

Detector Performance
and
Tracking Validation

Emilia

Software Meeting – 25/7/2017

Detector model: CLIC_o3_v12

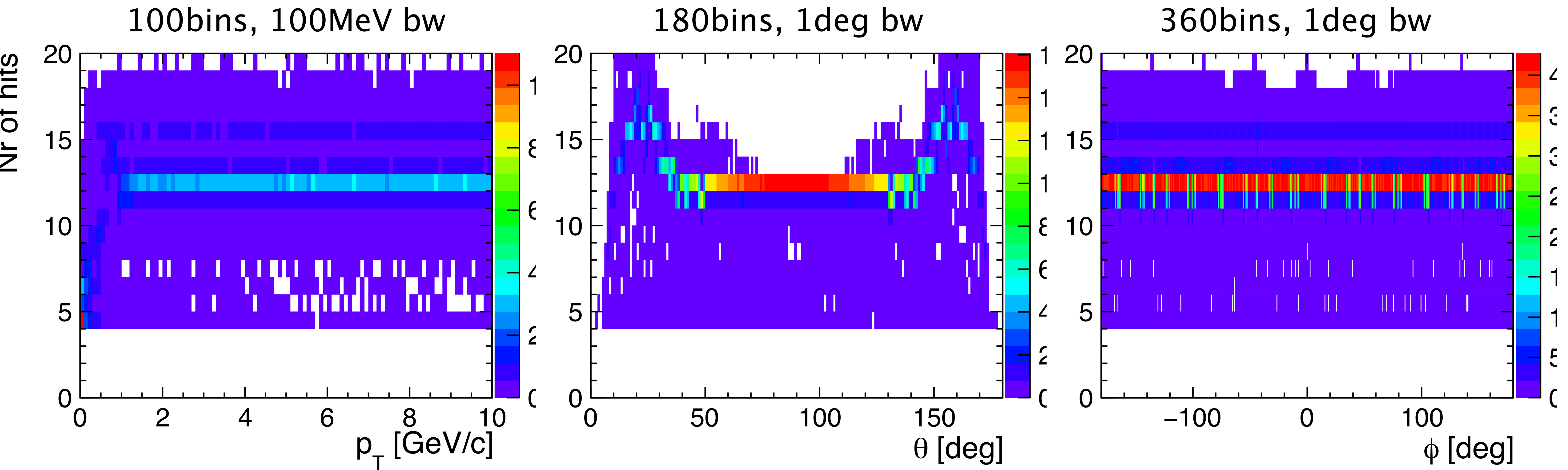
HEAD release: 2017-07-12

Number of hits

- 2M muons GPS
 - iso angular distribution, uniform energy distribution

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- iso angular distribution, uniform energy distribution

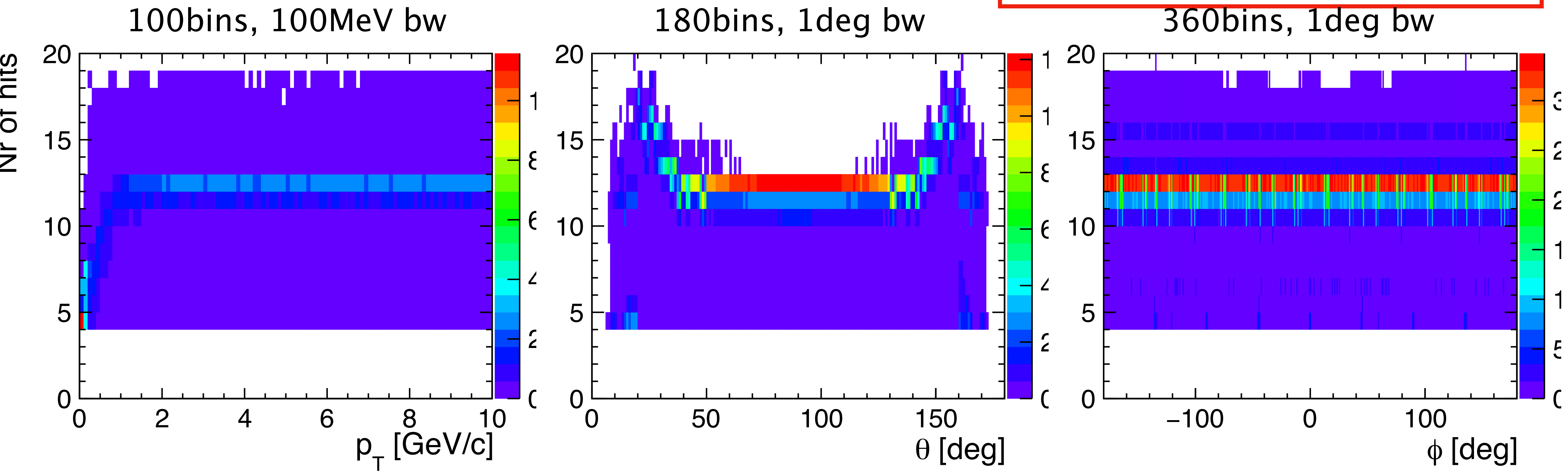
Truth Tracking



Structure in phi
 Is it due to the tracking algorithm
 or to the detector model
 or to the software release?

- 2M muons GPS
- iso angular distribution, uniform energy distribution

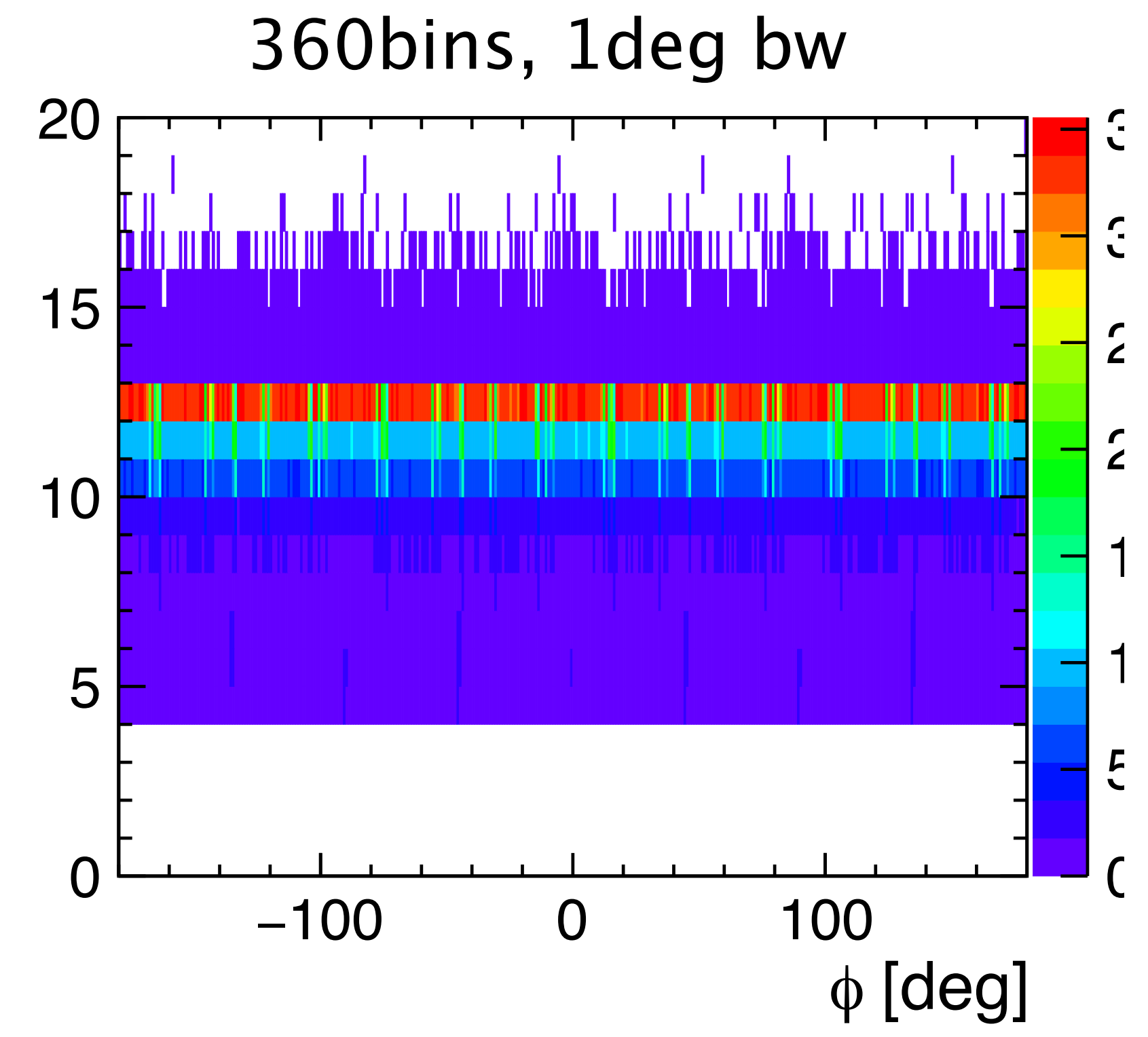
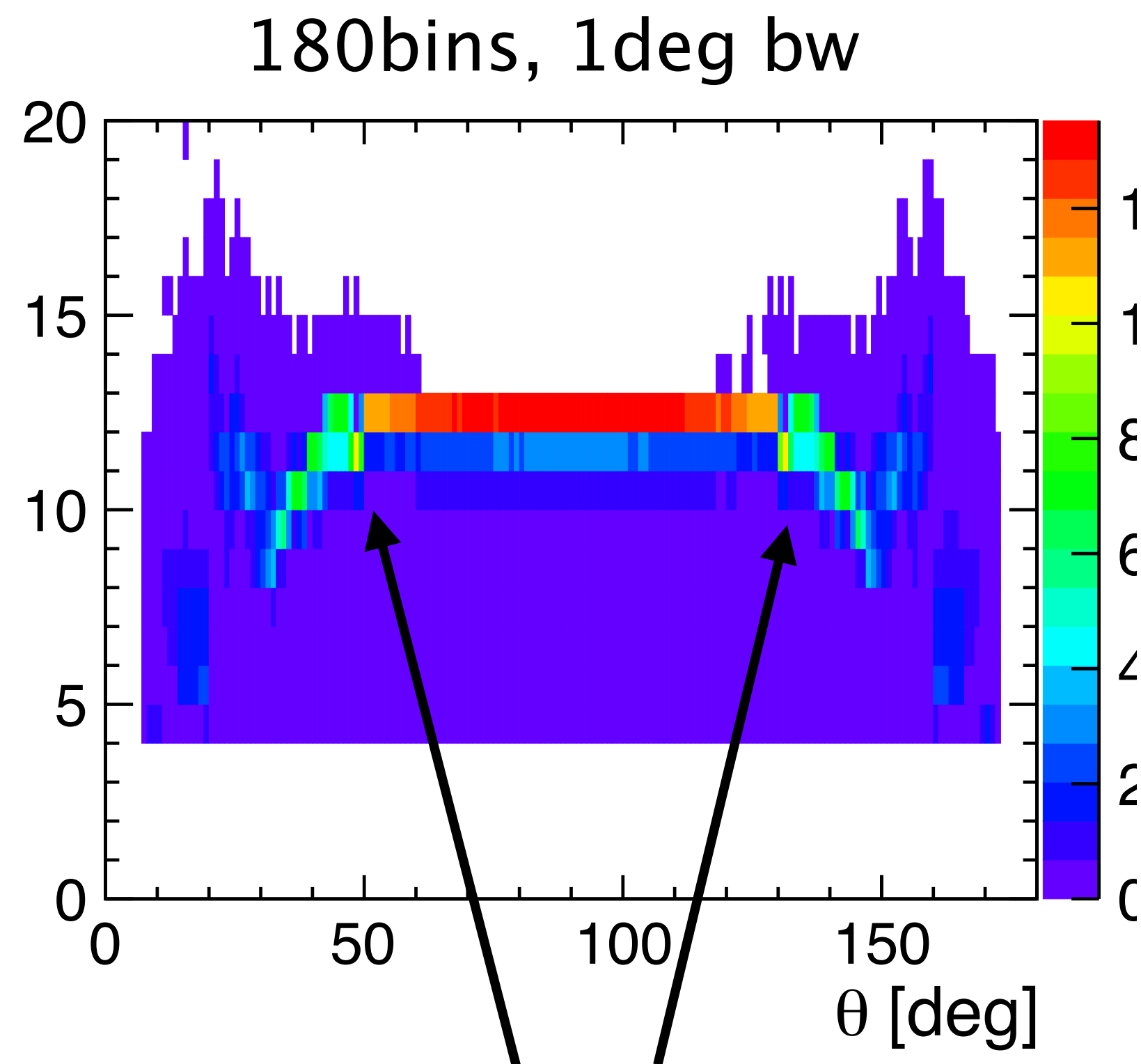
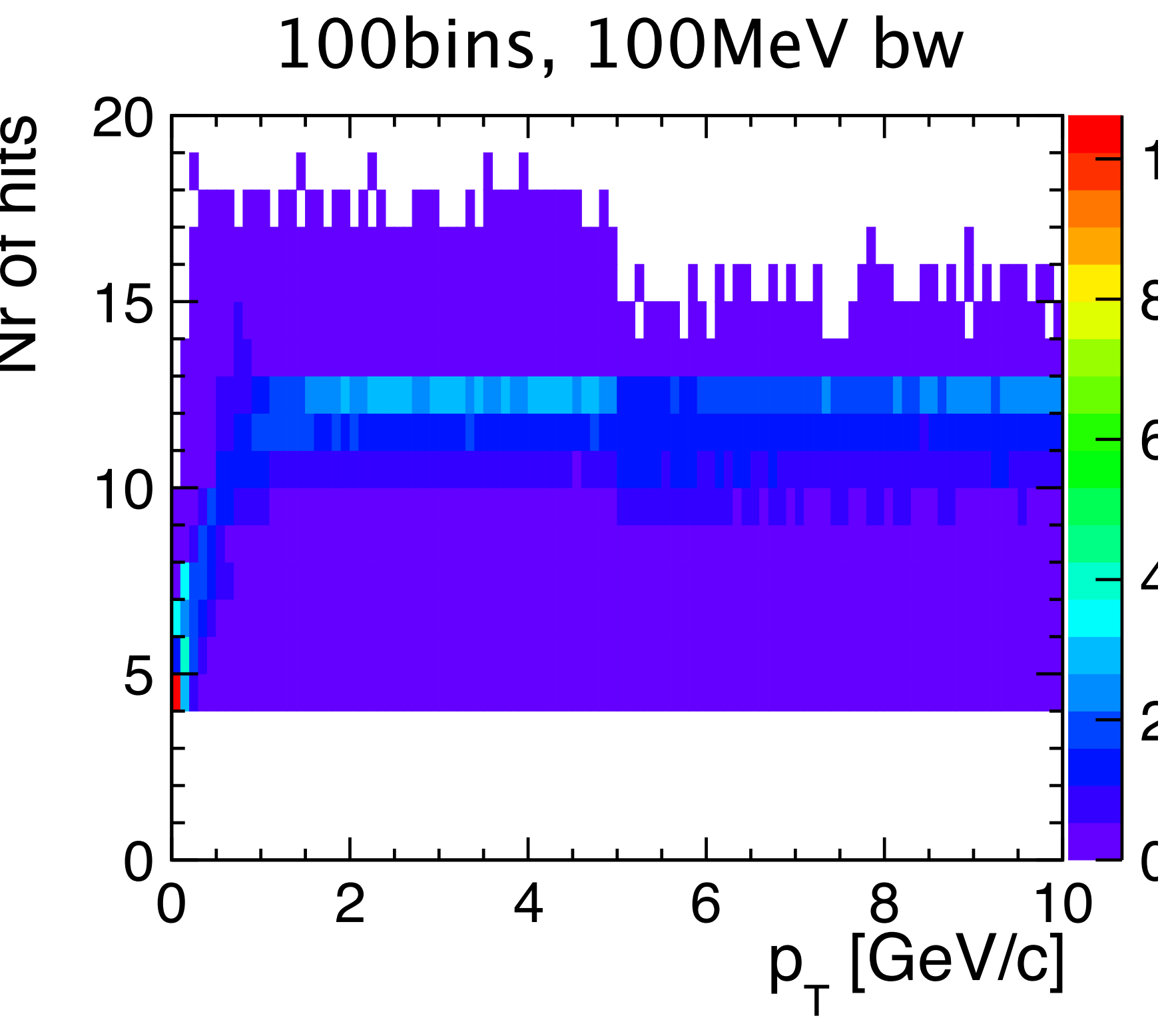
Conformal Tracking (VTX)
+ Extrapolator



Structure in phi?
Also with the Conformal Tracking

- 2M muons GPS
- iso angular distribution, uniform energy distribution

Conformal Tracking (FULL)



Hits not picked up in the transition regions (endcap + barrel)

Structure in phi?
Also with the Conformal Tracking

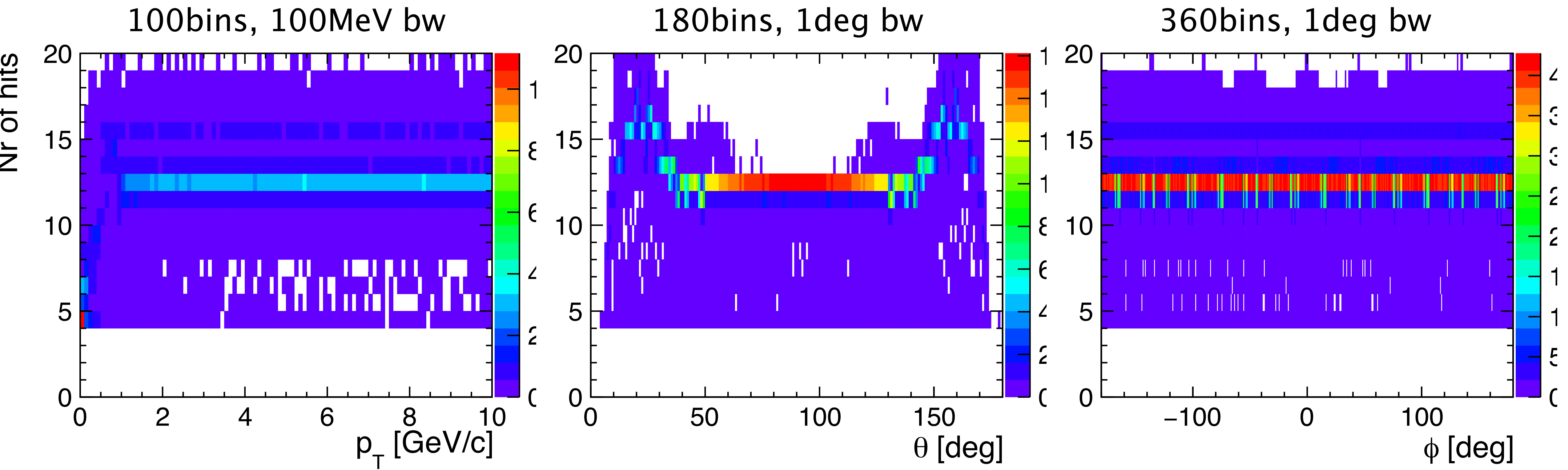
WORK IN PROGRESS

Structure in phi

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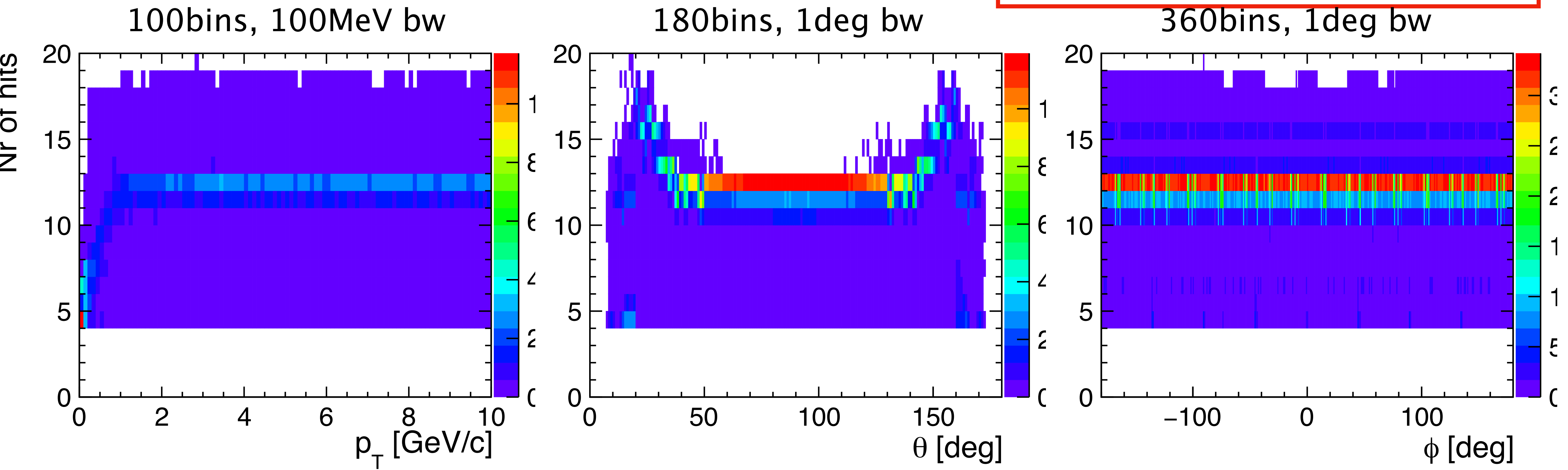
Truth Tracking



Structure in phi?
Also with this detector model

- 2M muons GPS
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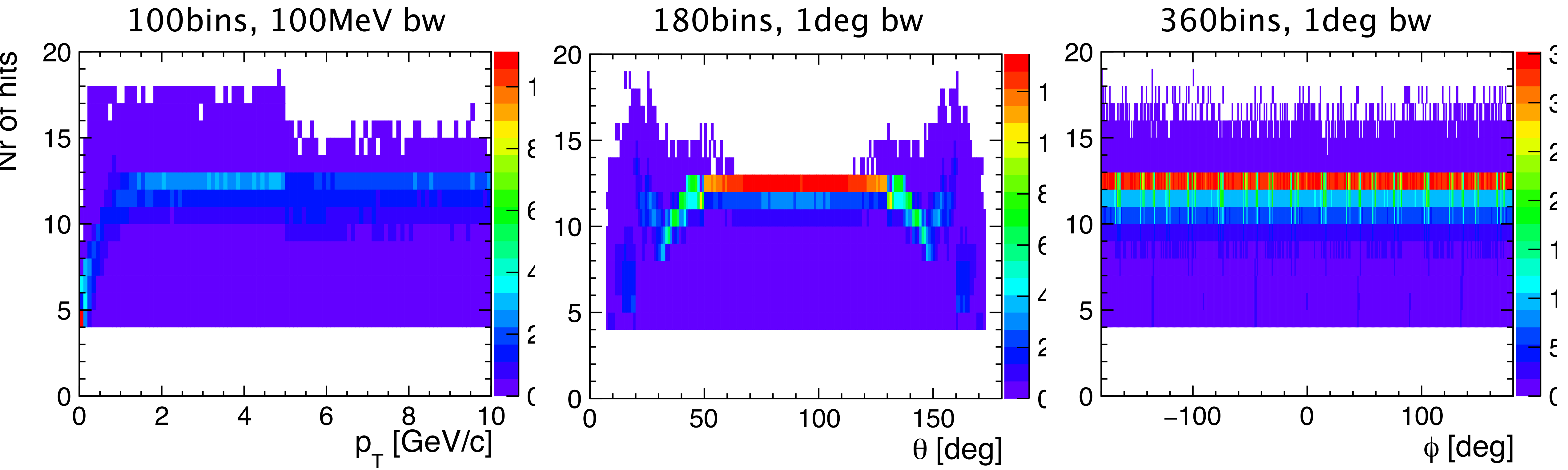
Conformal Tracking (VTX)
+ Extrapolator



Structure in phi?
Also with this detector model

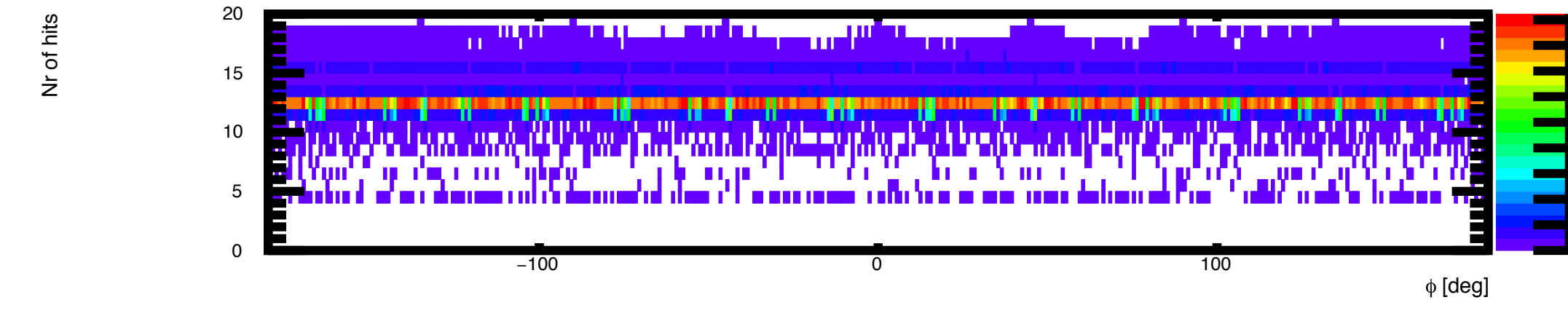
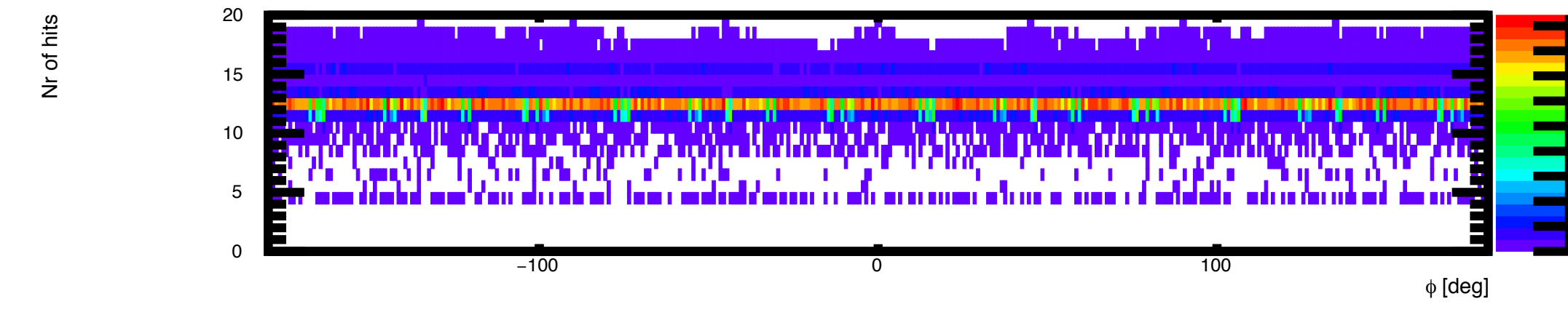
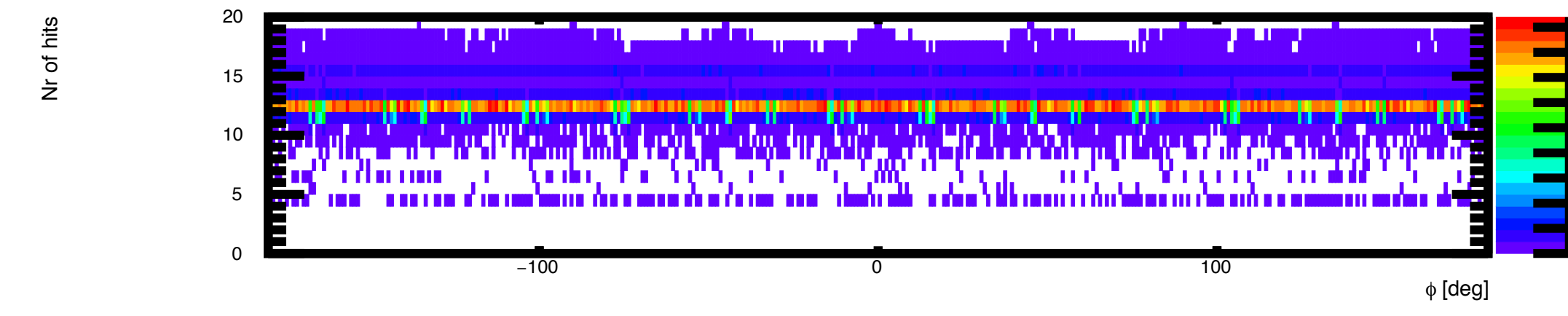
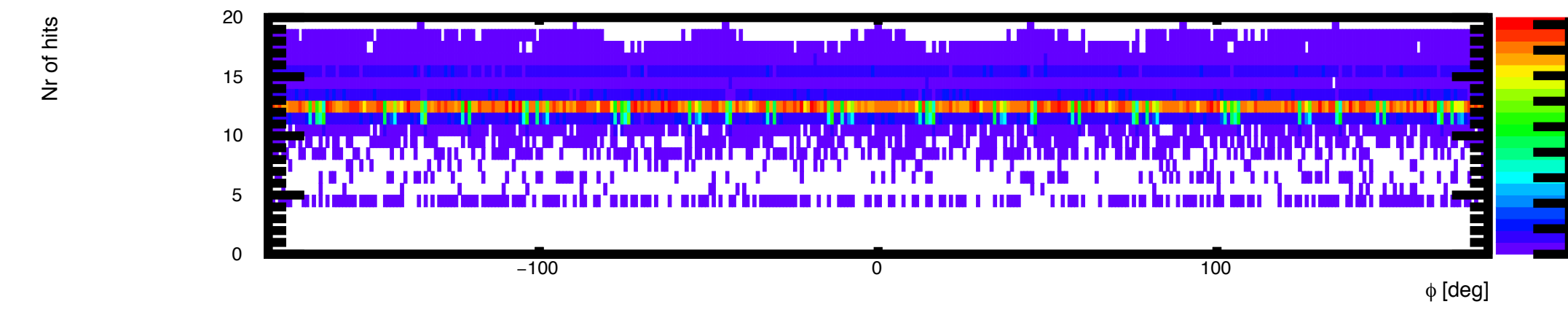
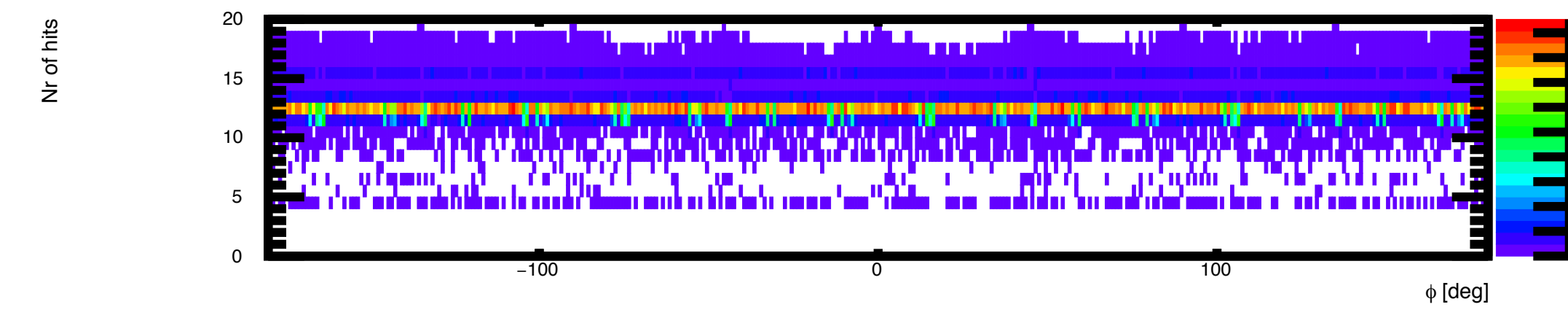
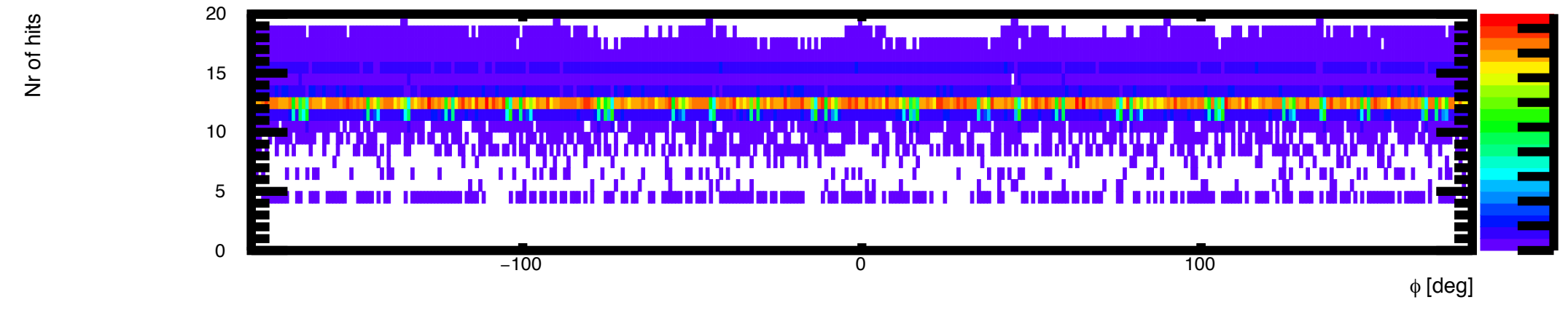
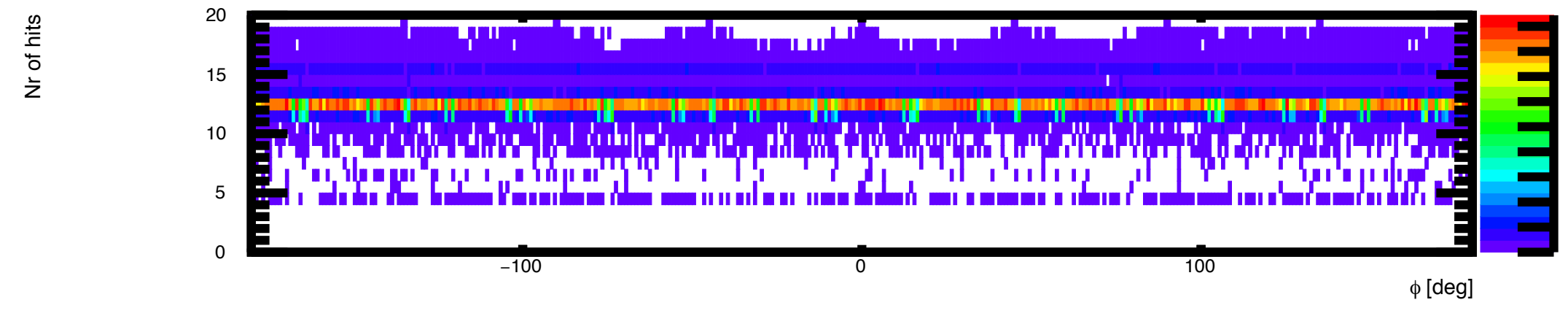
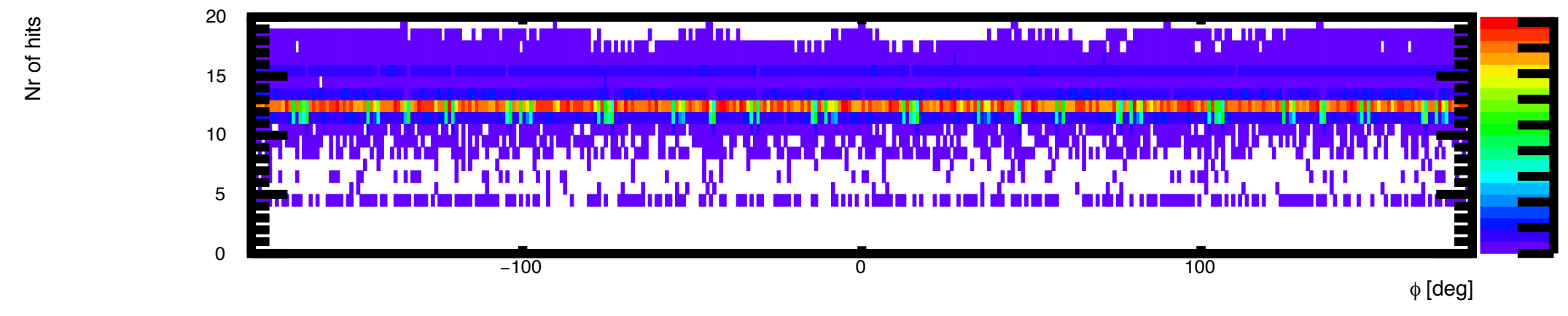
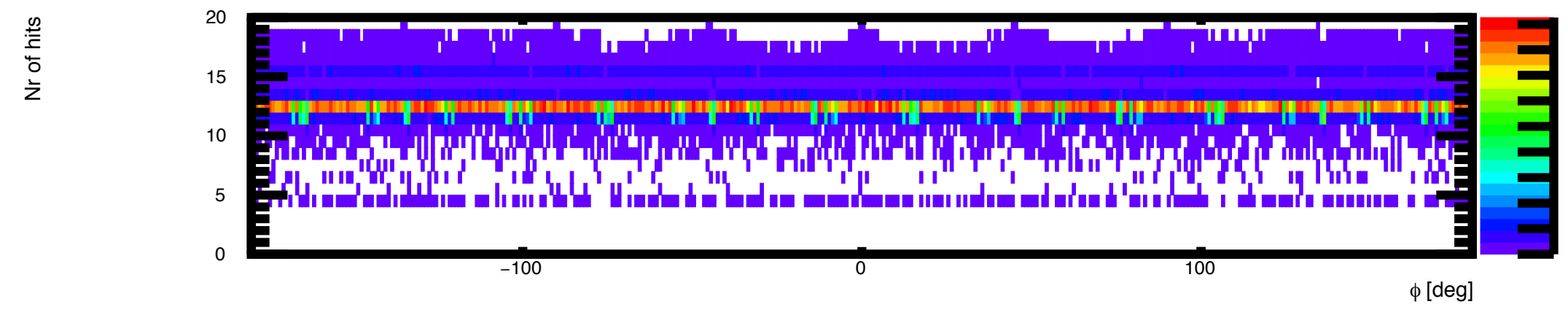
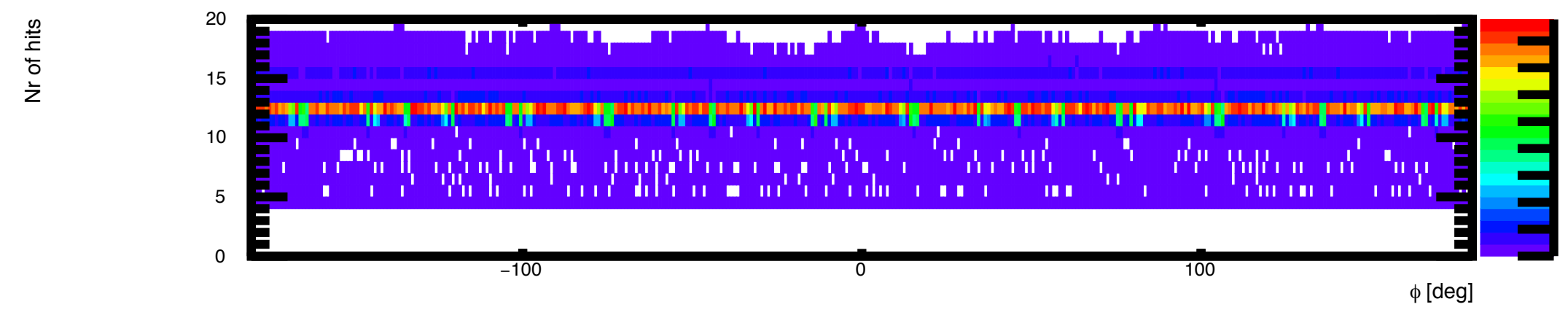
- 2M muons GPS
- iso angular distribution, uniform energy distribution

Conformal Tracking (FULL)



Structure in phi?
Also with this detector model

Structure in phi
Is it energy dependent?

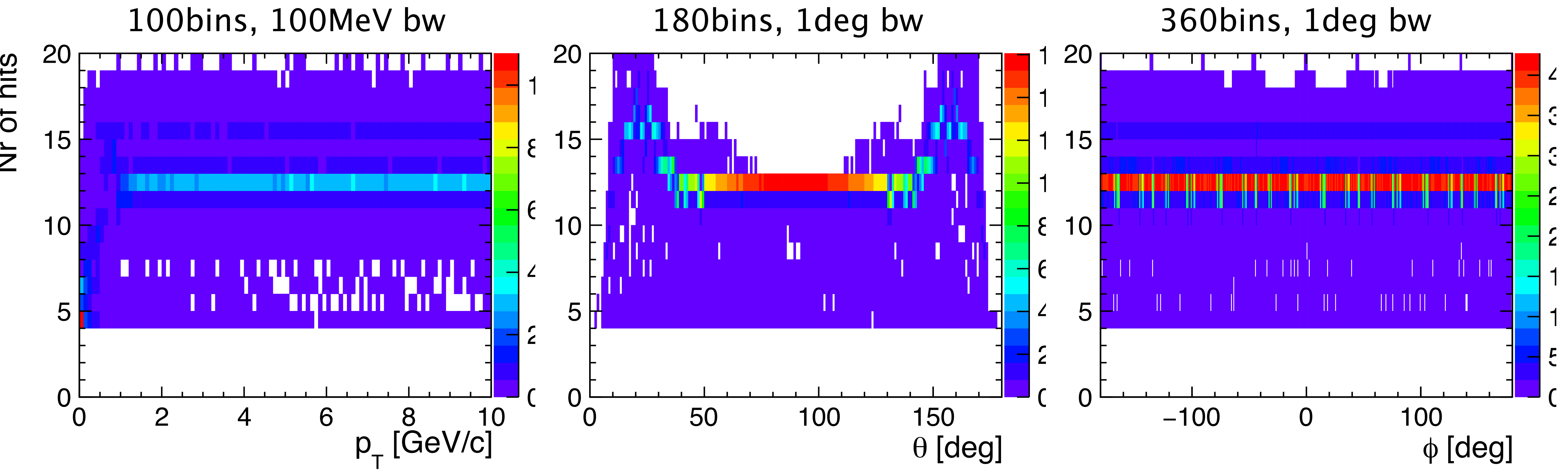


Structure in phi

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or to the software release?

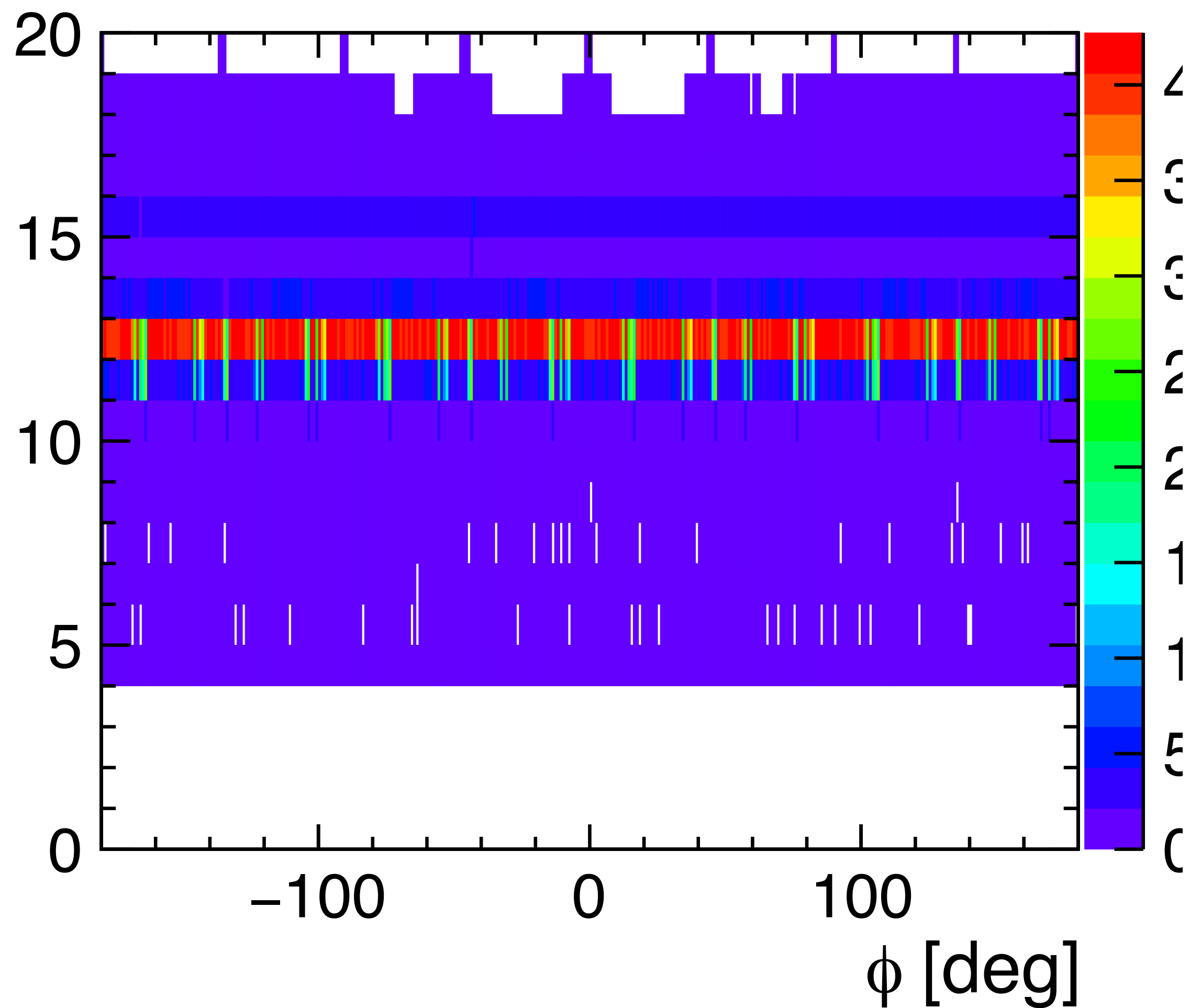
- 2M muons GPS
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Truth Tracking

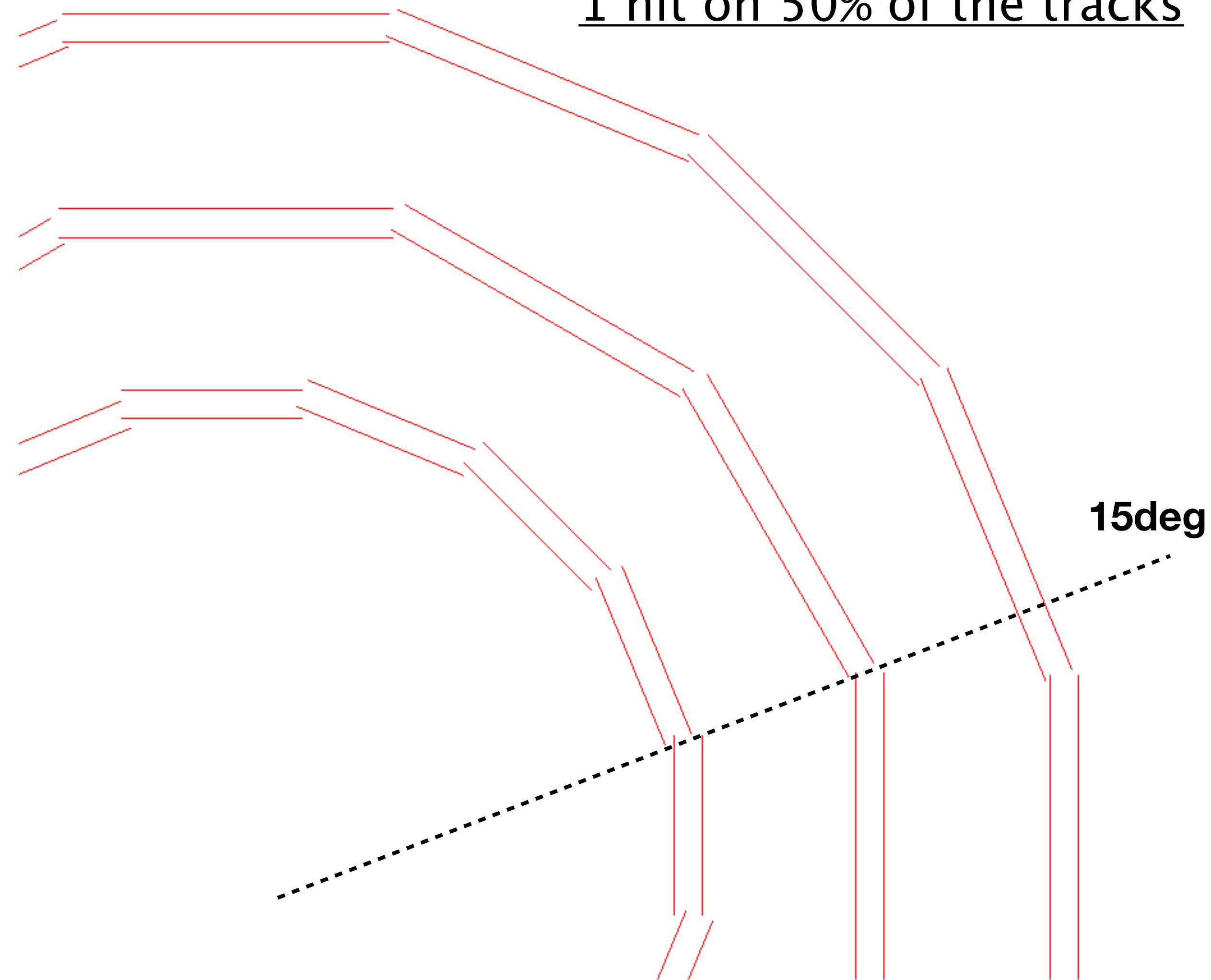


Structure in phi
Also with this software release

Structure in phi
~~Is it due to the tracking algorithm~~
~~or to the detector model~~
~~or to the software release?~~



Due to the layout of the detector
modules in φ , we lose on average
1 hit on 50% of the tracks



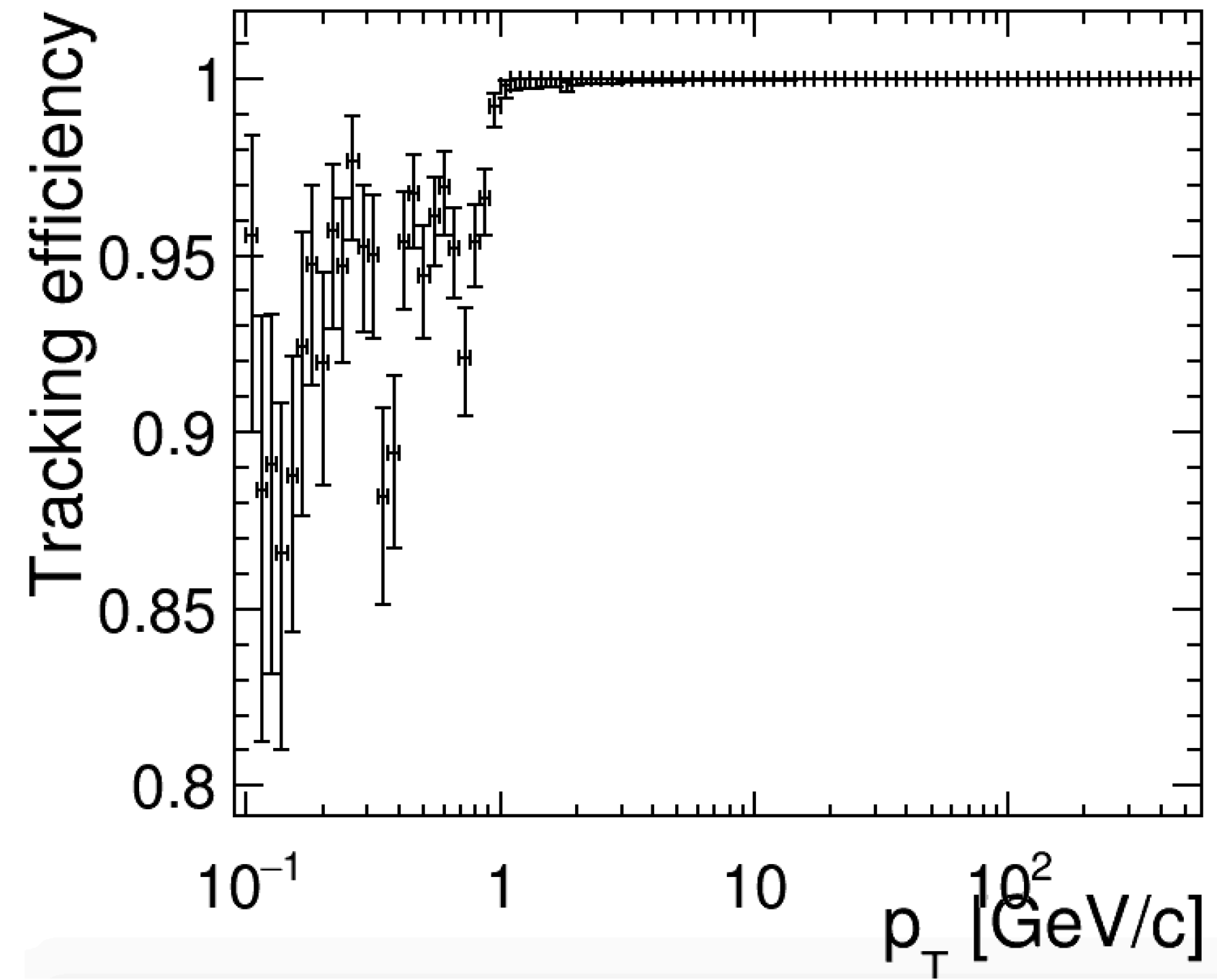
Detector model: CLIC_o3_v12

HEAD release: 2017-07-12

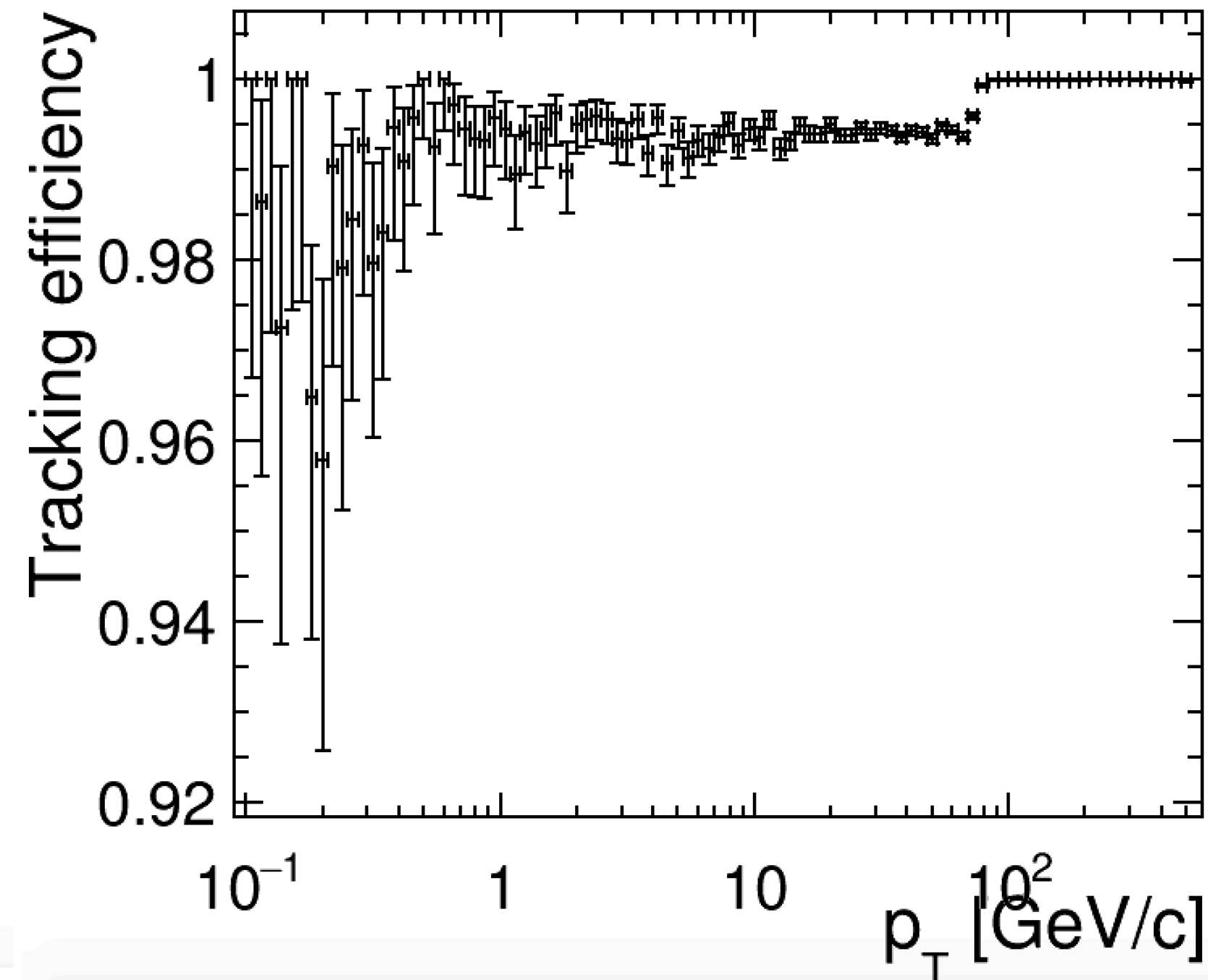
Tracking efficiency

- 2M muons GPS
 - iso angular distribution, uniform energy distribution

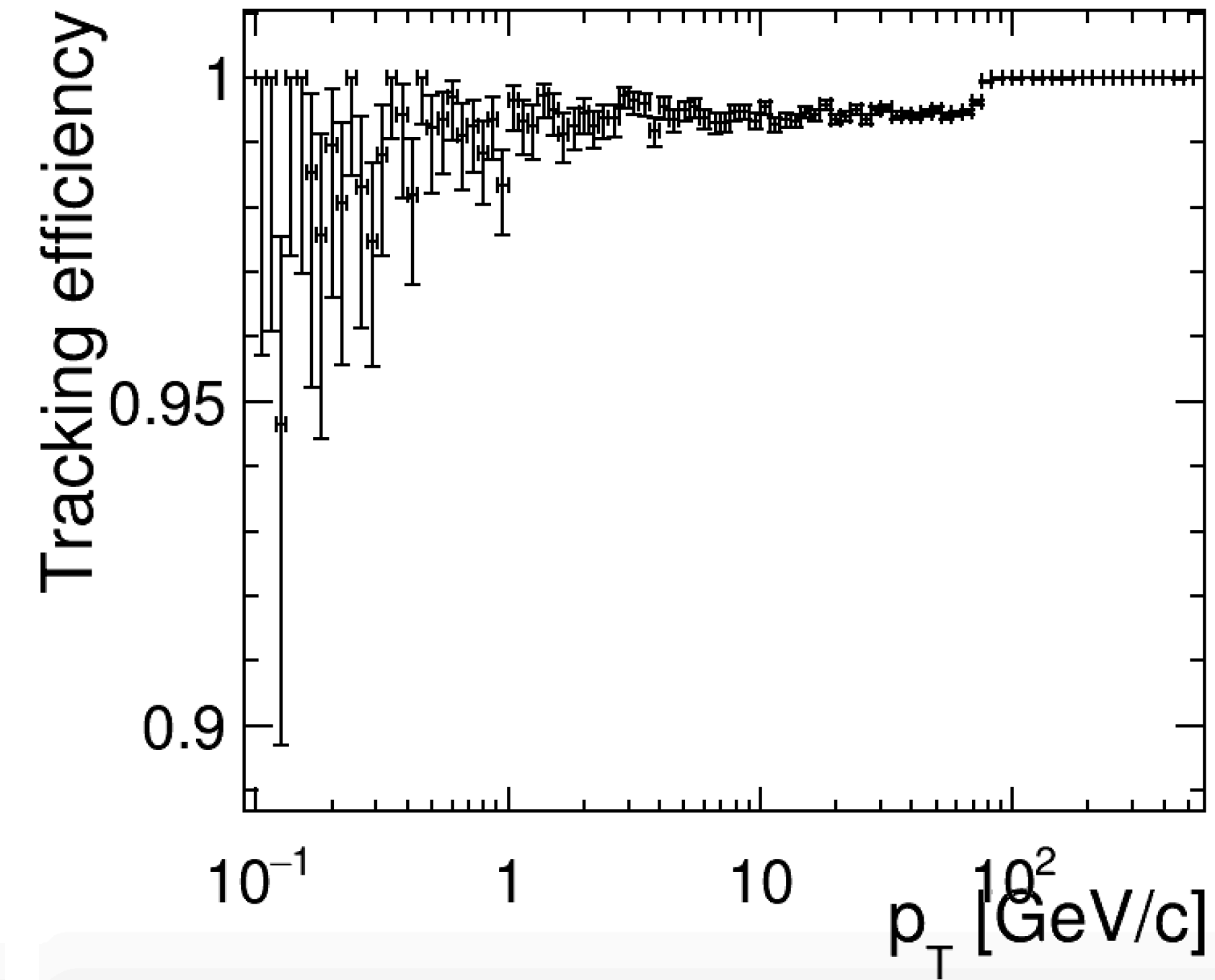
Truth Tracking



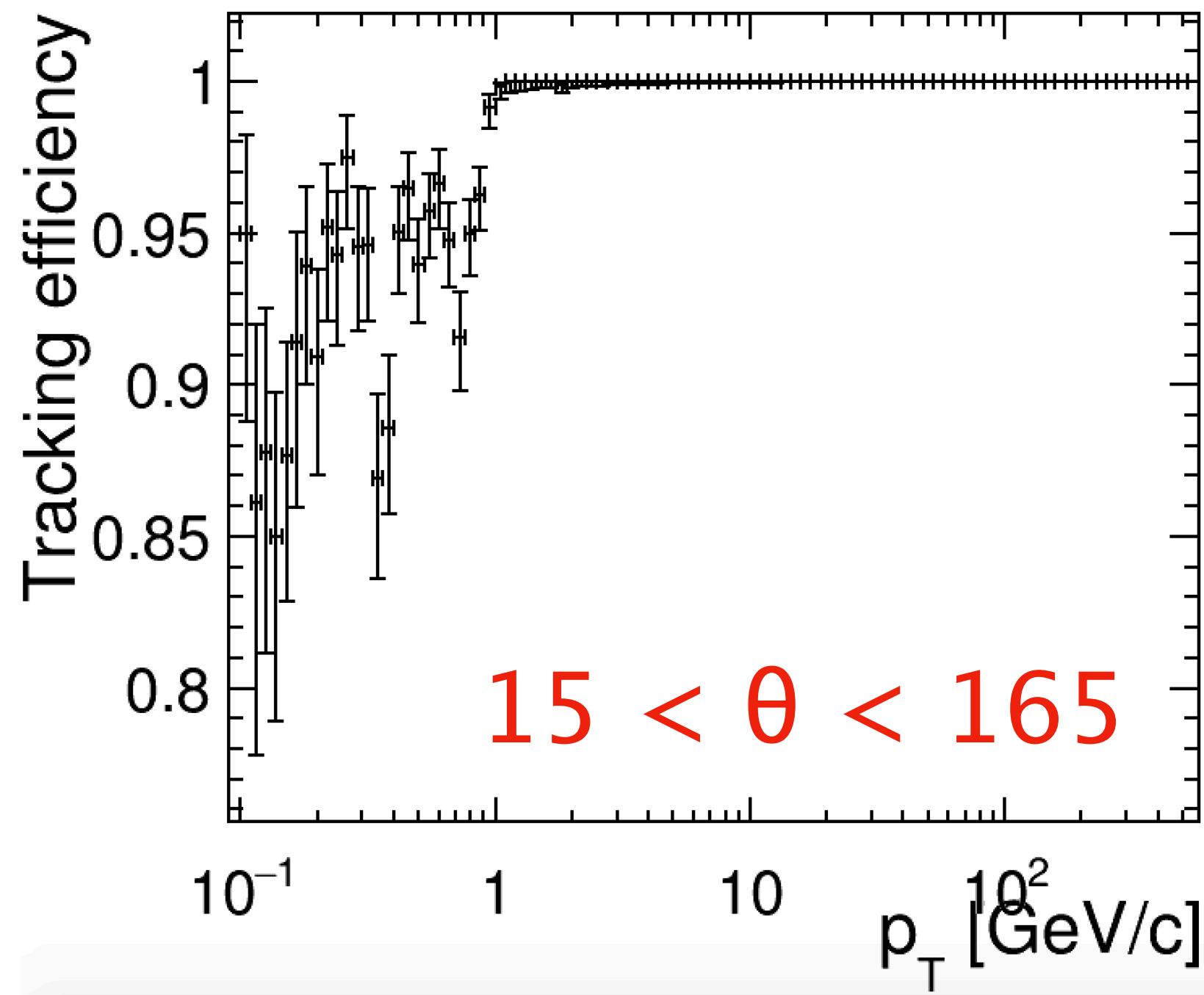
Conformal Tracking (VTX)
+ Extrapolator



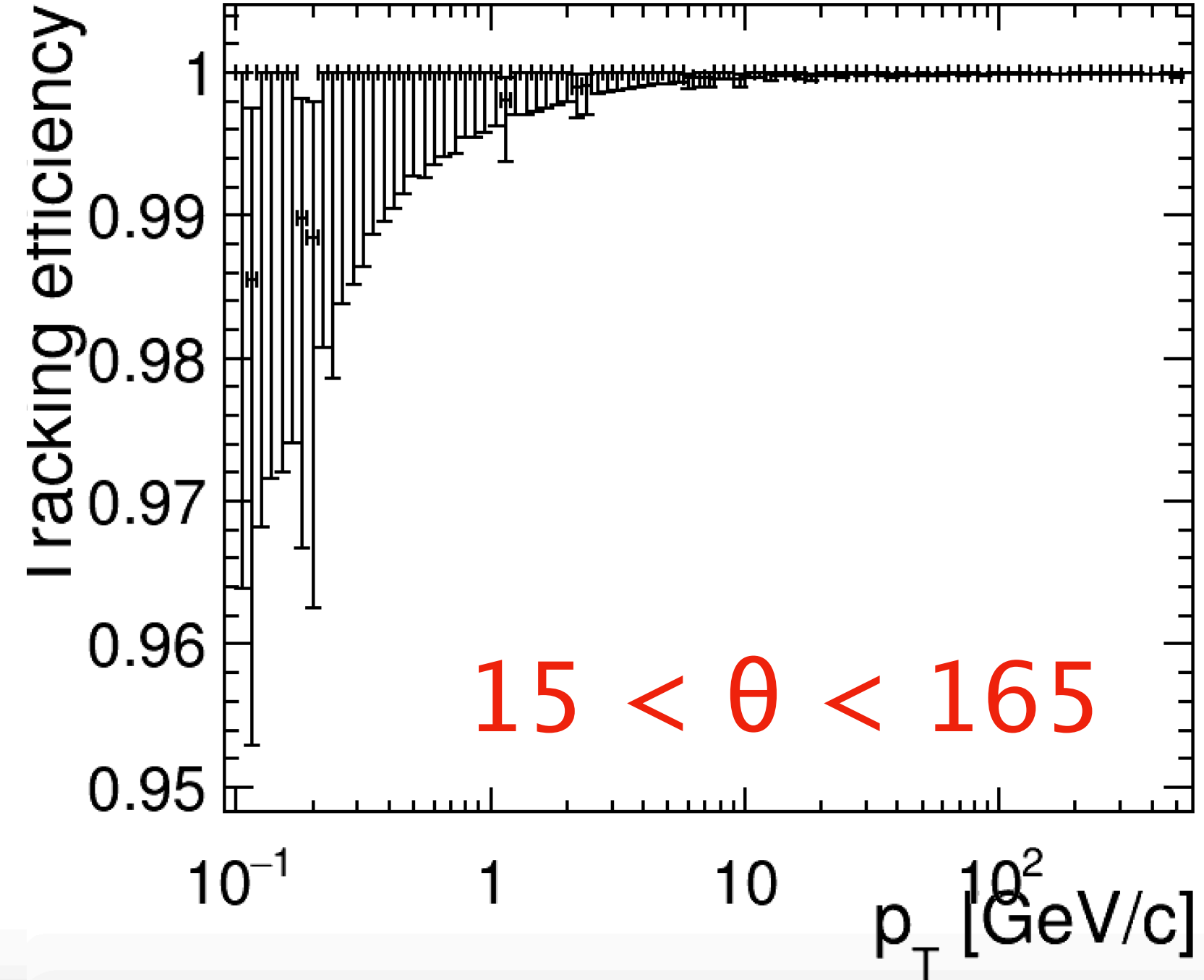
Conformal Tracking (FULL)



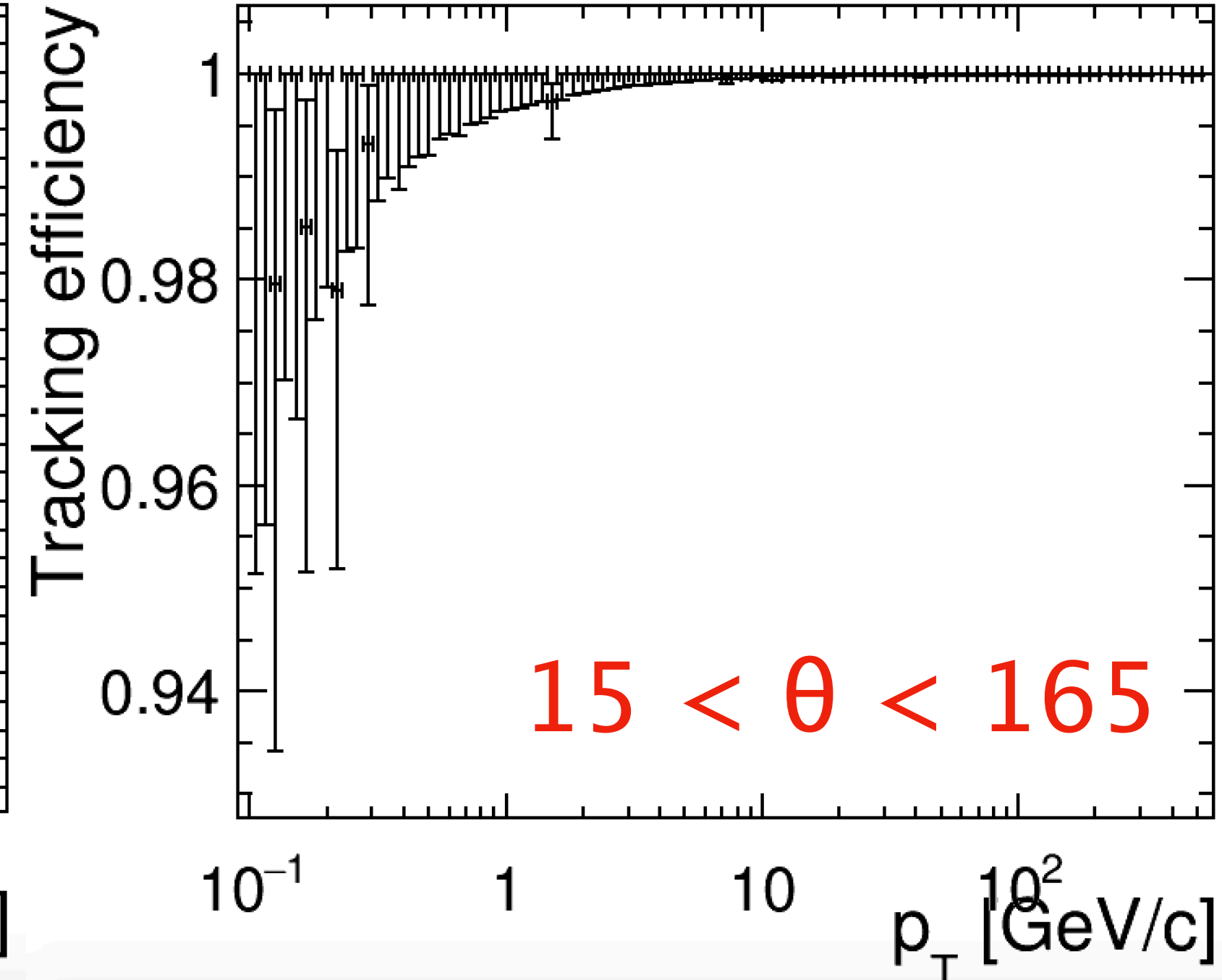
Truth Tracking



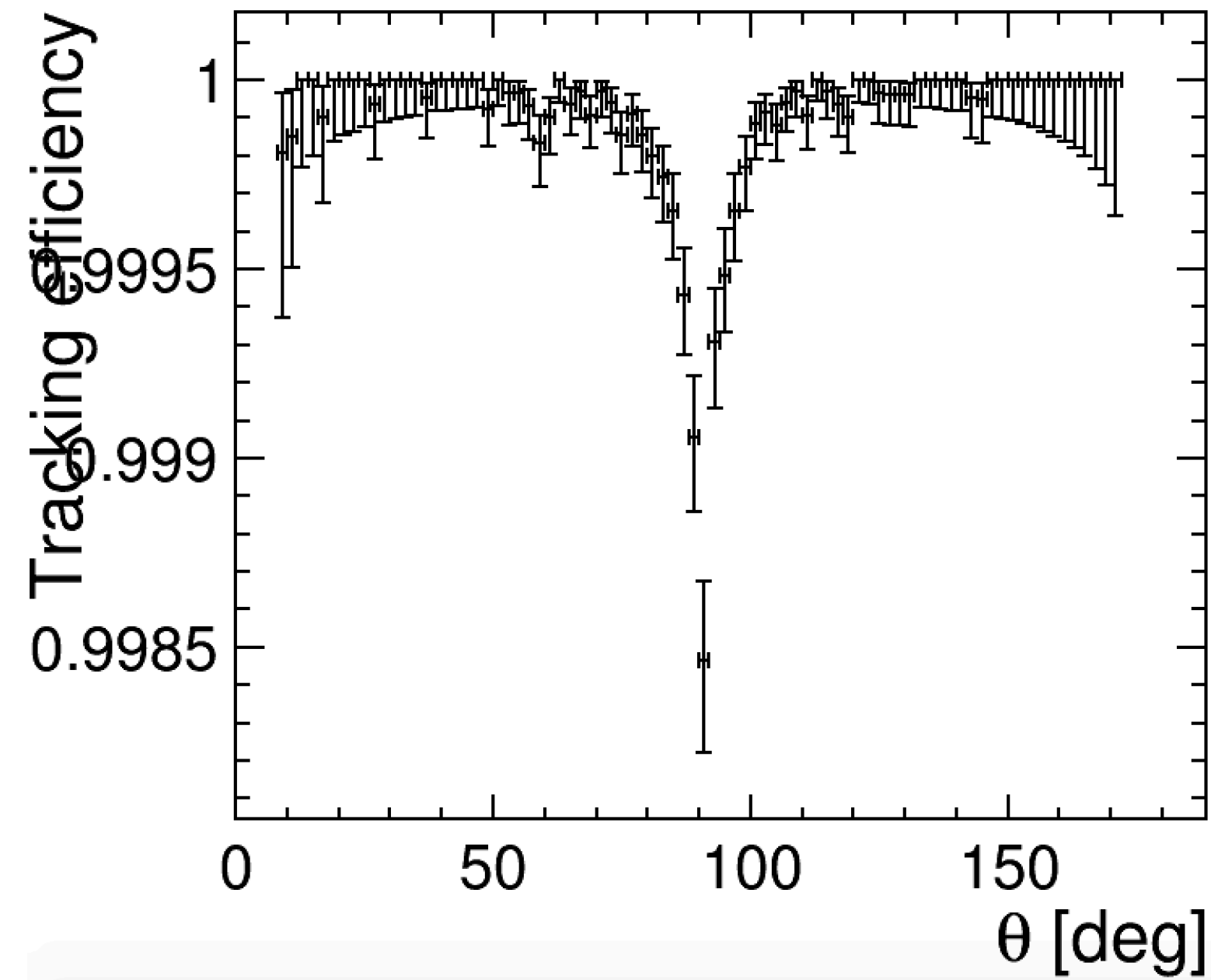
Conformal Tracking (VTX) + Extrapolator



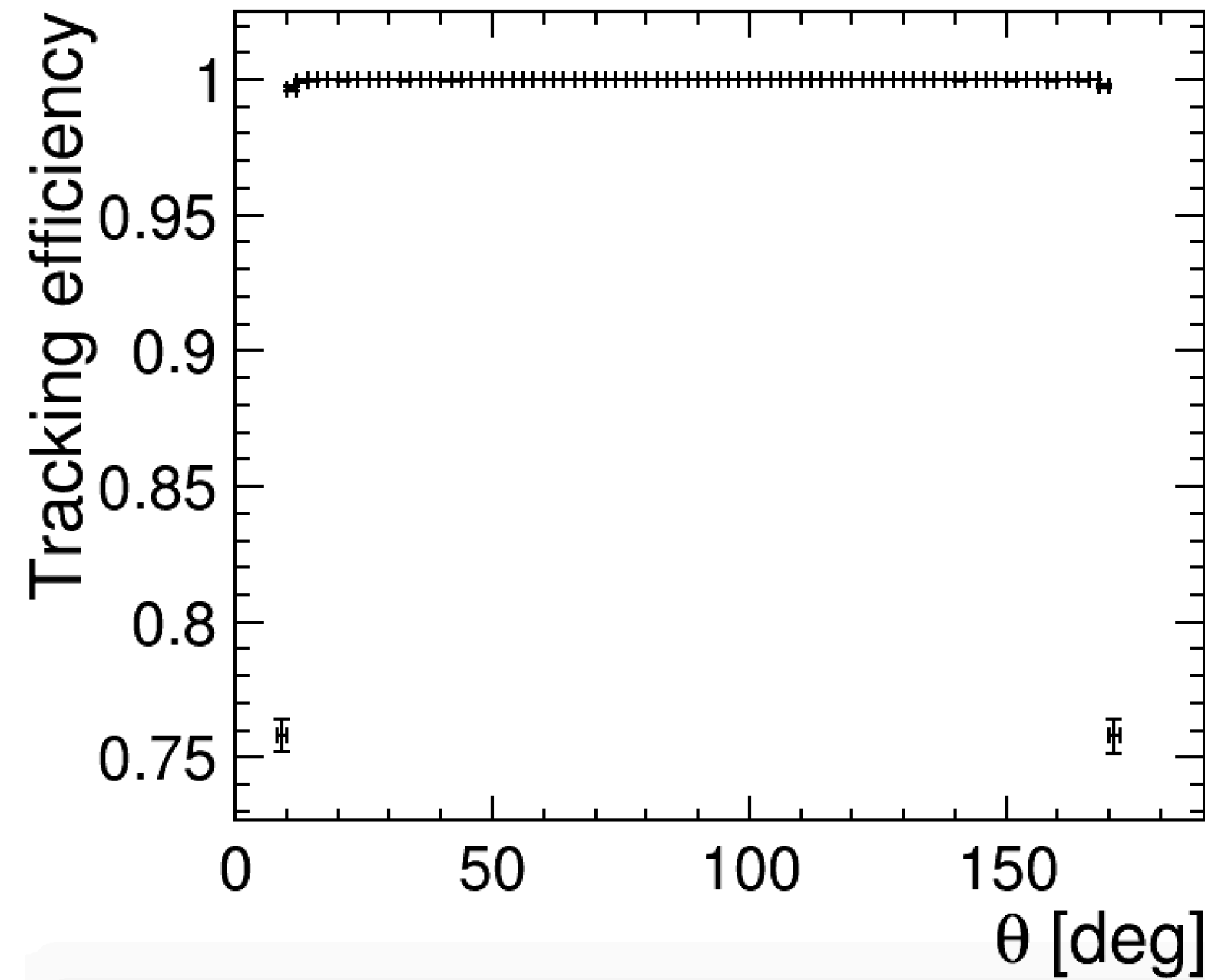
Conformal Tracking (FULL)



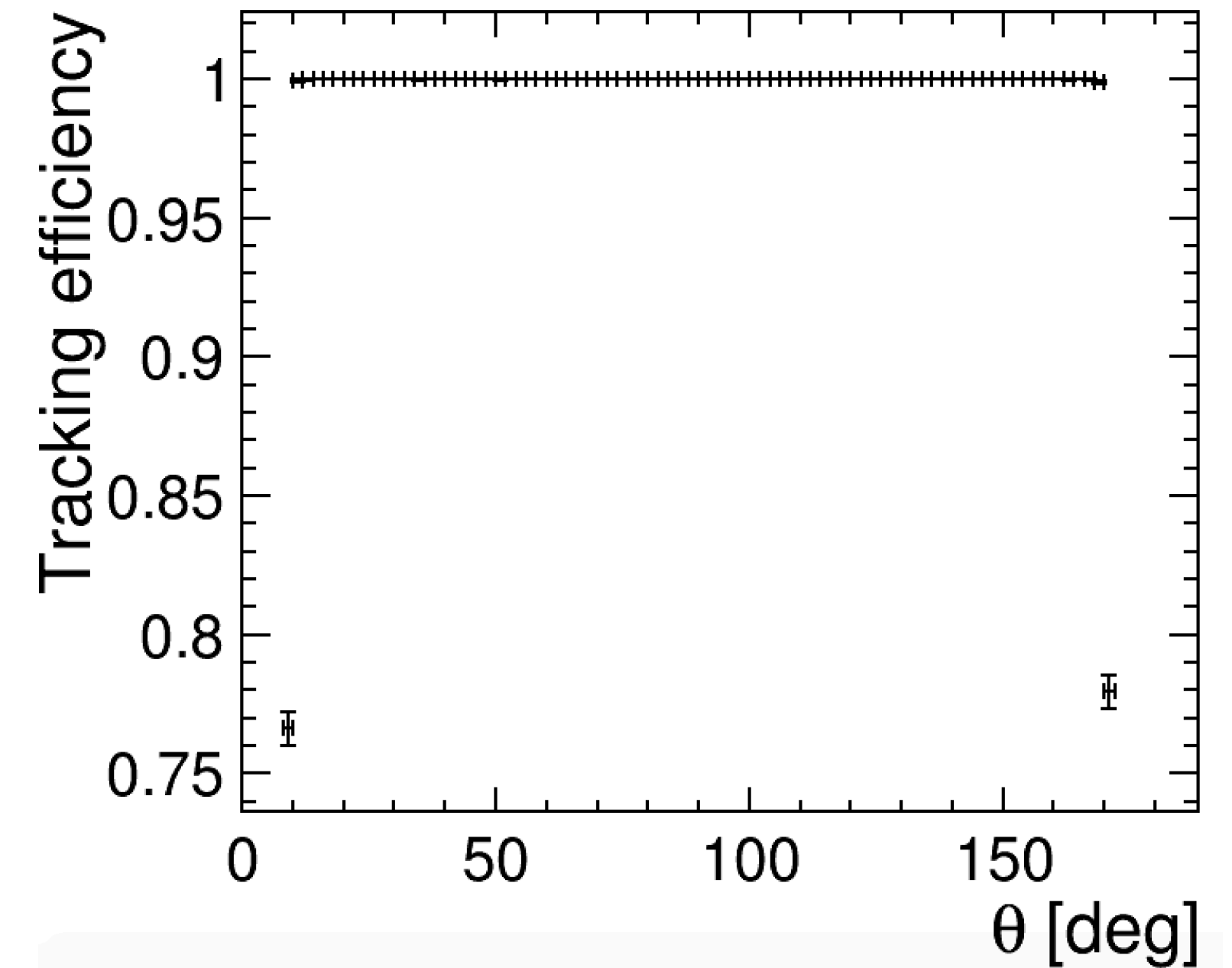
Truth Tracking



Conformal Tracking (VTX)
+ Extrapolator



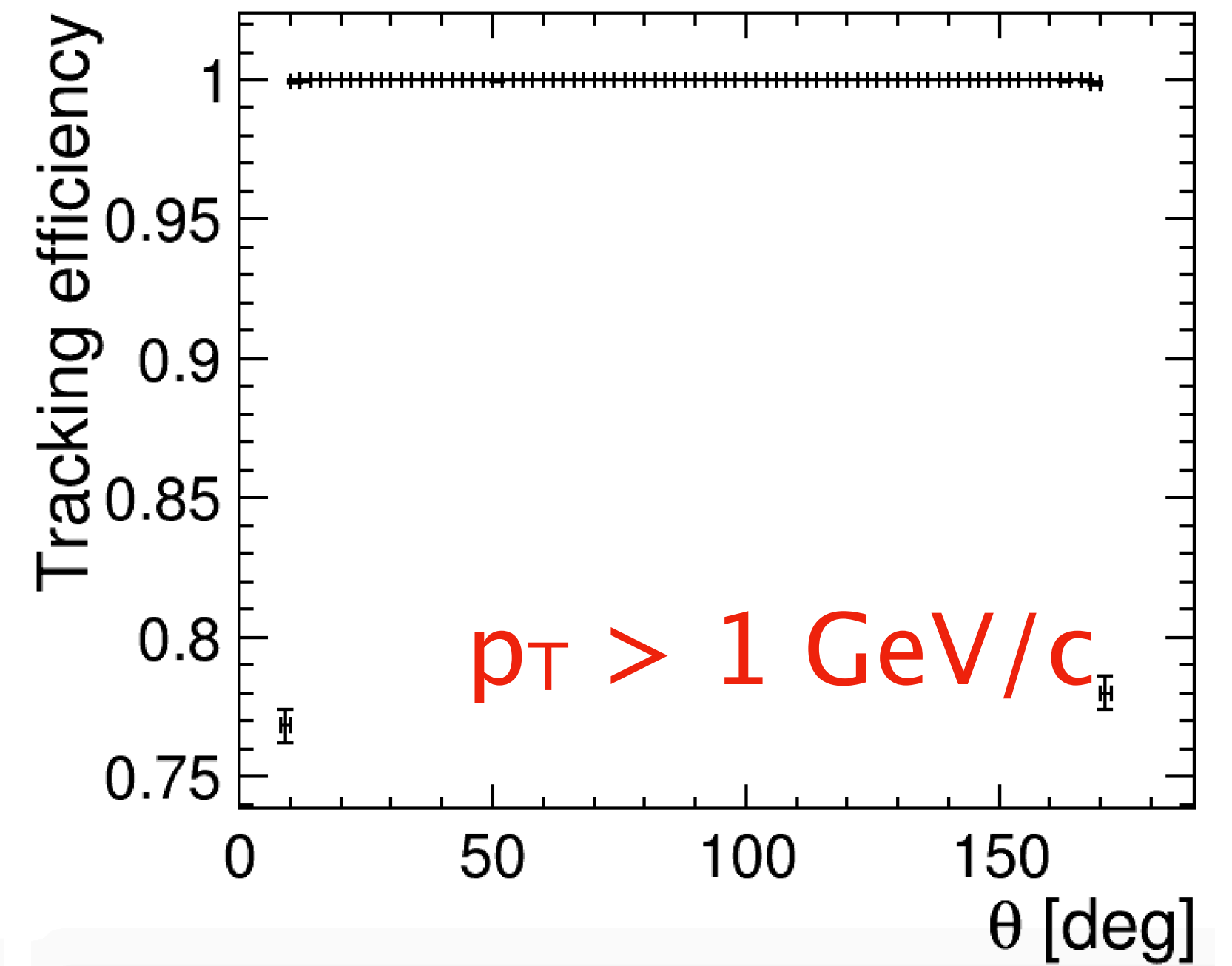
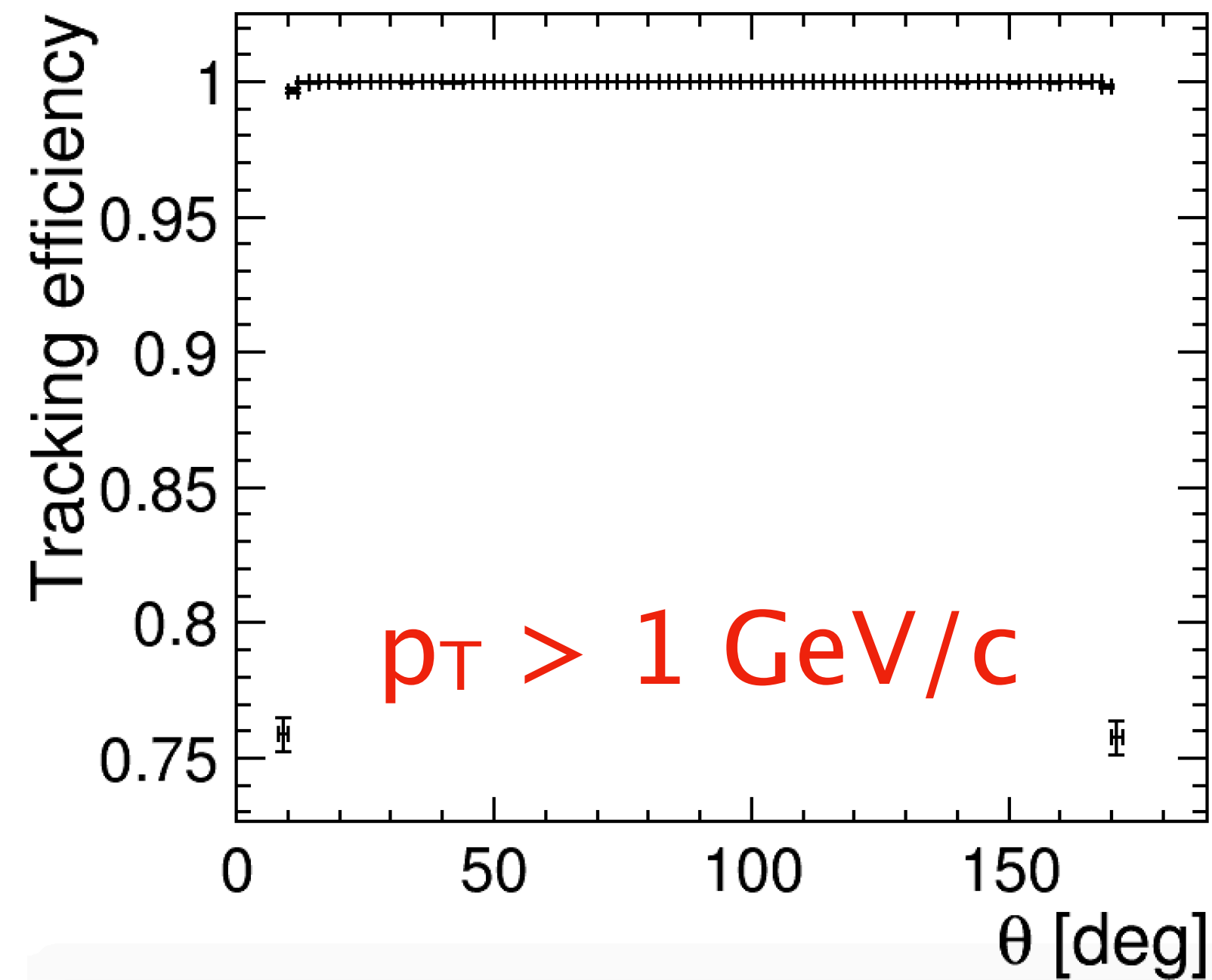
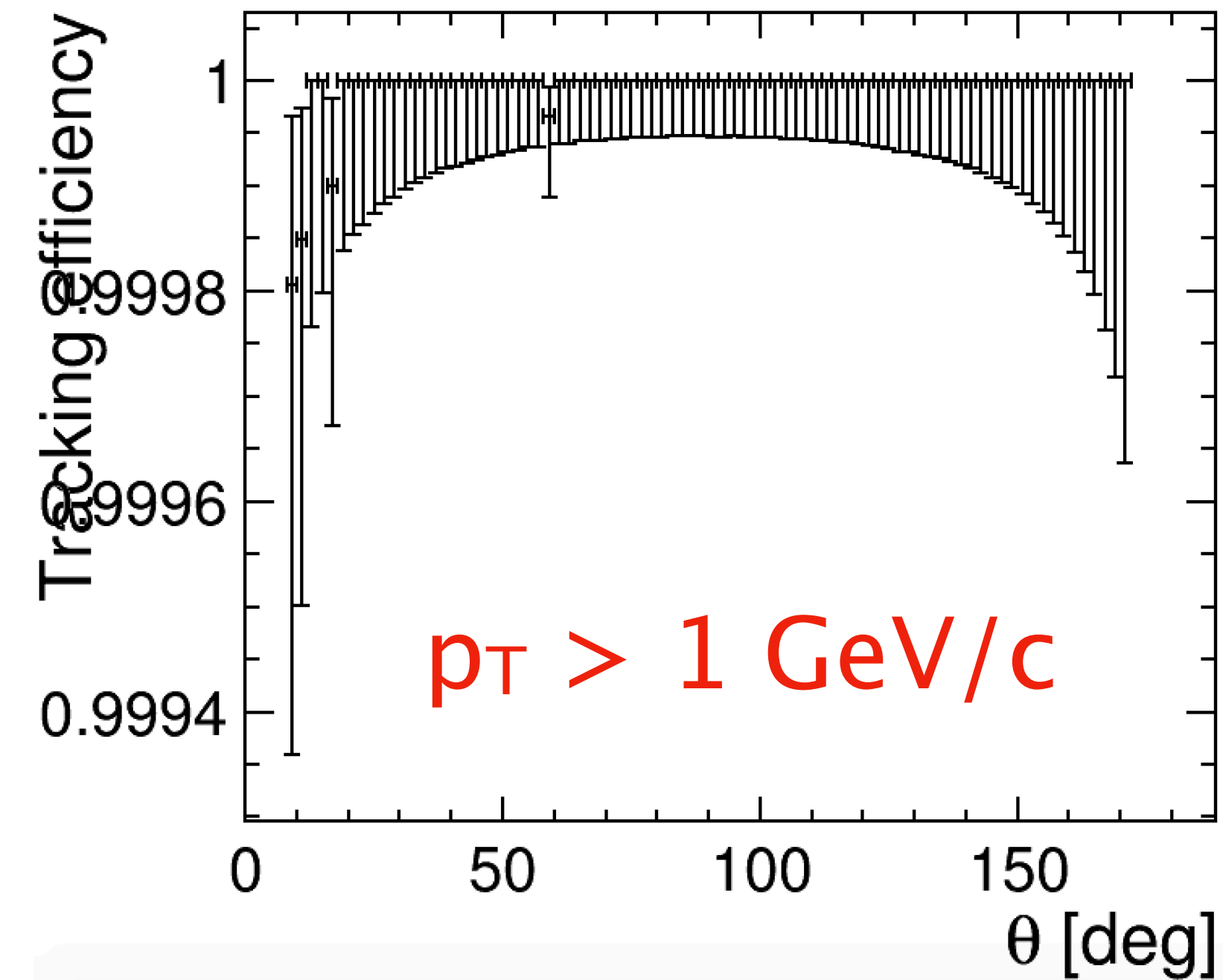
Conformal Tracking (FULL)



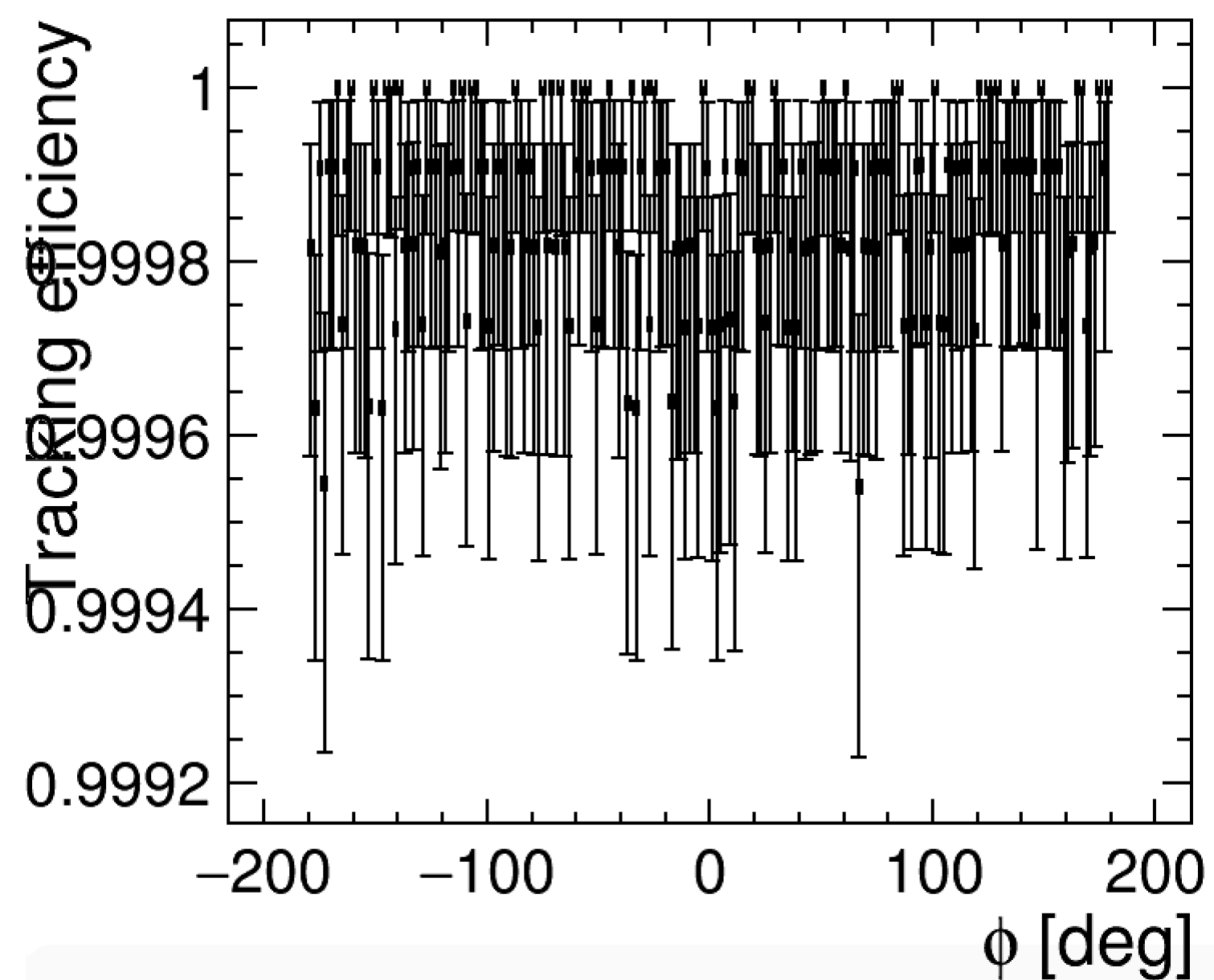
Truth Tracking

Conformal Tracking (VTX)
+ Extrapolator

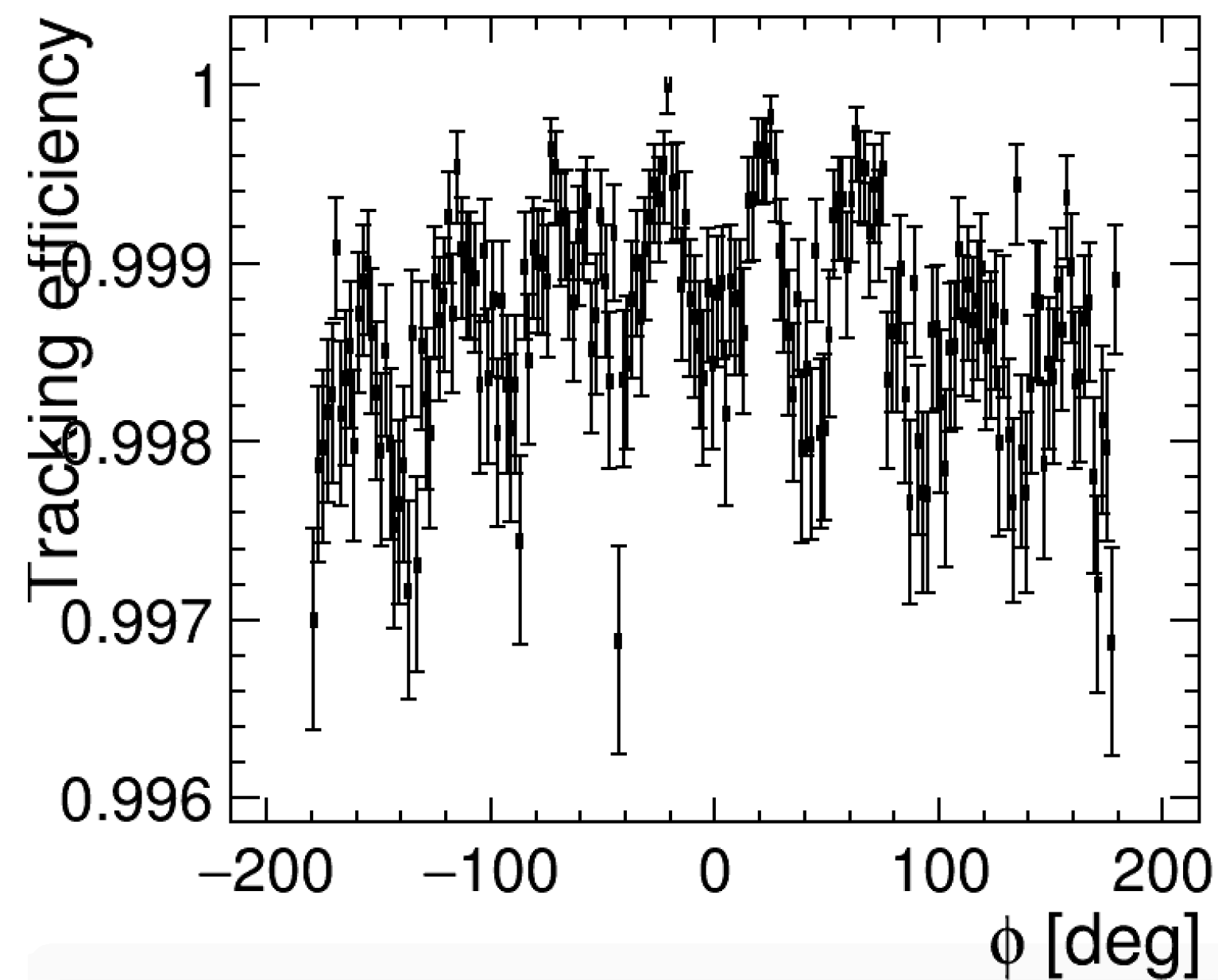
Conformal Tracking (FULL)



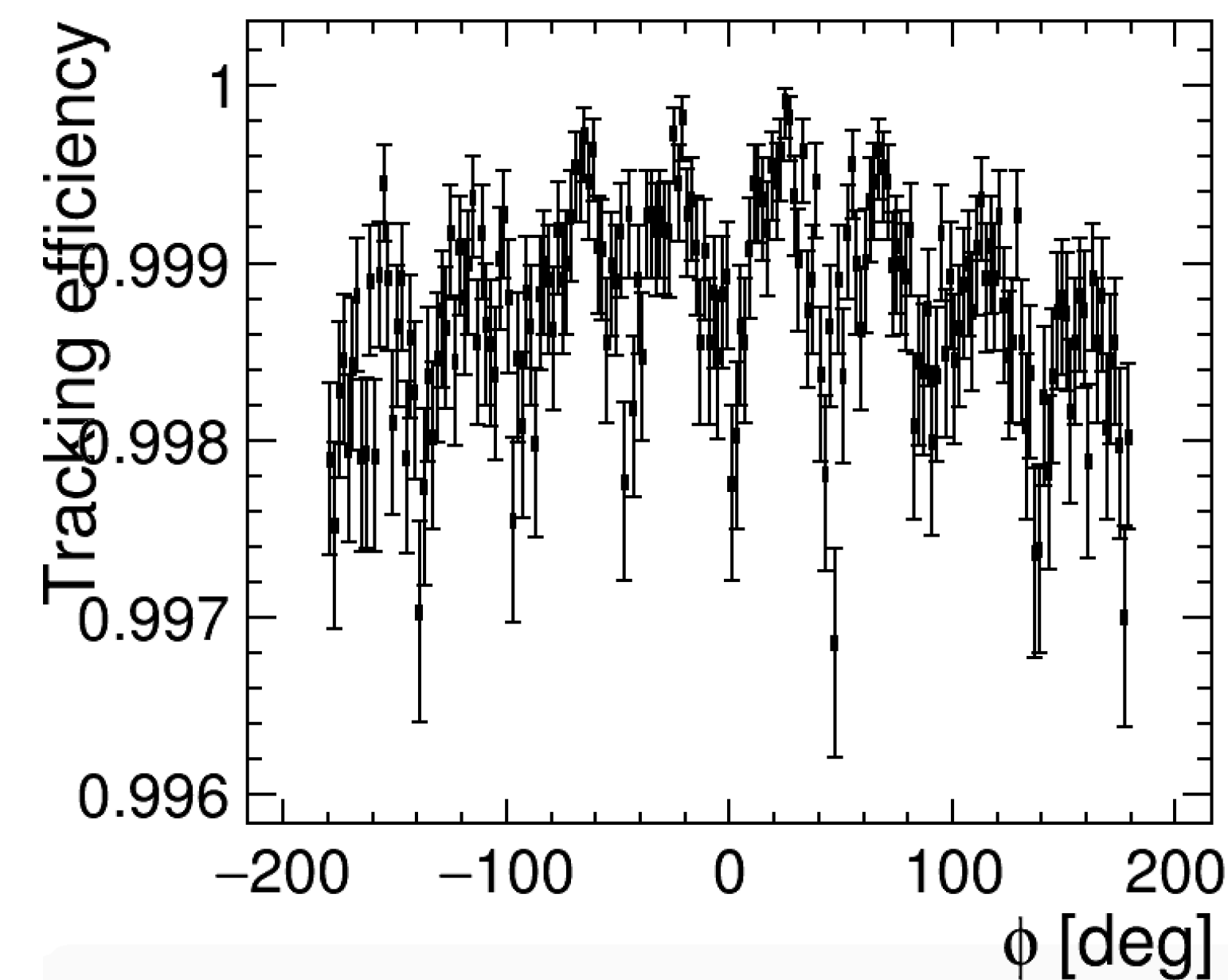
Truth Tracking



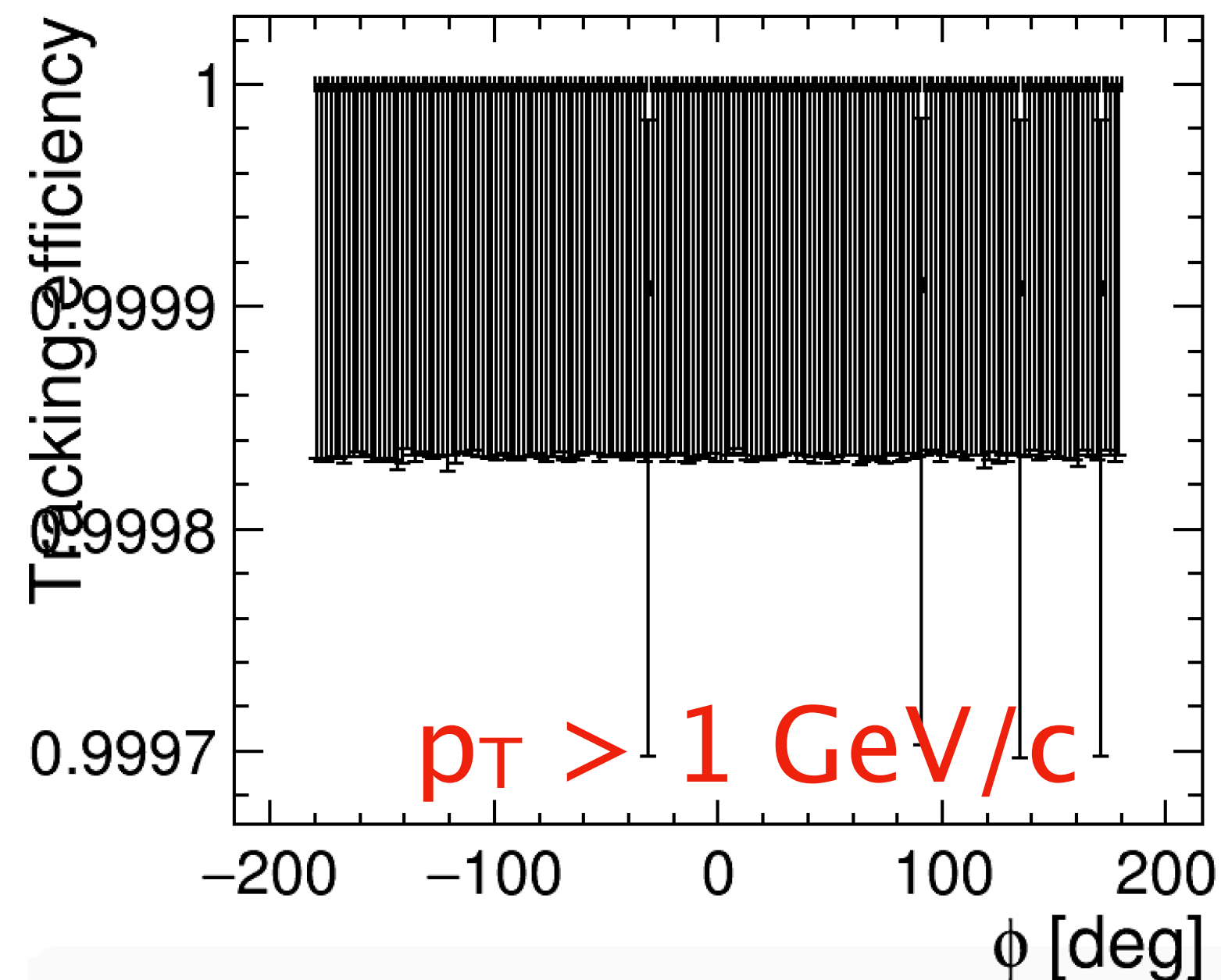
Conformal Tracking (VTX)
+ Extrapolator



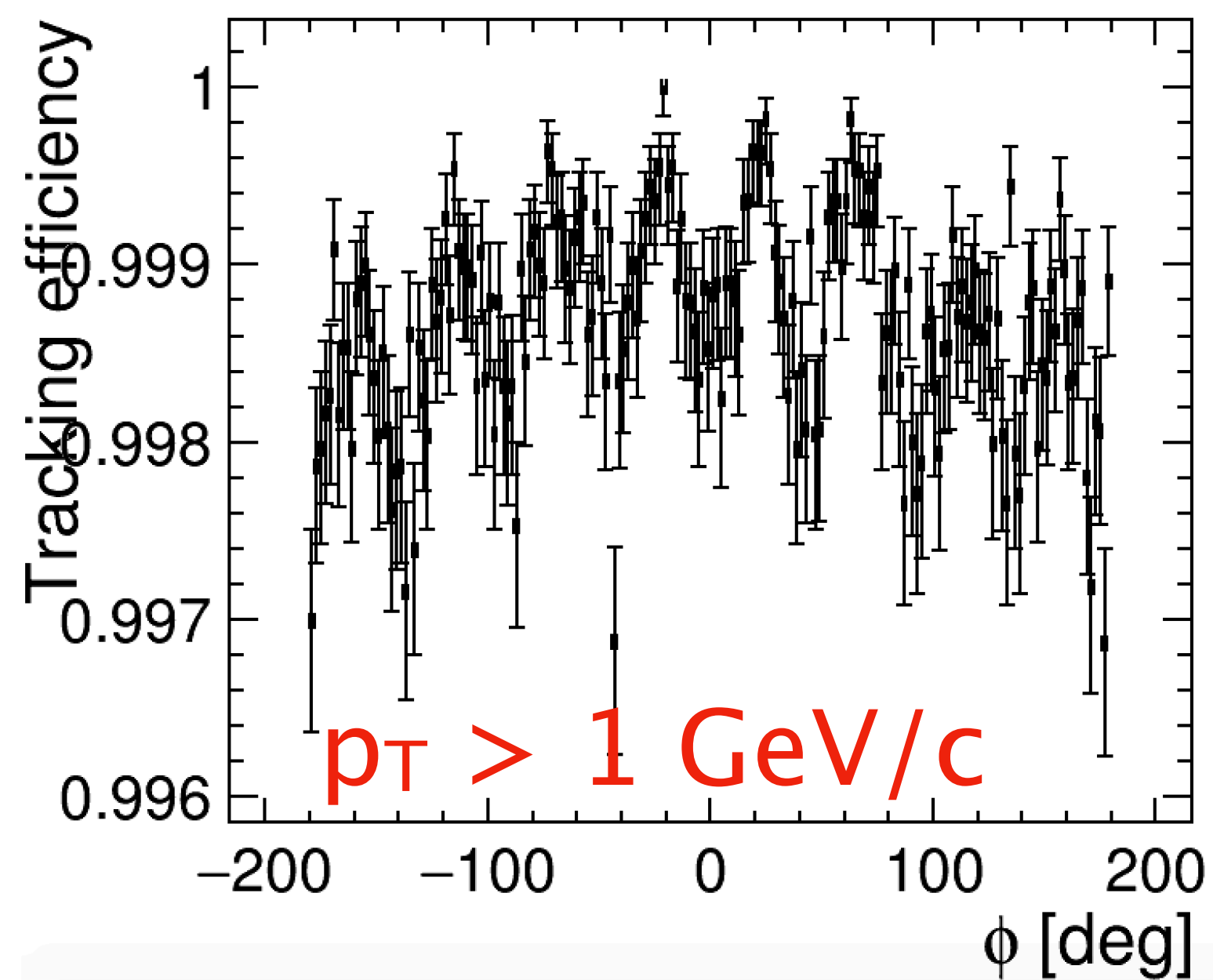
Conformal Tracking (FULL)



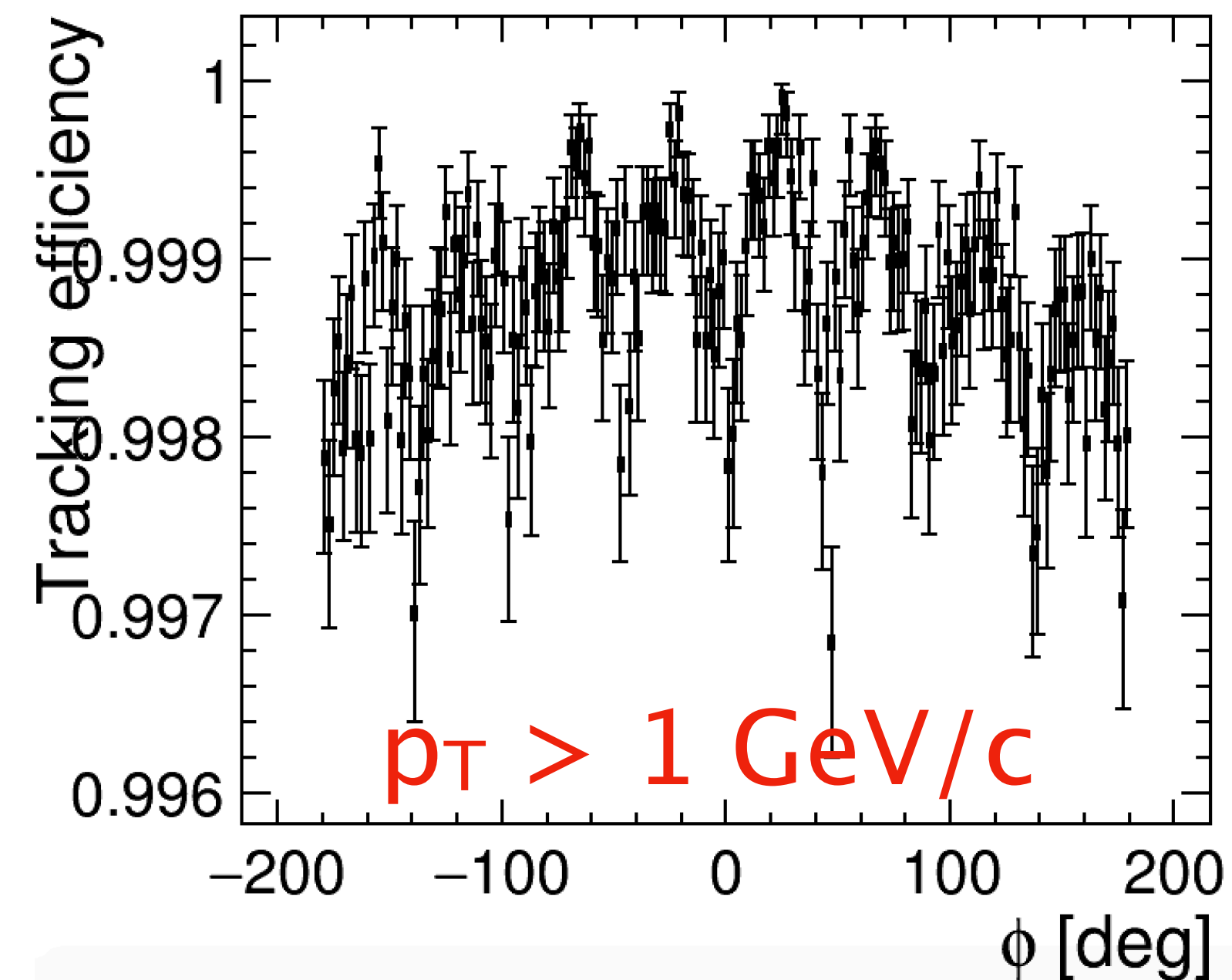
Truth Tracking



Conformal Tracking (VTX)
+ Extrapolator



Conformal Tracking (FULL)



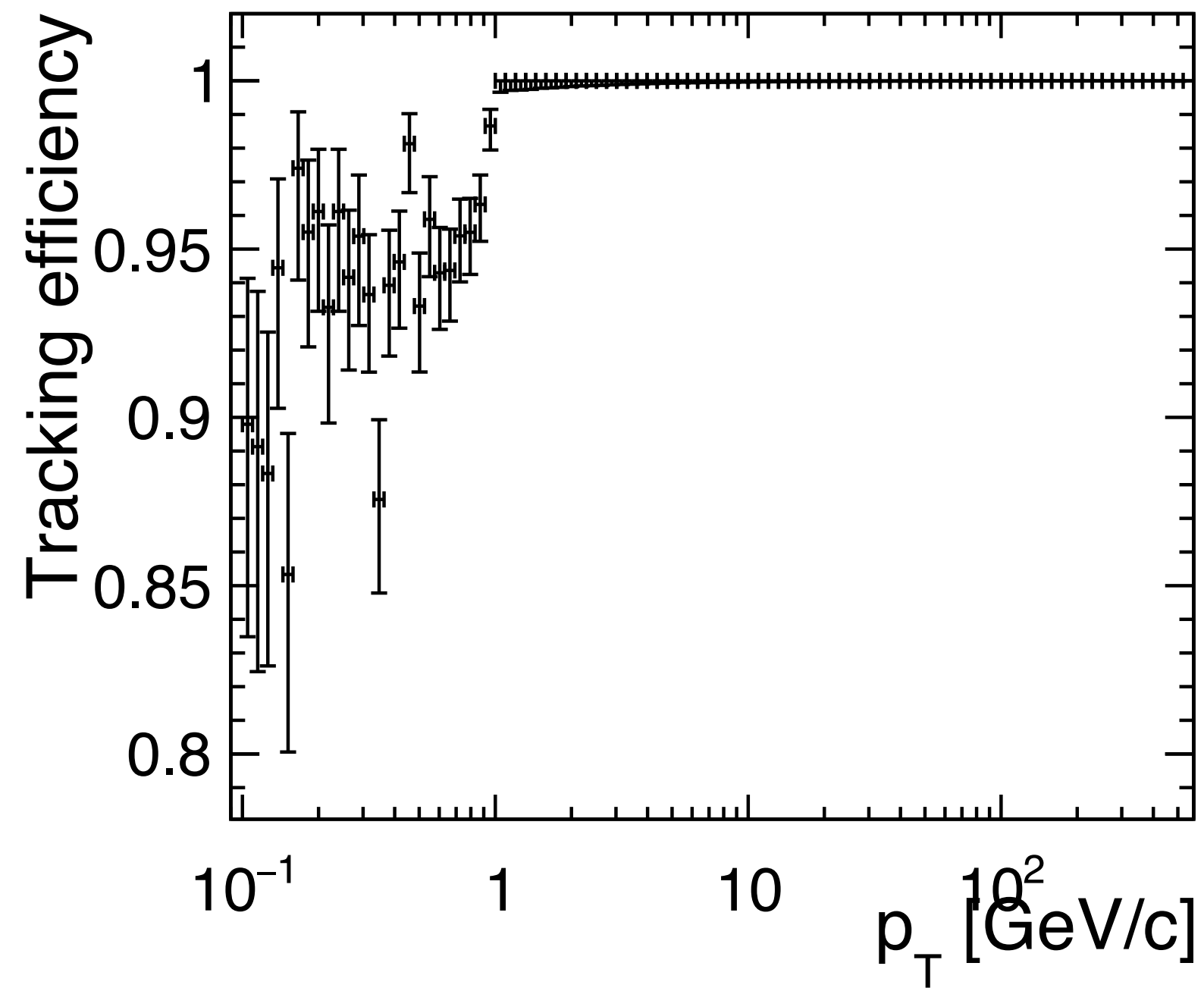
Detector model: CLIC_o3_v11

HEAD release: 2017-07-12

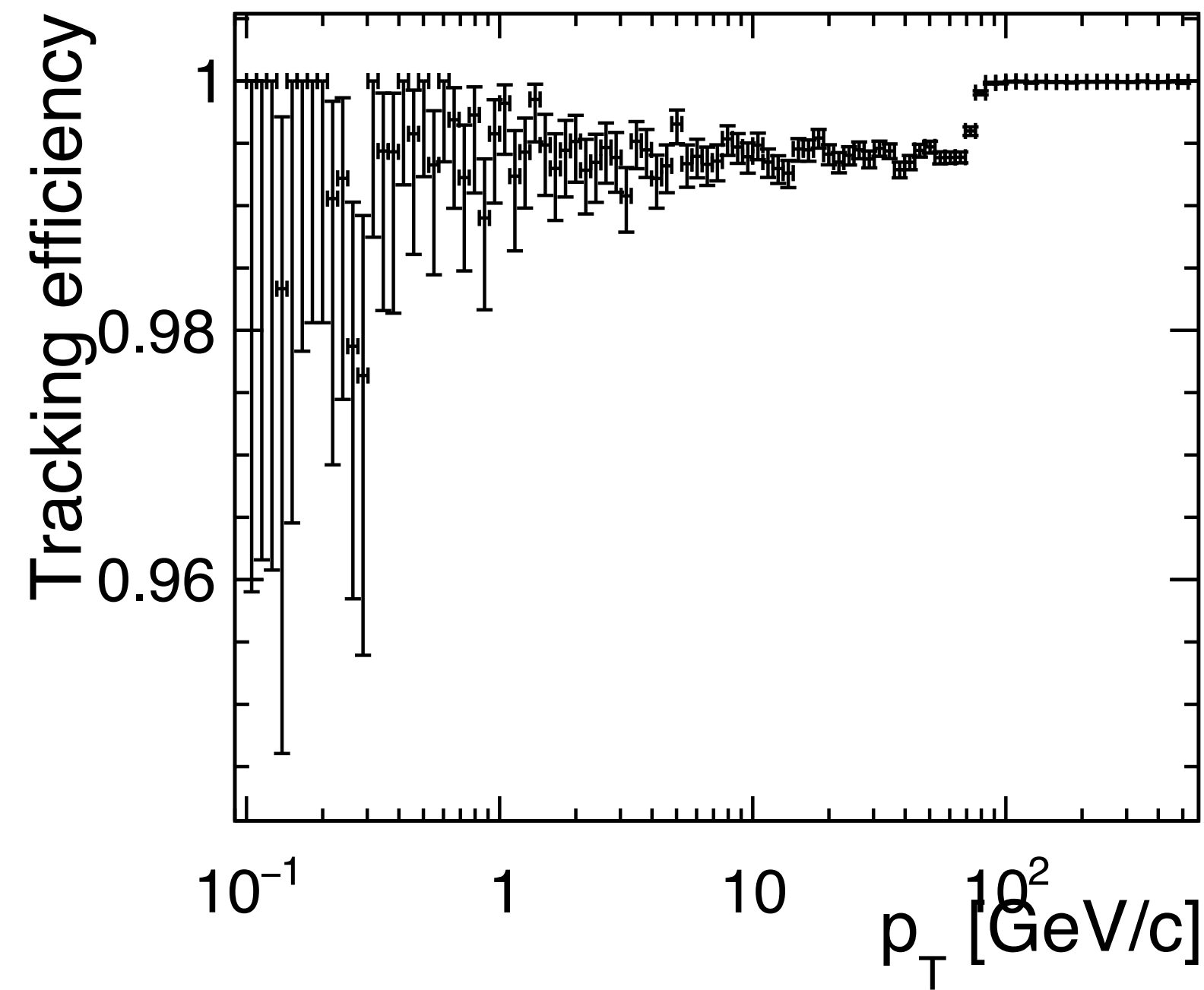
Tracking efficiency

- 2M muons GPS
 - iso angular distribution, uniform energy distribution

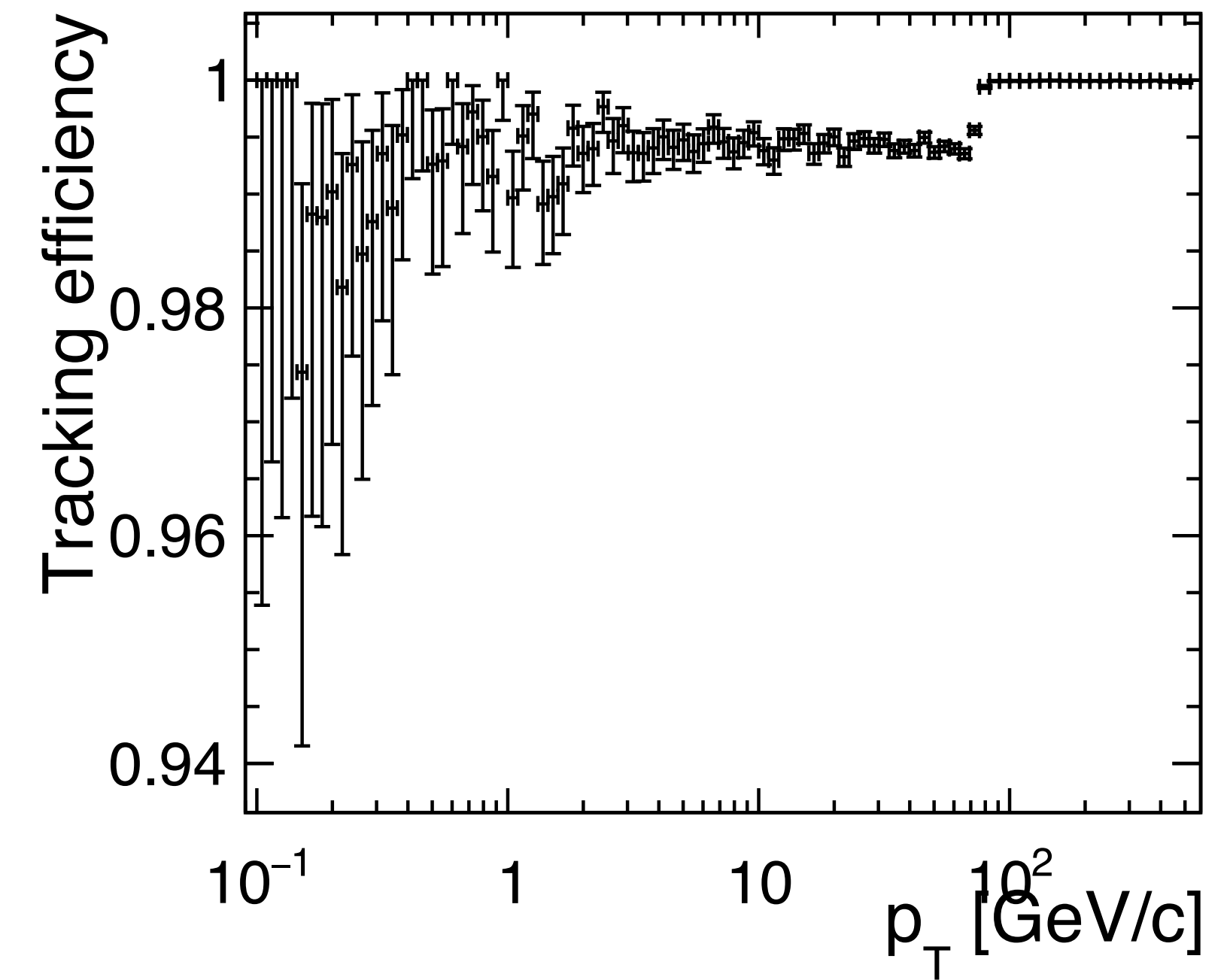
Truth Tracking



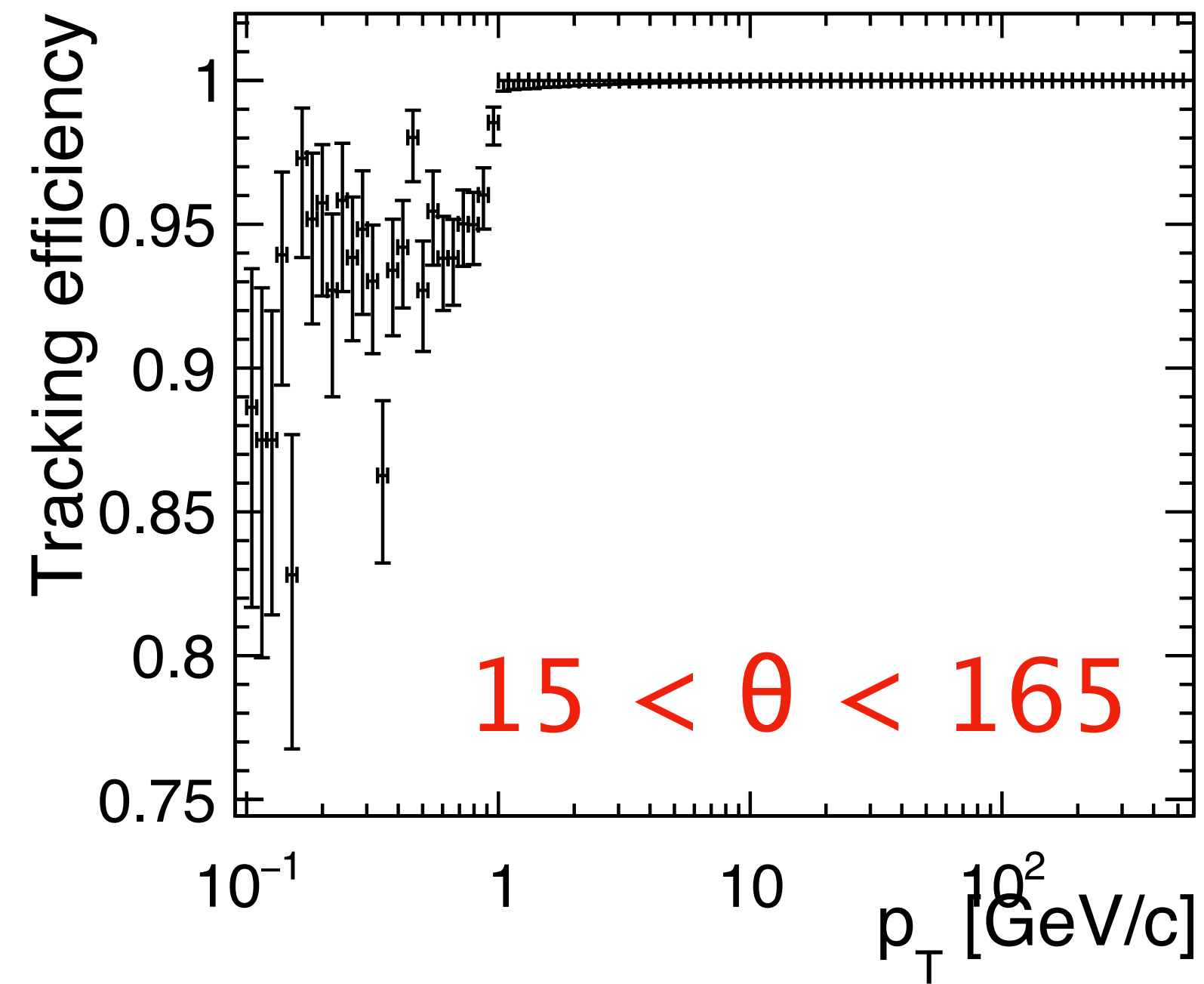
Conformal Tracking (VTX)
+ Extrapolator



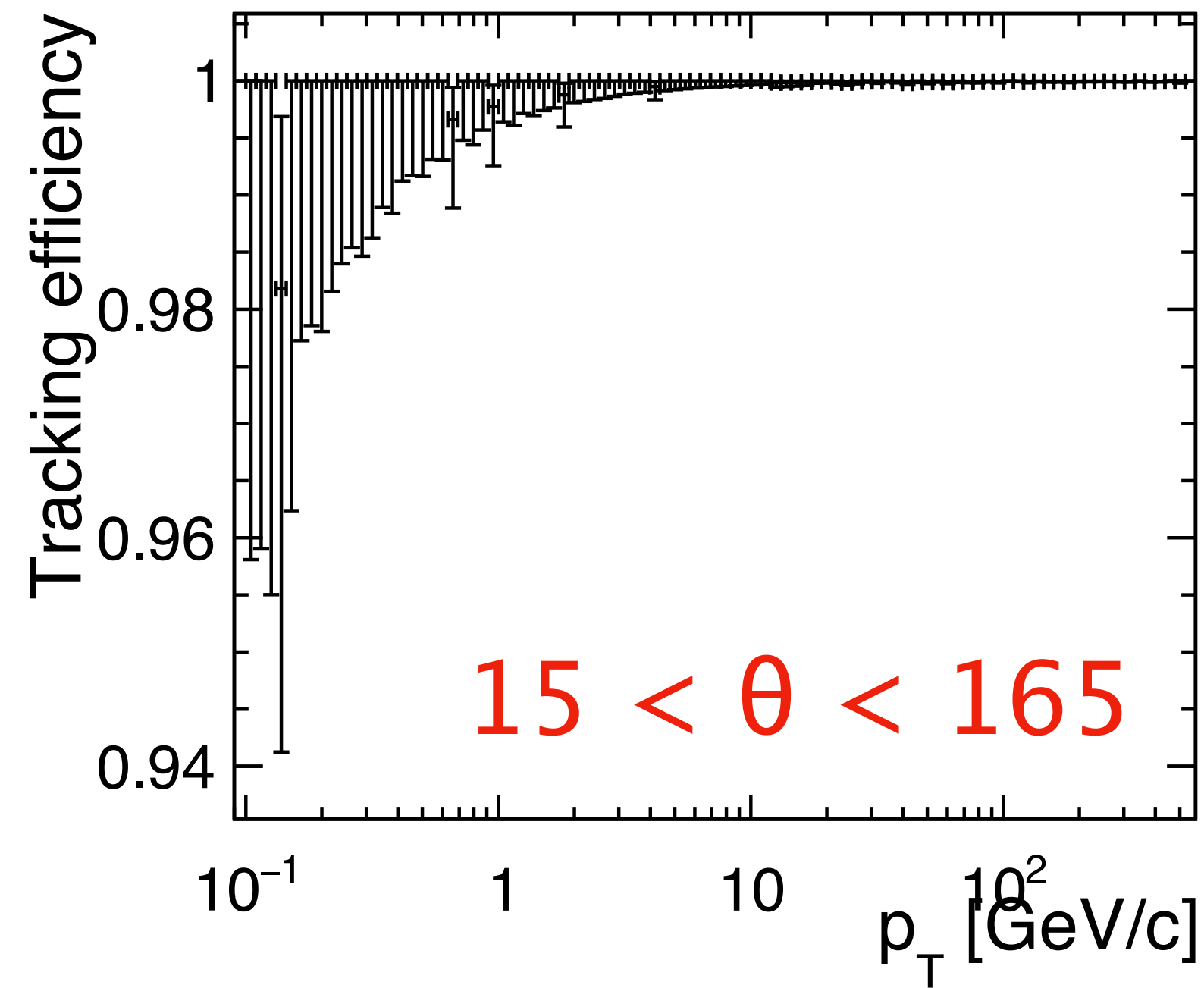
Conformal Tracking (FULL)



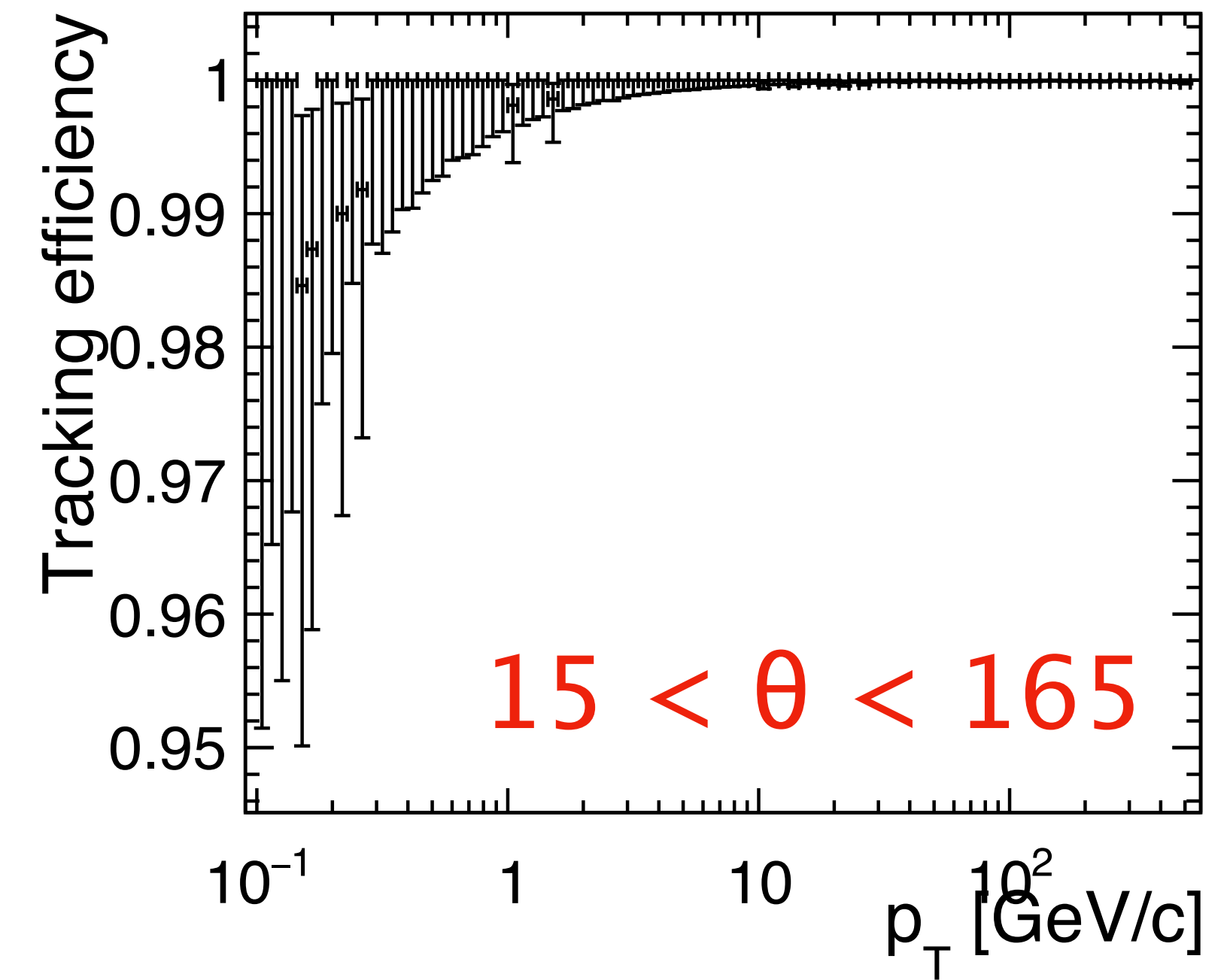
Truth Tracking



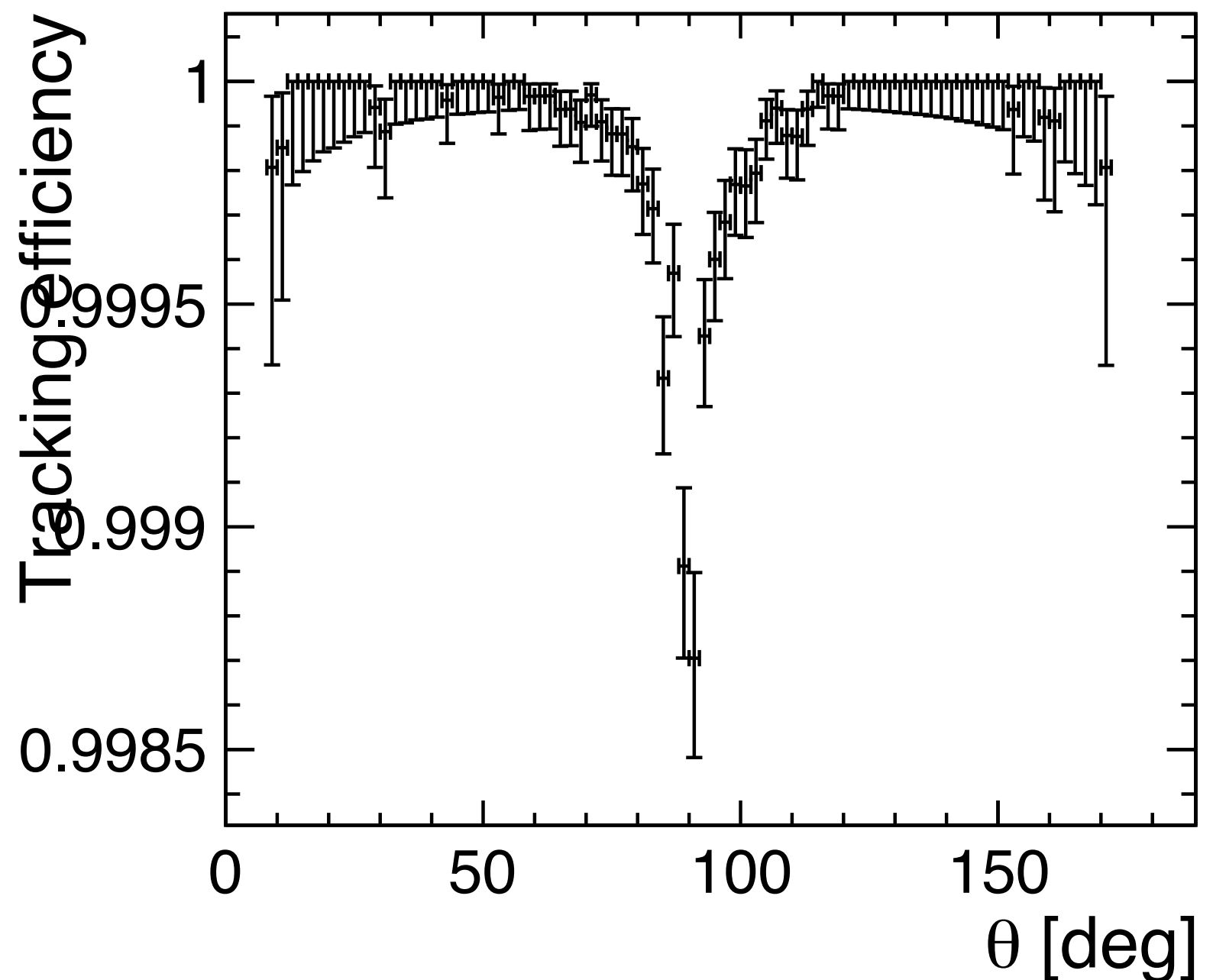
Conformal Tracking (VTX)
+ Extrapolator



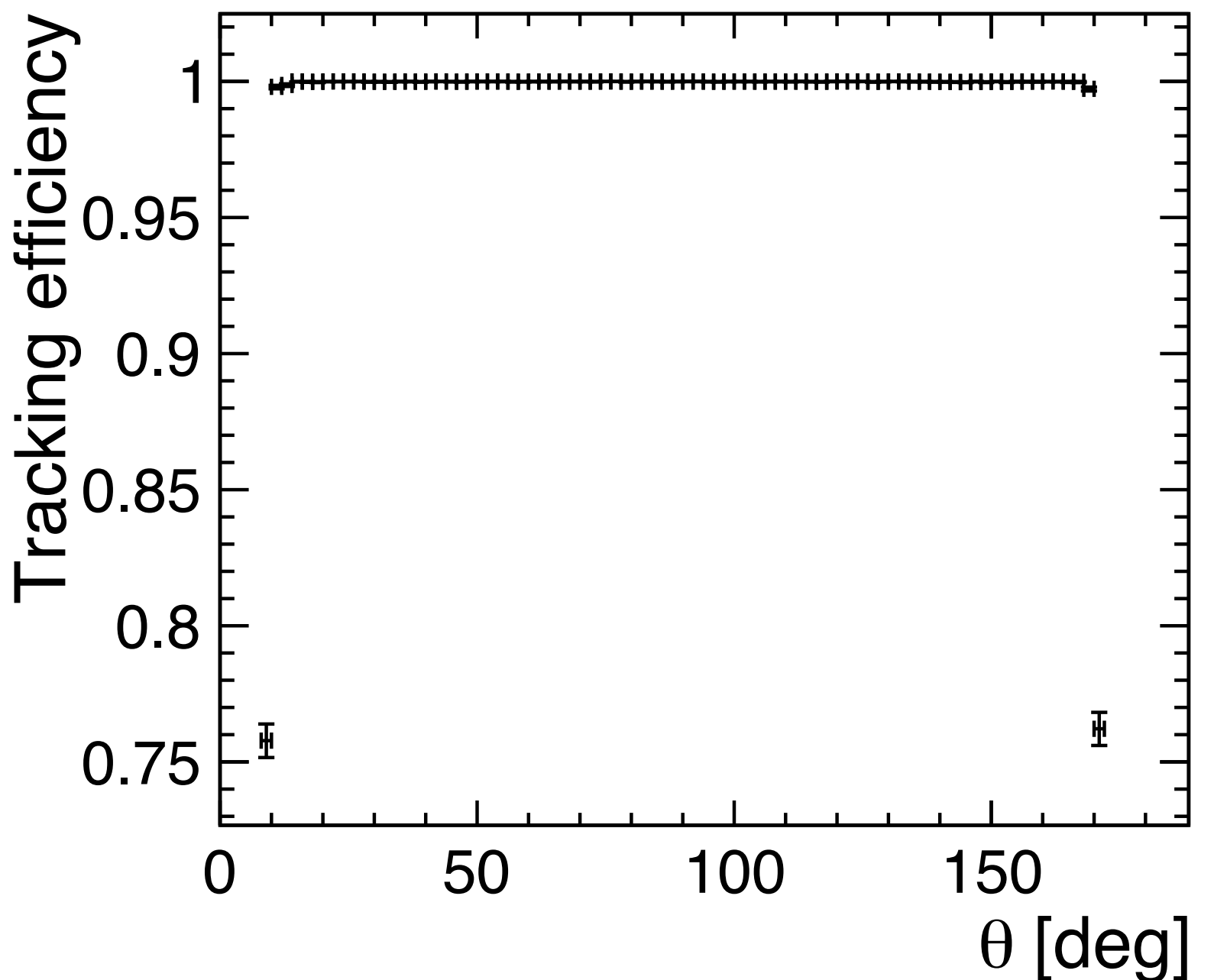
Conformal Tracking (FULL)



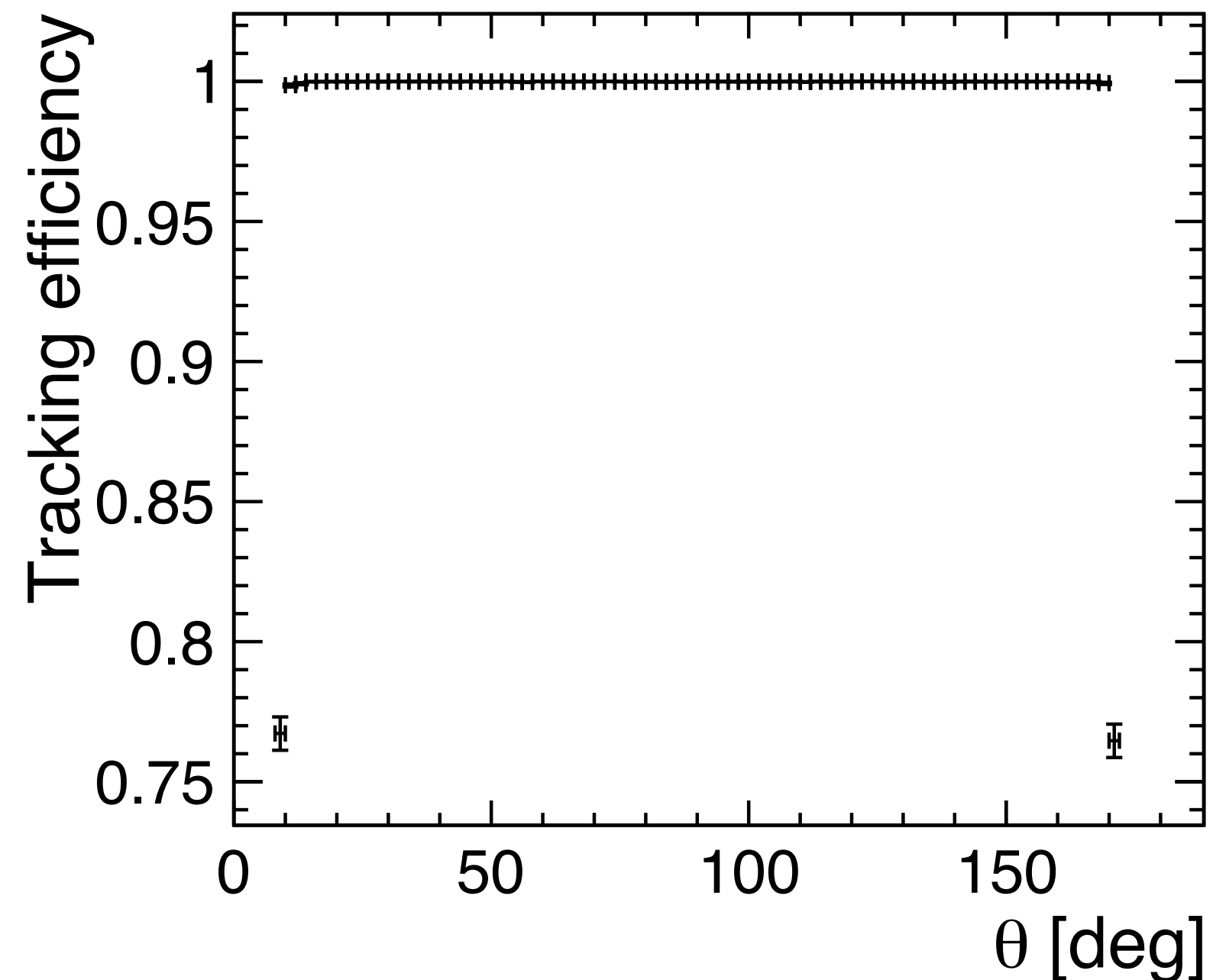
Truth Tracking



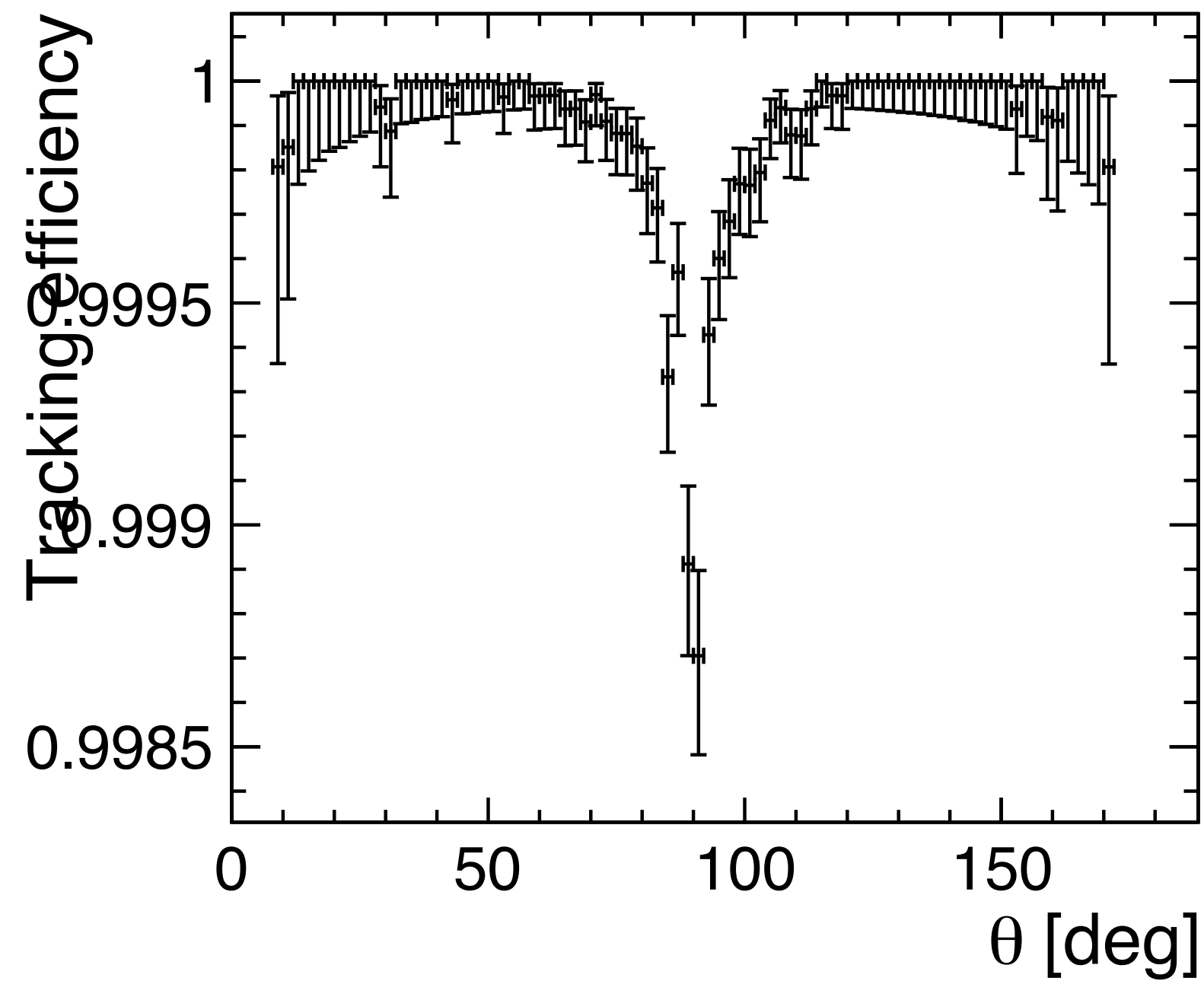
Conformal Tracking (VTX) + Extrapolator



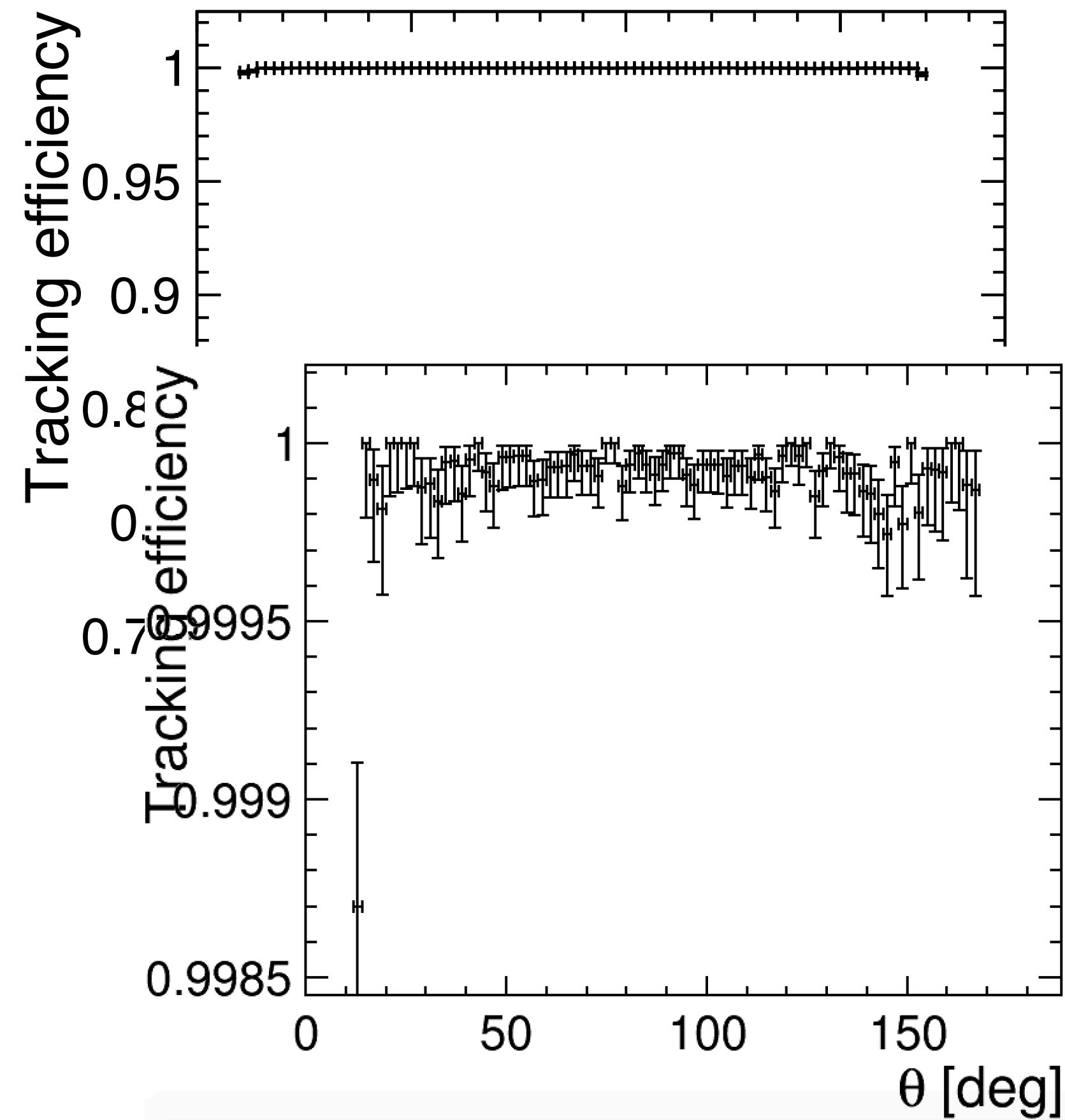
Conformal Tracking (FULL)



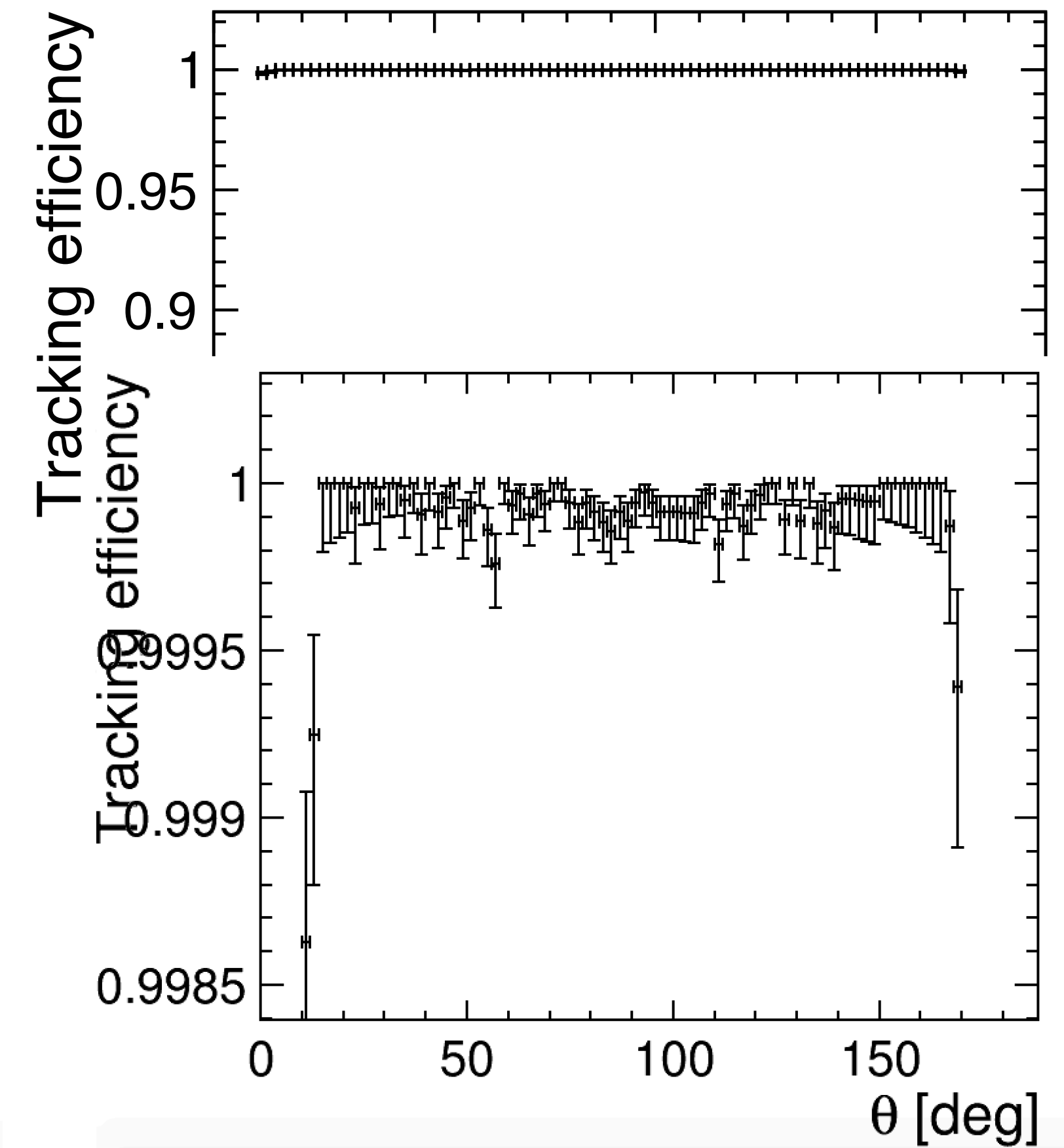
Truth Tracking



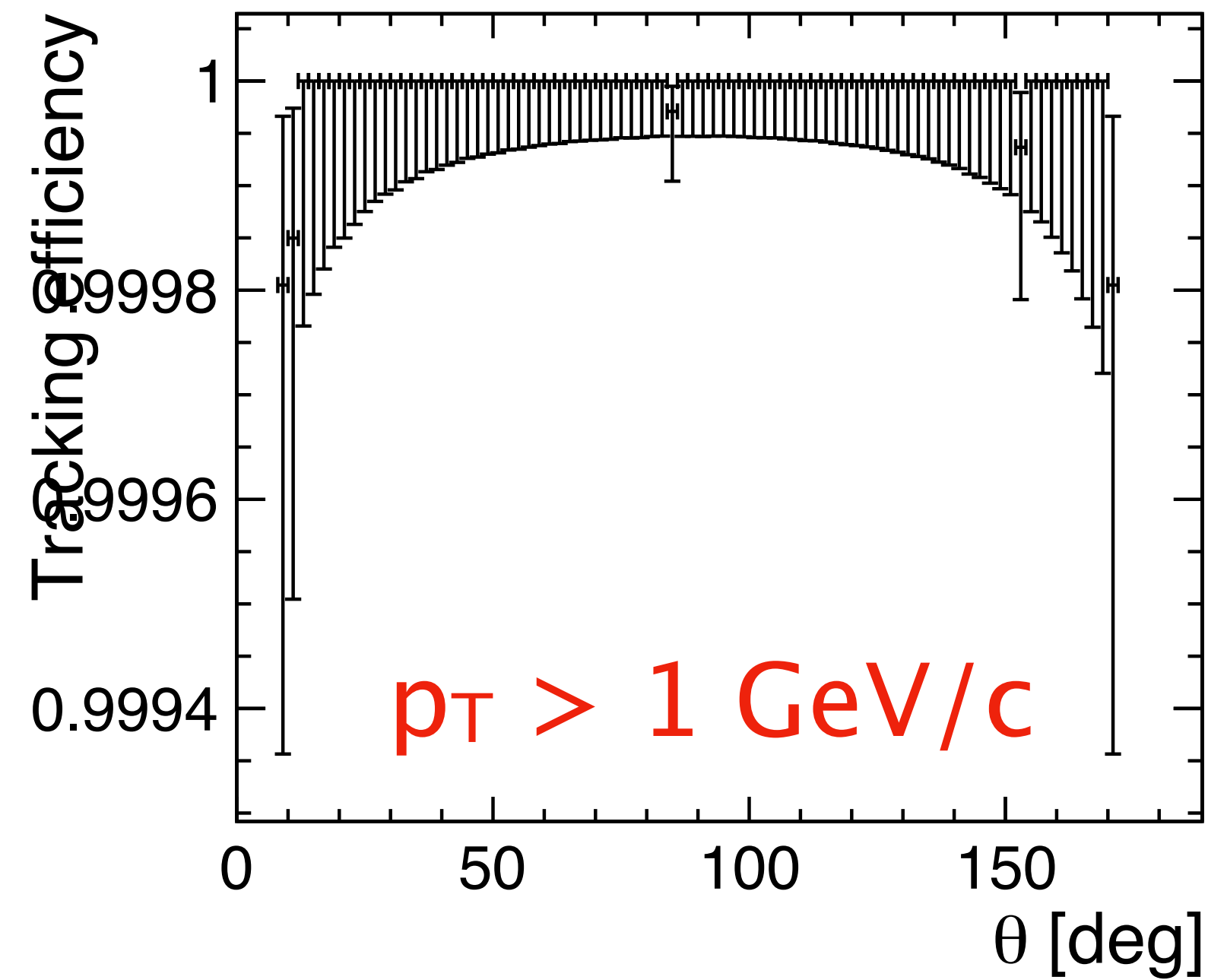
Conformal Tracking (VTX)
+ Extrapolator



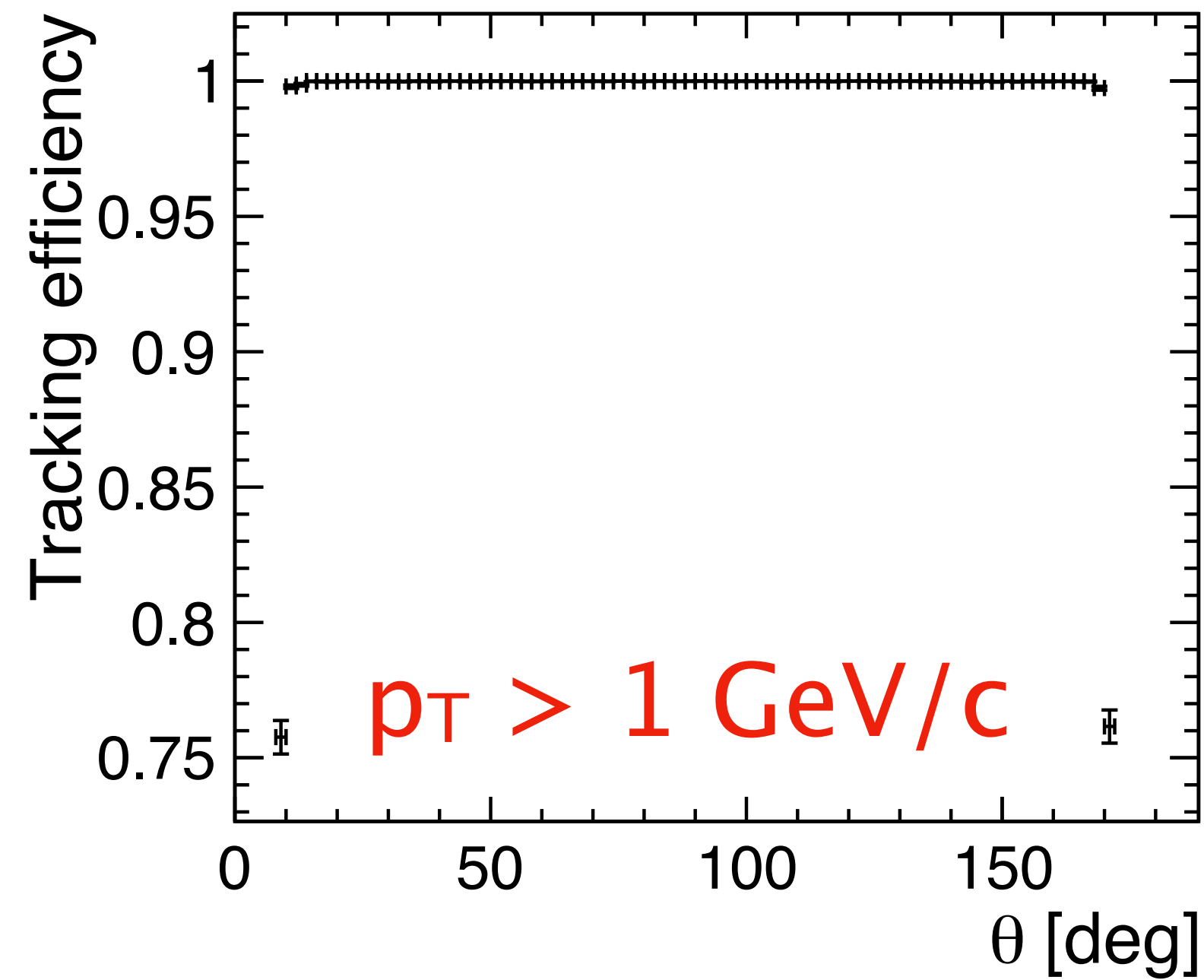
Conformal Tracking (FULL)



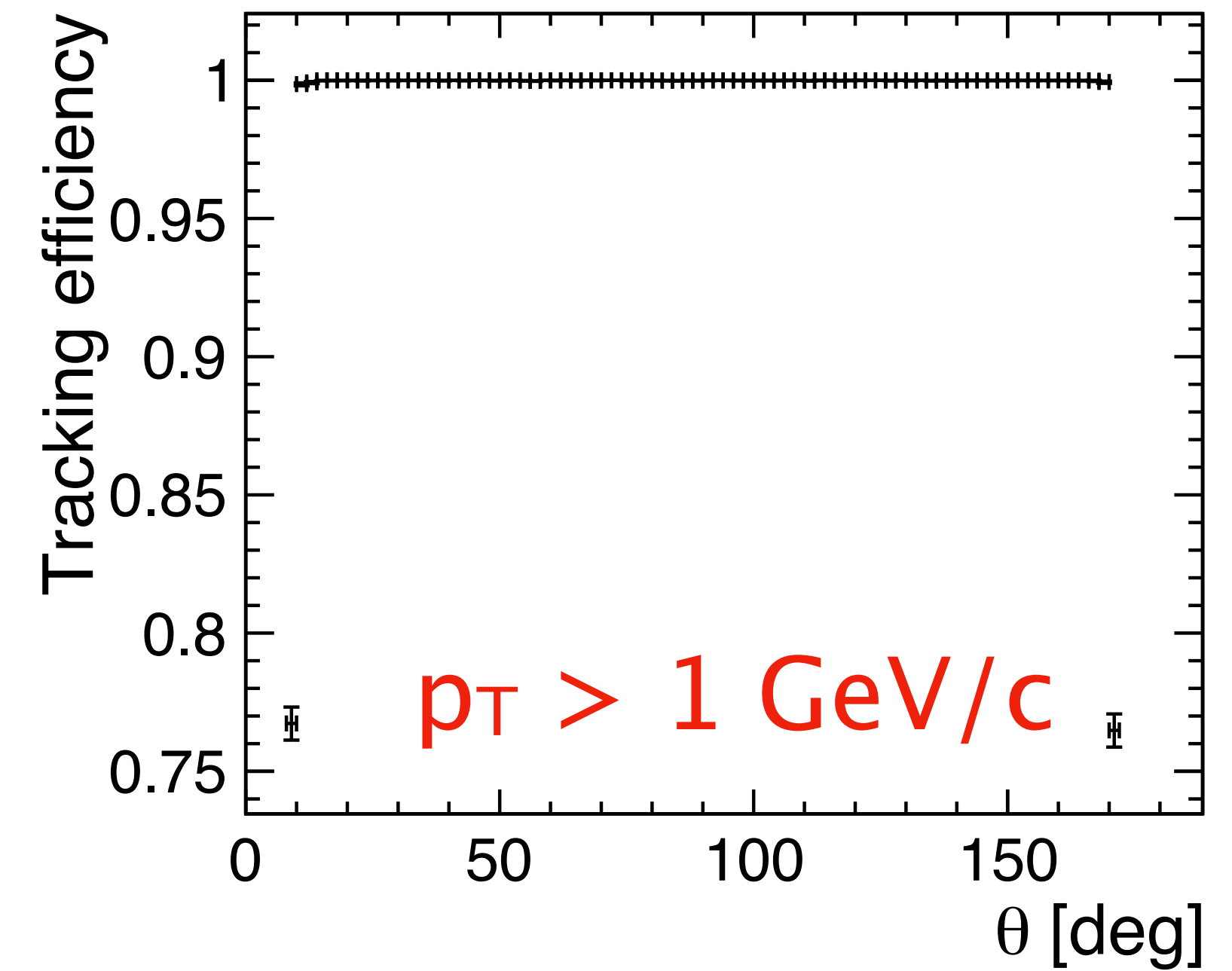
Truth Tracking



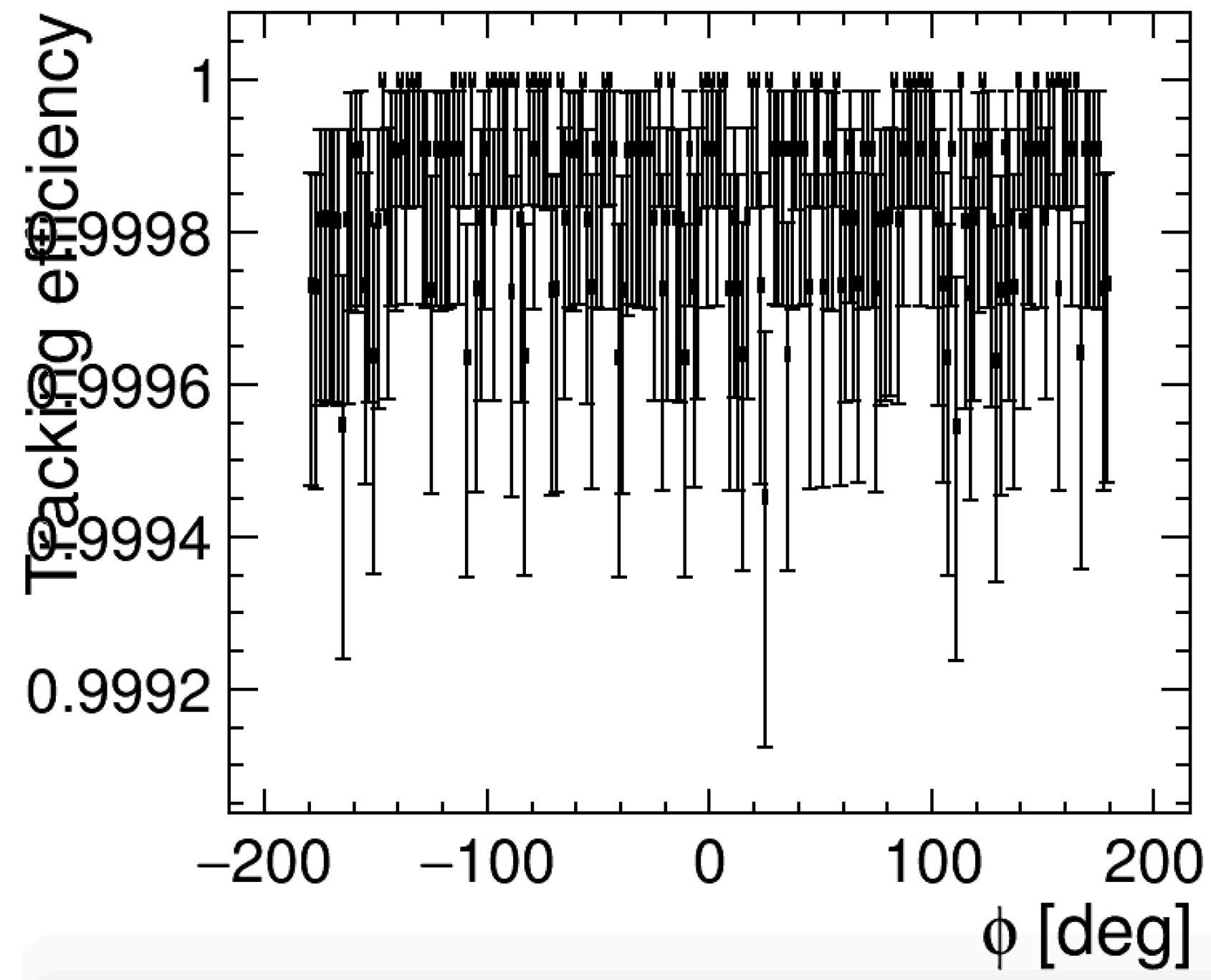
Conformal Tracking (VTX) + Extrapolator



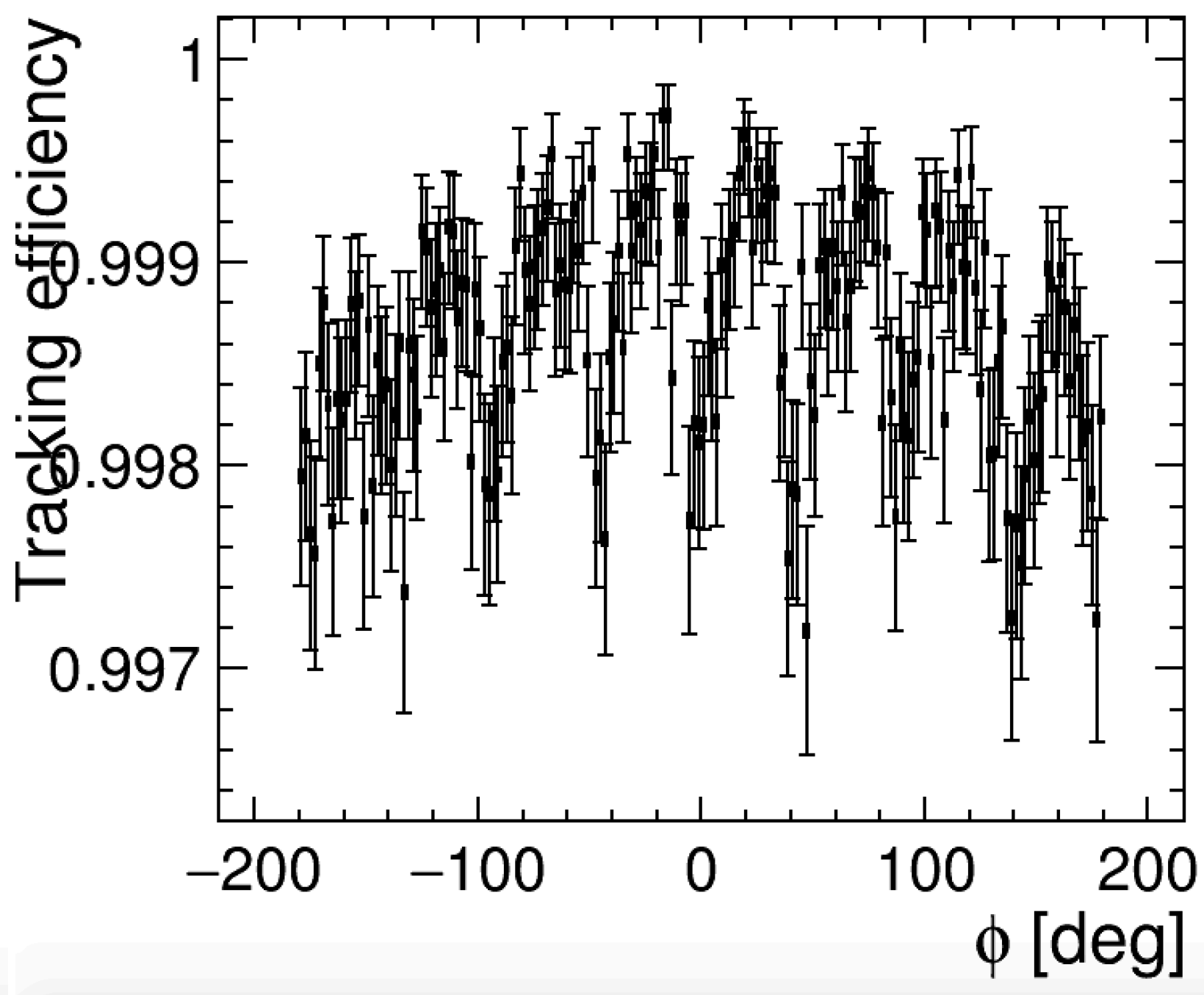
Conformal Tracking (FULL)



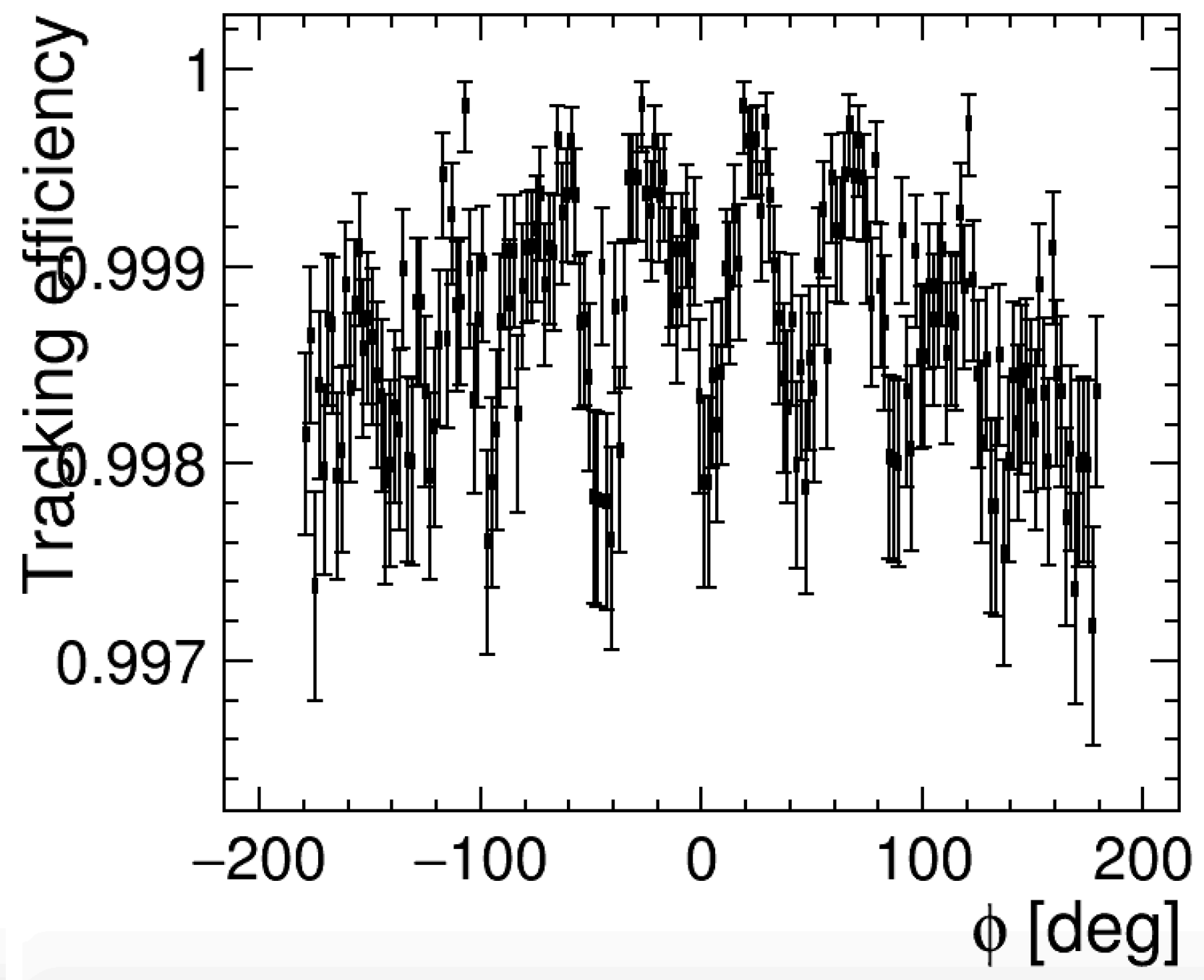
Truth Tracking



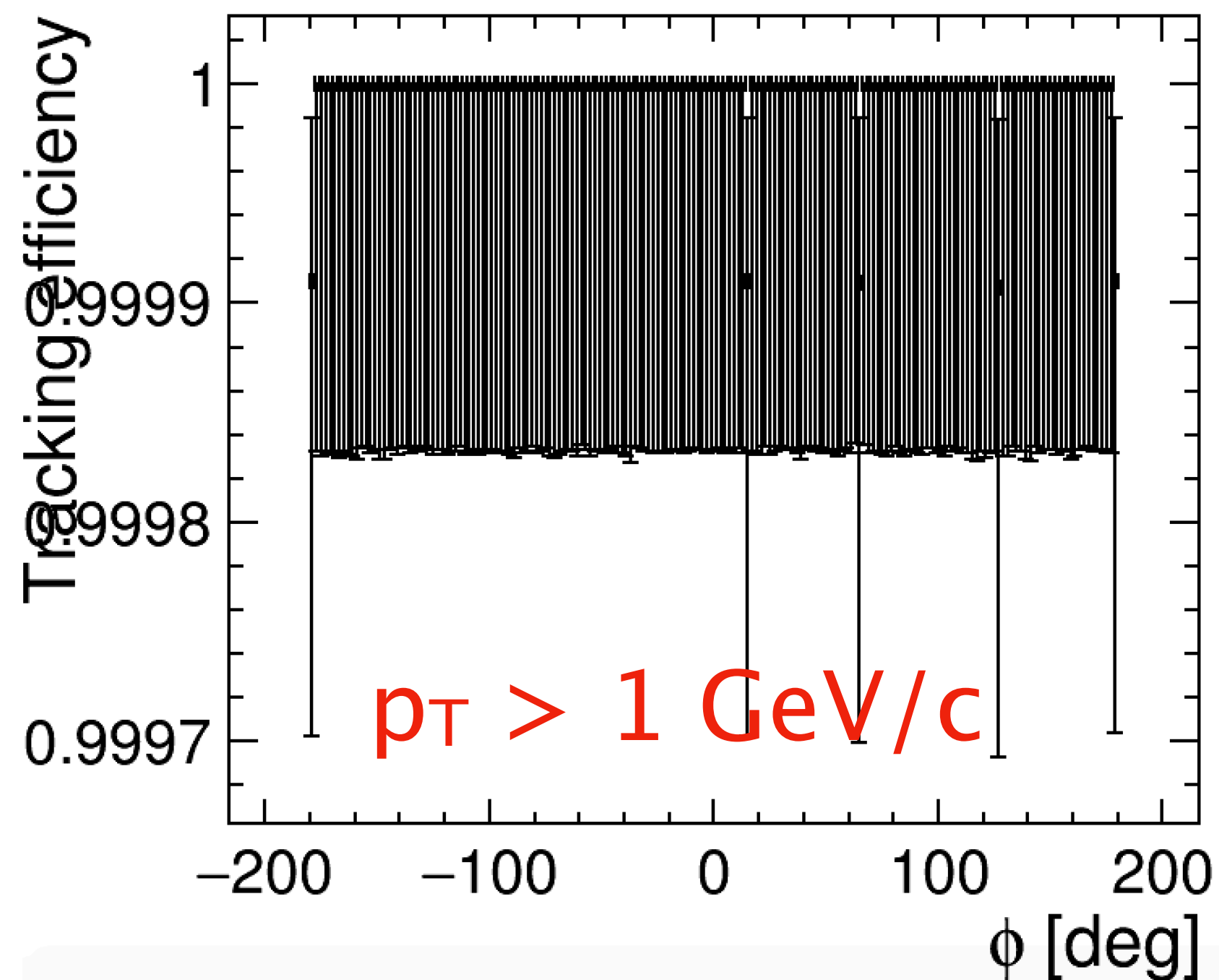
Conformal Tracking (VTX) + Extrapolator



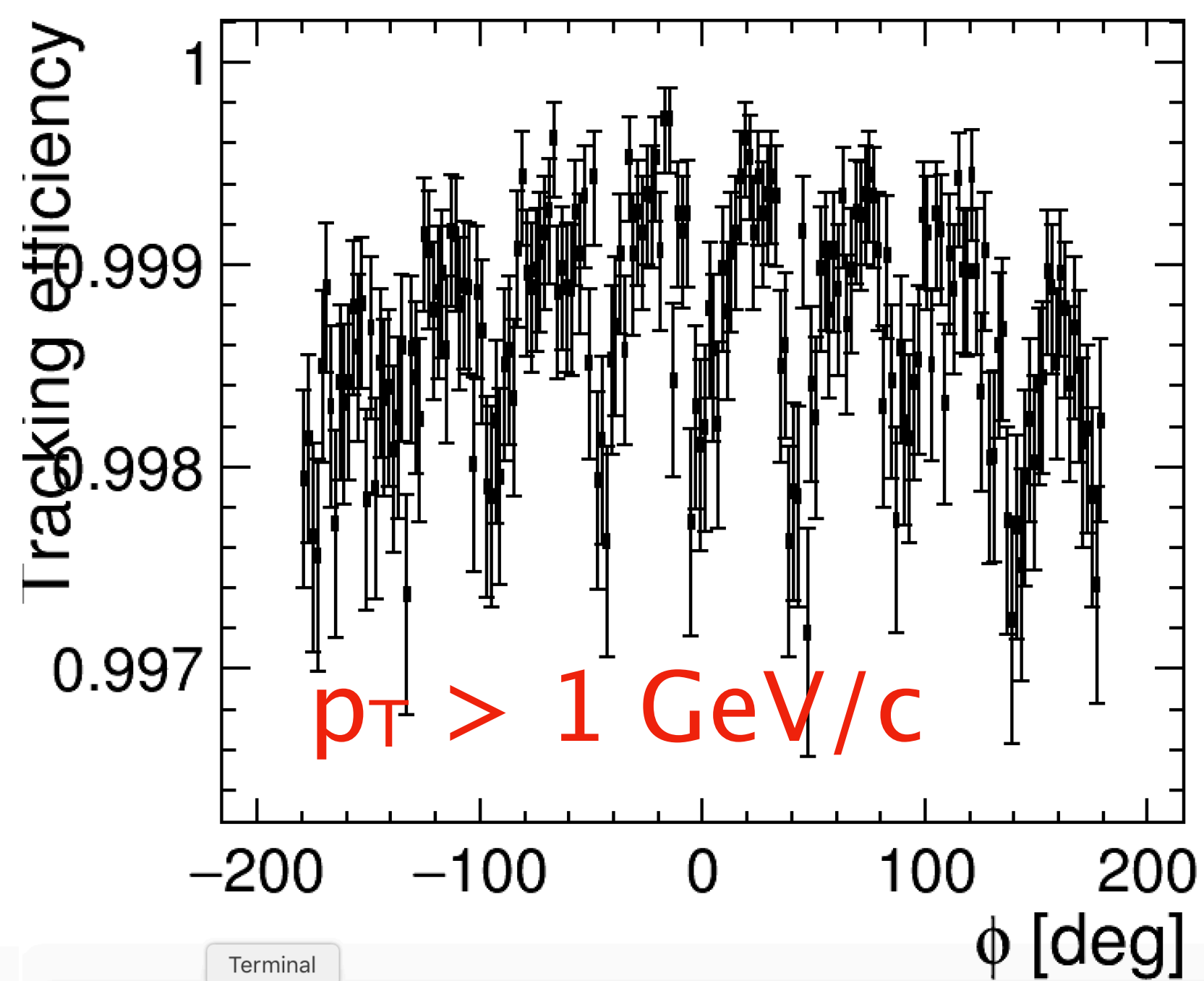
Conformal Tracking (FULL)



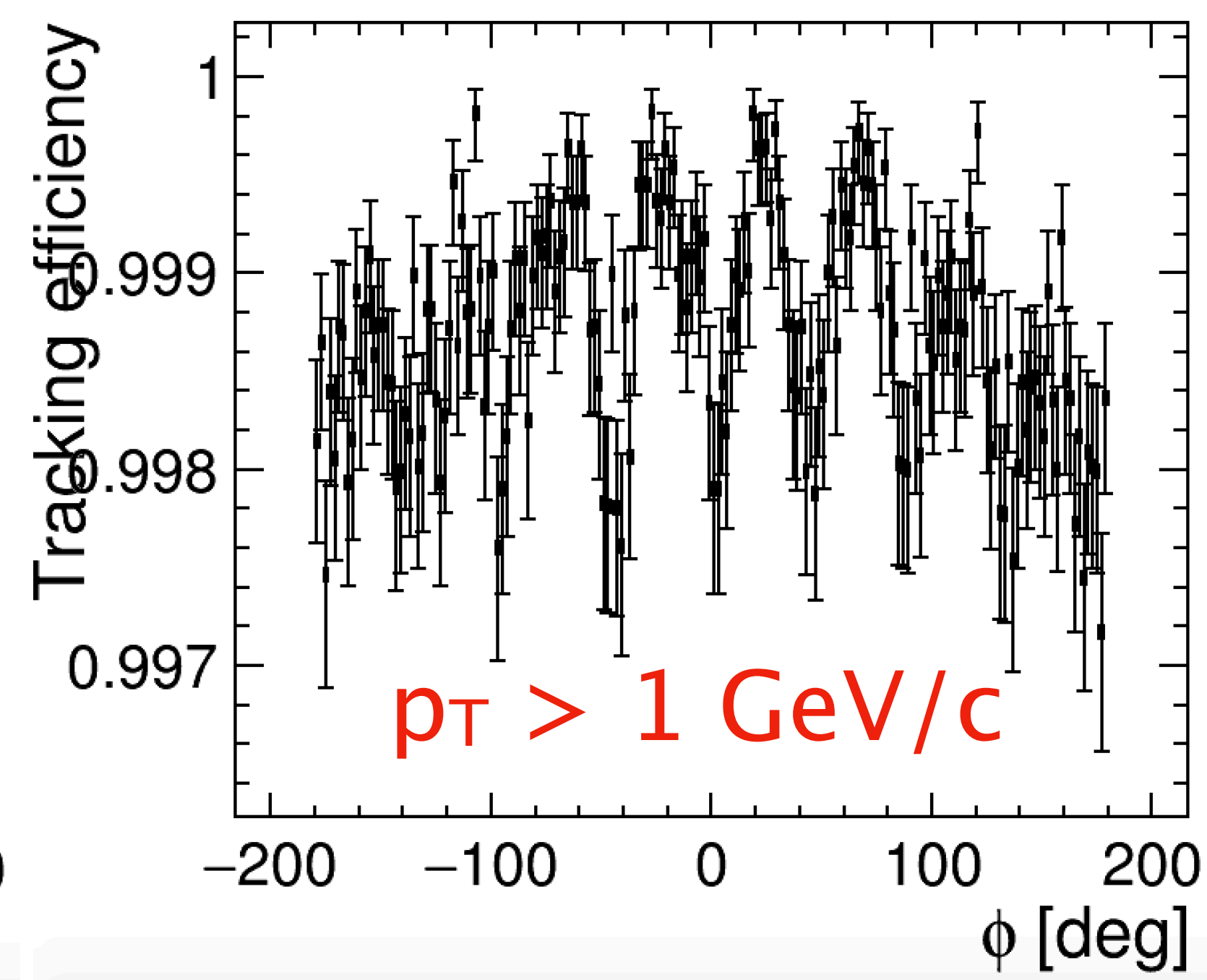
Truth Tracking



Conformal Tracking (VTX)
+ Extrapolator



Conformal Tracking (FULL)



Detector model: CLIC_o3_v11

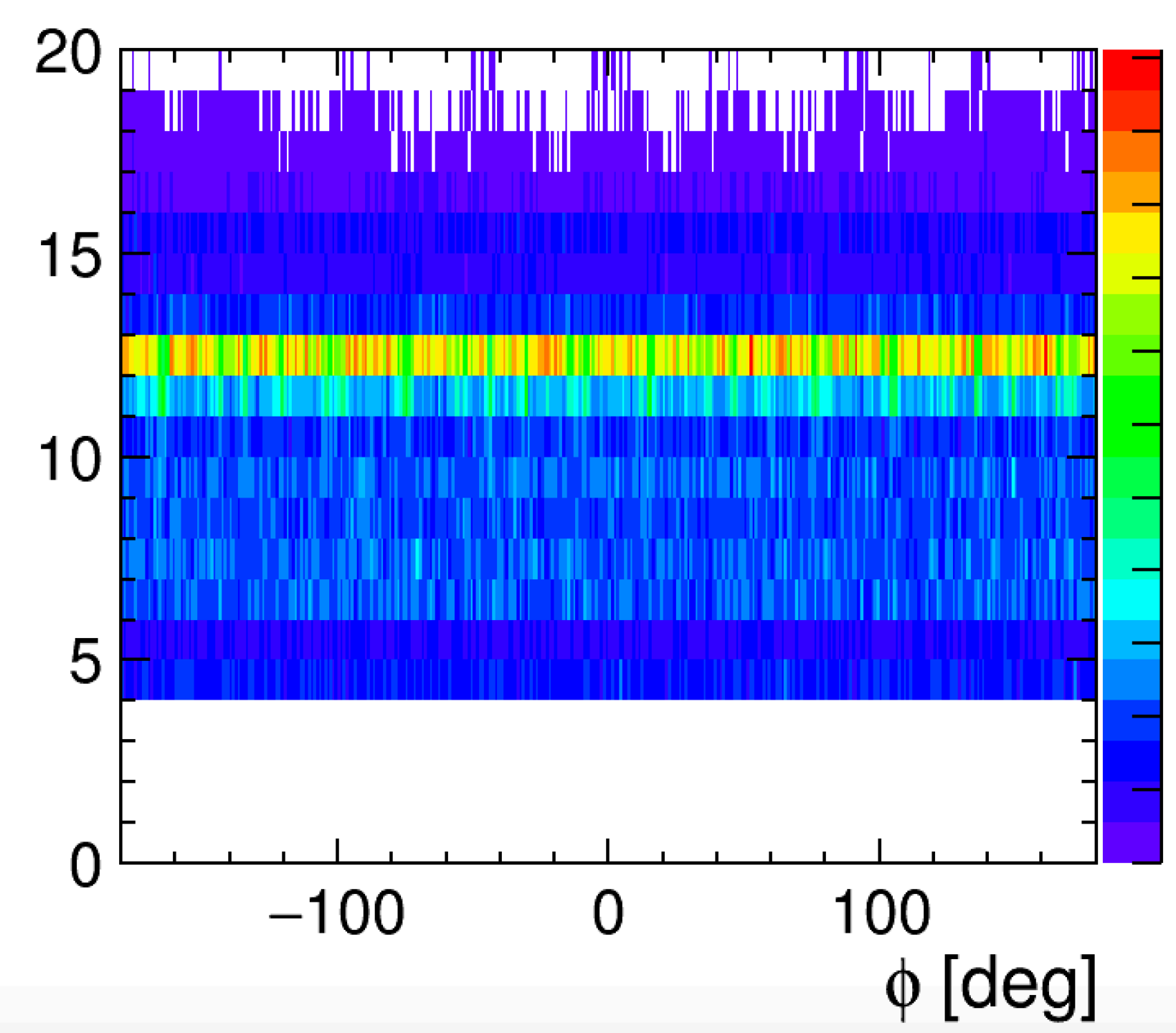
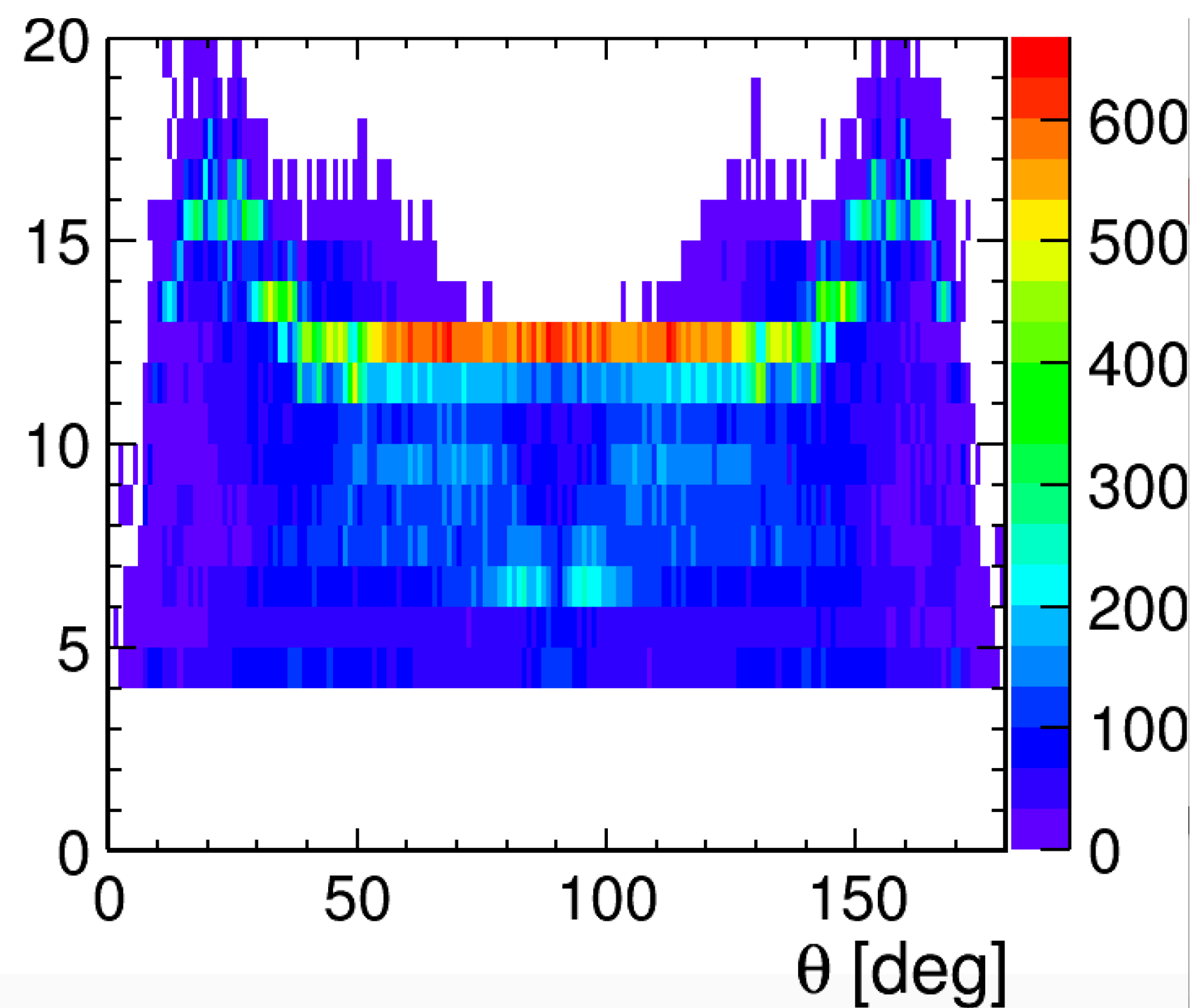
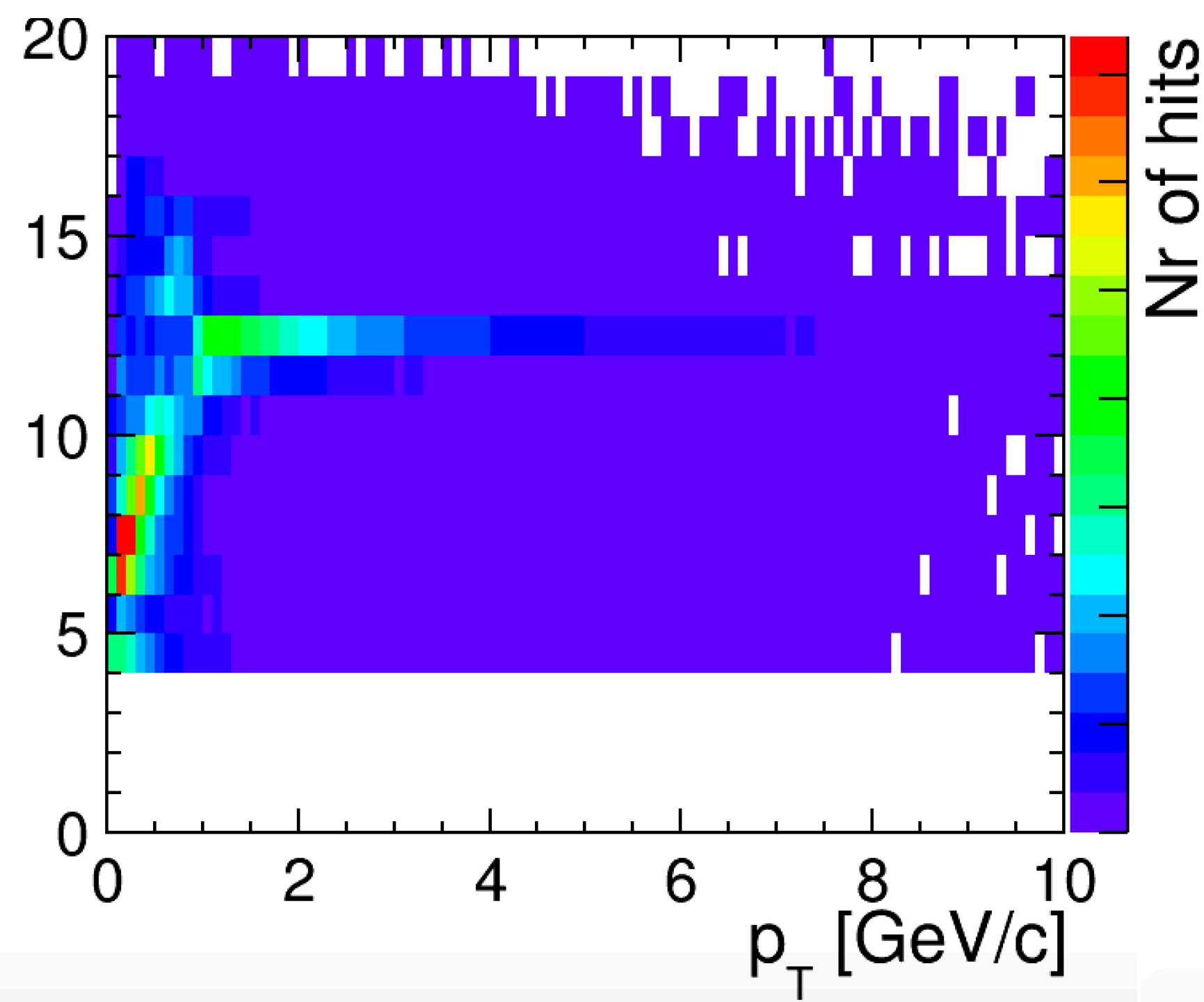
HEAD release: 2017-07-12

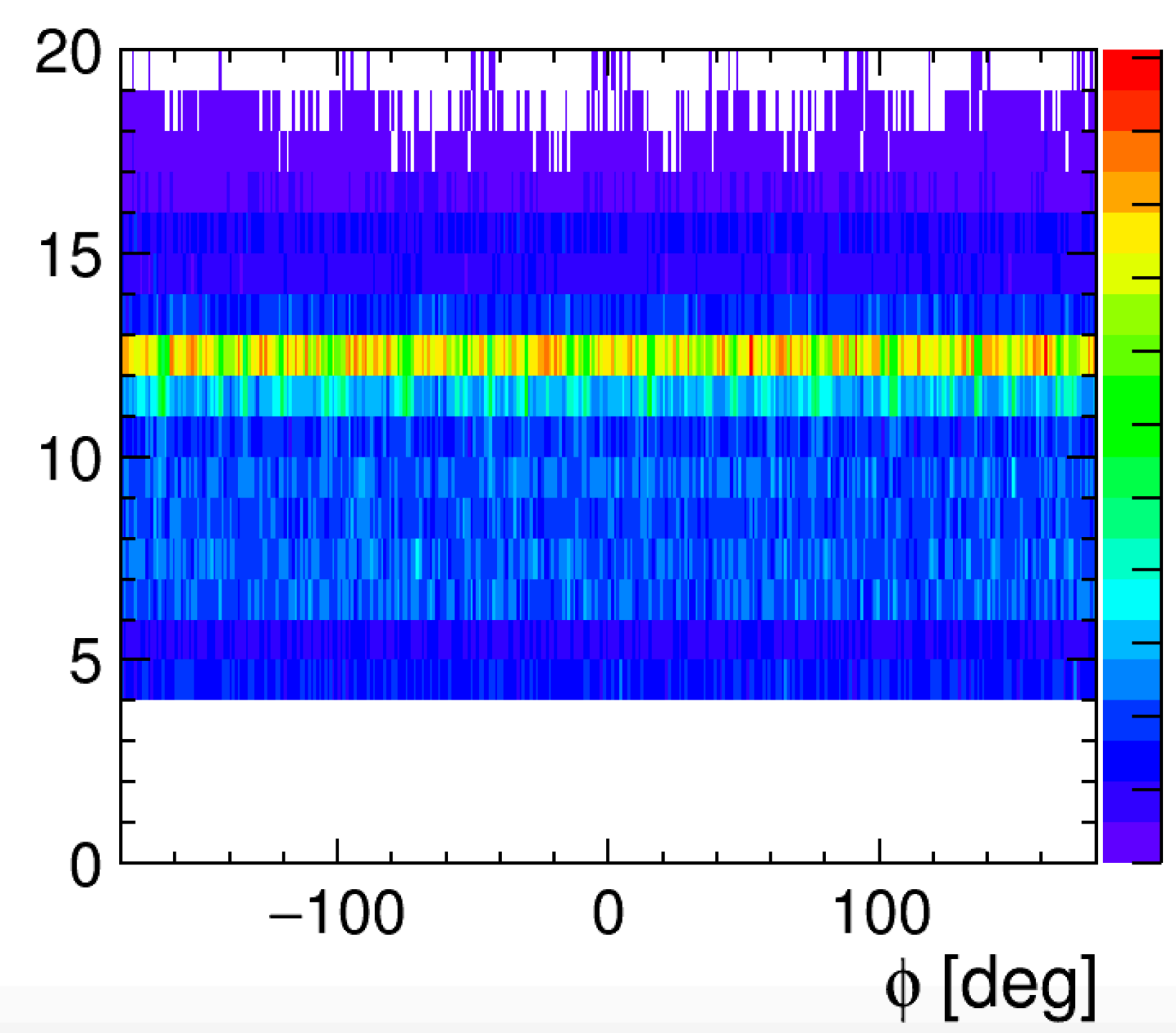
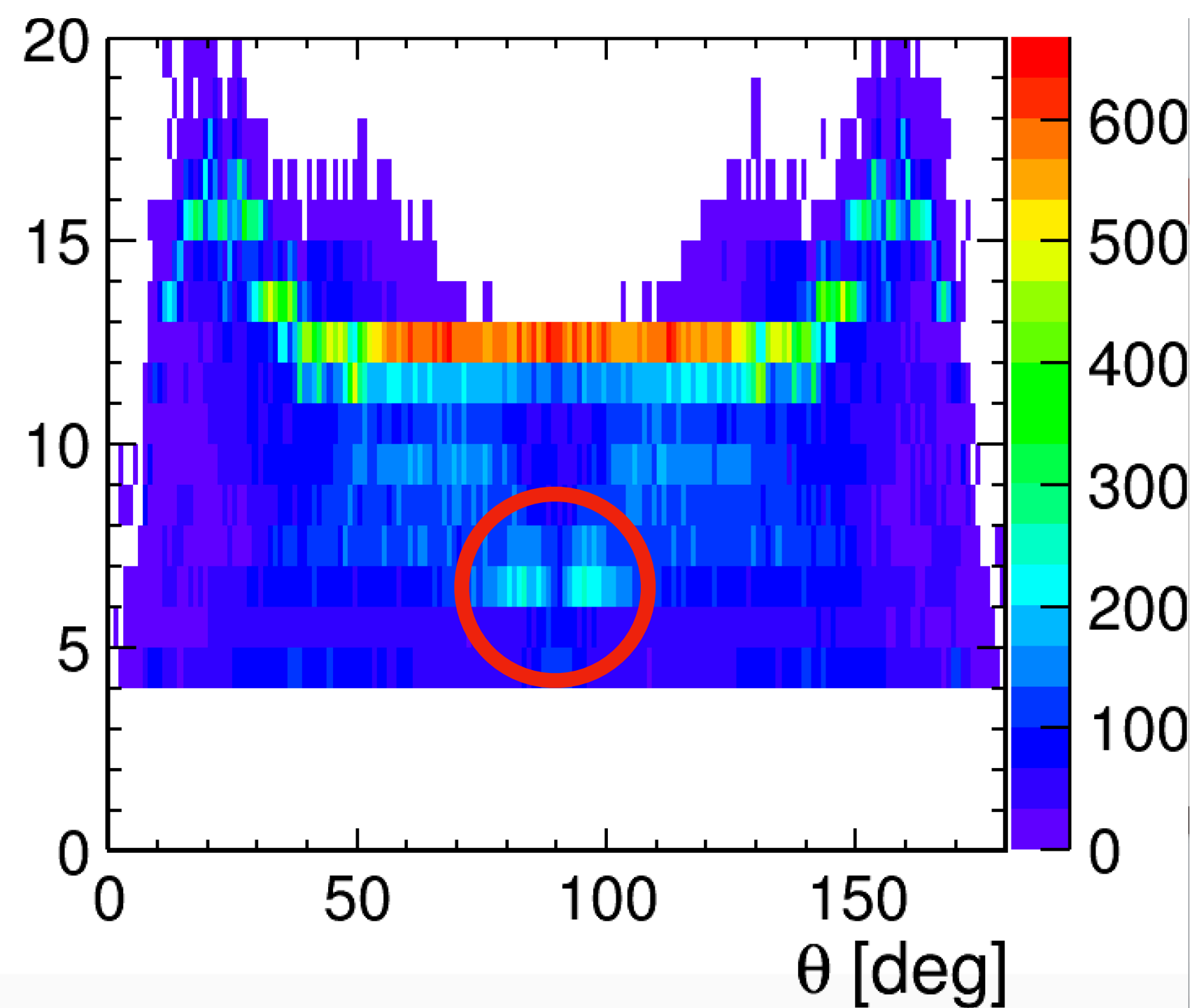
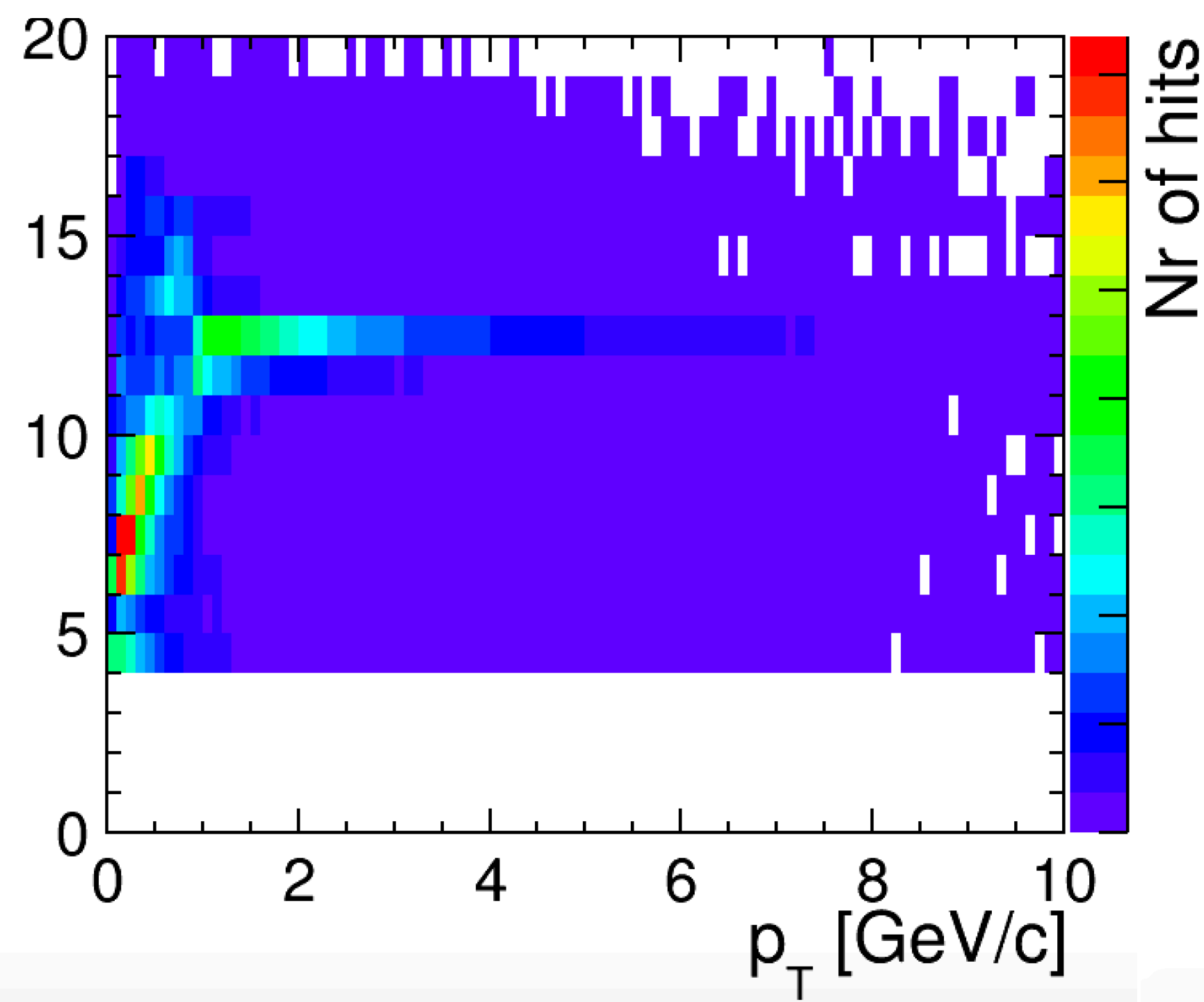
Tracking efficiency

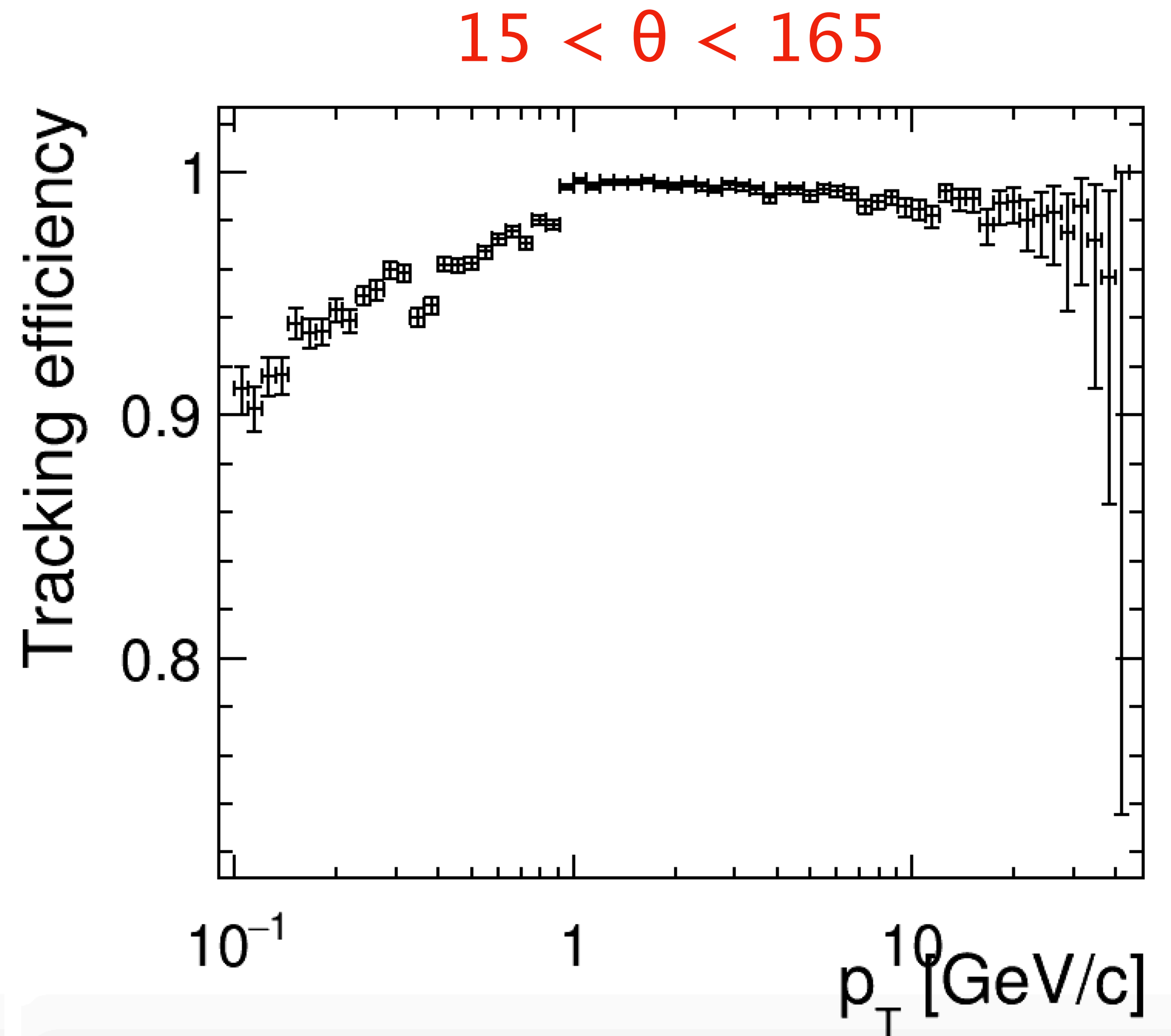
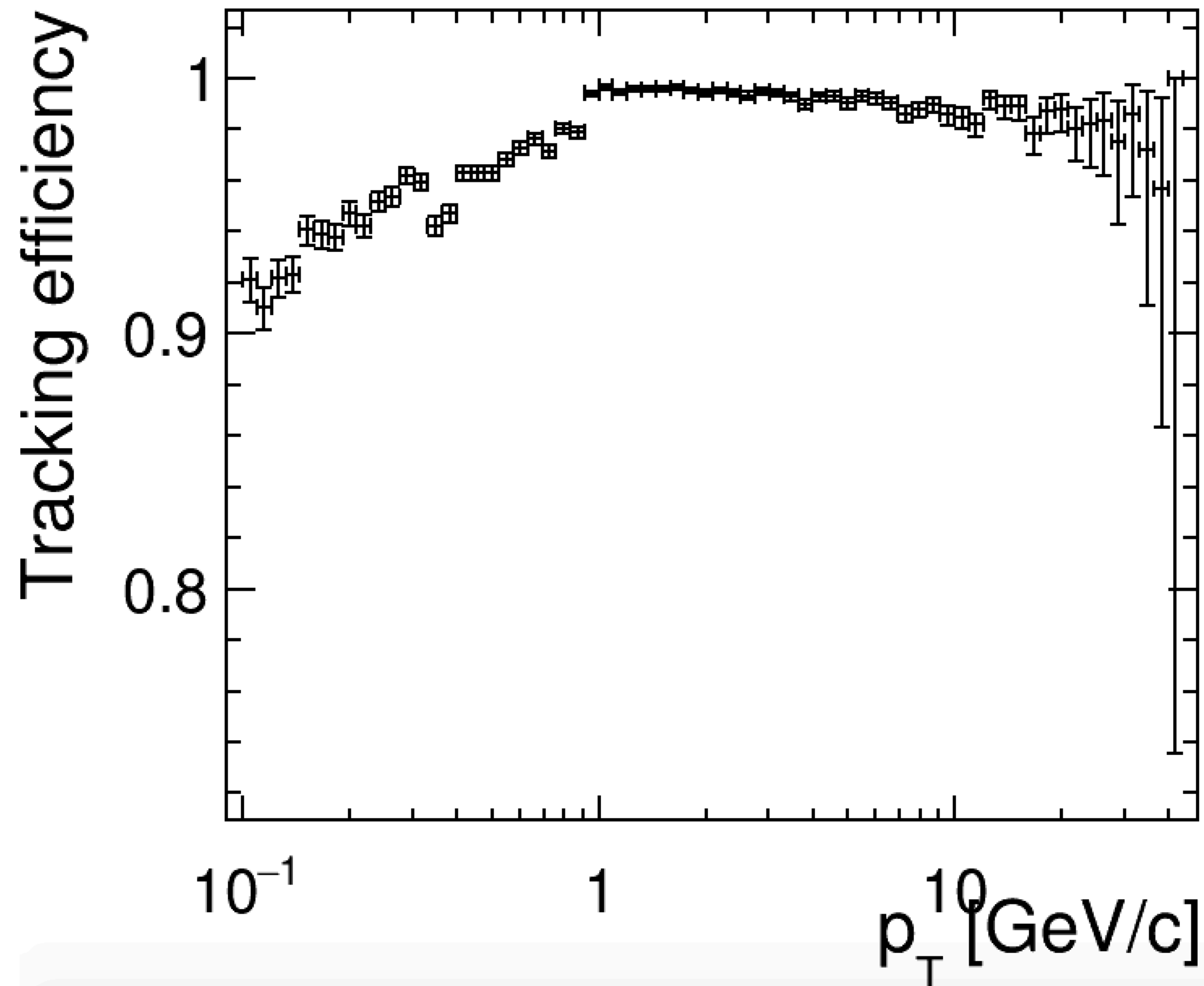
- Zuds @ 91 GeV

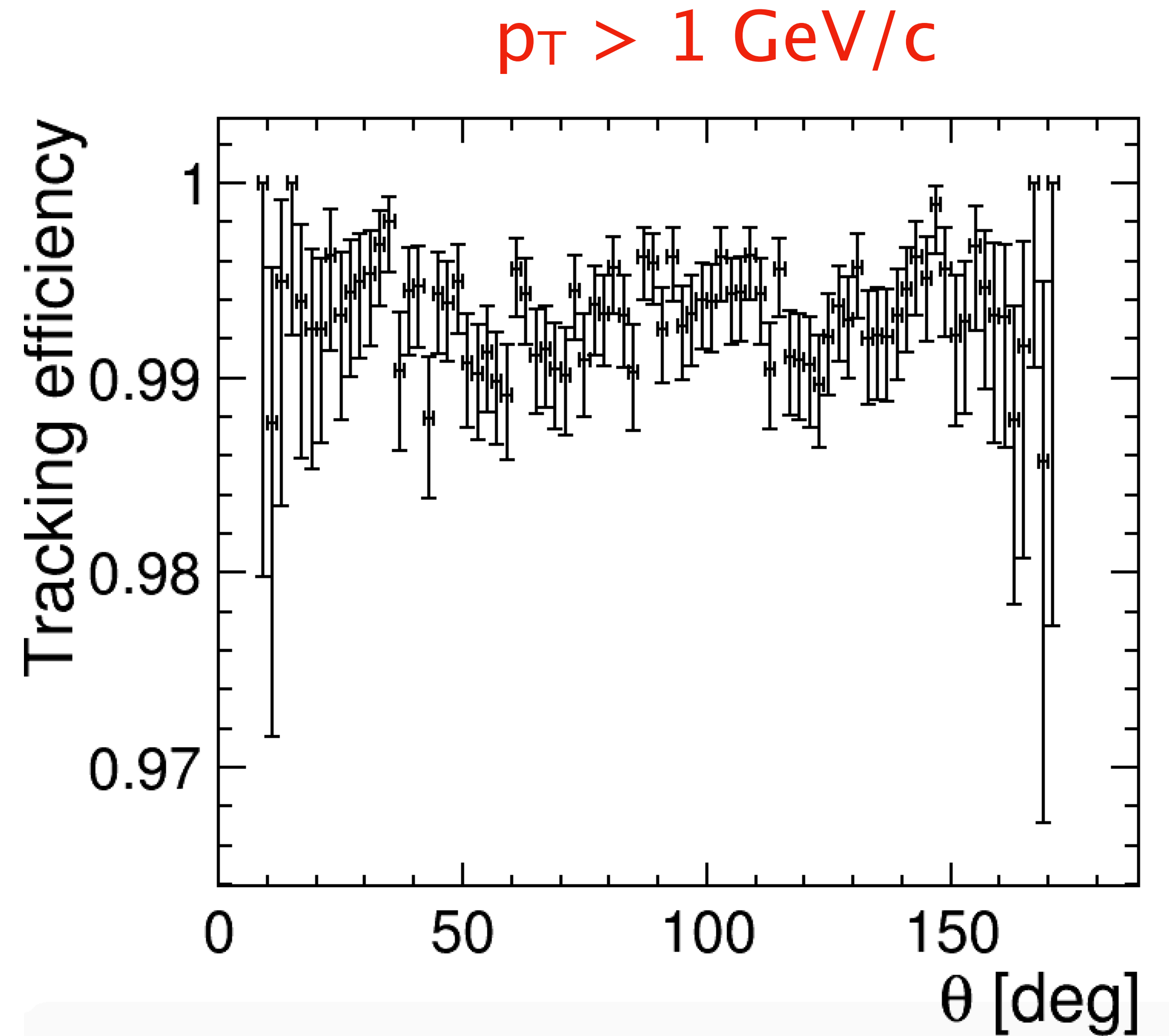
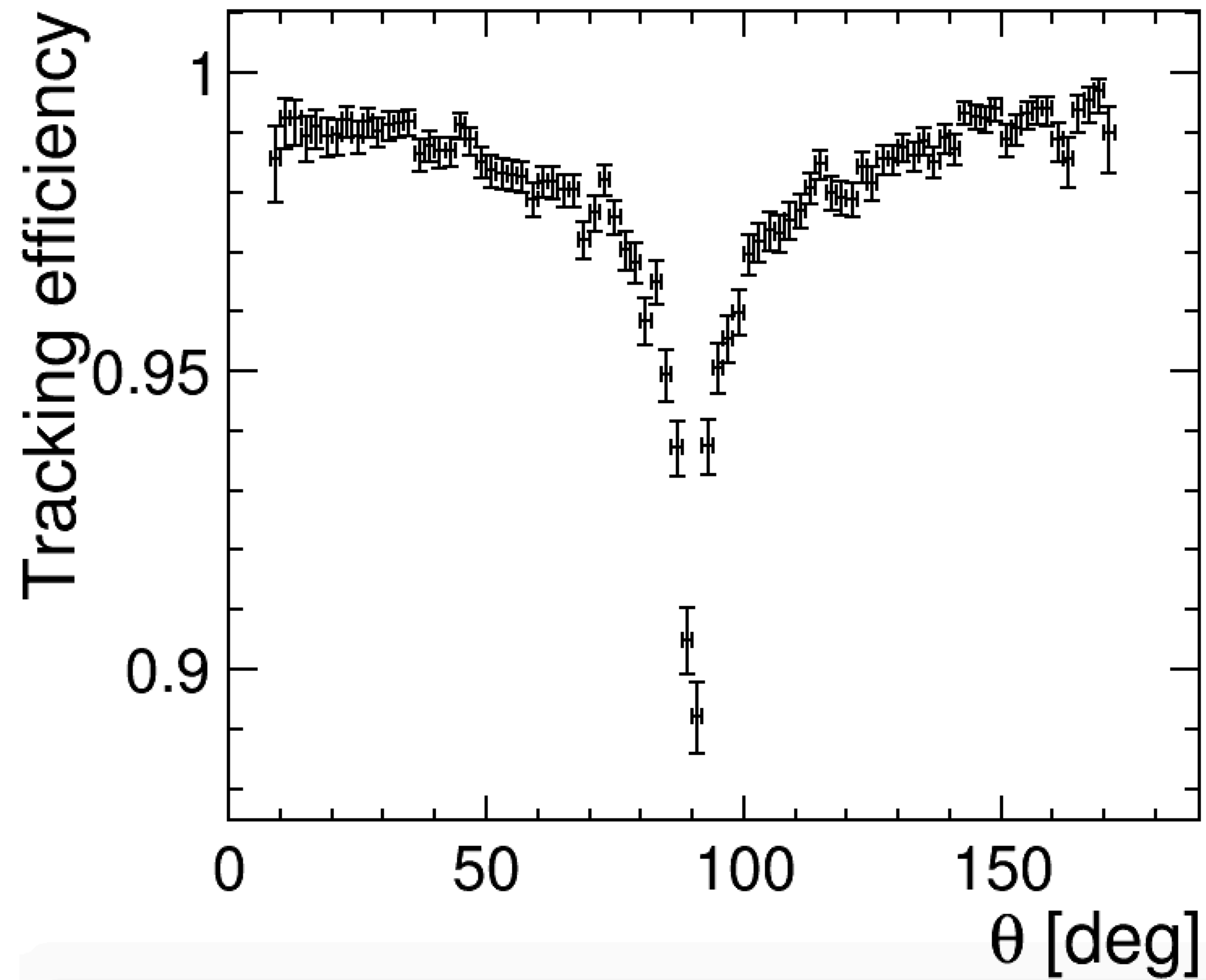
10k events

Truth Tracking

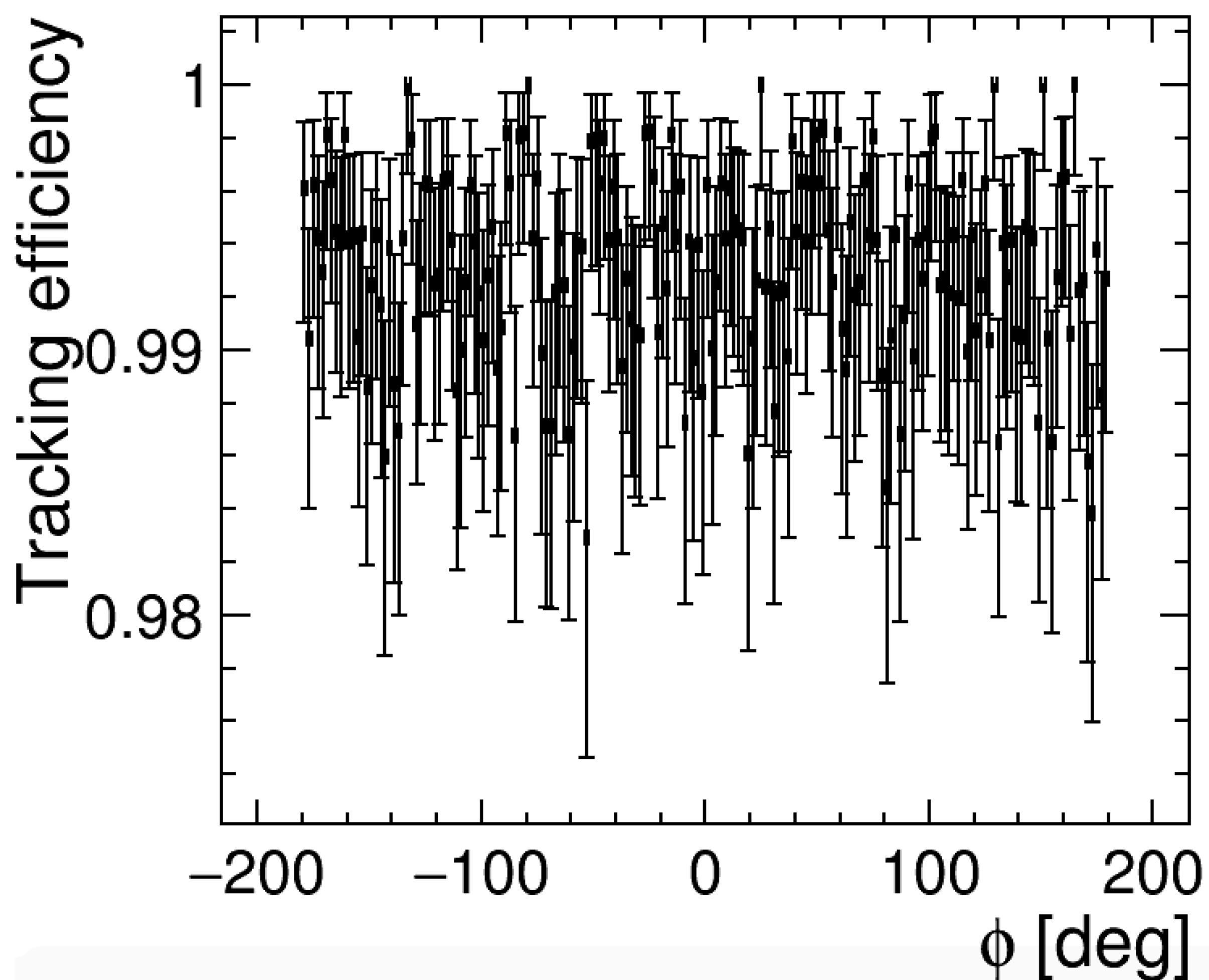
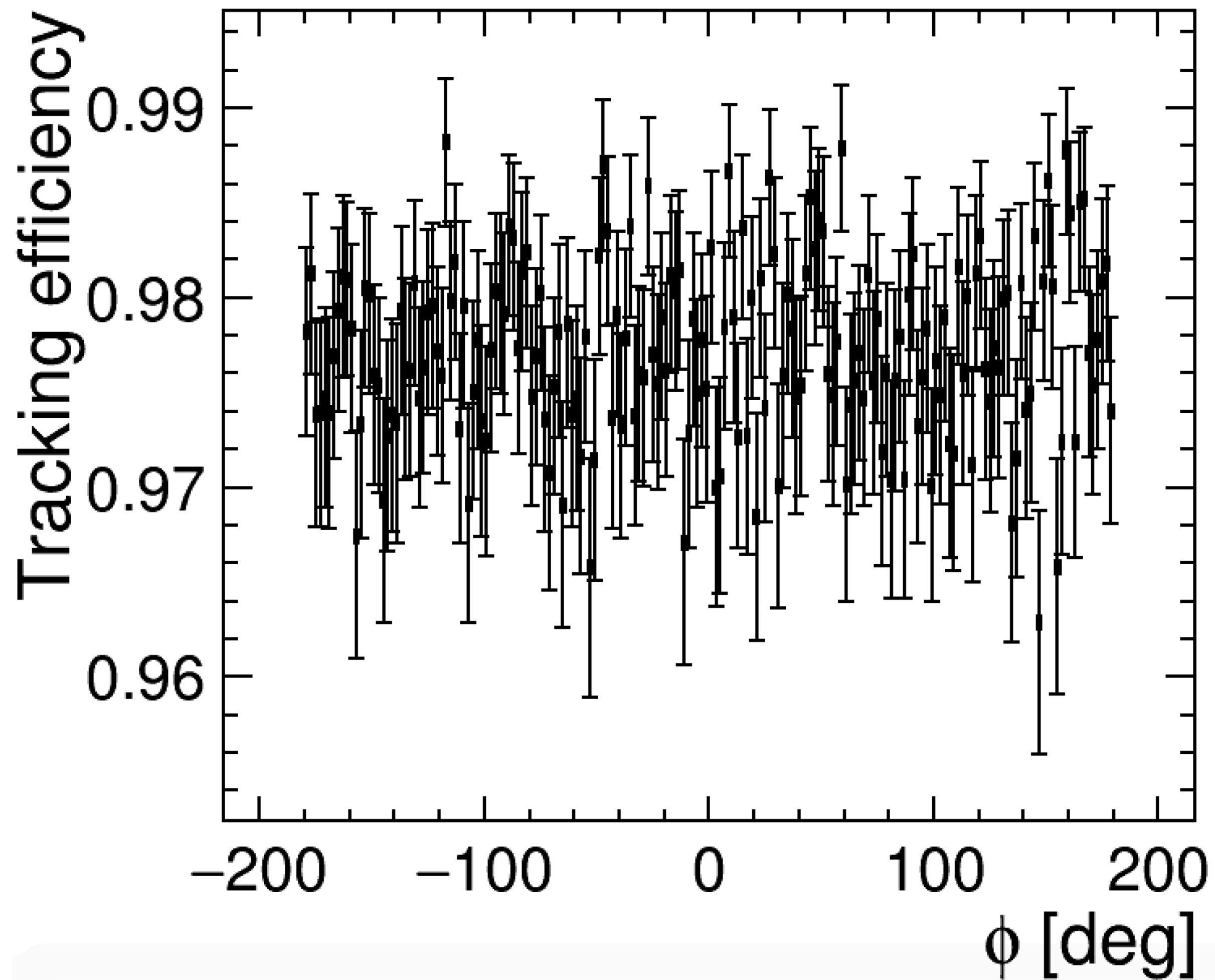








$p_T > 1 \text{ GeV}/c$



Detector model: CLIC_o3_v11

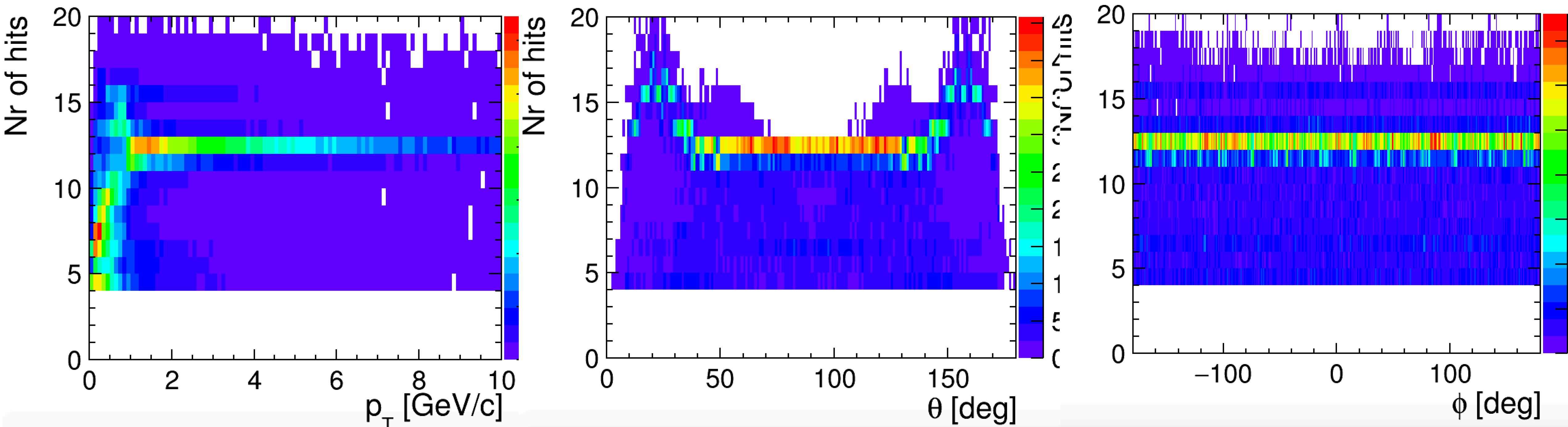
HEAD release: 2017-07-12

Tracking efficiency

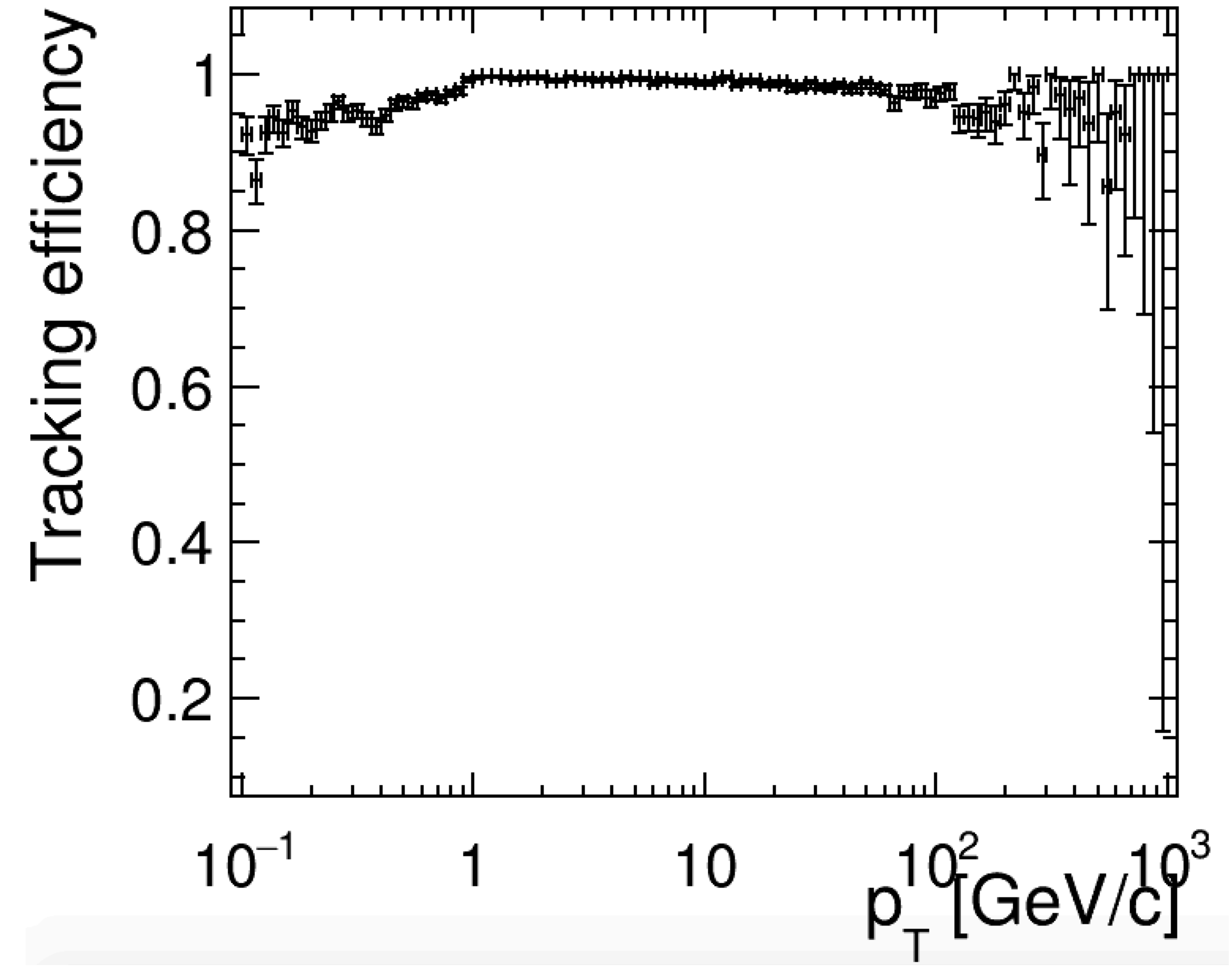
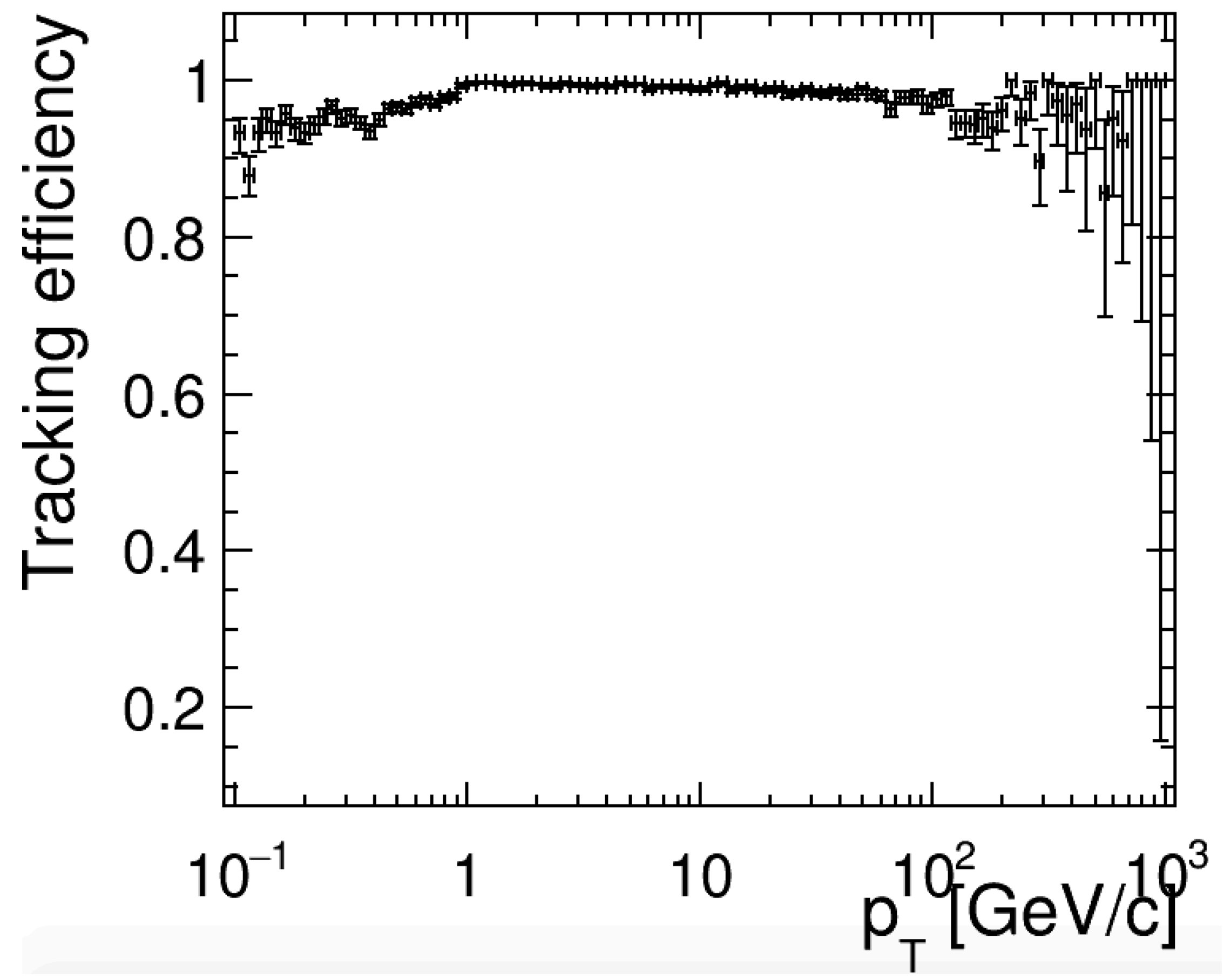
- ttbar @ 3 TeV

1k events

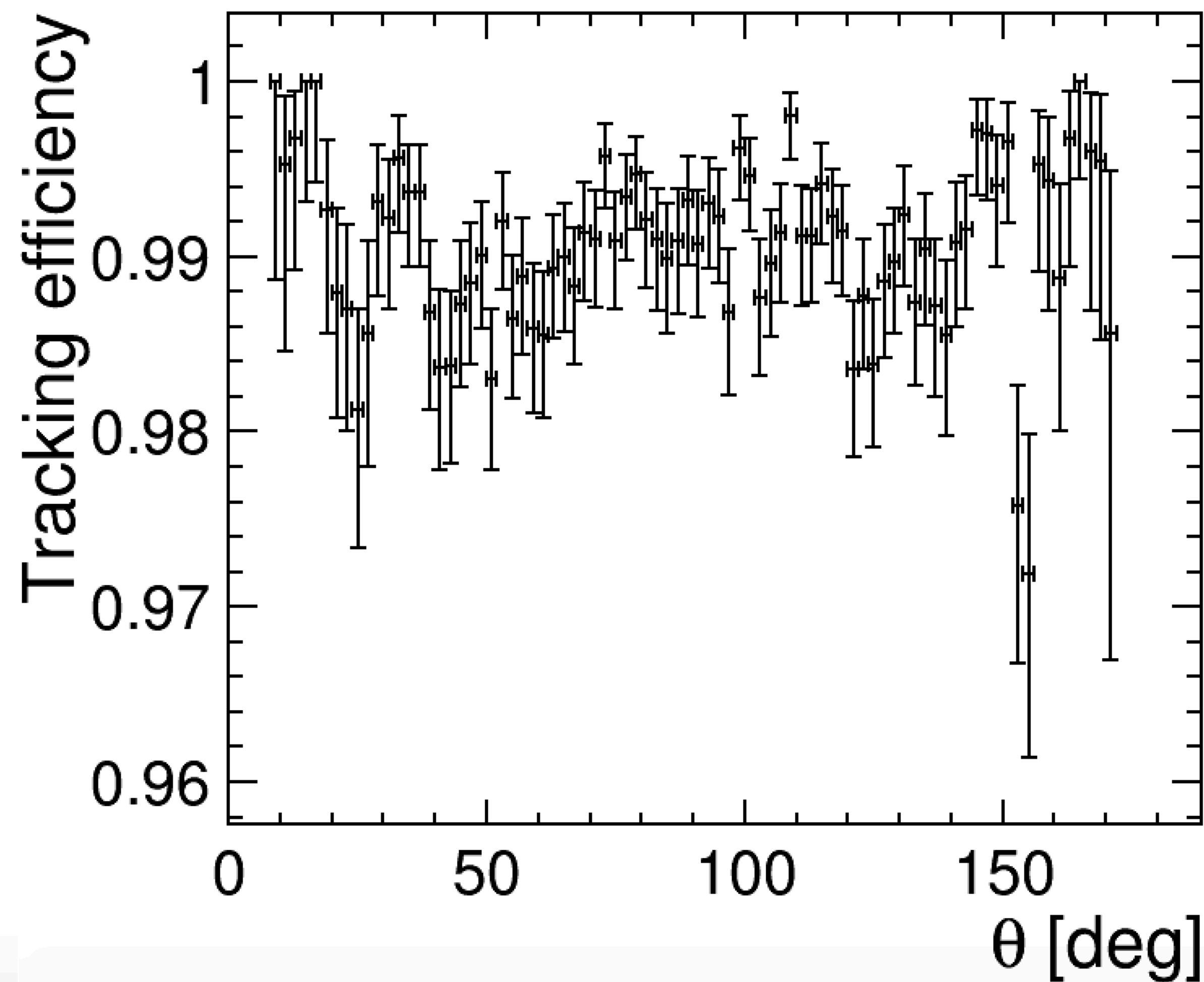
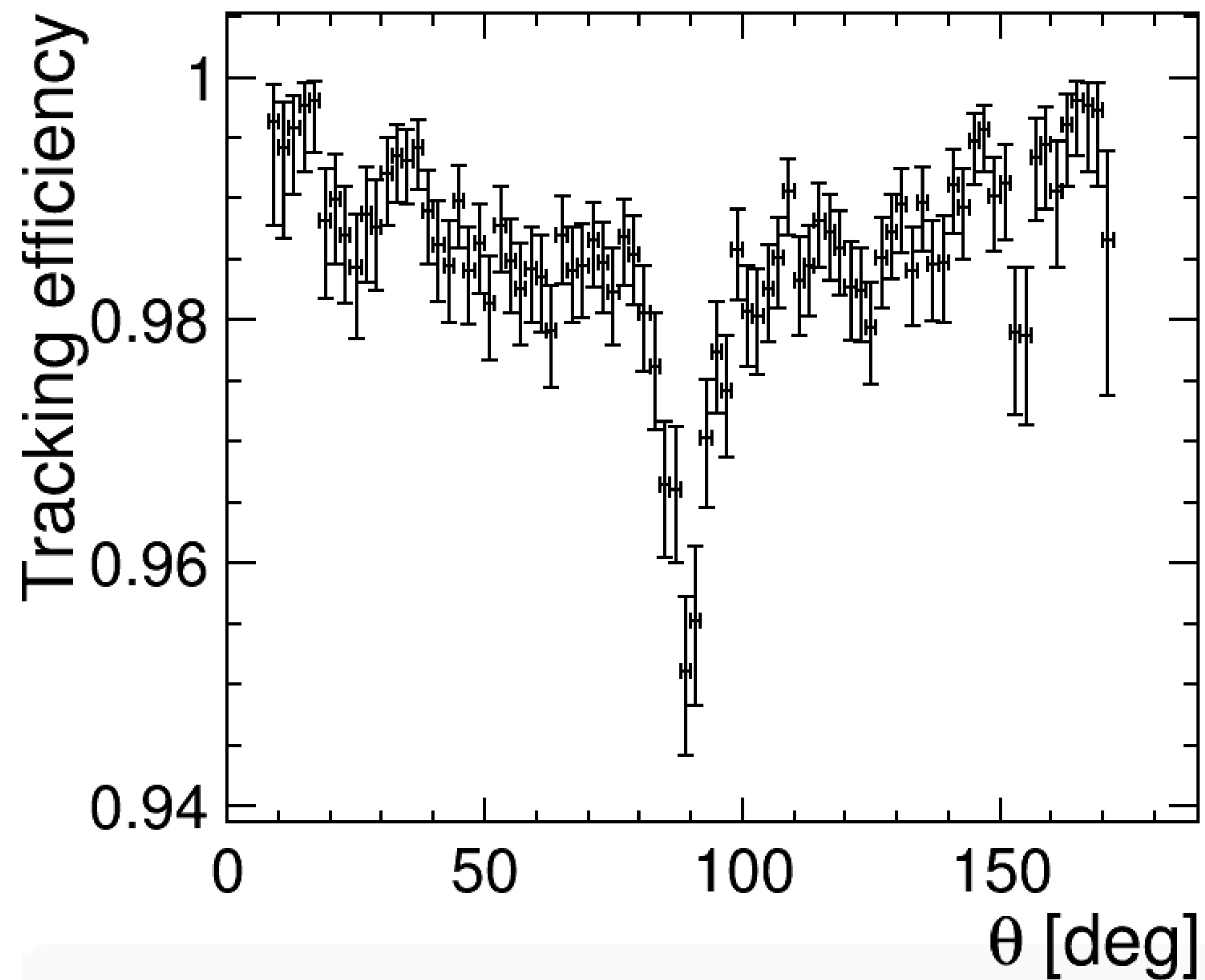
Truth Tracking



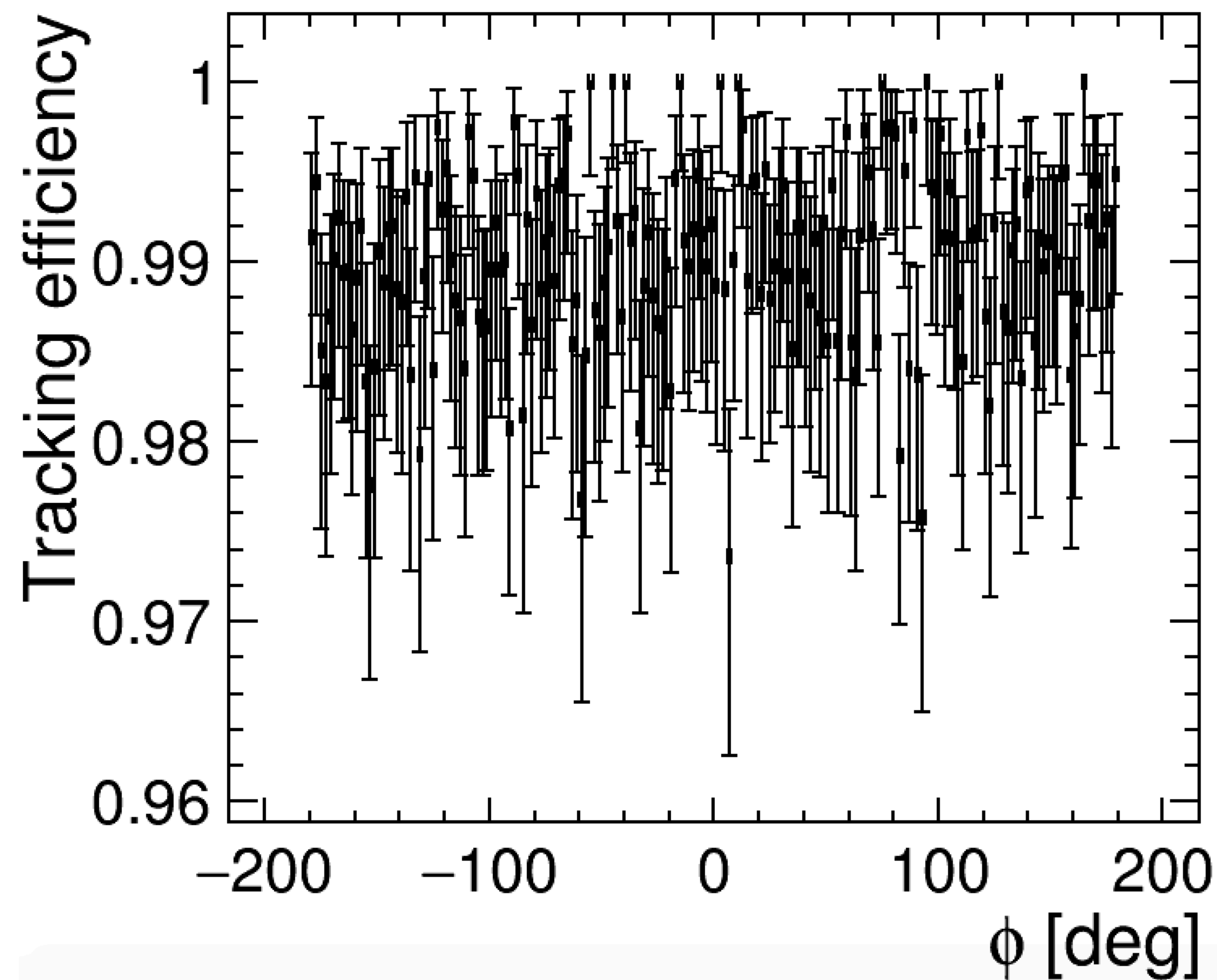
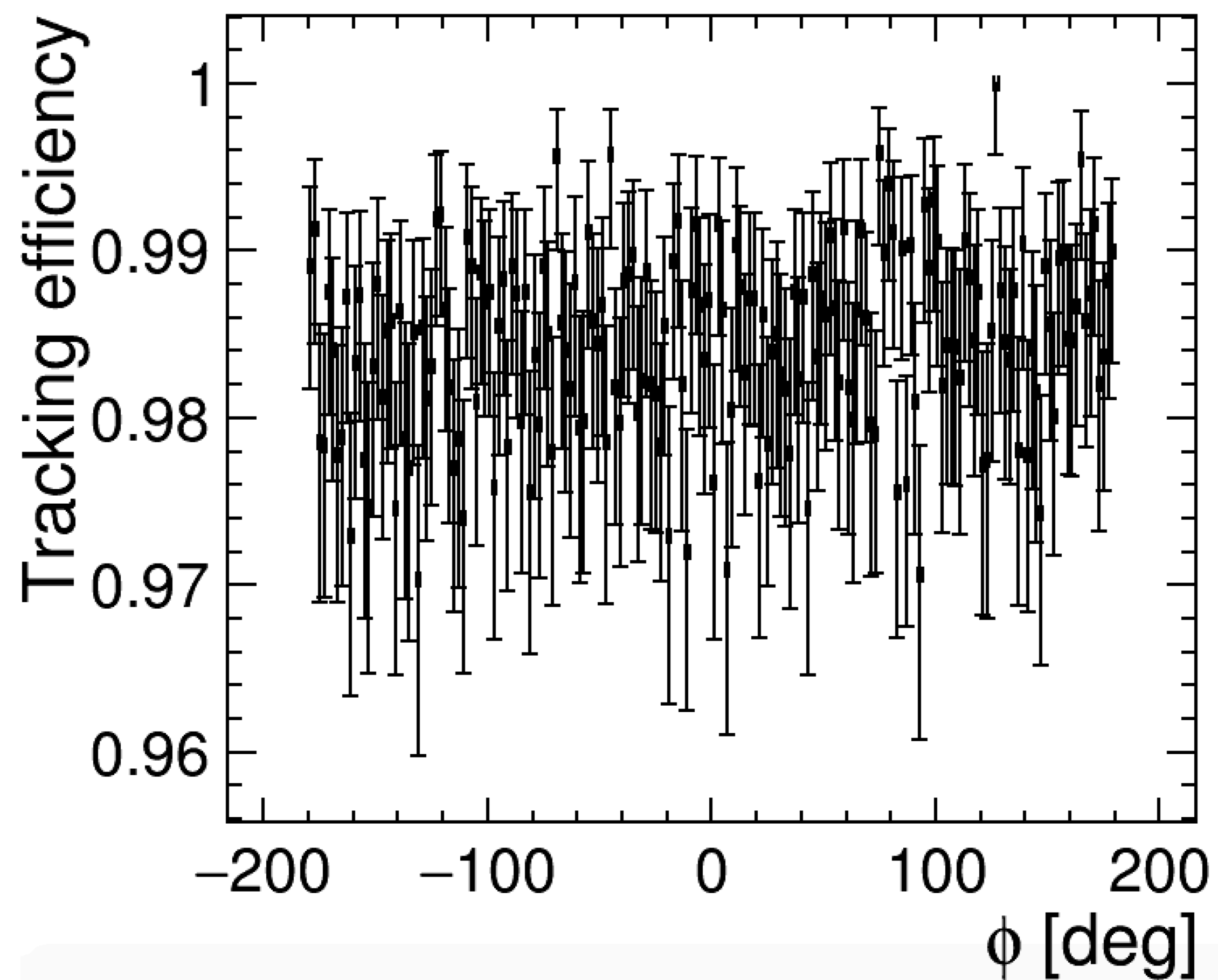
$15 < \theta < 165$



$p_T > 1 \text{ GeV}/c$



$p_T > 1 \text{ GeV}/c$



Detector model: CLIC_o3_v12

HEAD release: 2017-07-12

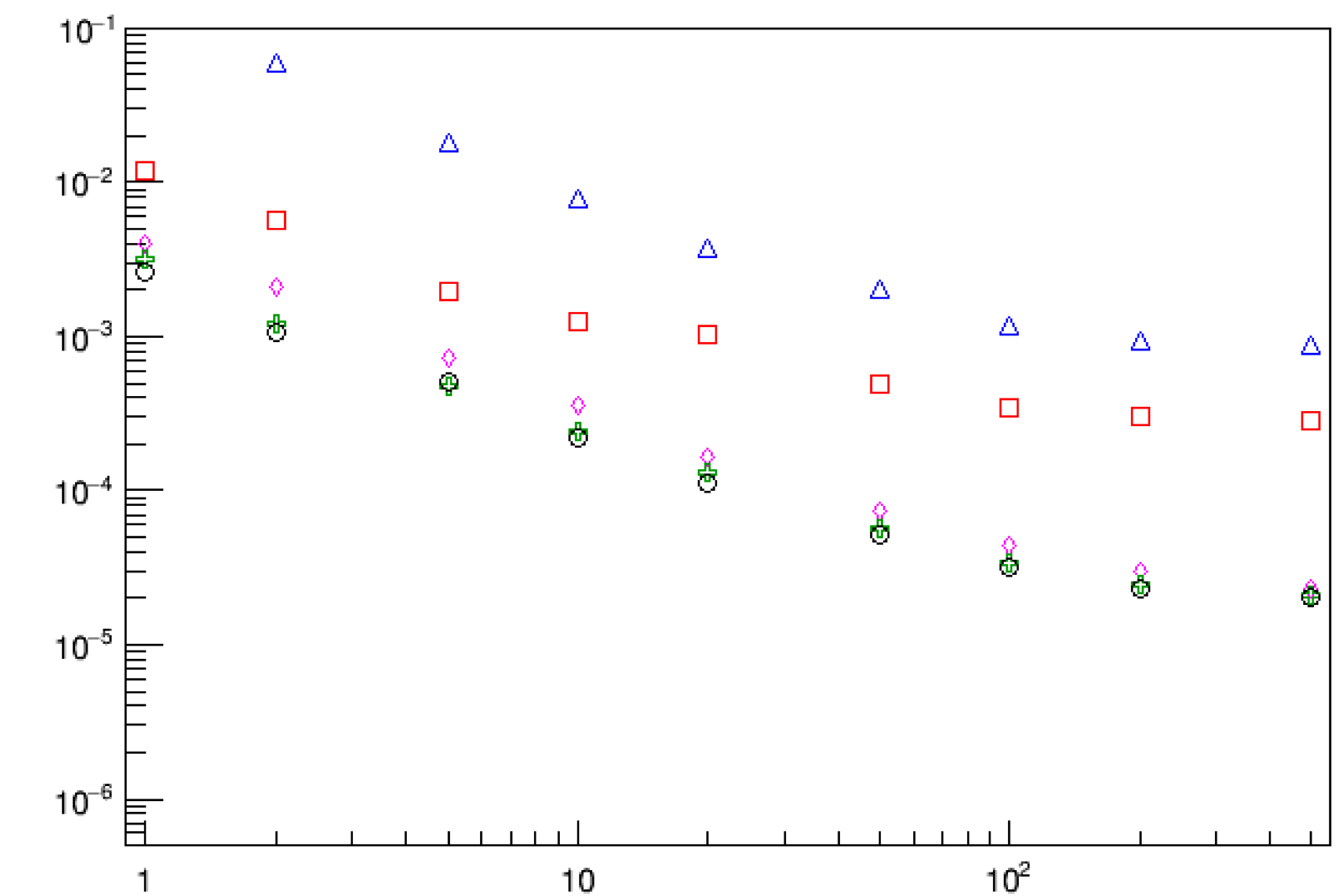
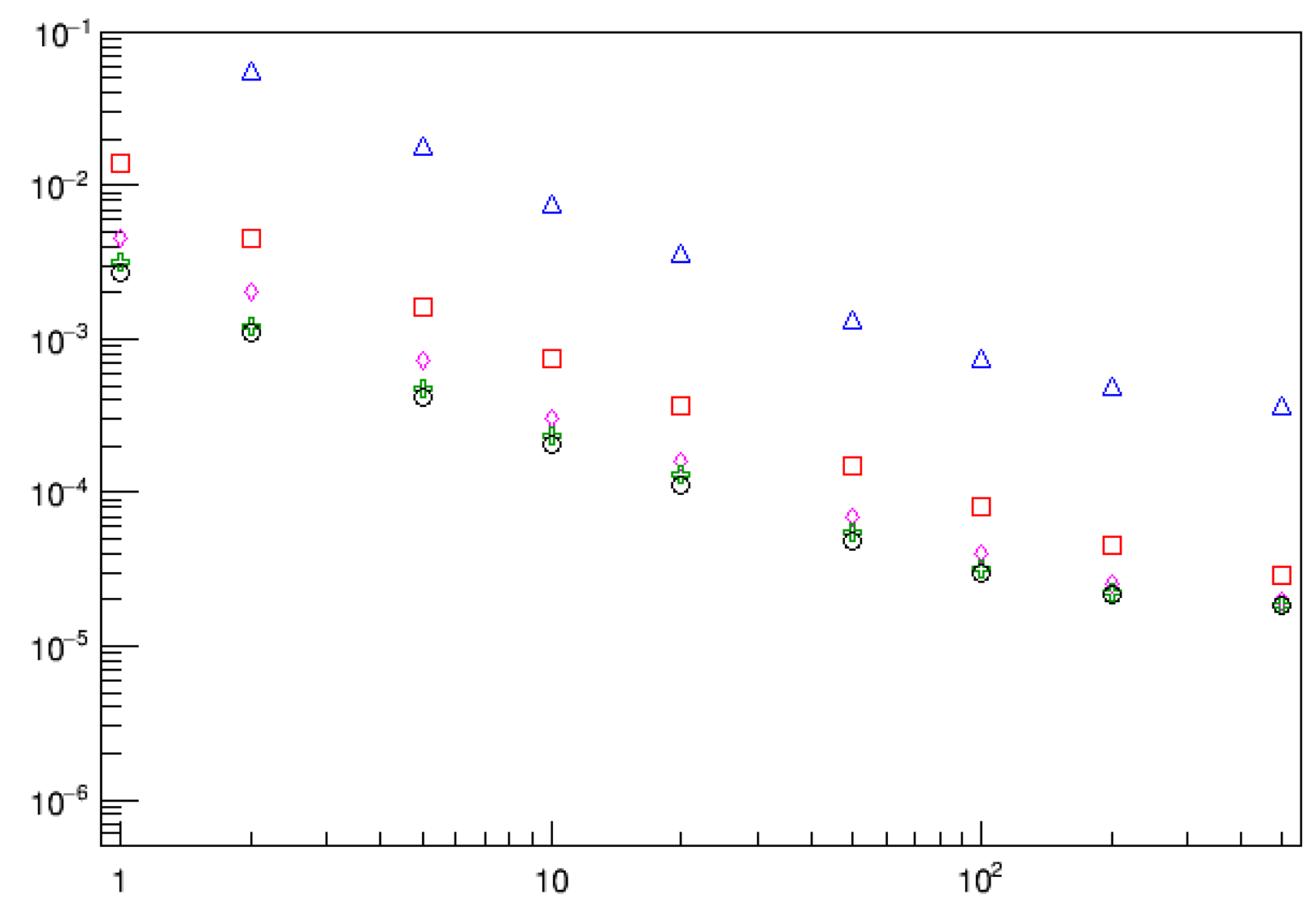
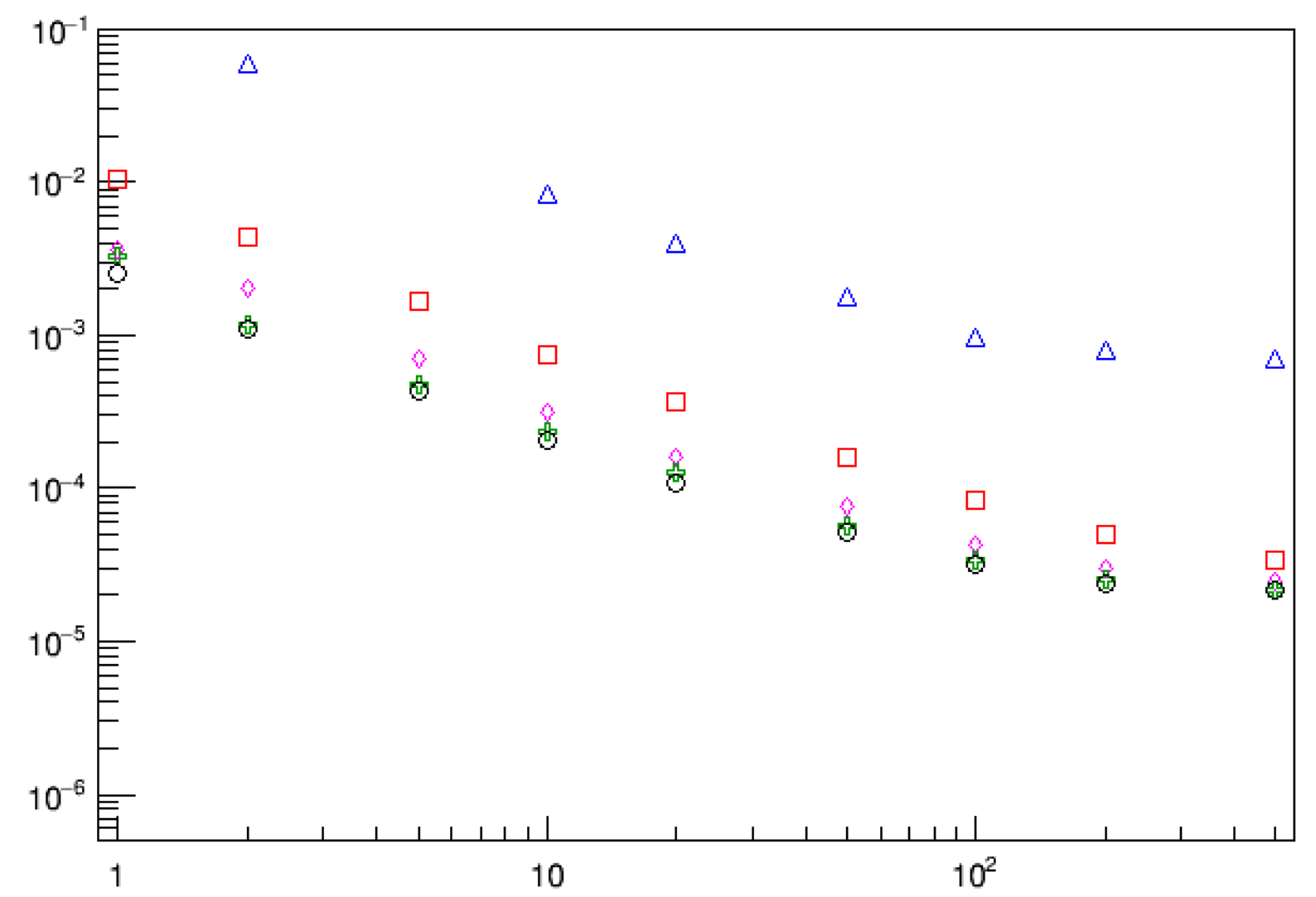
Momentum resolution

- 10k muons guns
 - fixed energy = GeV {1,2,5,10,20,50,100,200,500}
 - fixed theta = deg {10,30,50,70,89}

Truth Tracking

Conformal Tracking (VTX)
+ Extrapolator

Conformal Tracking (FULL)



- $\theta = 10\text{deg}$
- $\theta = 30\text{deg}$
- $\theta = 50\text{deg}$
- $\theta = 70\text{deg}$
- $\theta = 90\text{deg}$

Detector model: CLIC_o3_v11

HEAD release: 2017-07-12

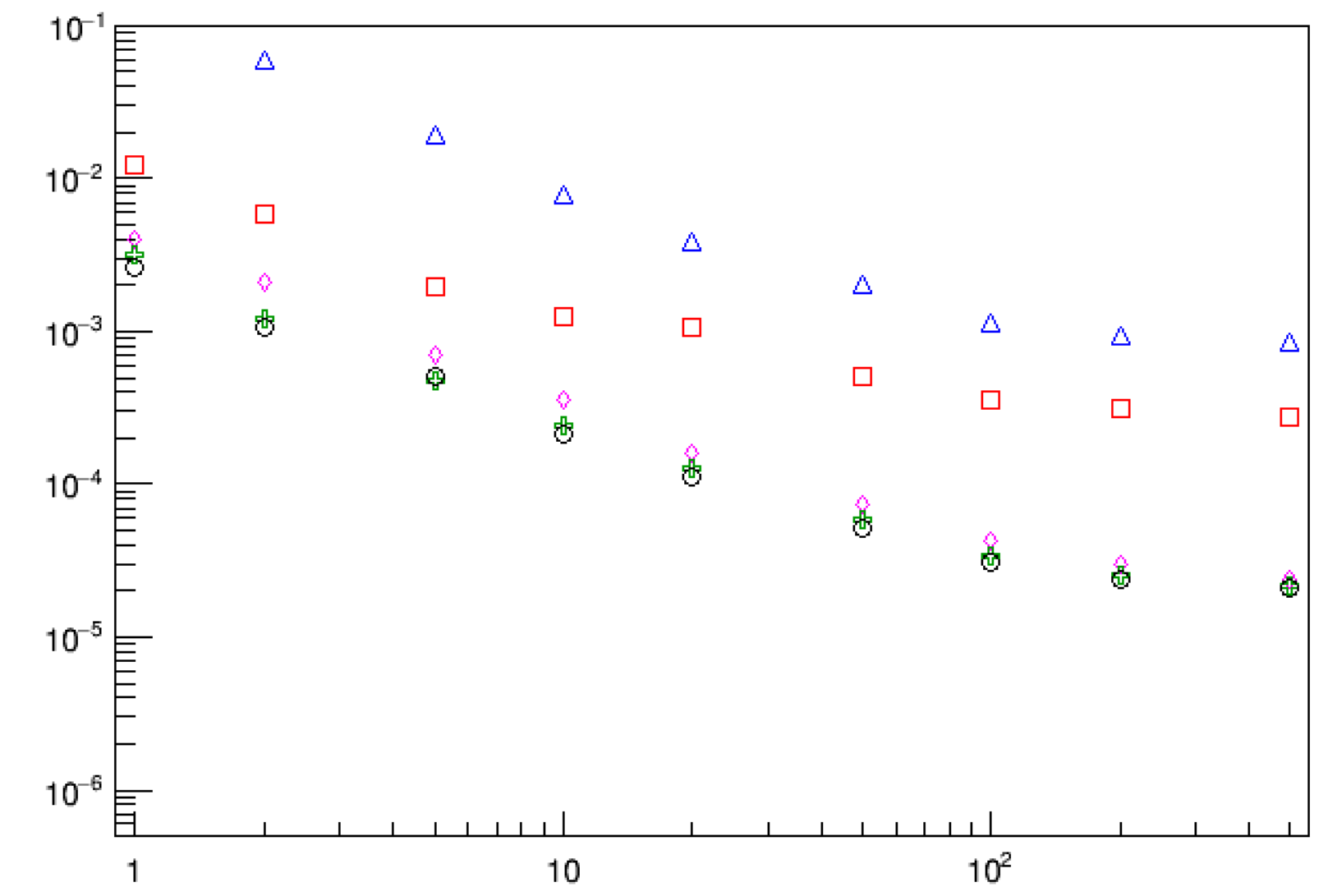
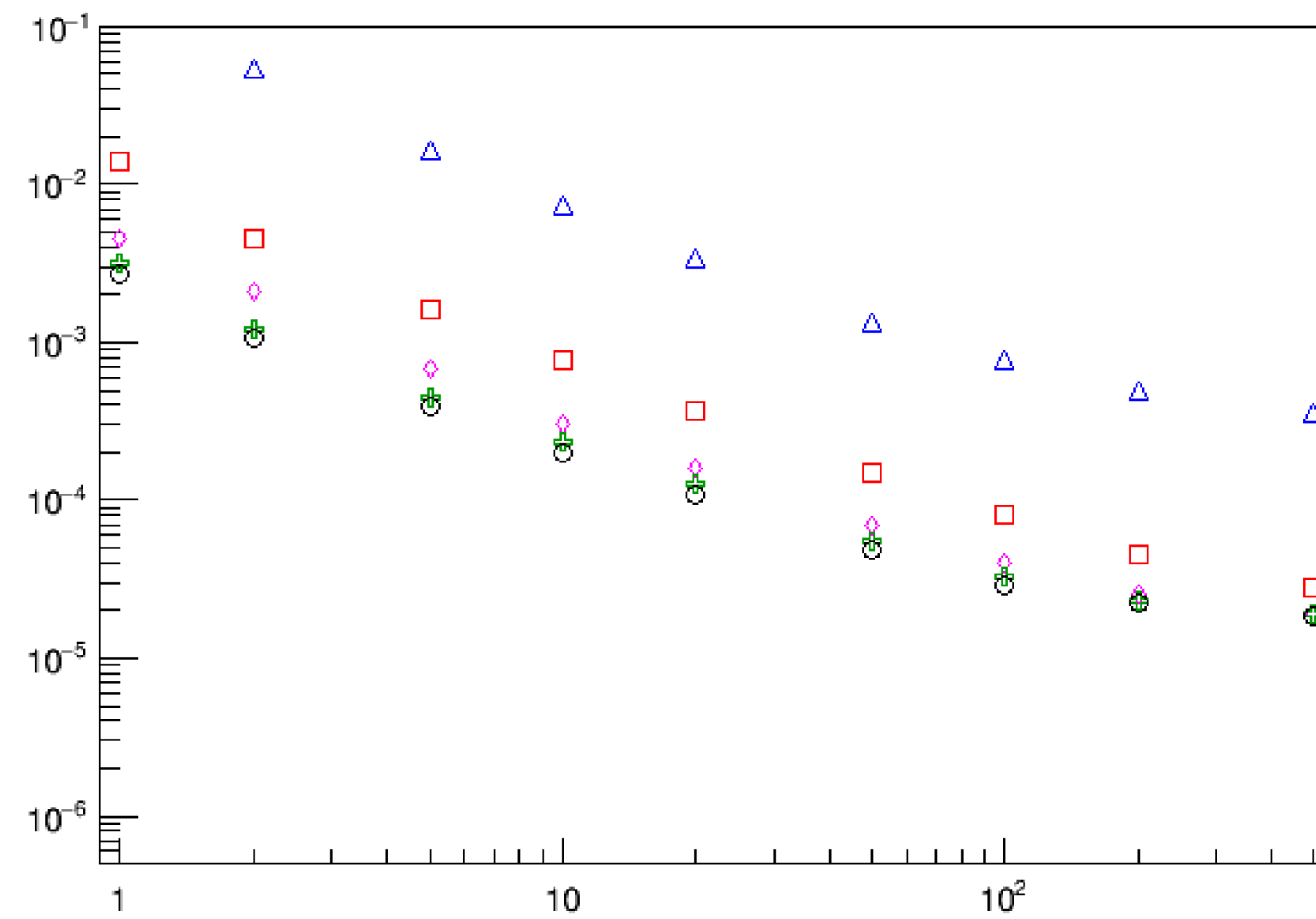
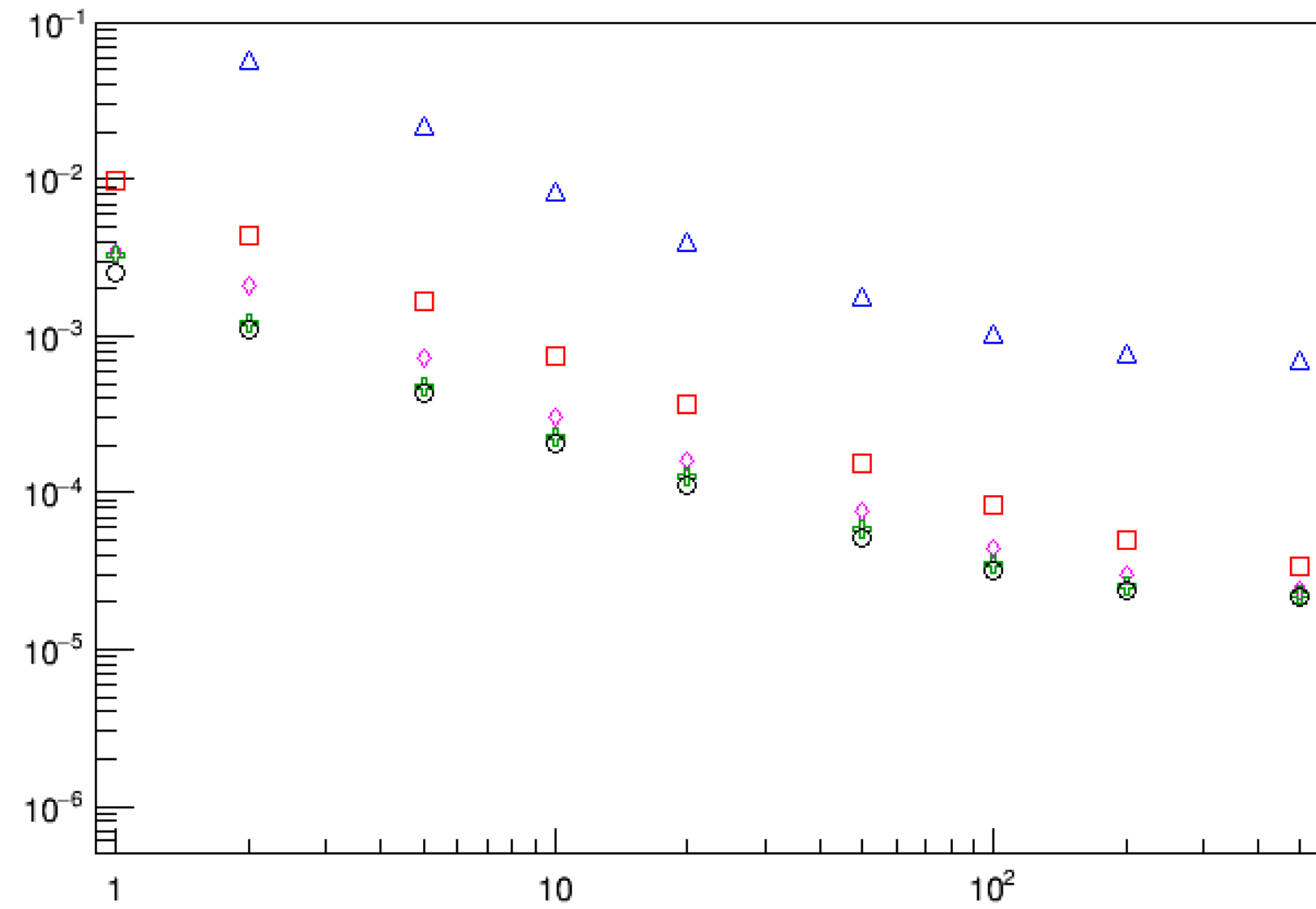
Momentum resolution

- 10k muons guns
 - fixed energy = GeV {1,2,5,10,20,50,100,200,500}
 - fixed theta = deg {10,30,50,70,89}

Truth Tracking

Conformal Tracking (VTX)
+ Extrapolator

Conformal Tracking (FULL)



$\theta = 10\text{deg}$
 $\theta = 30\text{deg}$
 $\theta = 50\text{deg}$
 $\theta = 70\text{deg}$
 $\theta = 90\text{deg}$