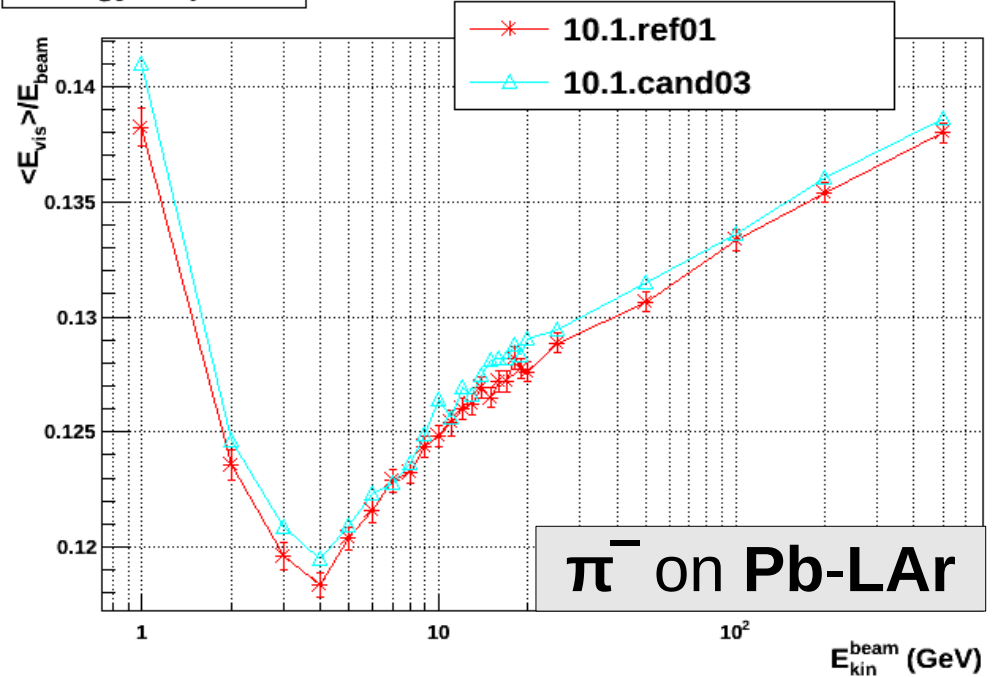
$\pi^-$  on Cu-LAr

Energy response



$\pi^-$  on W-LAr

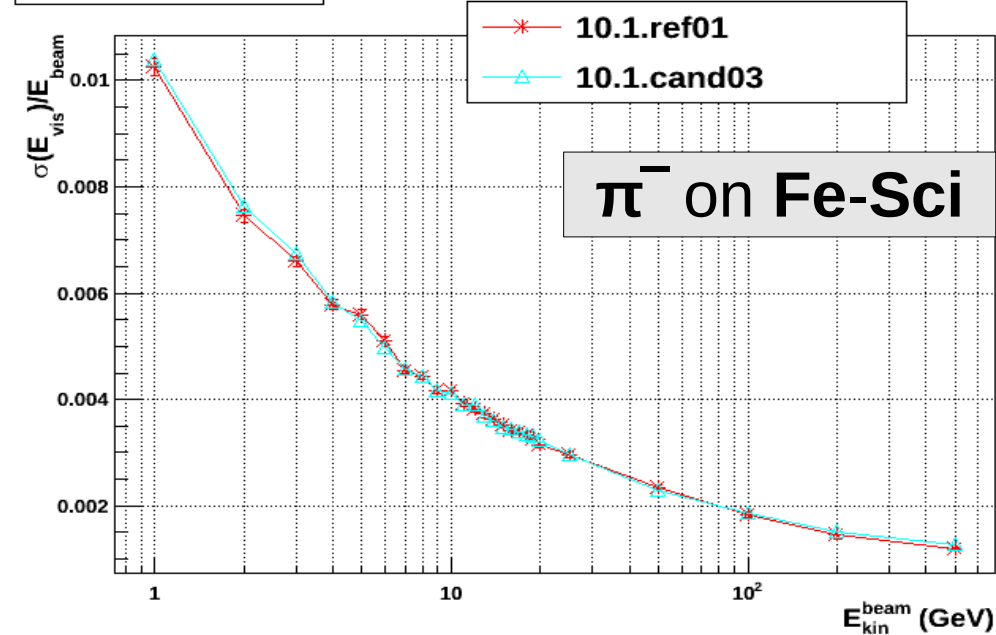
Energy response



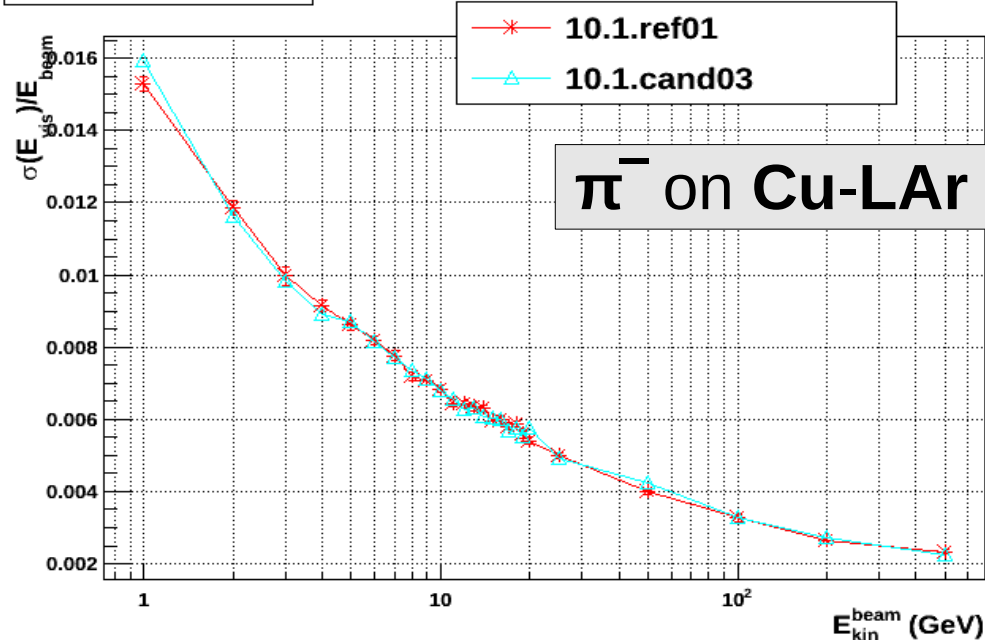
$\pi^-$  on Pb-LAr

# FTFP\_BERT : Energy Width

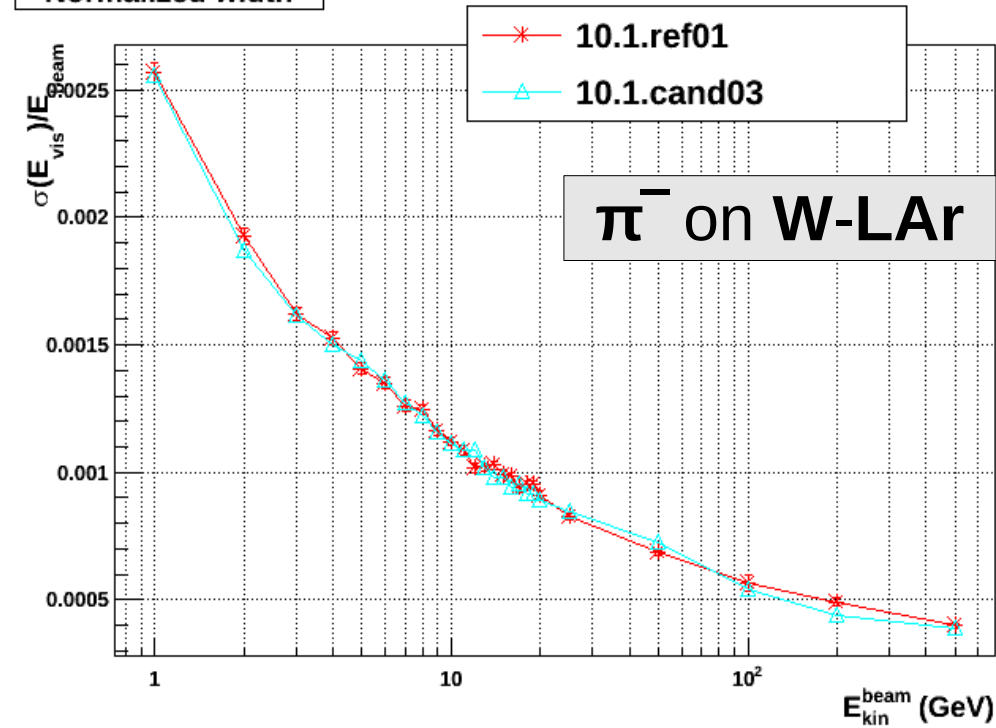
Normalized width



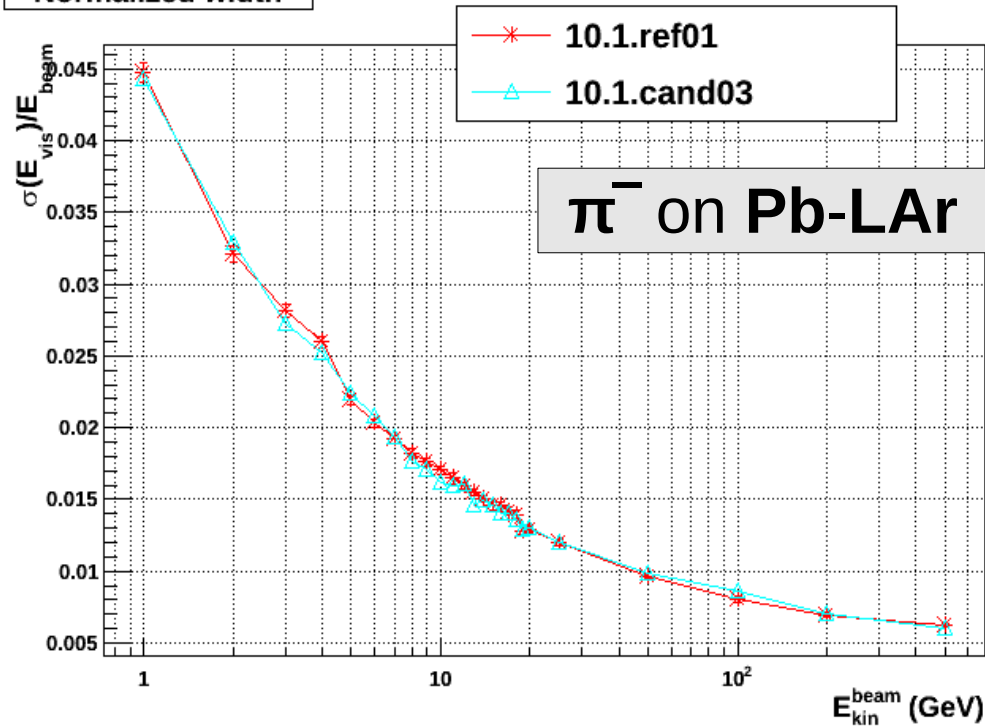
Normalized width



Normalized width

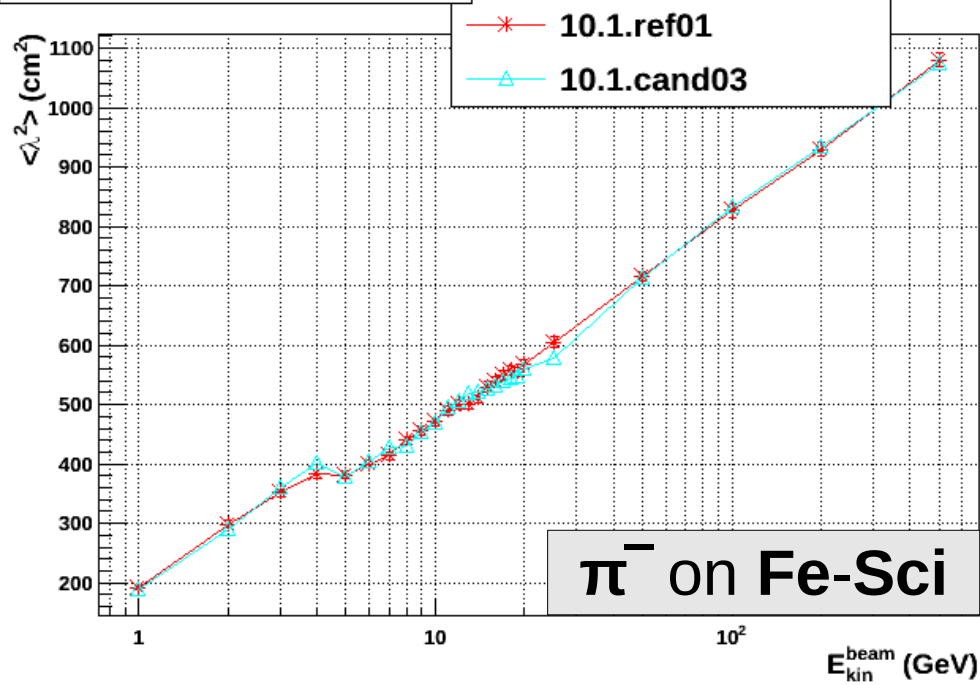


Normalized width



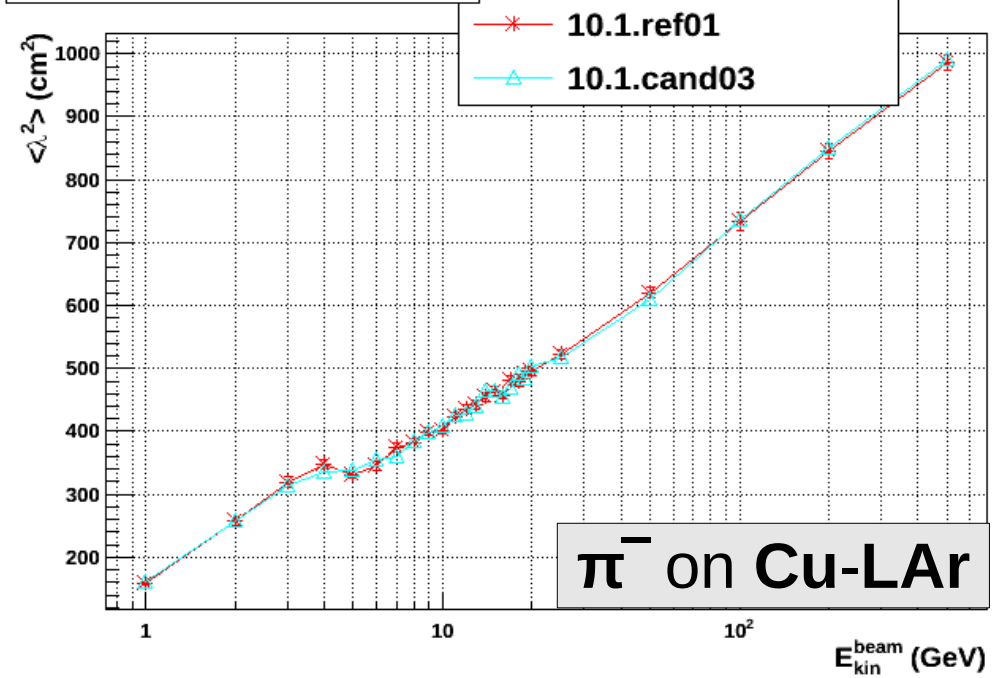
# FTFP\_BERT : Longitudinal Shape

Longitudinal shower shape



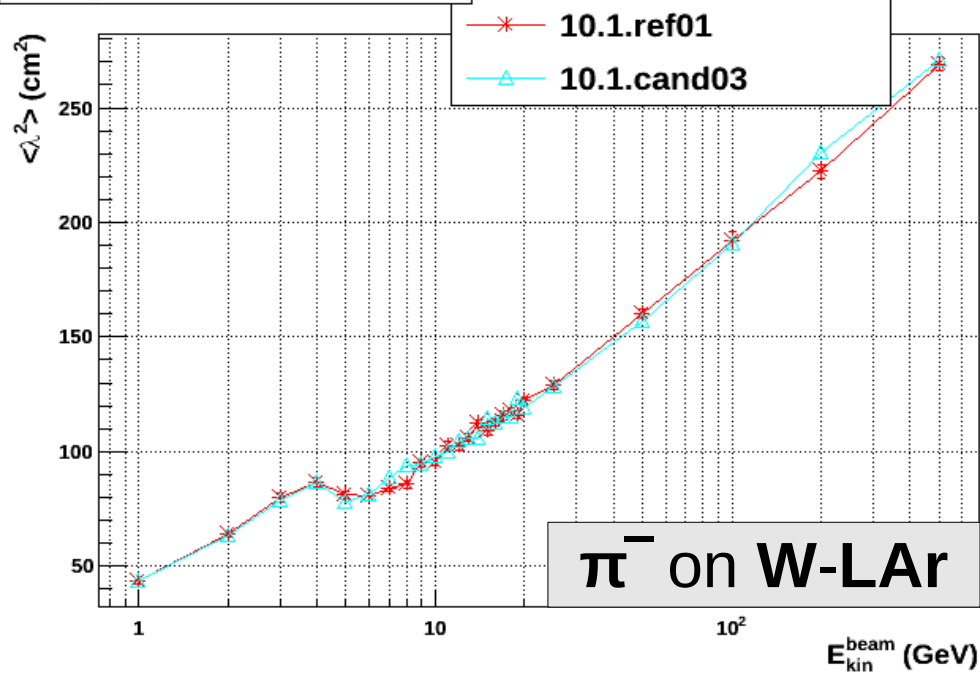
$\pi^-$  on Fe-Sci

Longitudinal shower shape



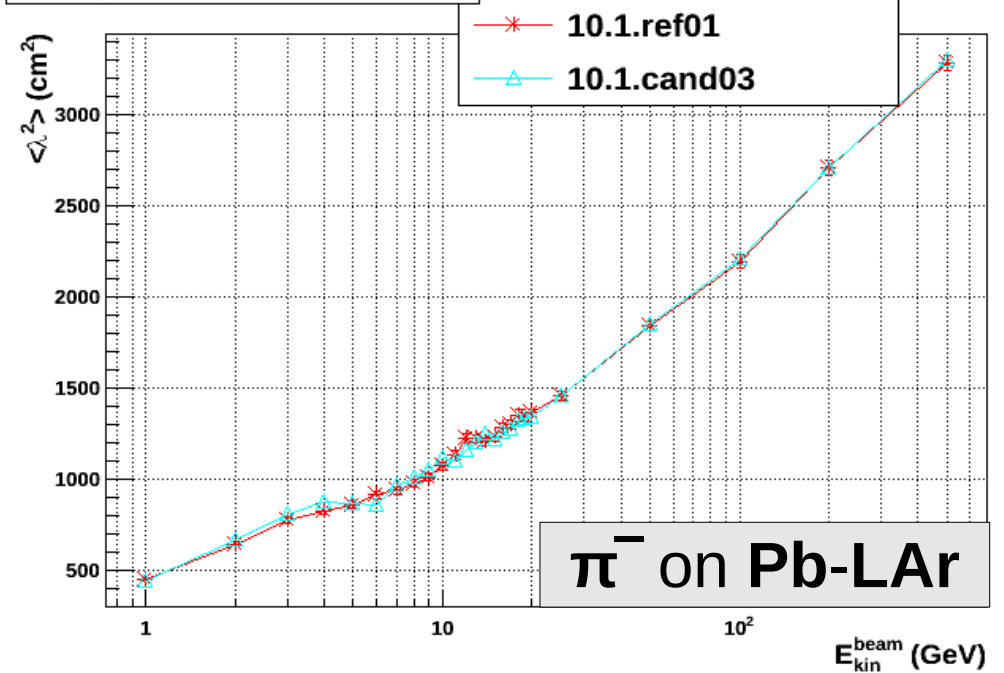
$\pi^-$  on Cu-LAr

Longitudinal shower shape



$\pi^-$  on W-LAr

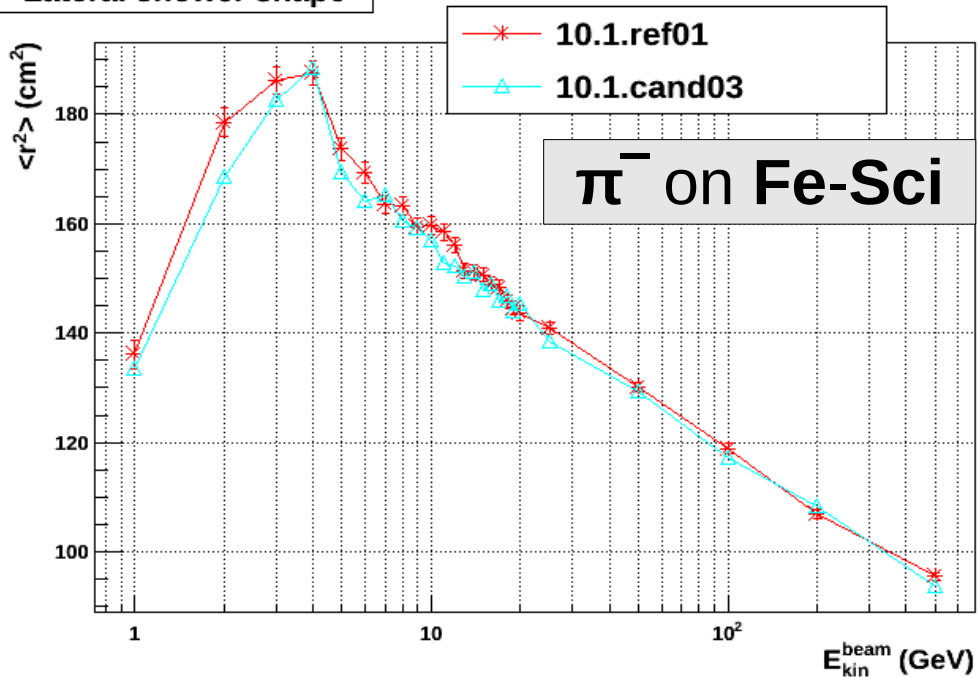
Longitudinal shower shape



$\pi^-$  on Pb-LAr

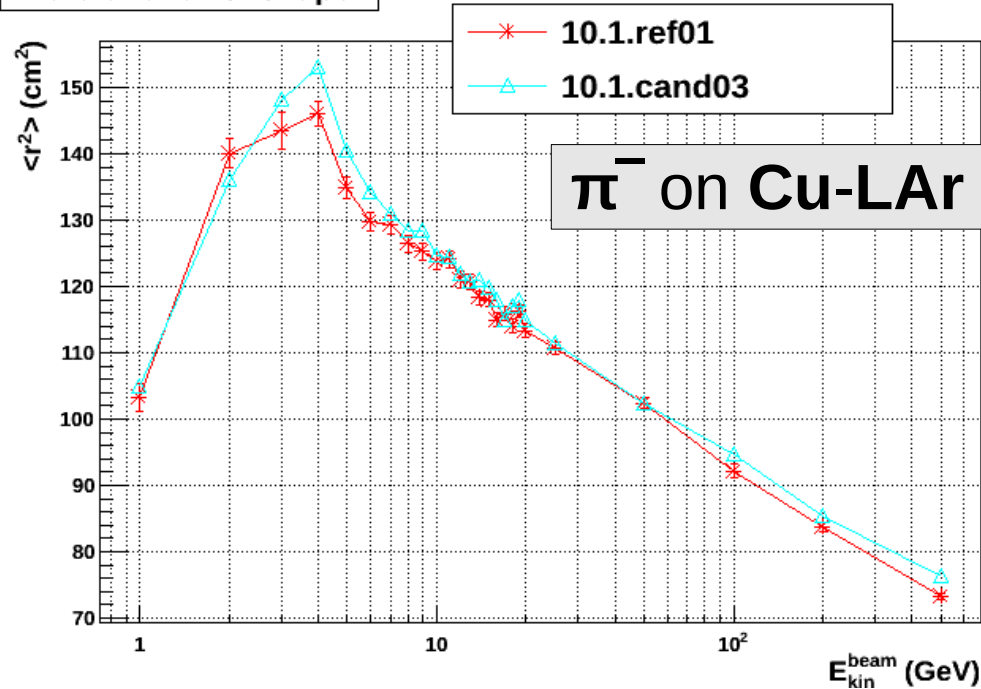
# FTFP\_BERT : Lateral Shape

Lateral shower shape



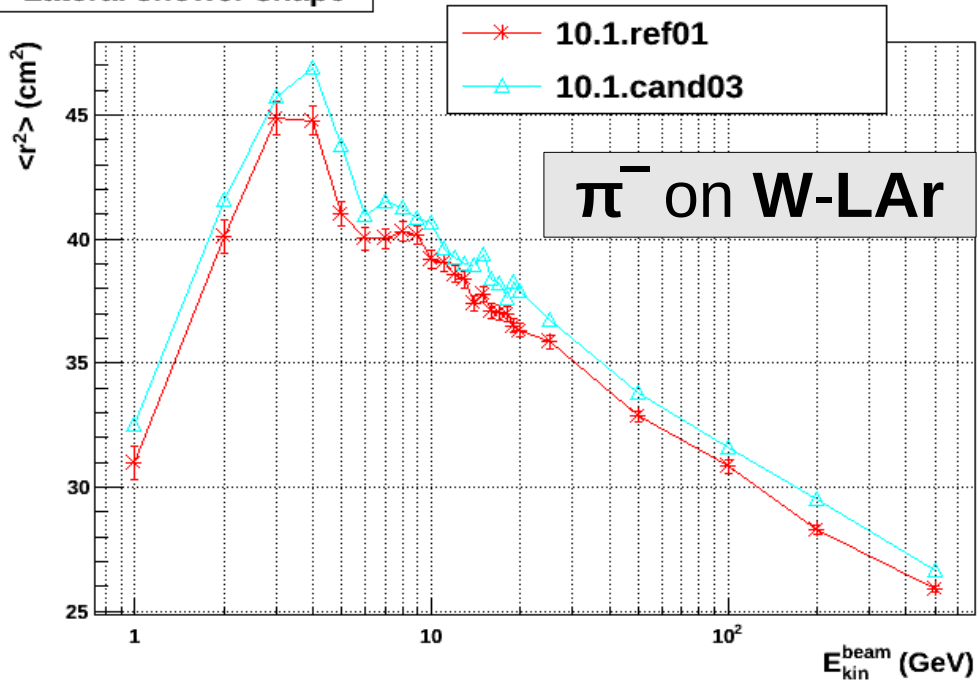
$\pi^-$  on Fe-Sci

Lateral shower shape



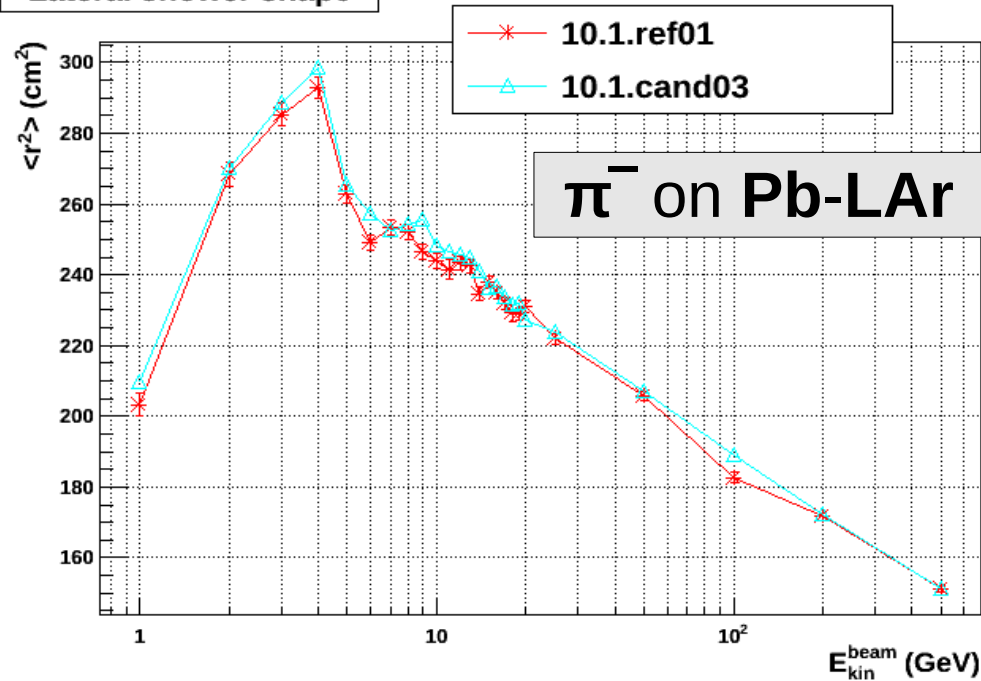
$\pi^-$  on Cu-LAr

Lateral shower shape



$\pi^-$  on W-LAr

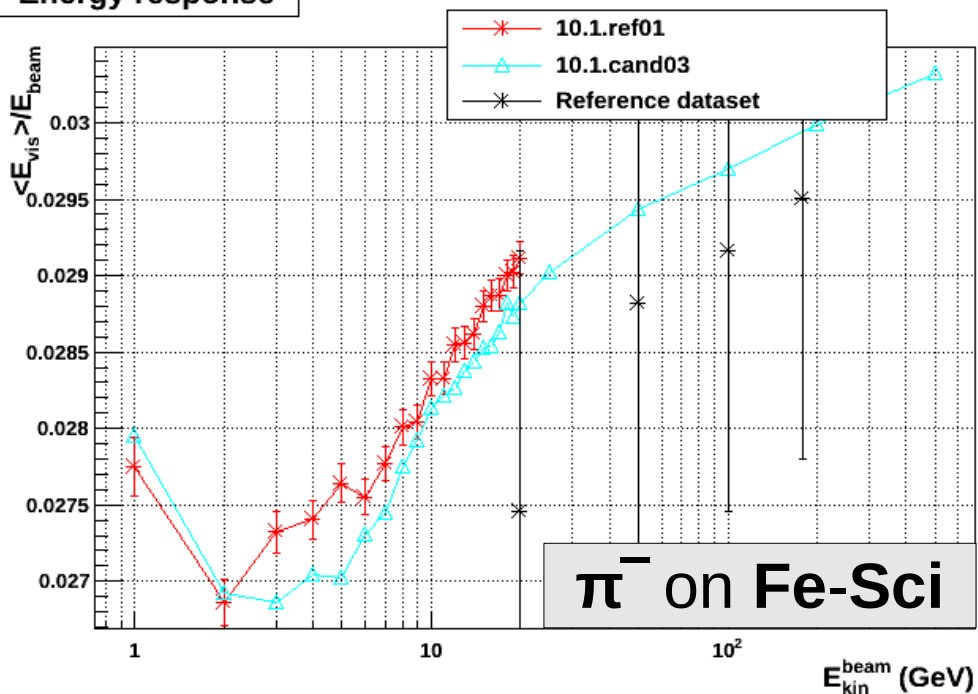
Lateral shower shape



$\pi^-$  on Pb-LAr

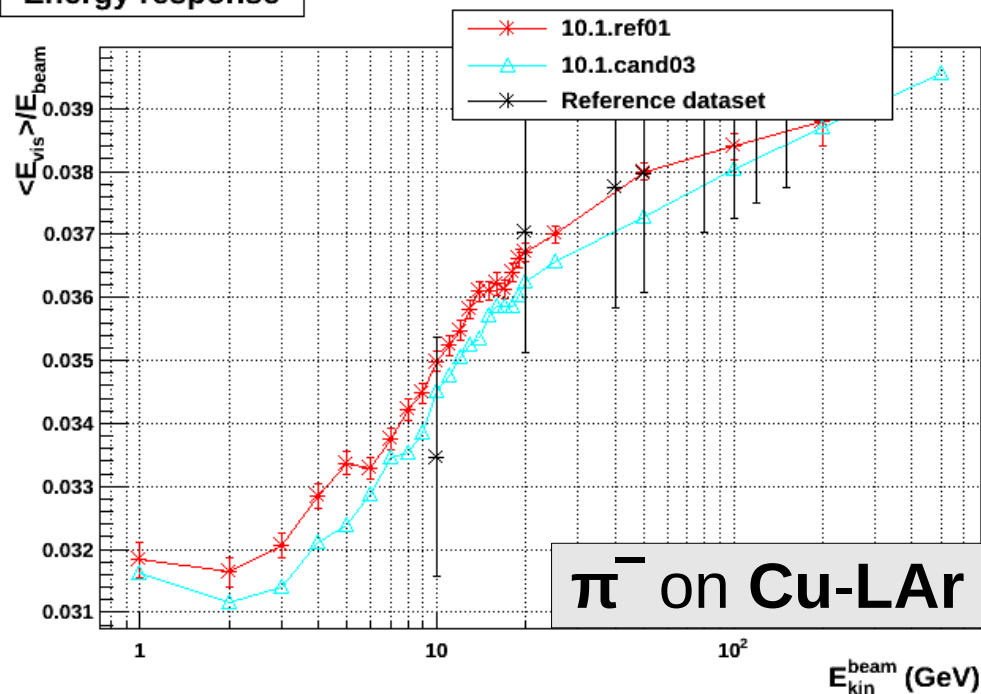
# FTFP\_BERT\_TRV : Energy Response

Energy response



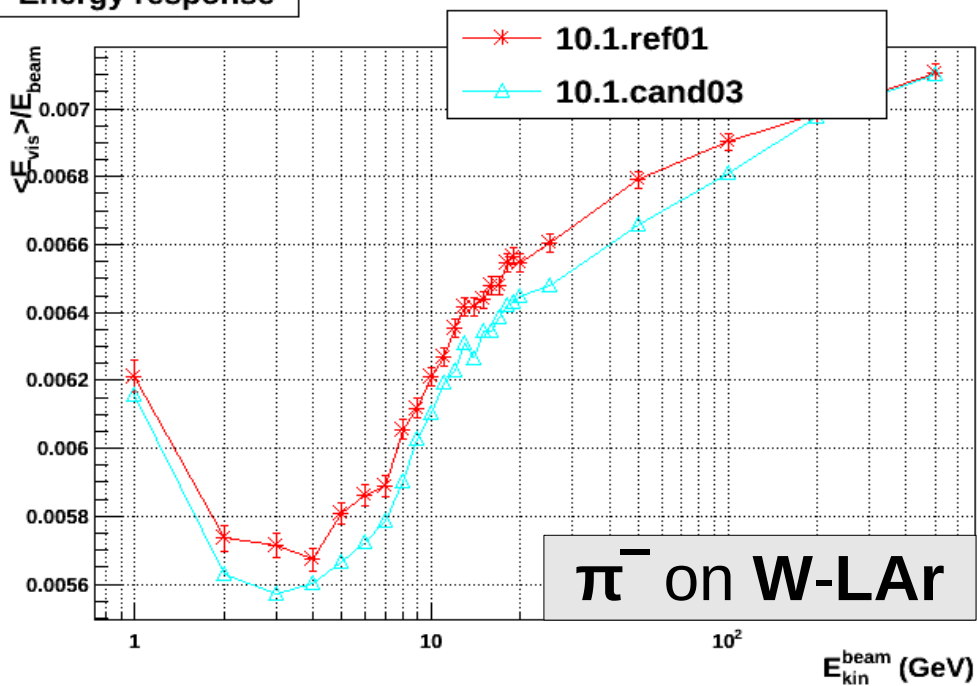
$\pi^-$  on Fe-Sci

Energy response



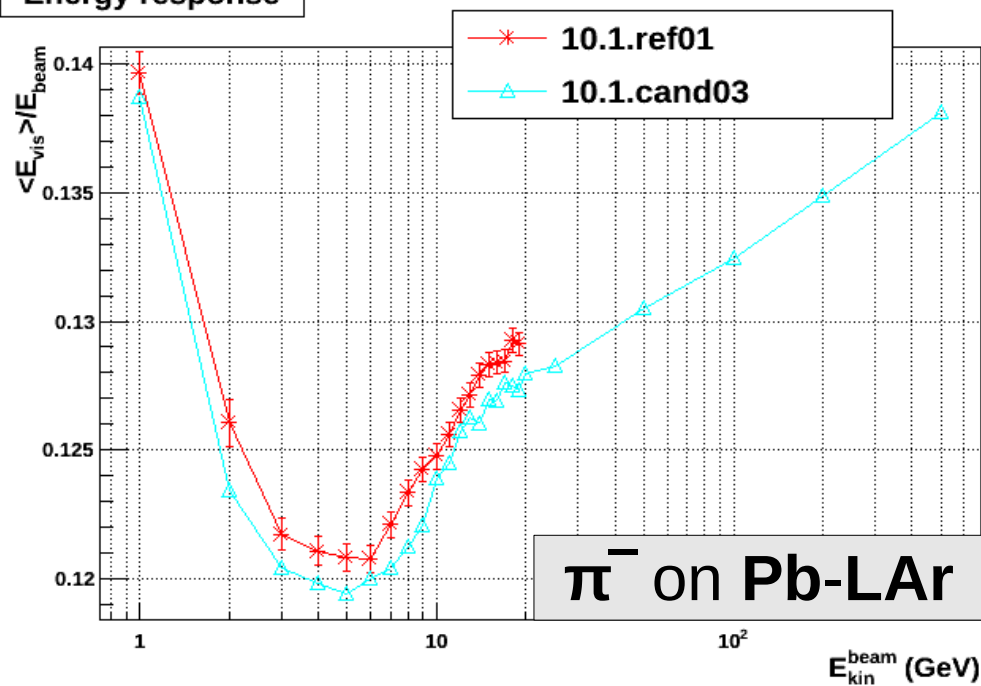
$\pi^-$  on Cu-LAr

Energy response



$\pi^-$  on W-LAr

Energy response

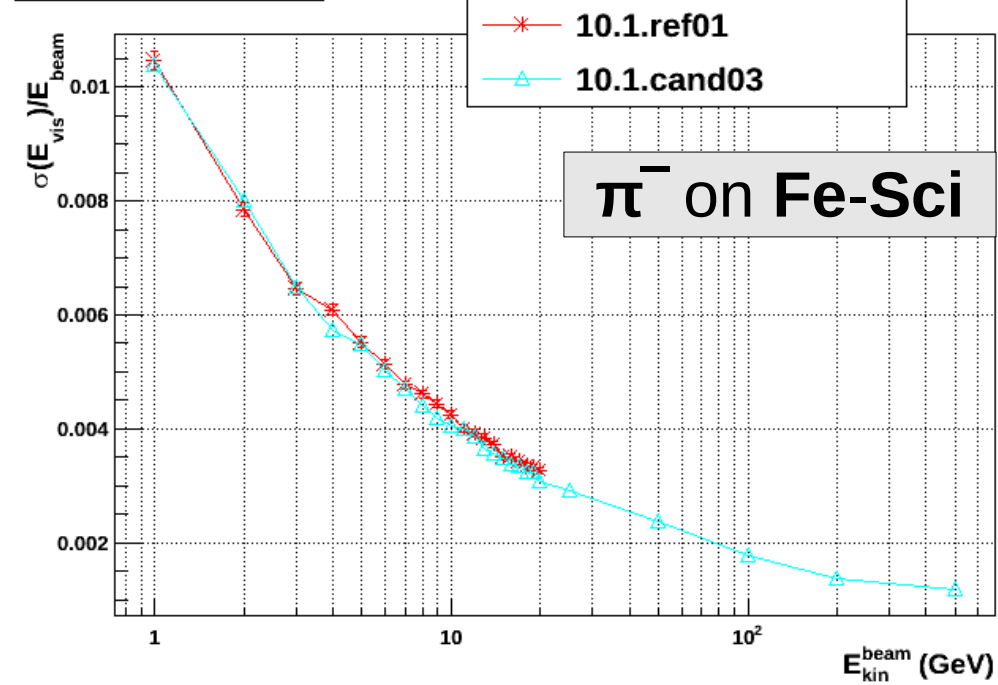


$\pi^-$  on Pb-LAr

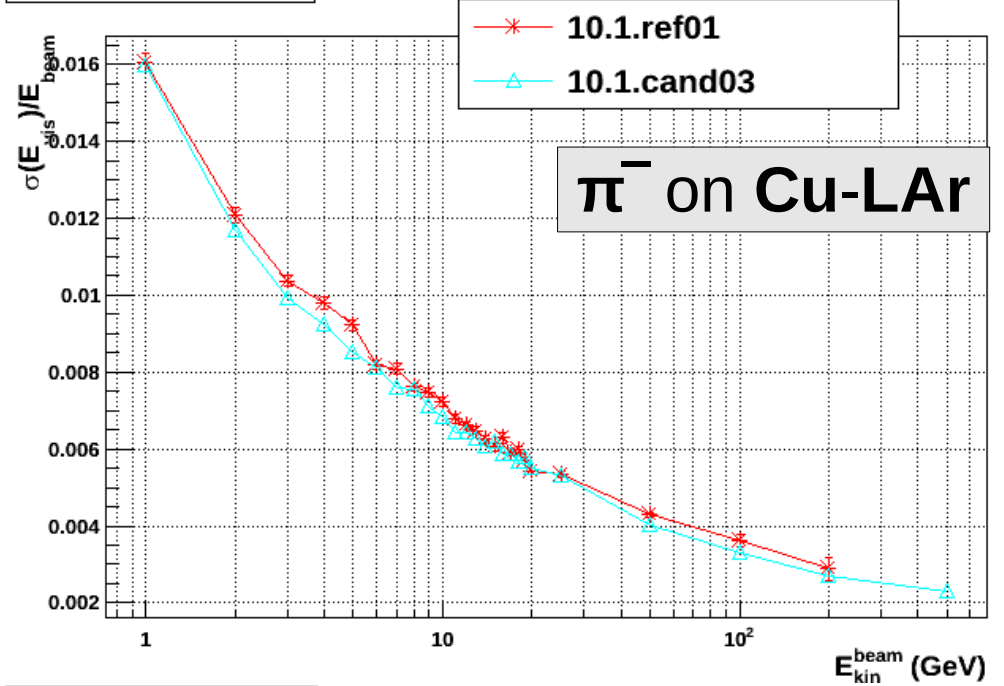


# FTFP\_BERT\_TRV : Energy Width

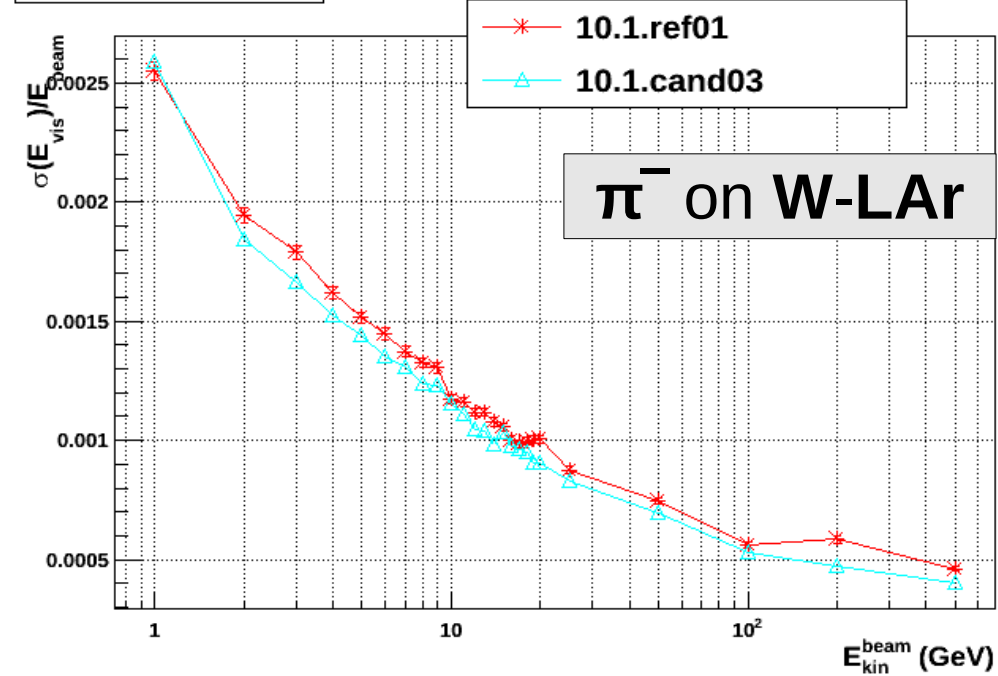
Normalized width



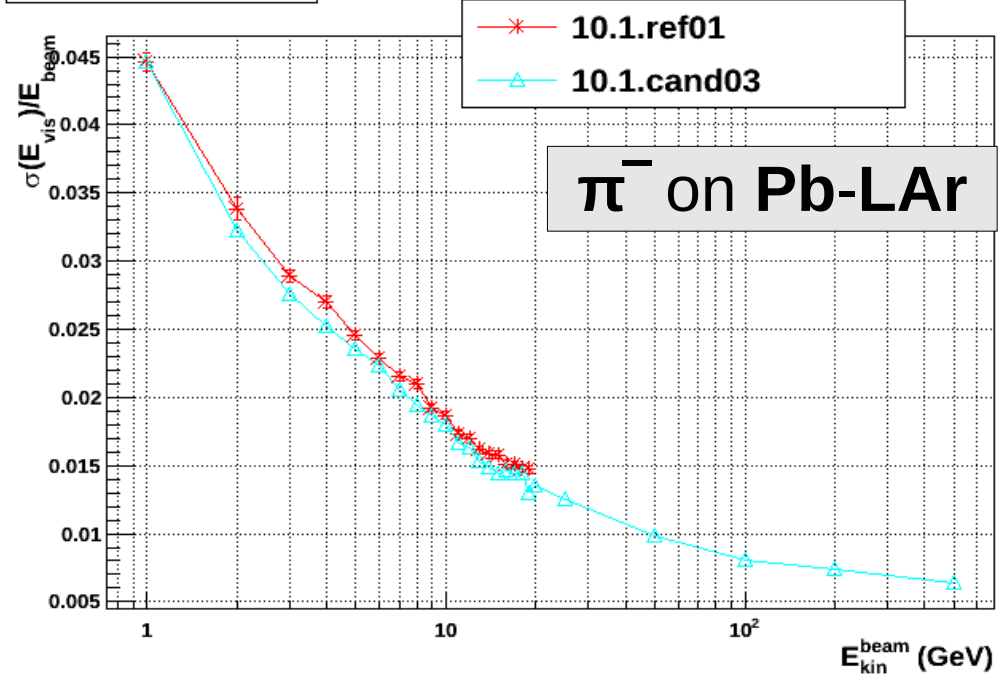
Normalized width



Normalized width

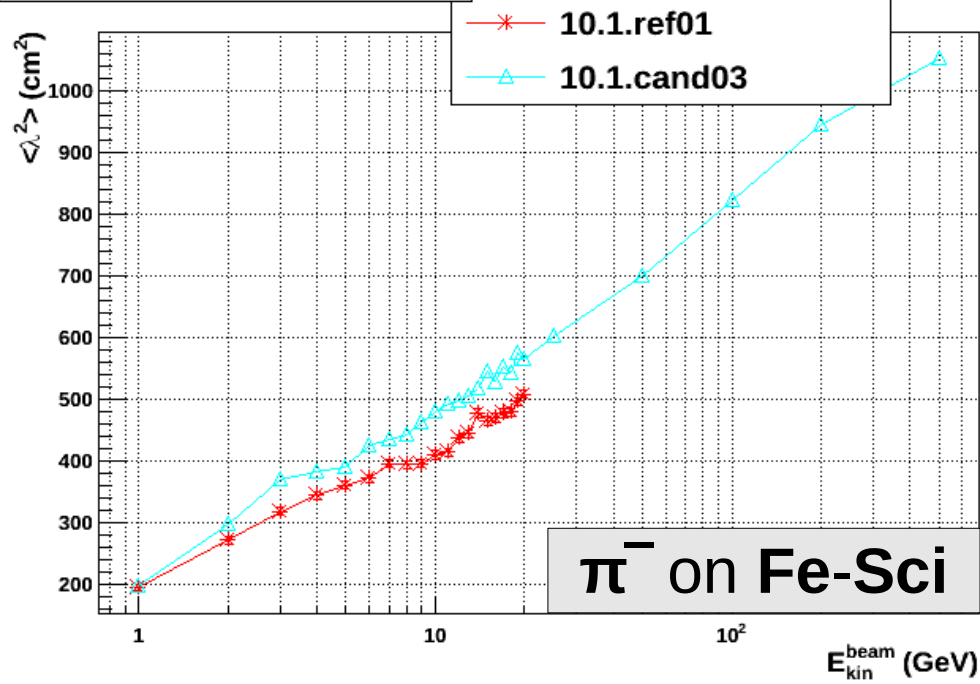


Normalized width



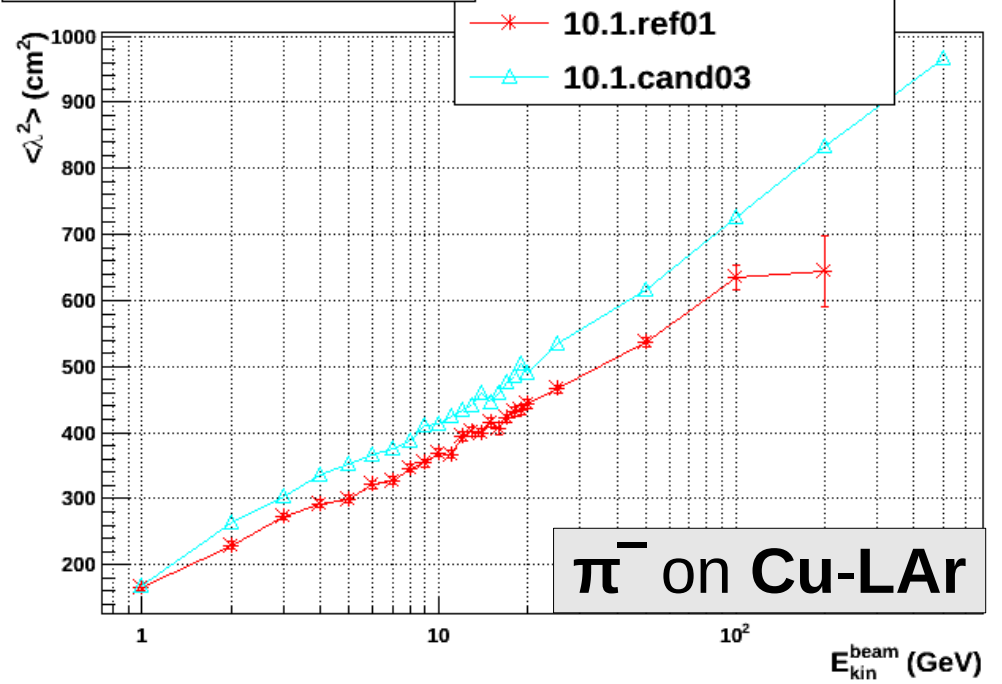
# FTFP\_BERT\_TRV : Longitudinal Shape

Longitudinal shower shape



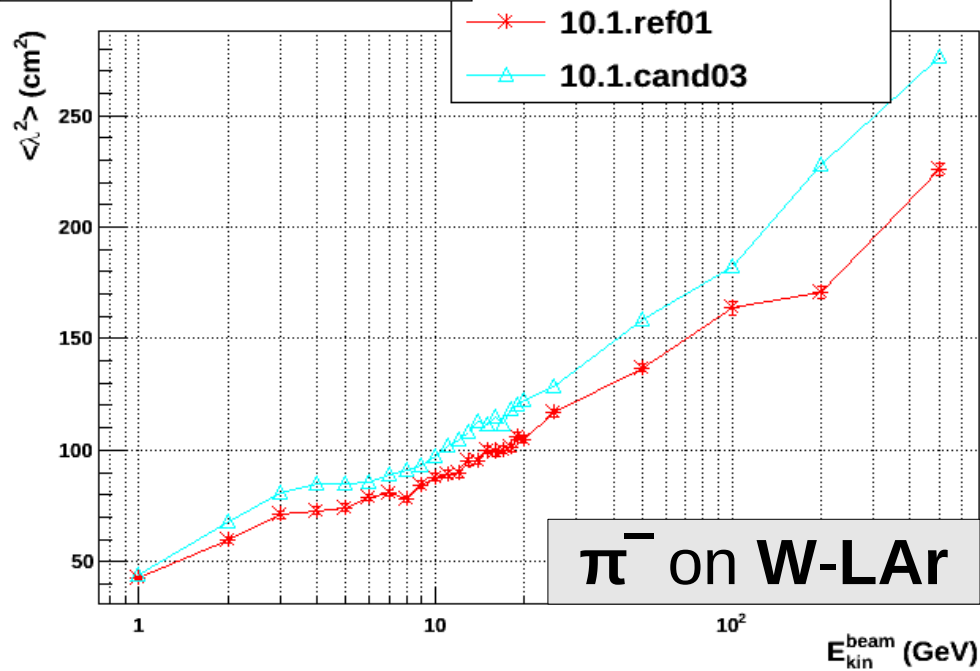
$\pi^-$  on Fe-Sci

Longitudinal shower shape



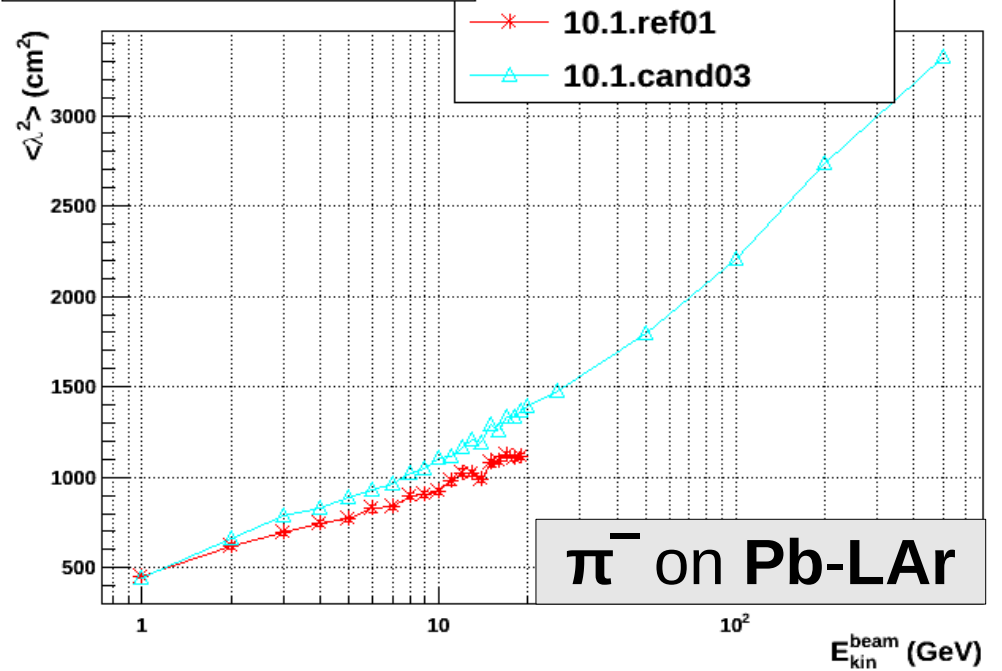
$\pi^-$  on Cu-LAr

Longitudinal shower shape



$\pi^-$  on W-LAr

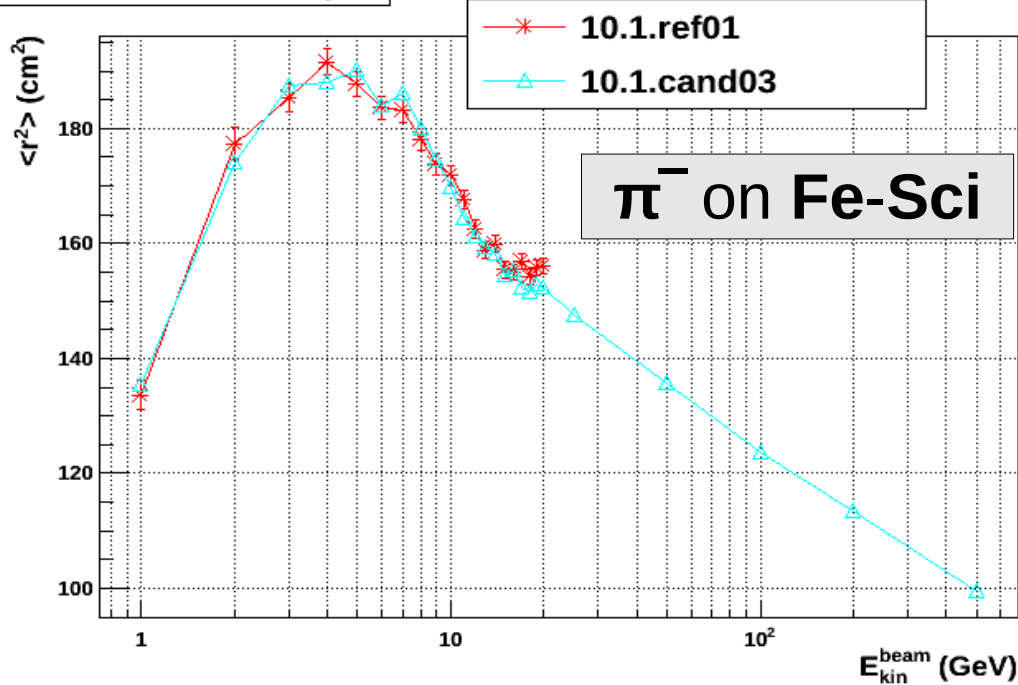
Longitudinal shower shape



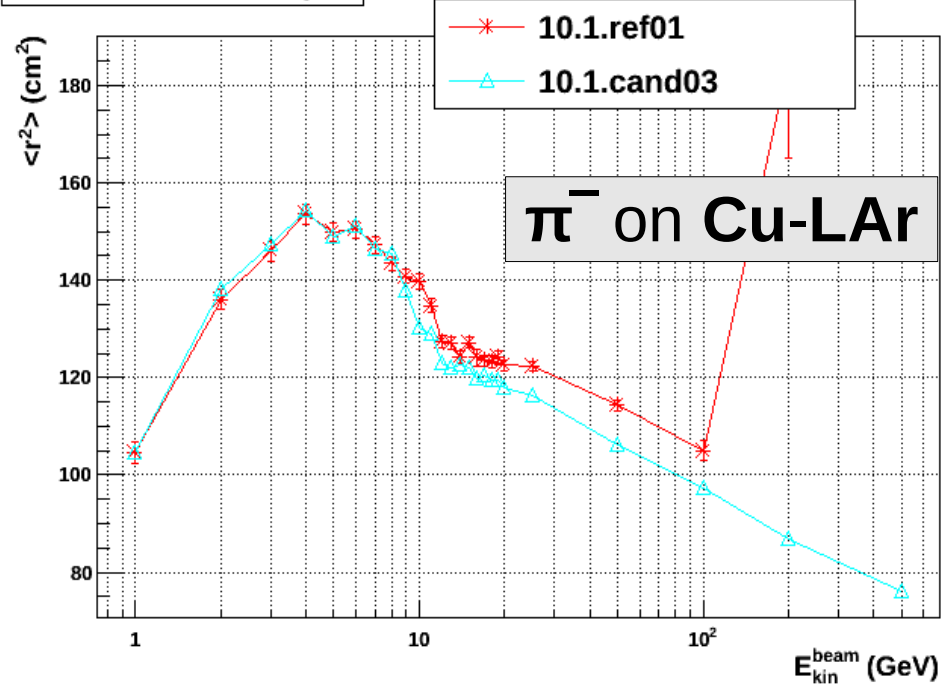
$\pi^-$  on Pb-LAr

# FTFP\_BERT\_TRV : Lateral Shape

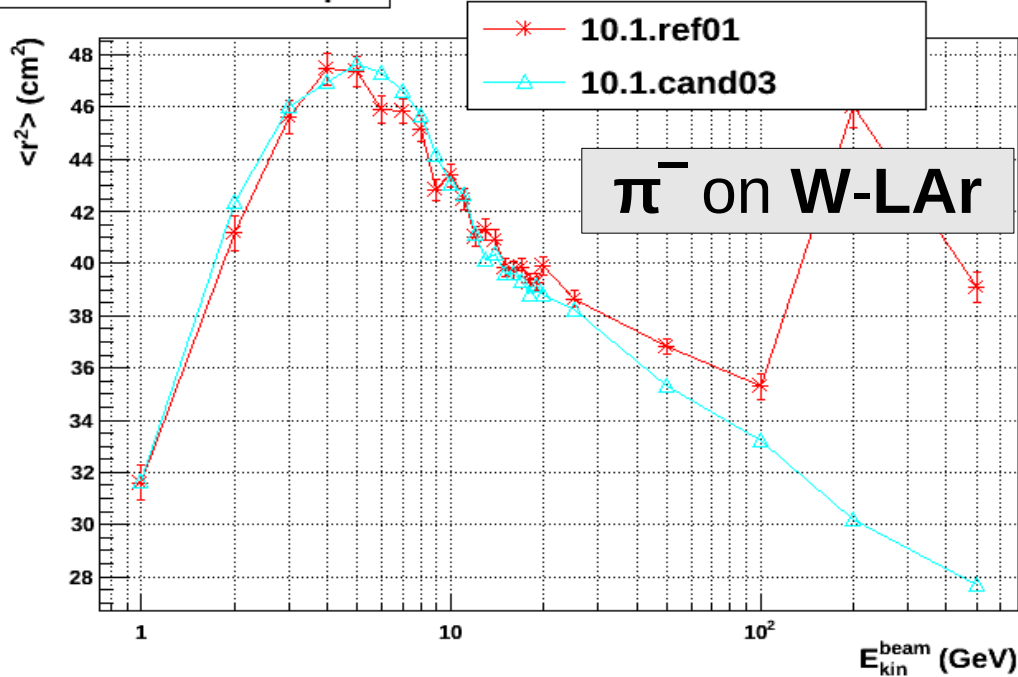
Lateral shower shape



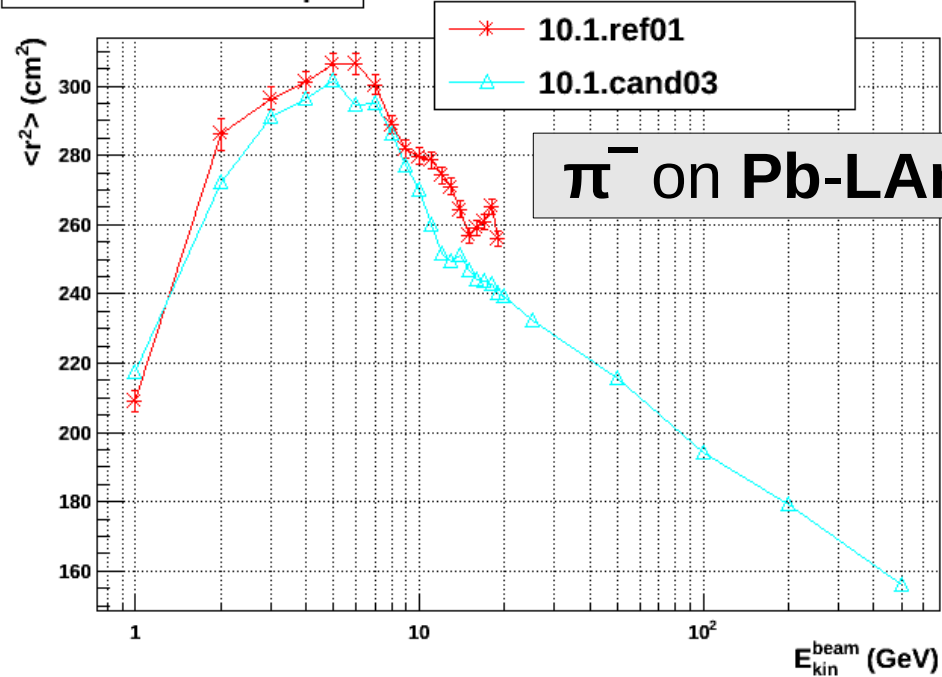
Lateral shower shape



Lateral shower shape



Lateral shower shape





# Conclusions

## G4 9.6.p04

- **Stable** (no crashes)
- **Showers very similar** to G4 9.6.p03

## G4 10.1.ref01

- Shower similar to G4 10.1
  - A bit lower response and narrower in W due to neutron elastic (Chips vs Gheisha neutron elastic cross section)
  - Big effects in FTFP\_BERT\_TRV likely due to the new Grichine's low-mass diffraction dissociation