

27.10.2020



Snow Mass geometry candidate

Changes and performance

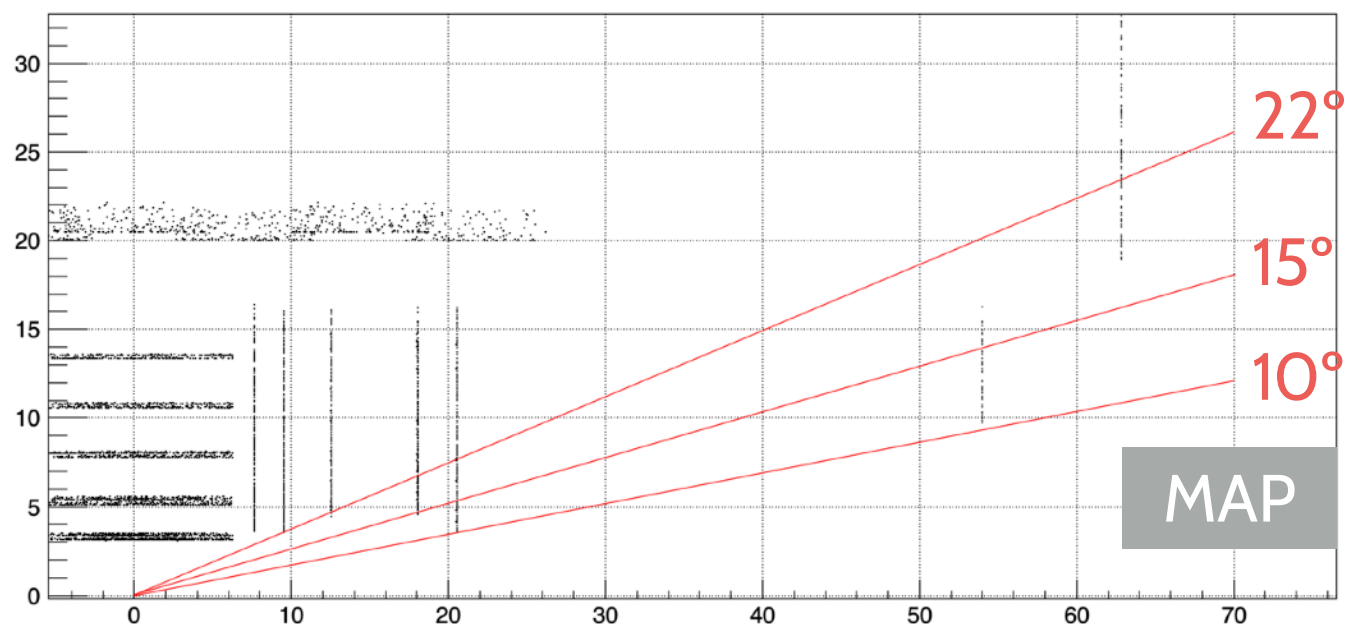
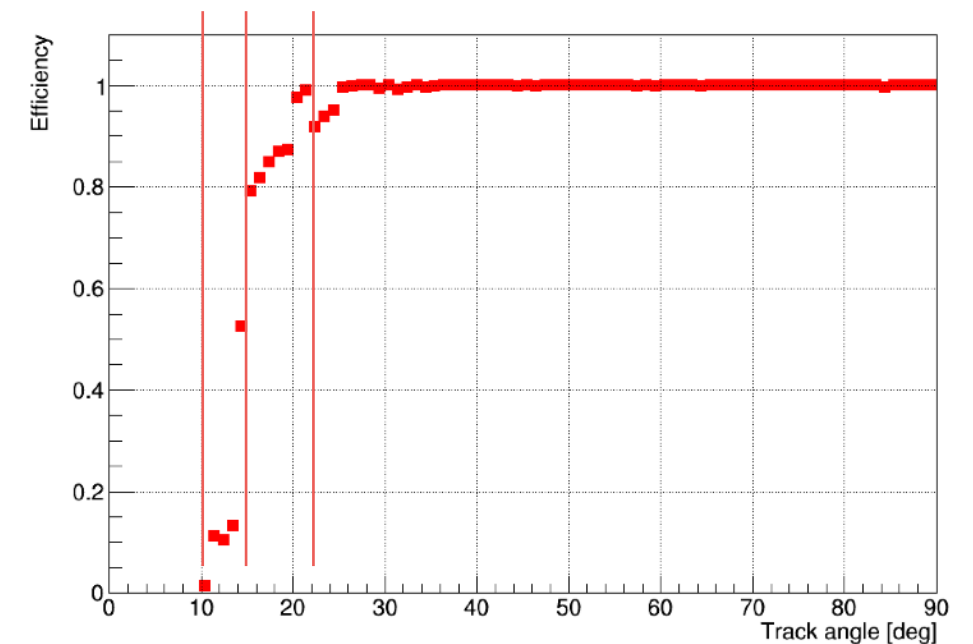
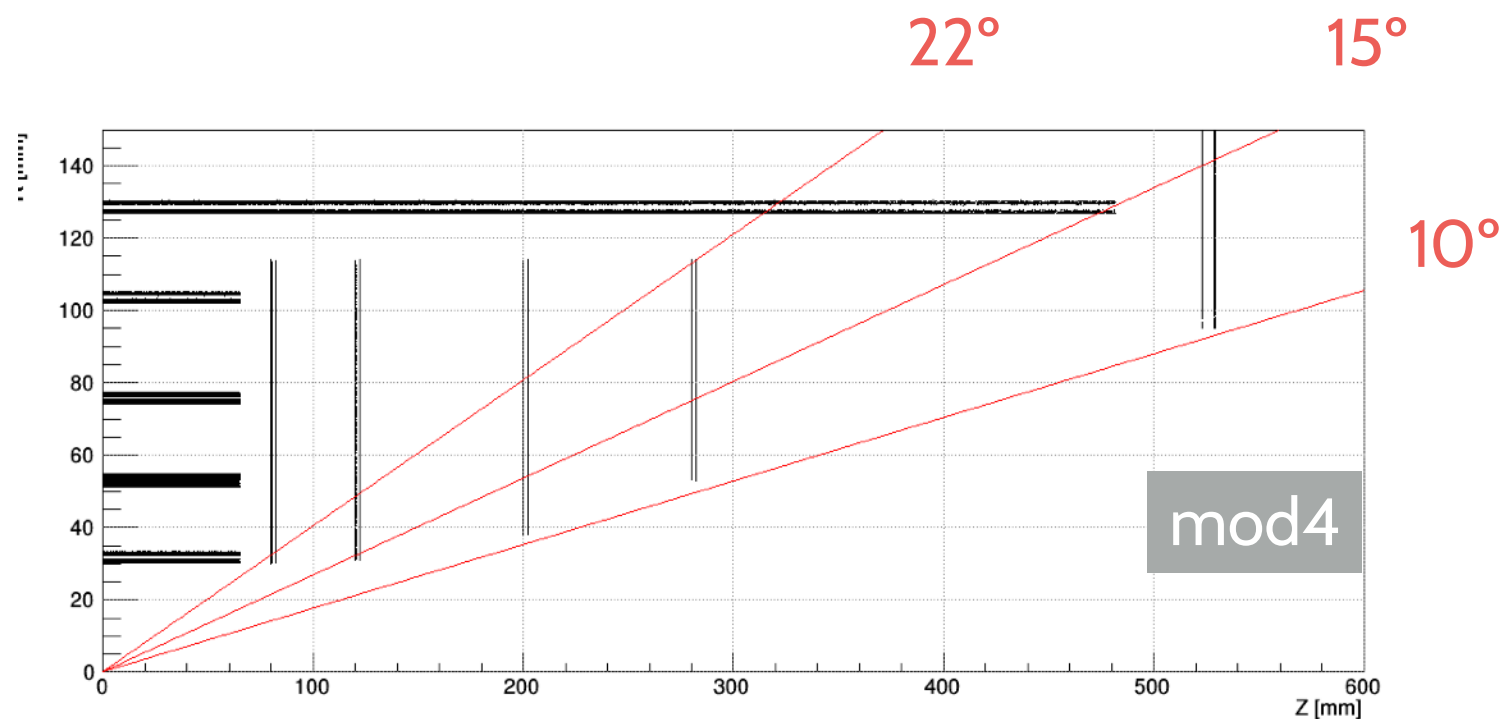
N. Bartosik

INFN Torino

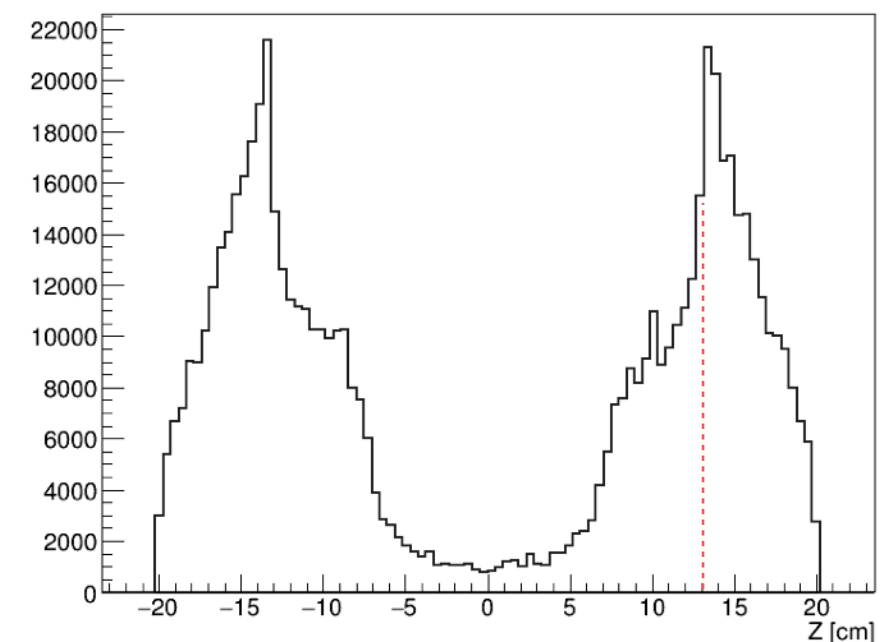
Vertex detector layout

Currently used version: [CLIC_o3_v14_mod4](#)

- has a few issues with track reconstruction efficiency in the forward region



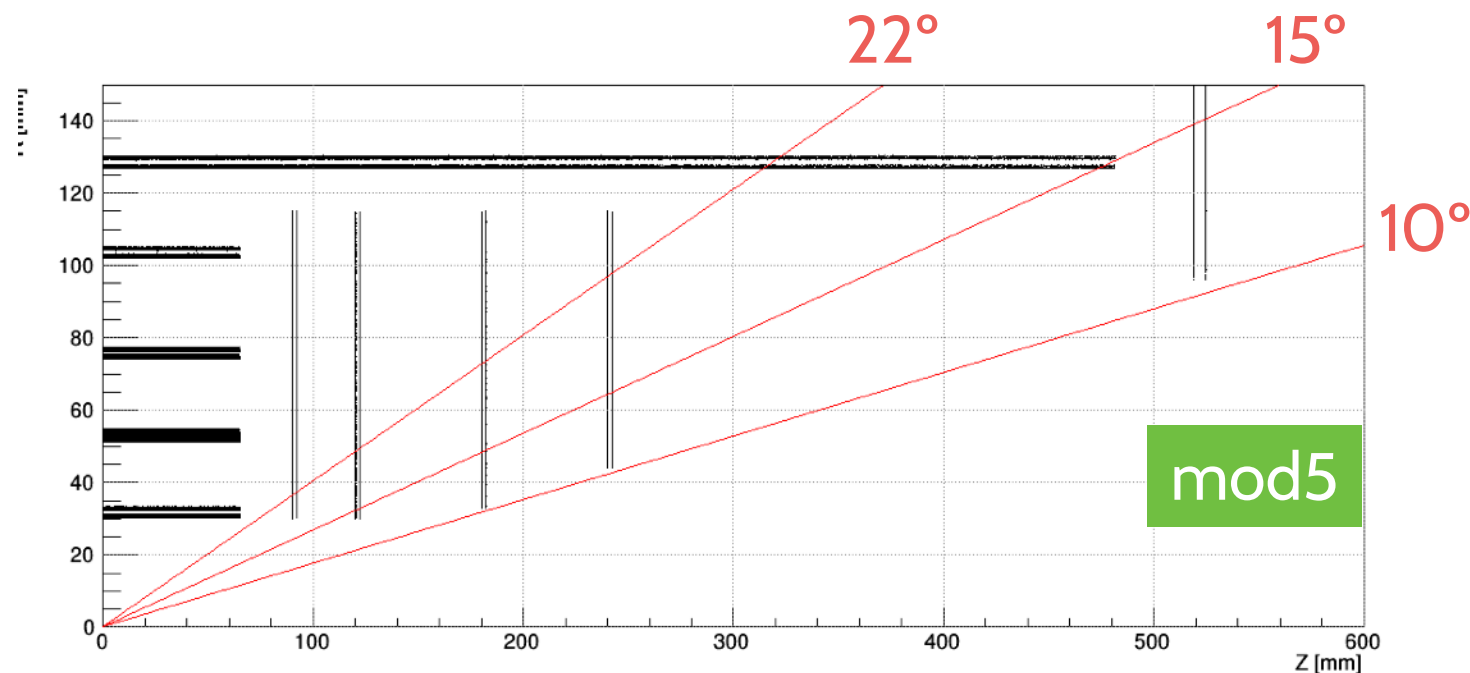
Entrance Z of MARS charged particles



Endcap region adjustments

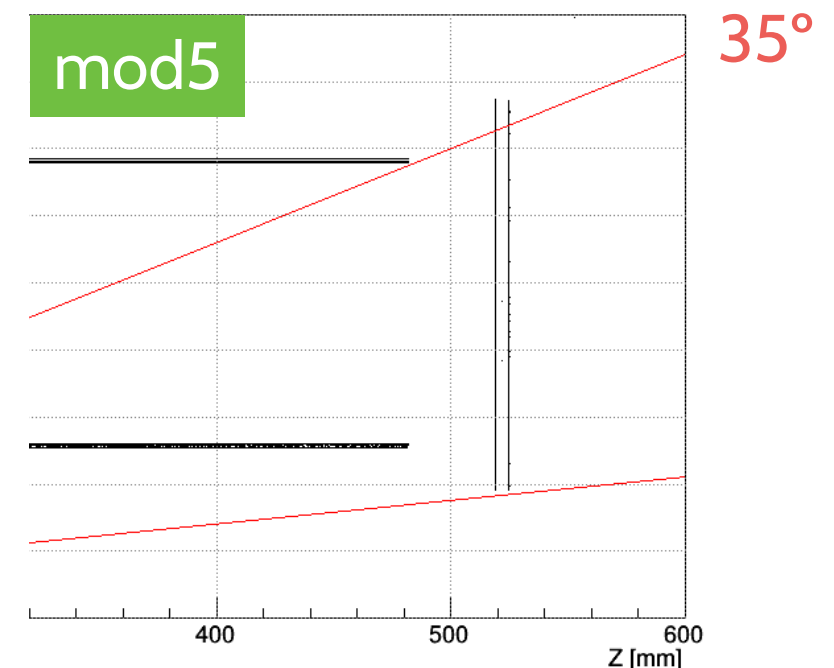
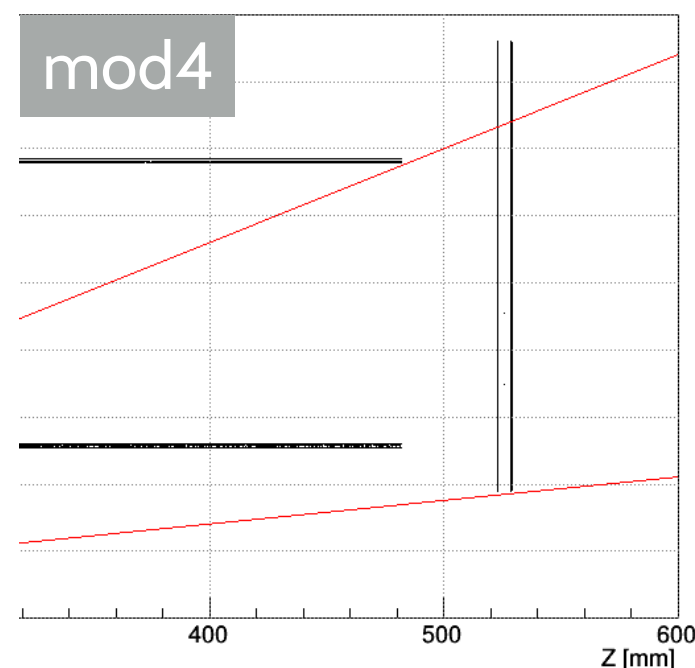
New version: [CLIC_o3_v14_mod5](#)

- weaker magnetic field: 4.0 T $\rightarrow$ 3.57 T (same as MAP) + Endcap layout changes
external field: -1.5 T $\rightarrow$ -1.34 T - is this correct?



Better coverage in the forward region around 20°

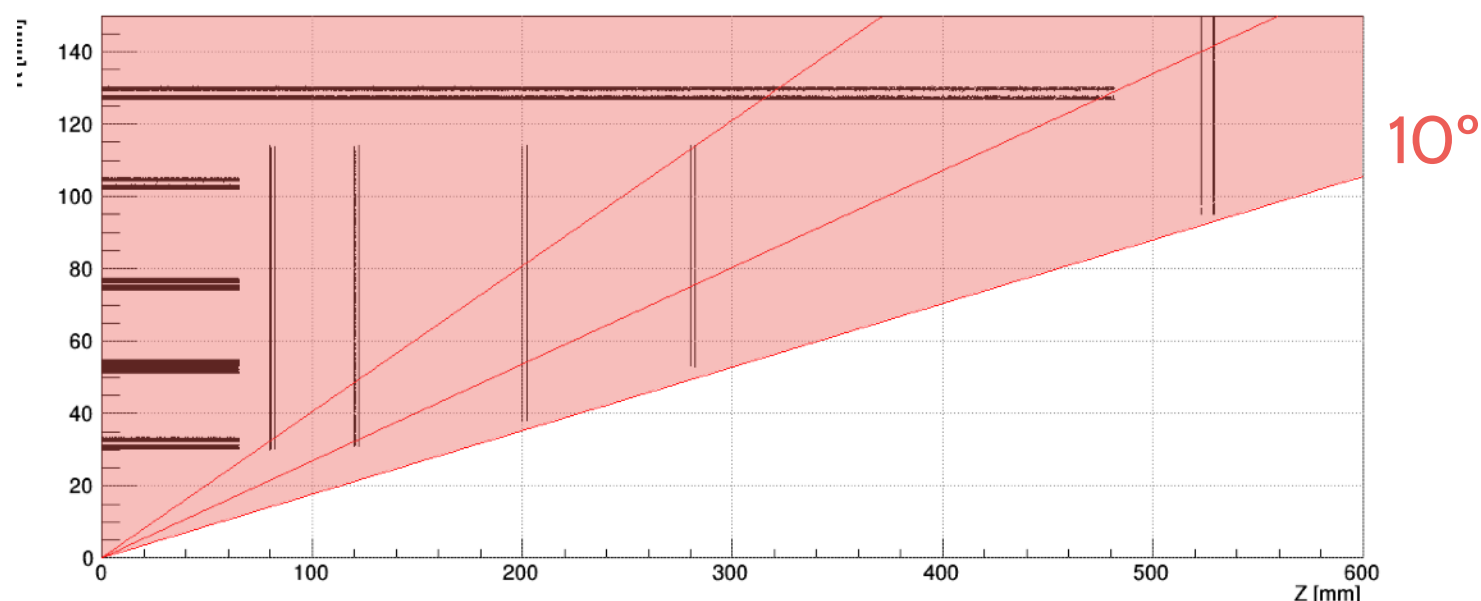
Reduced radius of the 1st Inner Endcap disk



Tracking efficiency: algorithm

Estimating track reconstruction efficiency on single $\mu^\pm$ events:

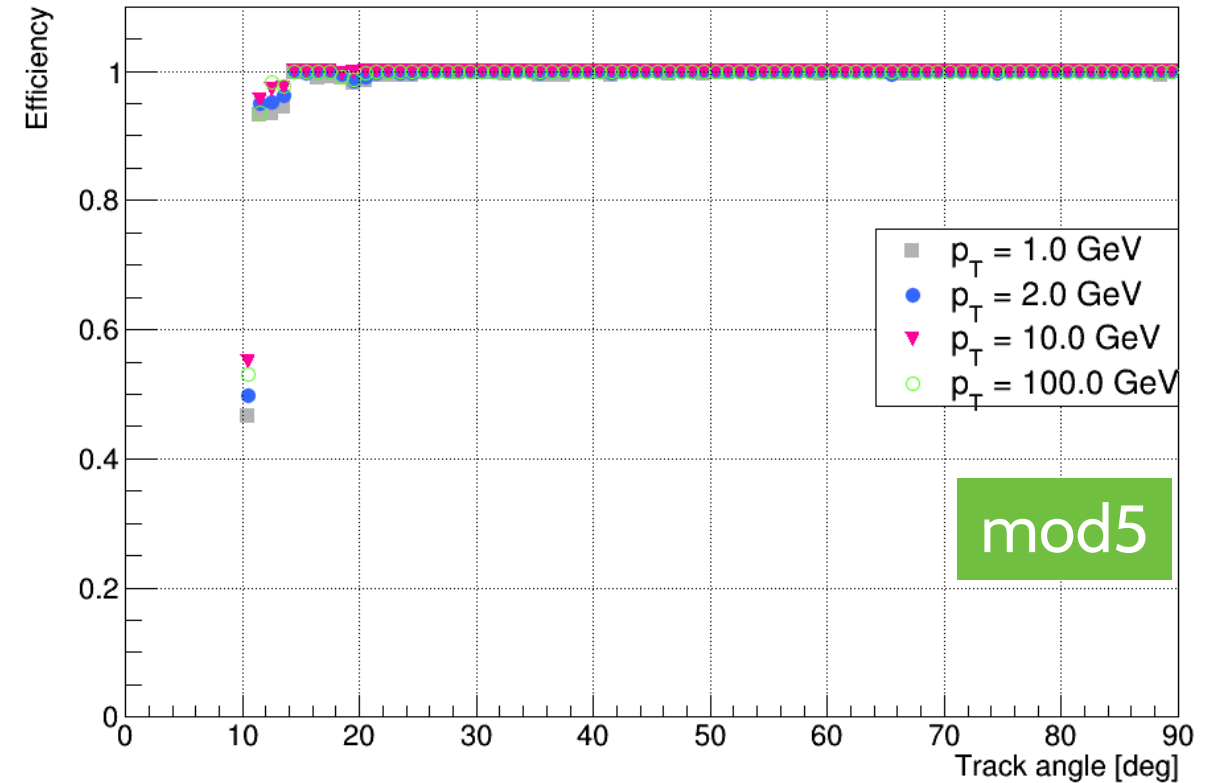
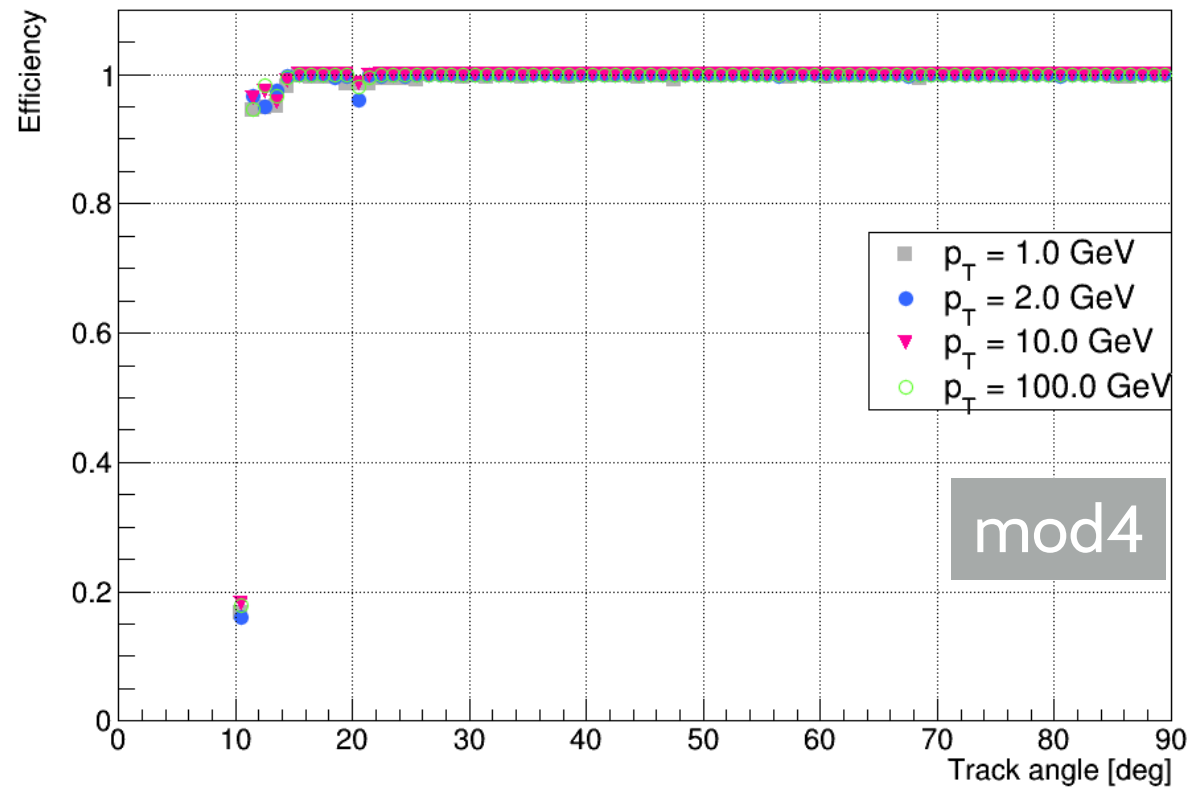
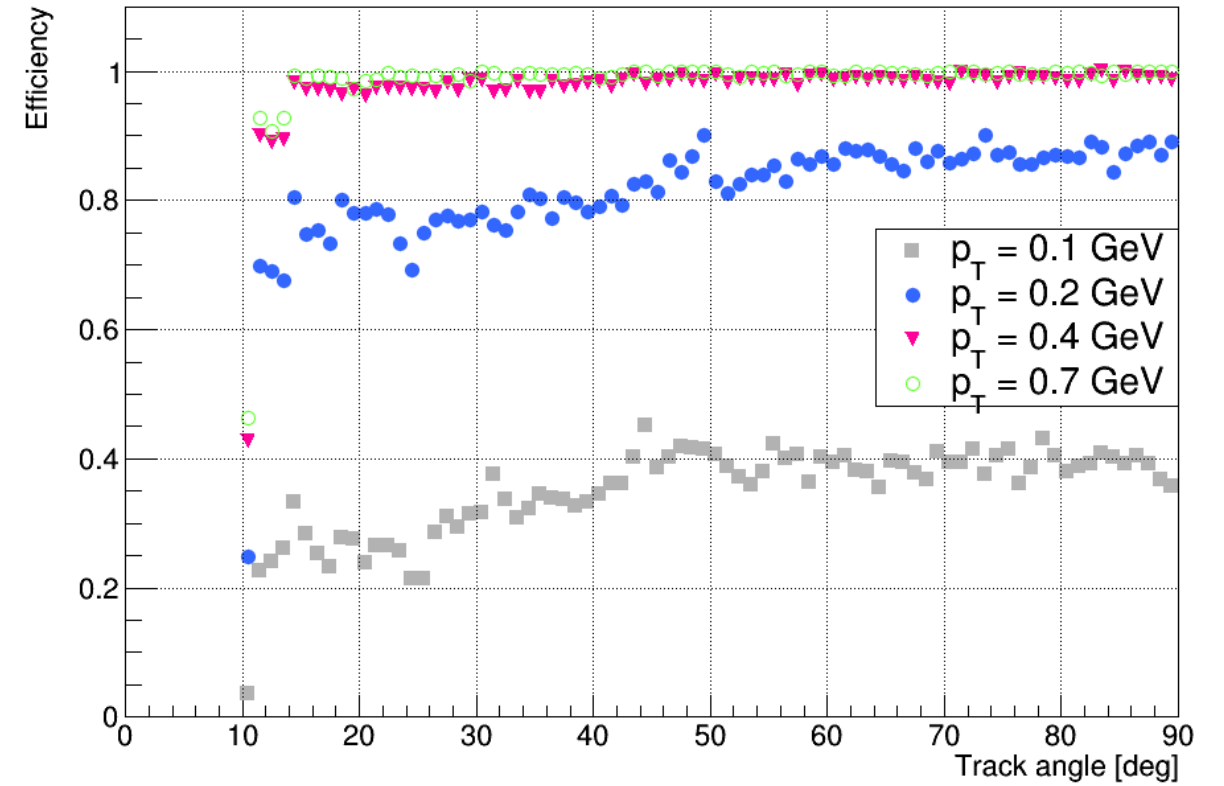
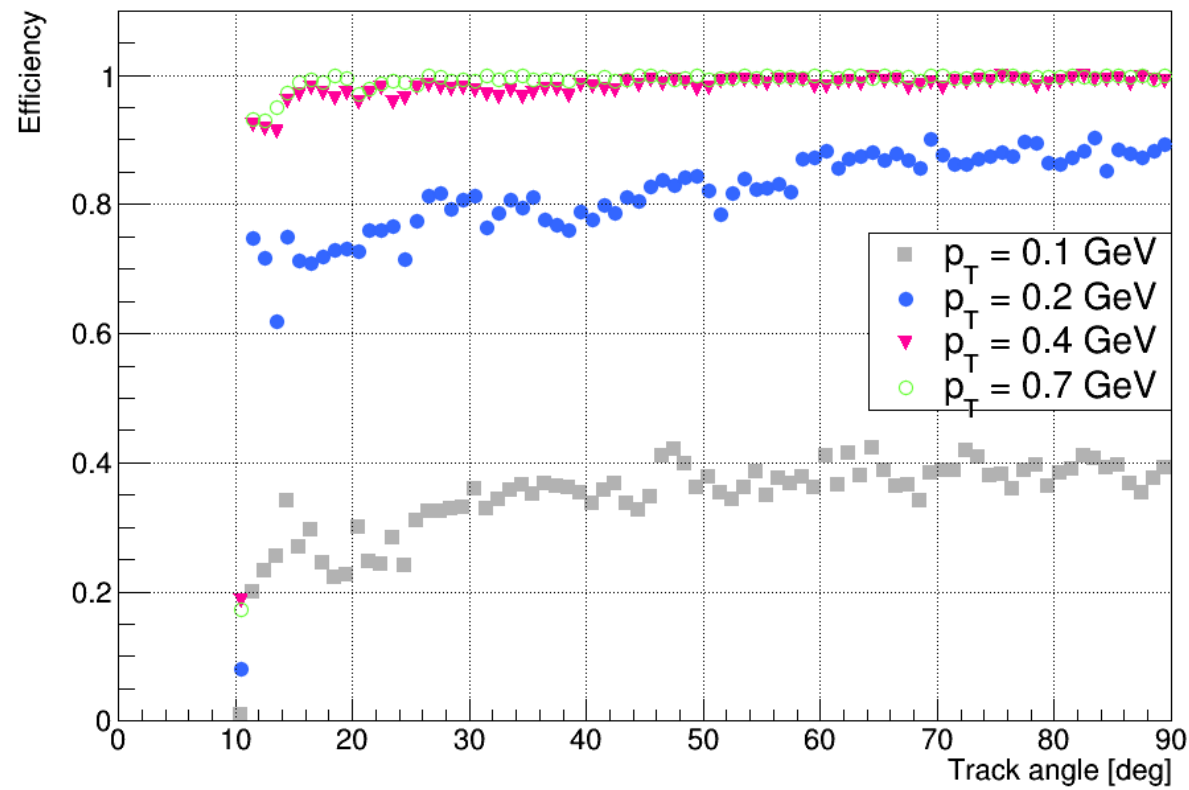
- uniform Theta $[10^\circ-170^\circ]$ at fixed p_T : [0.1 0.2 0.4 0.7 1 2 10 100]



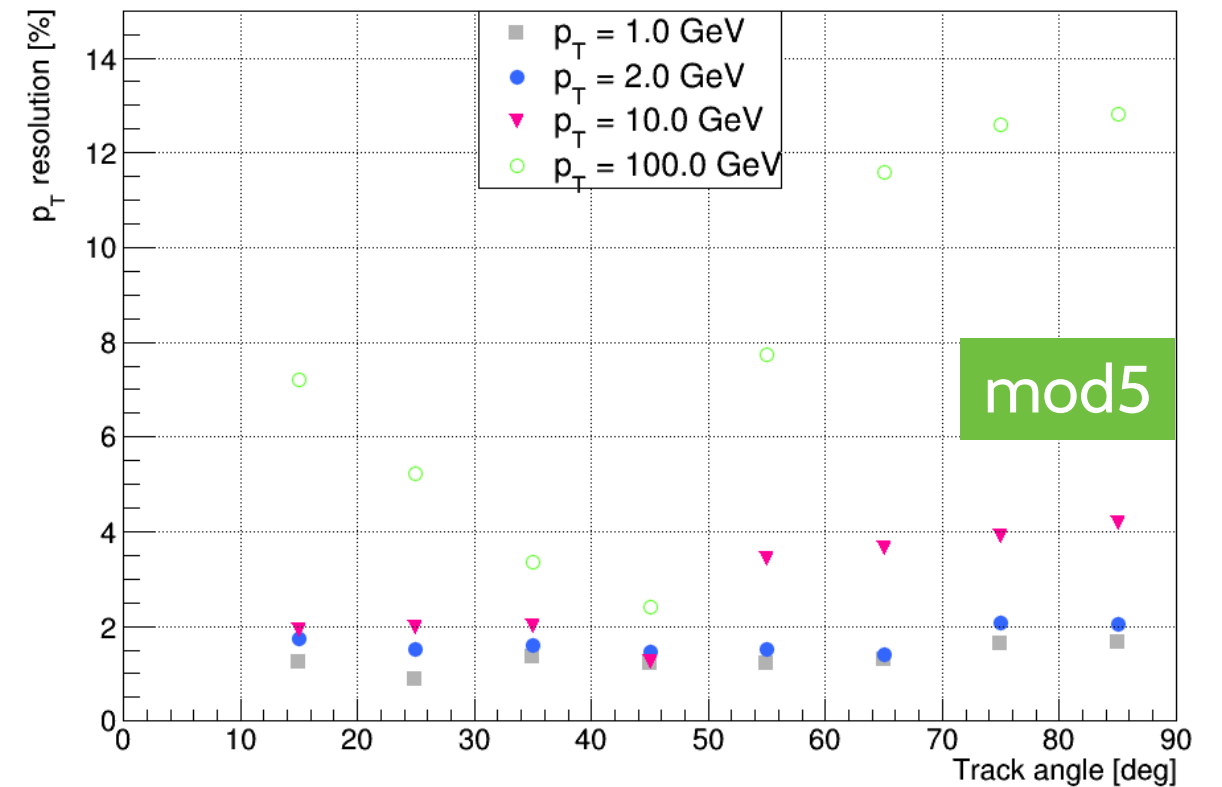
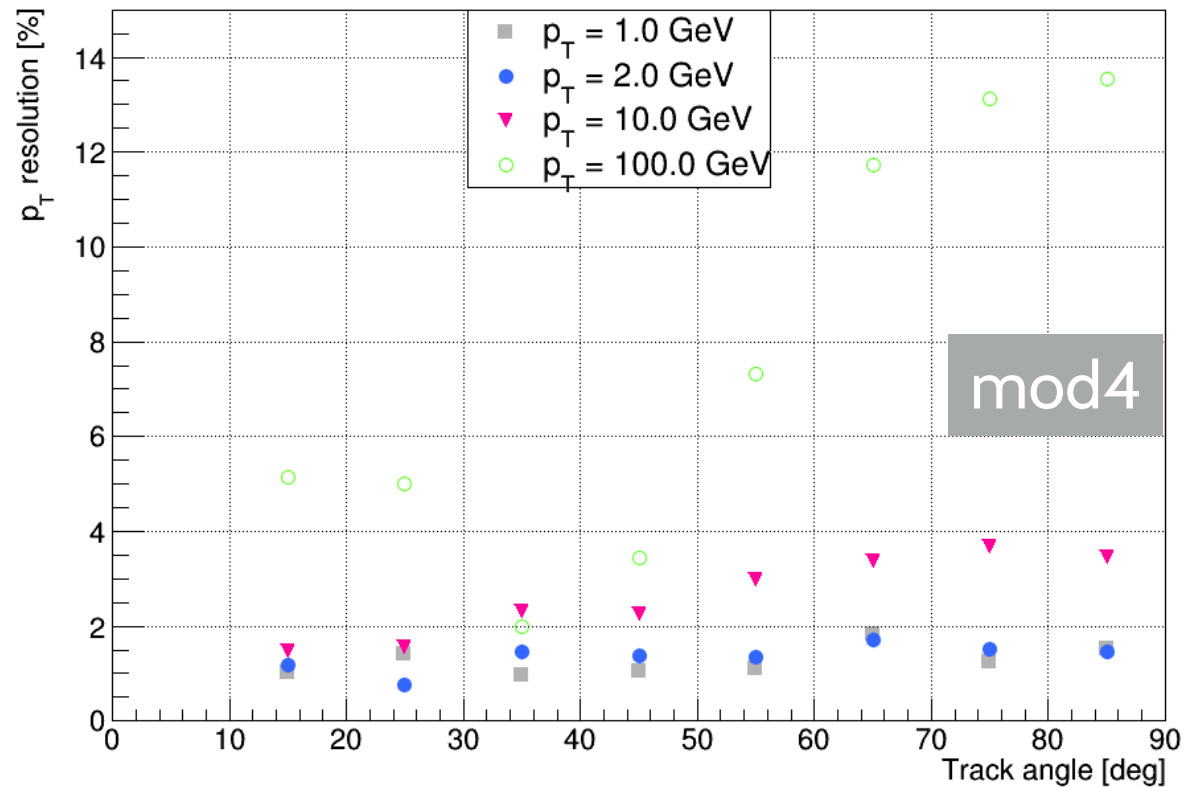
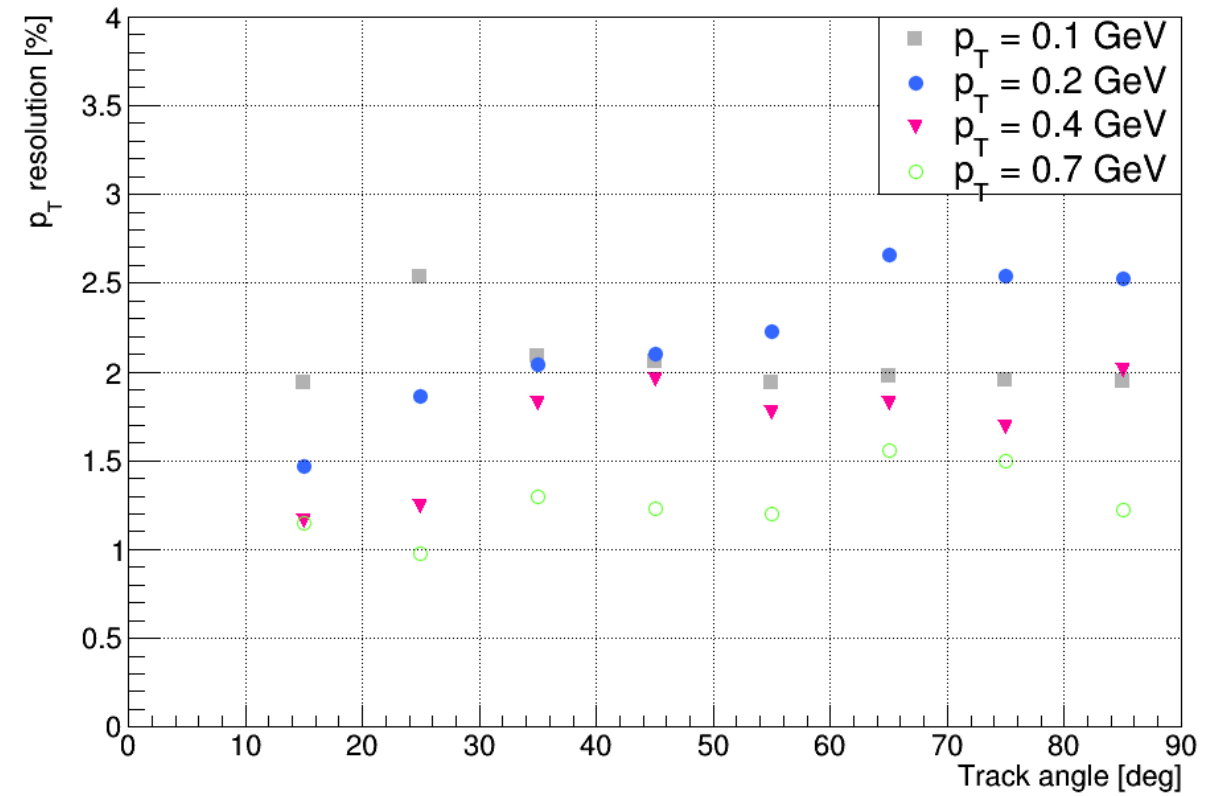
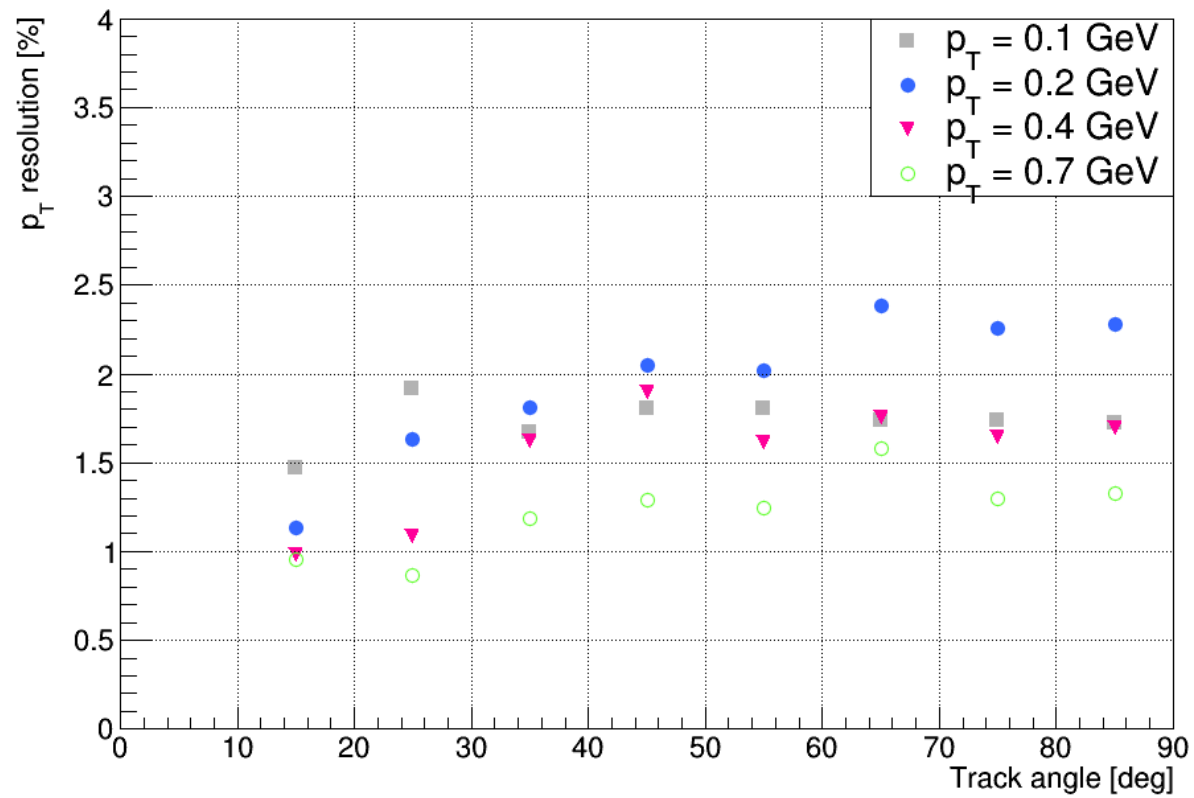
For each initial muon (*denominator*) find a matched track (*nominator*):

- $dR(\text{track}, \text{muon}) < 0.01$
- $|\mathbf{p}_T^{\text{track}} - \mathbf{p}_T^{\text{muon}}| / \mathbf{p}_T^{\text{muon}} < 1.0$
- closest in dR

Tracking efficiency: no changes



Track p_T resolution: very similar



Occupancy: slightly worse

Noticeable increase in VXD endcap occupancy

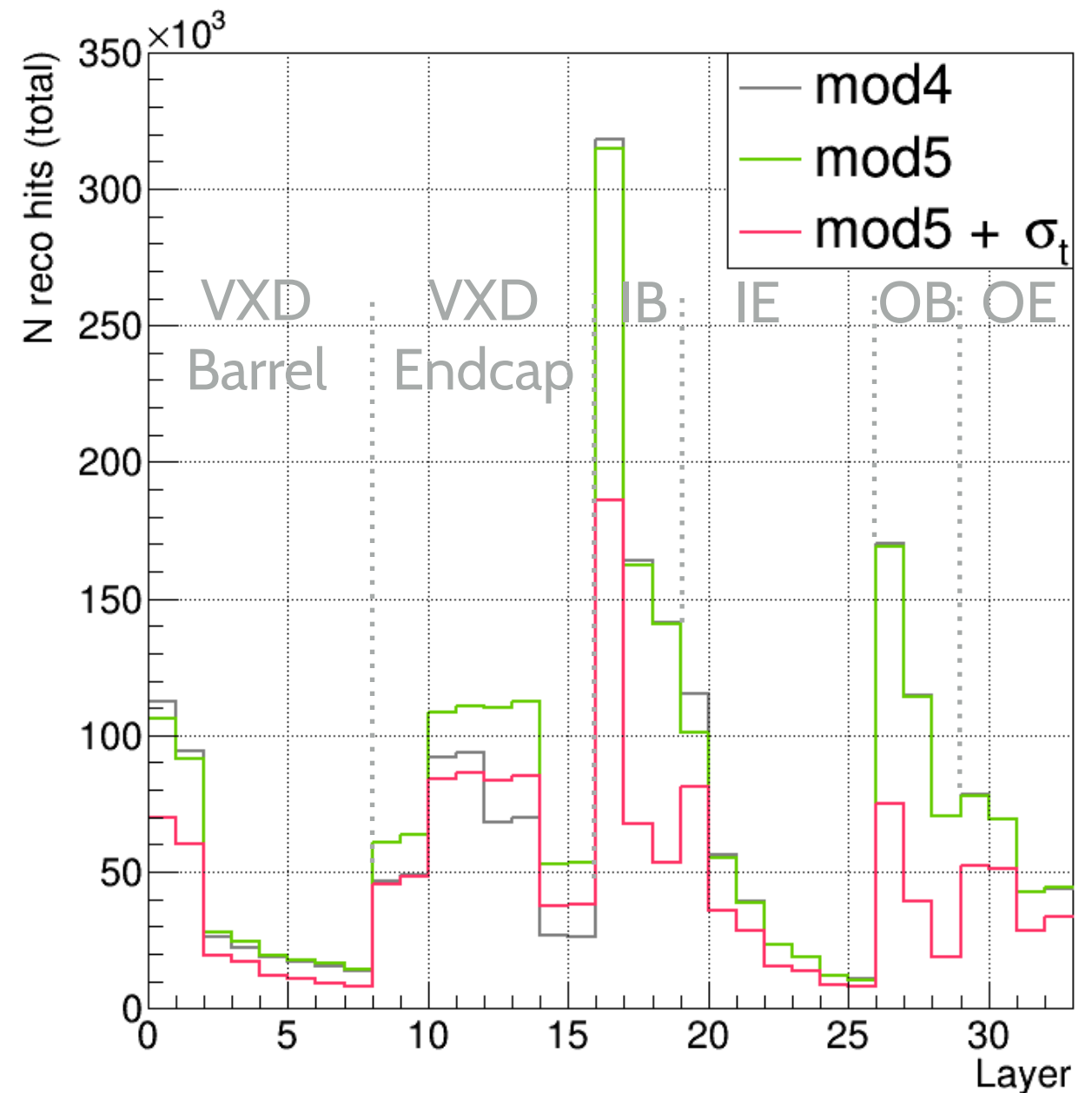
- due to VXD disks rearrangement

Slightly lower occupancy in the barrel region

- might be due to the weaker magnetic field

Large improvement with better timing precision assumption:

- VXD: 50ps TRK: 100ps
- VXD: 30ps TRK: 60ps



Summary

New geometry has been prepared and tested

Provides the same tracking efficiency and slightly lower p_T resolution

Noticeably higher occupancy in the Vertex Endcaps