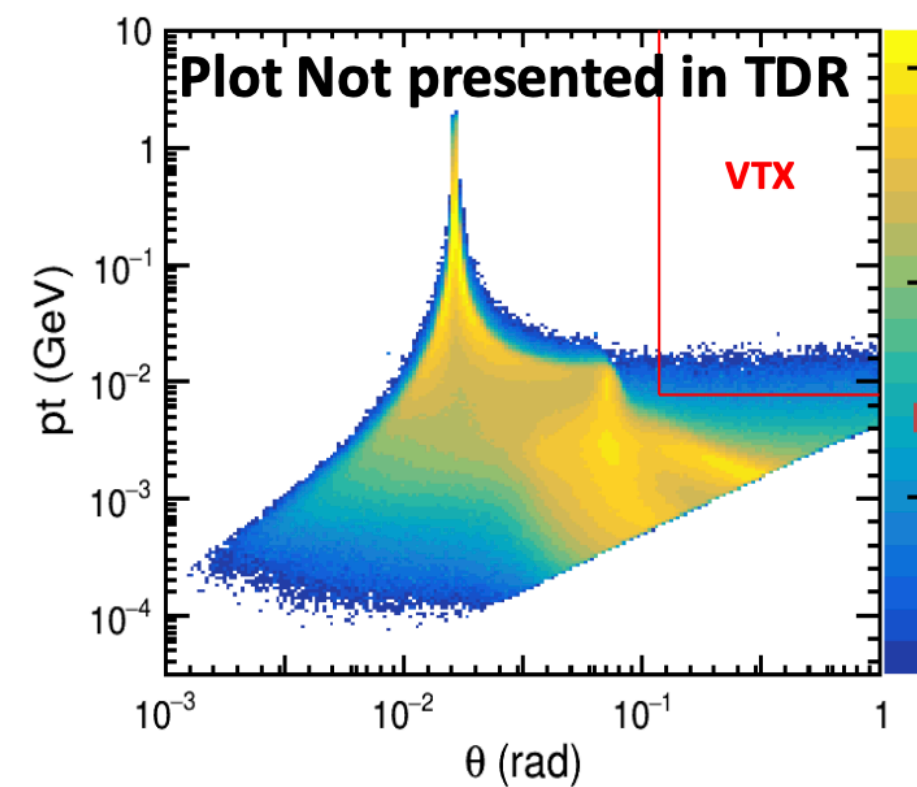


- How does the ecut change bkg hit rate?
- 0.005 GeV is not safe but should not change the bkg rate a lot

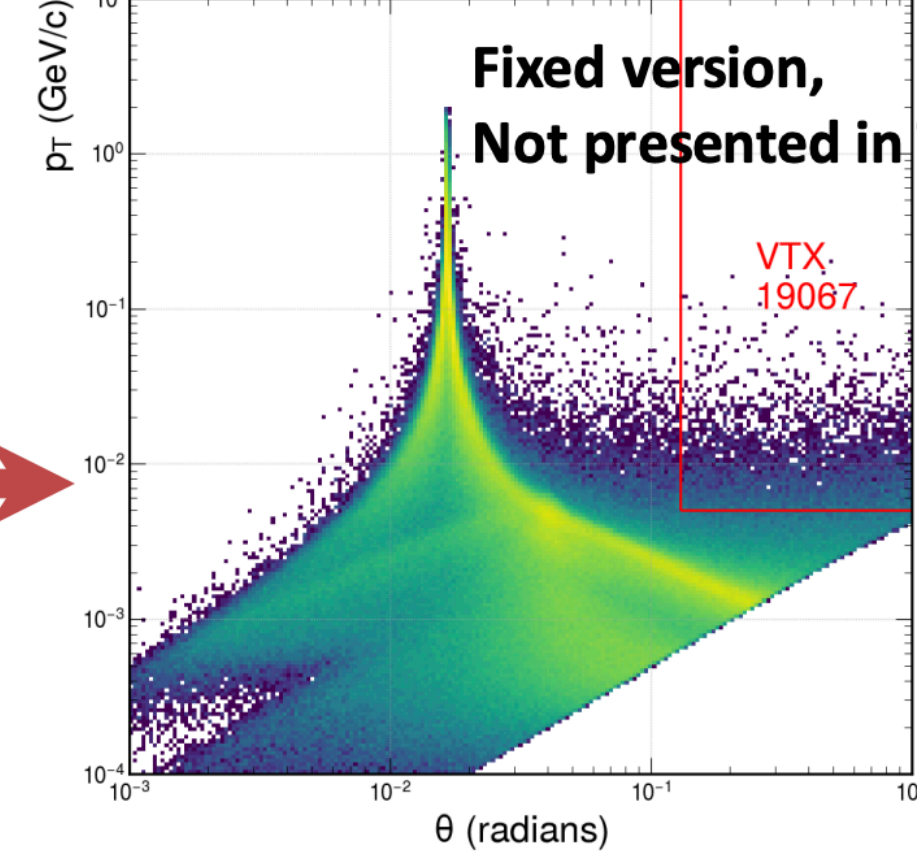
Updates: pair production generation – reduce energy threshold

From Haoyu

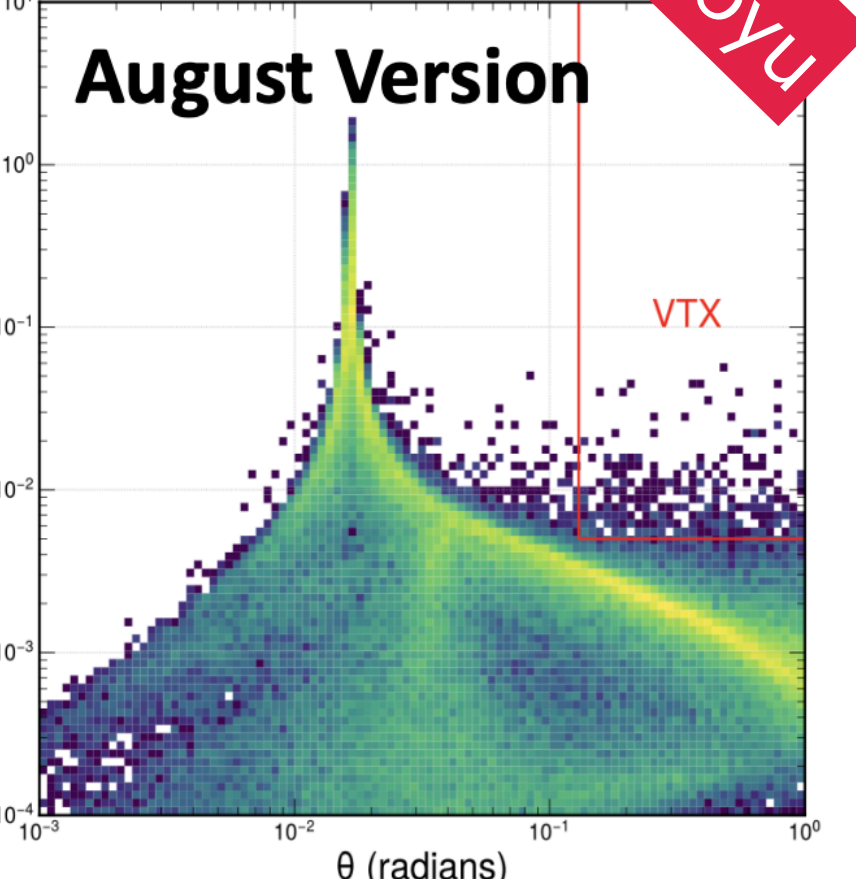
June Version and before



CEPC Ref-TDR $\sqrt{s} = 240$ GeV



CEPC Ref-TDR \sqrt{s}



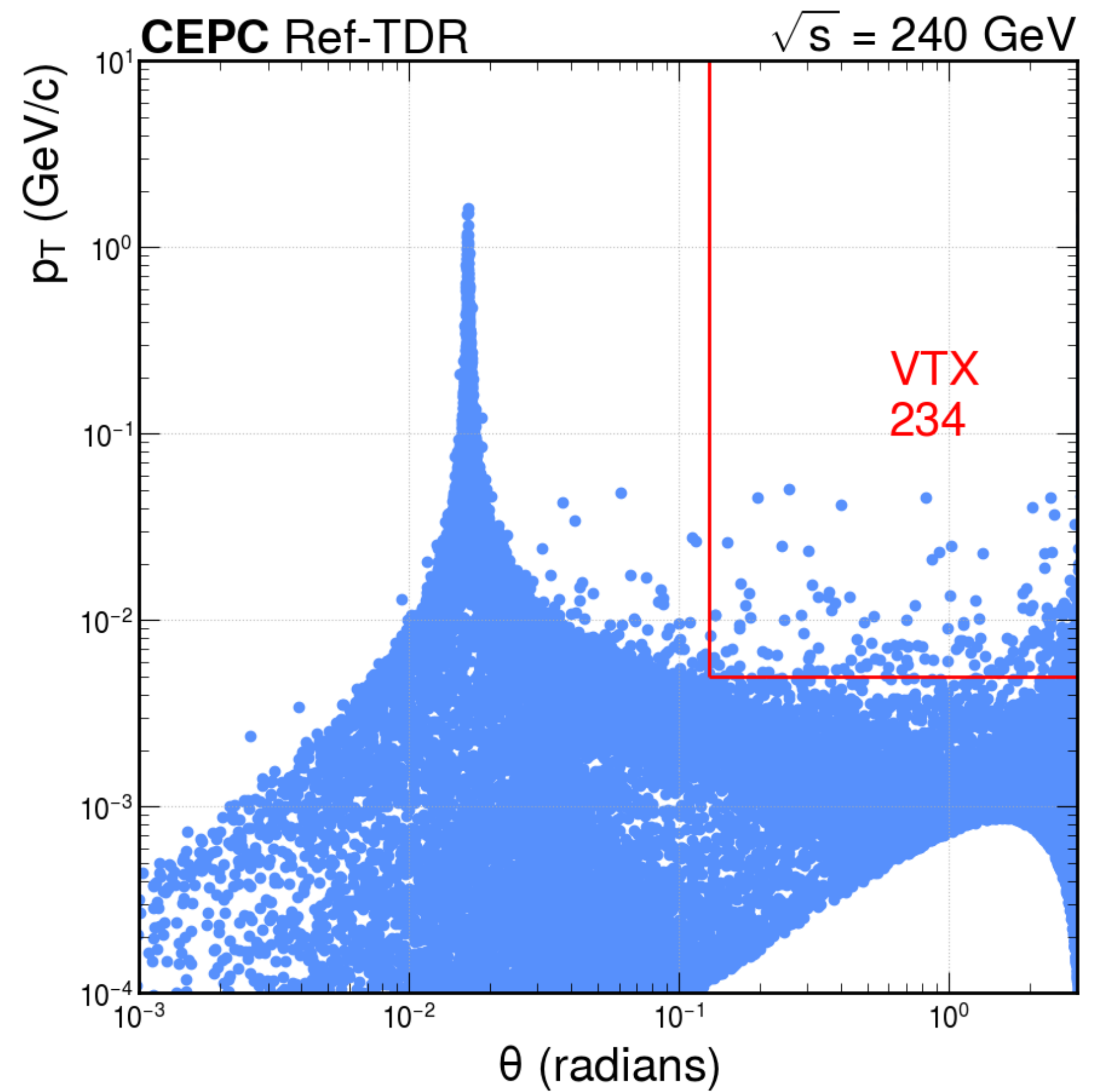
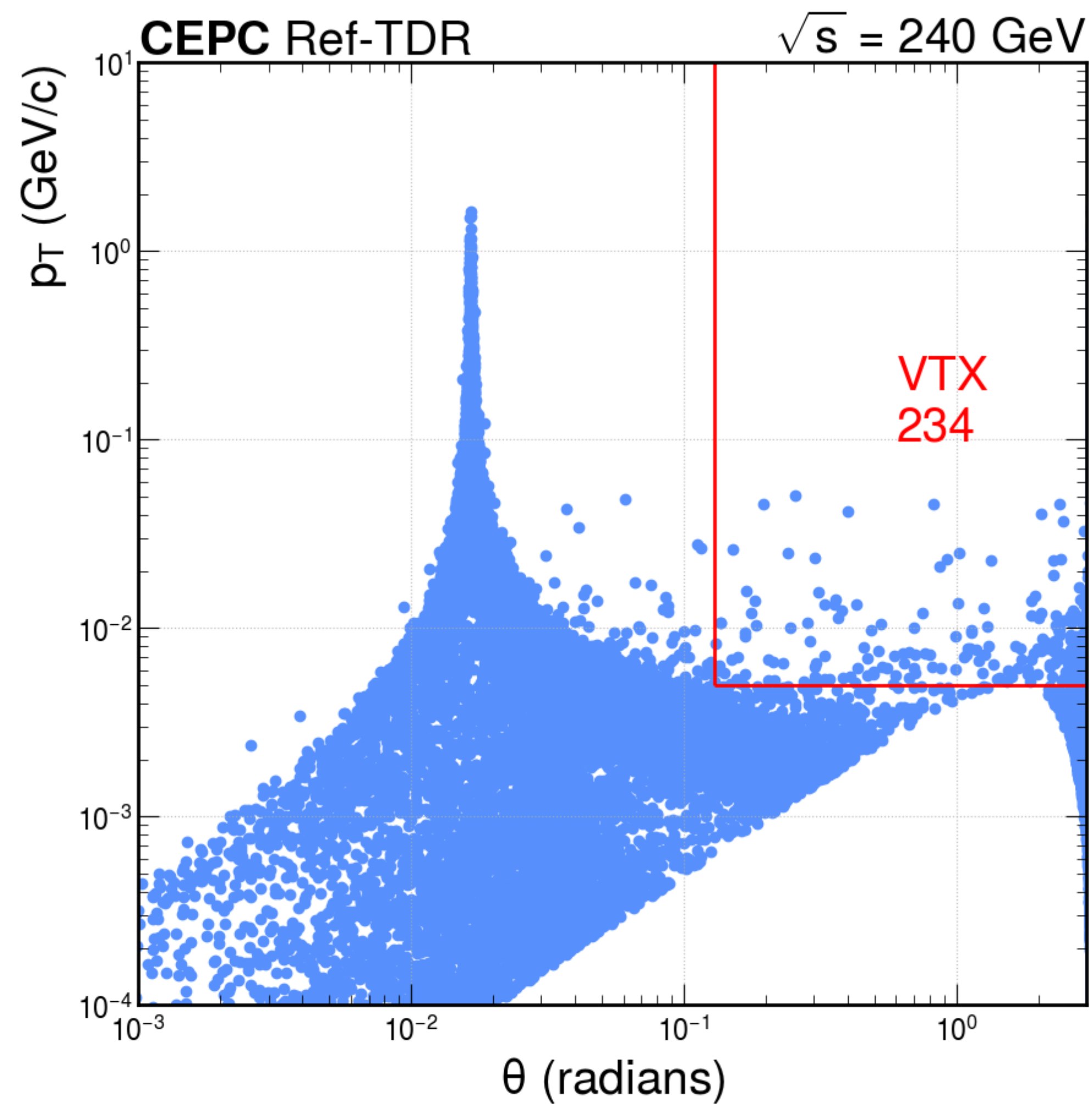
- Decrease the threshold on electron/positron output from 5 MeV(the built-in value) to 0.511 MeV, results shown at 50 MW Higgs

– We are asking the authors the reason of setting the threshold at 5 MeV and doing more study on this

Not in TDR v0.6.1

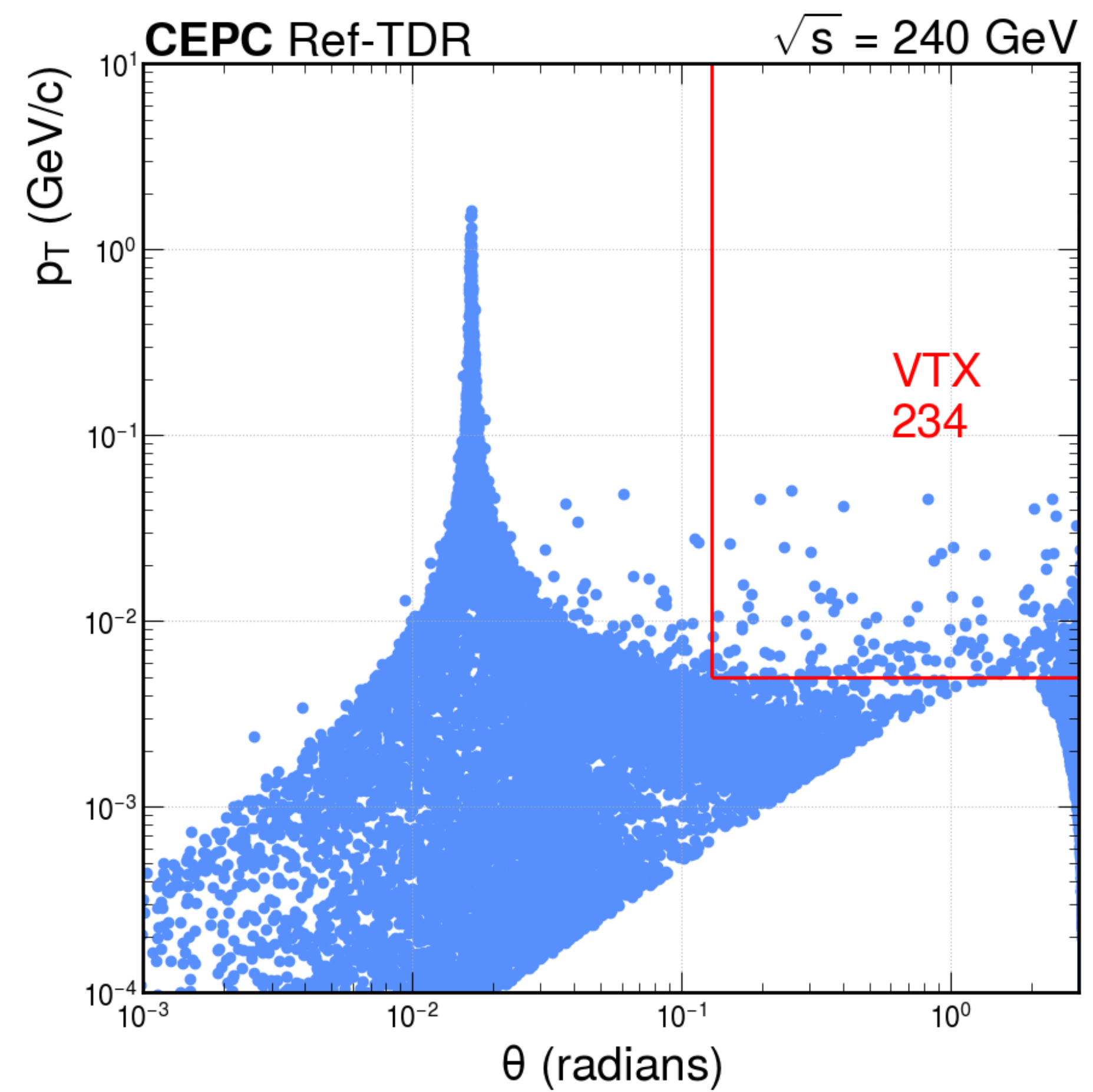
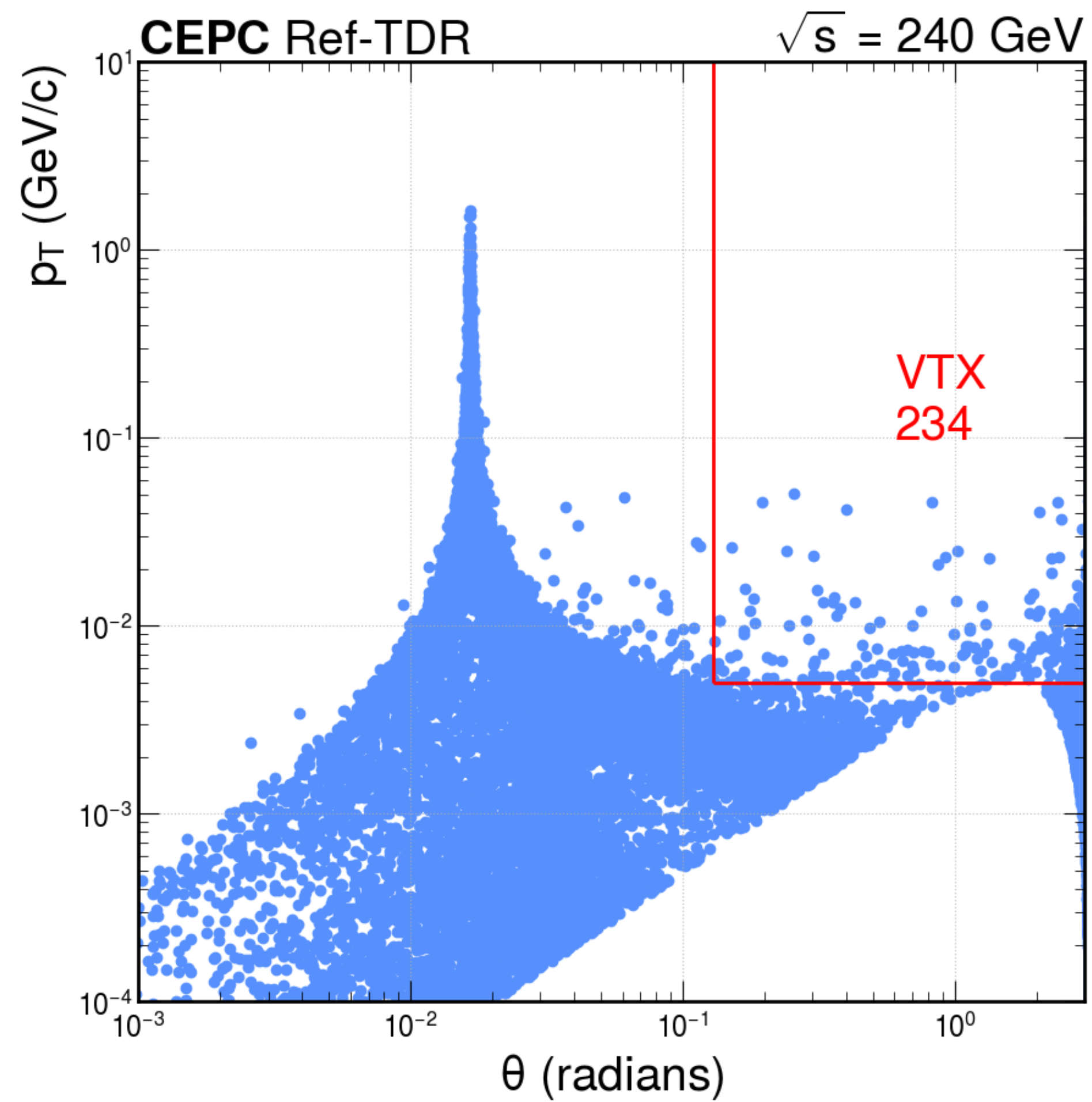
	Fixed the Mismatch	Decrease the the Th.	Changes
No. of Pairs / BX	~1300	~2200	+ ~70%
Hit Rate on 1 st VTXL [MHz/cm ²]	1.17	2.7	+ ~150 %
Hit Rate on Whole VTX [MHz/cm ²]	0.051	0.08	+ ~50 %

2025/9/17

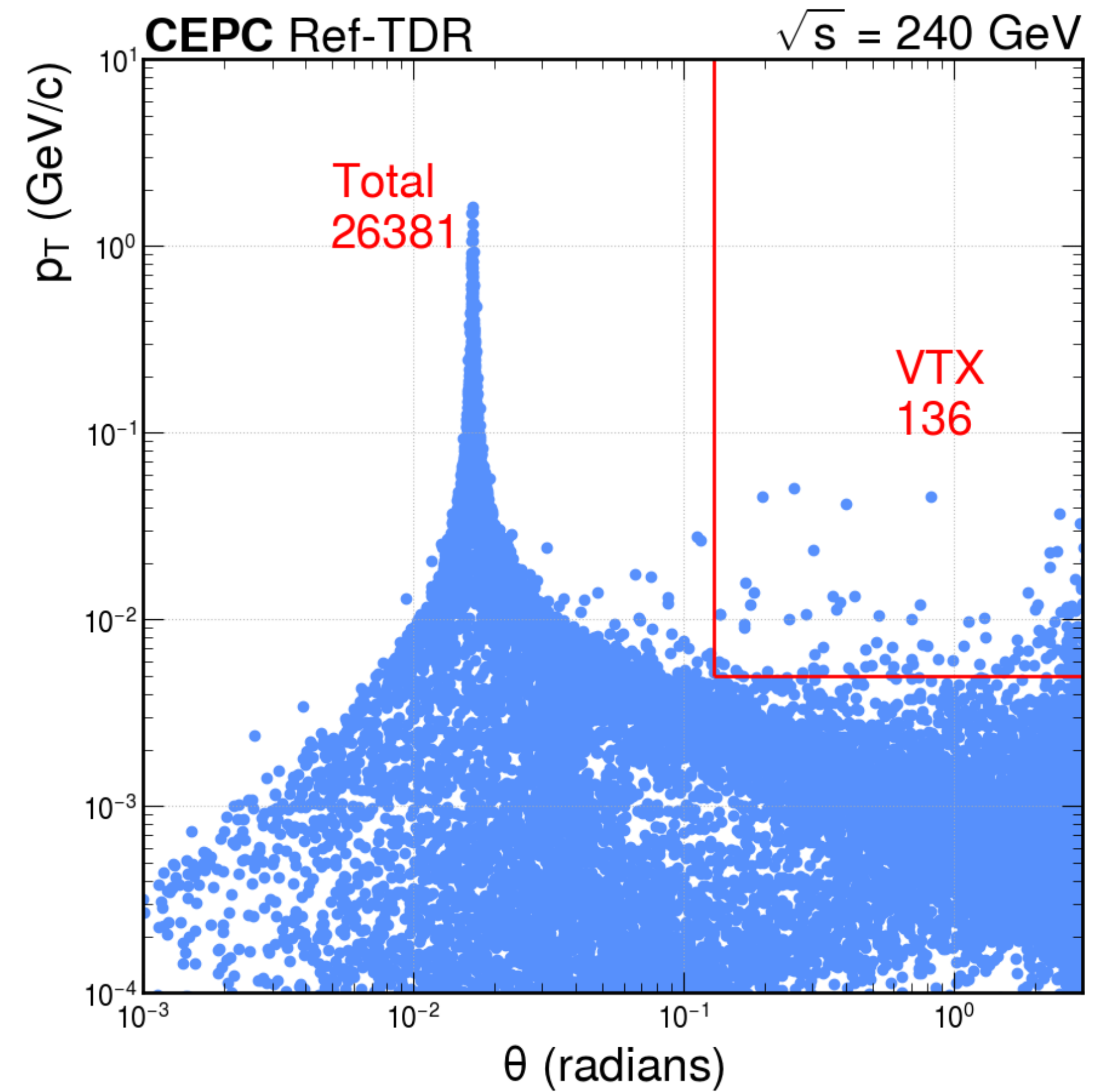
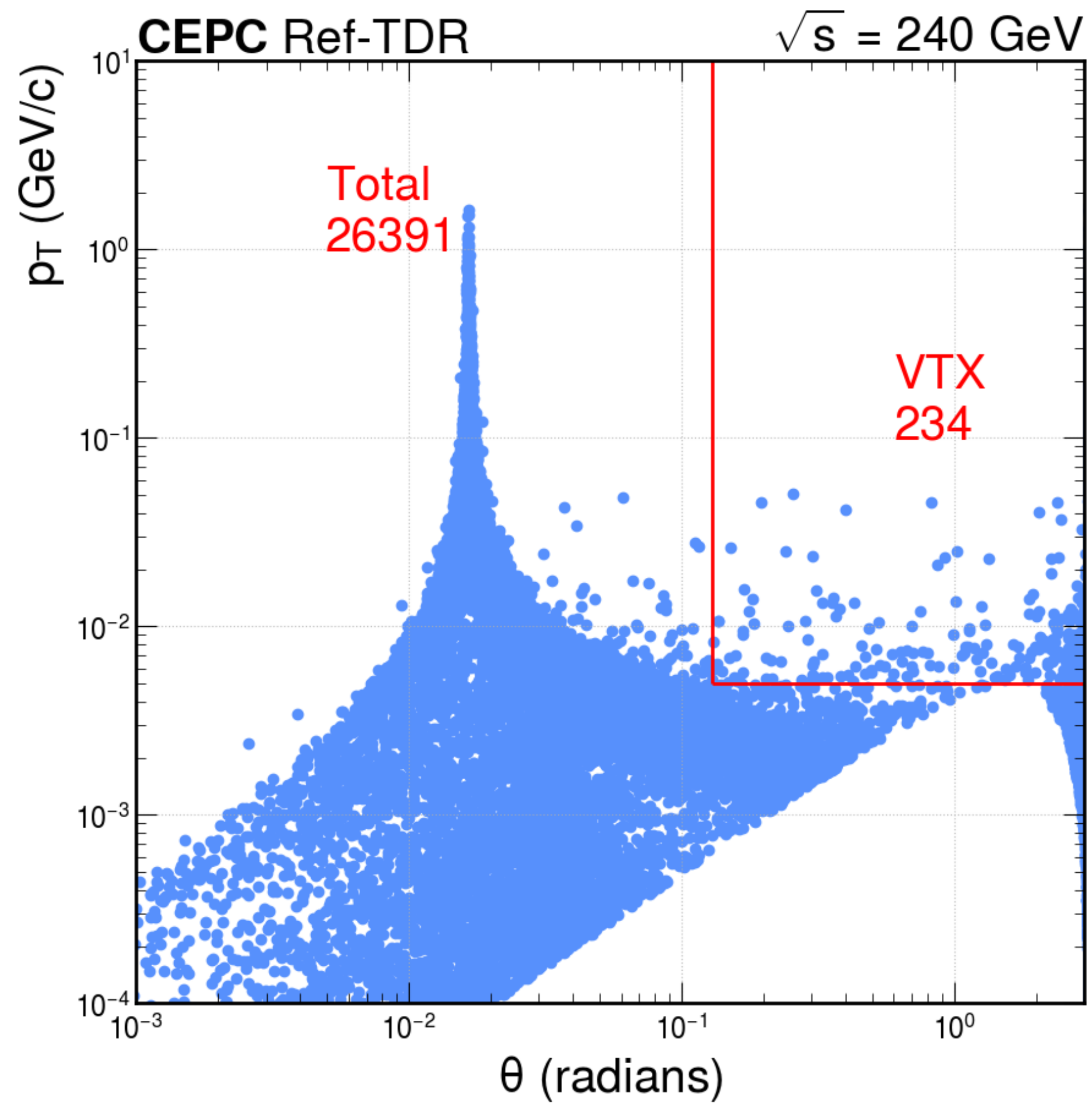


- 20BX
- energy threshold = 0.005 [left] and 0.001 [right] GeV
- Agree with expectation, the yields in the the red box do not change

- GUINEAPIG simulation routines
 - In center mass frame
 - Generate pairs following cross-section formula
 - Immediately, two cuts implemented to select which pairs to be tracked
 - electron energy threshold [we change this from 5MeV to 0.5MeV]
 - macro particle ratio [we use the default value: 1]
 - Electromagnetic field calculation
 - Track the selected pairs through the fields
- The energy threshold is applied in the centre mass frame but we observe its impact in lab. frame
- The energy threshold is applied before tracking the pairs but E field can accelerate particles



- 20BX
- Left: energy cut of 5MeV in the C.M frame
- Right: energy cut of 5MeV in the Lab. frame



- 20BX
- Left: In the C.M frame; 5MeV energy cut applied **after tracking the pairs**
- Right: In the C.M. frame; 5MeV energy cut applied **before tracking the pairs**
- All the dots in the plots are post-tracked