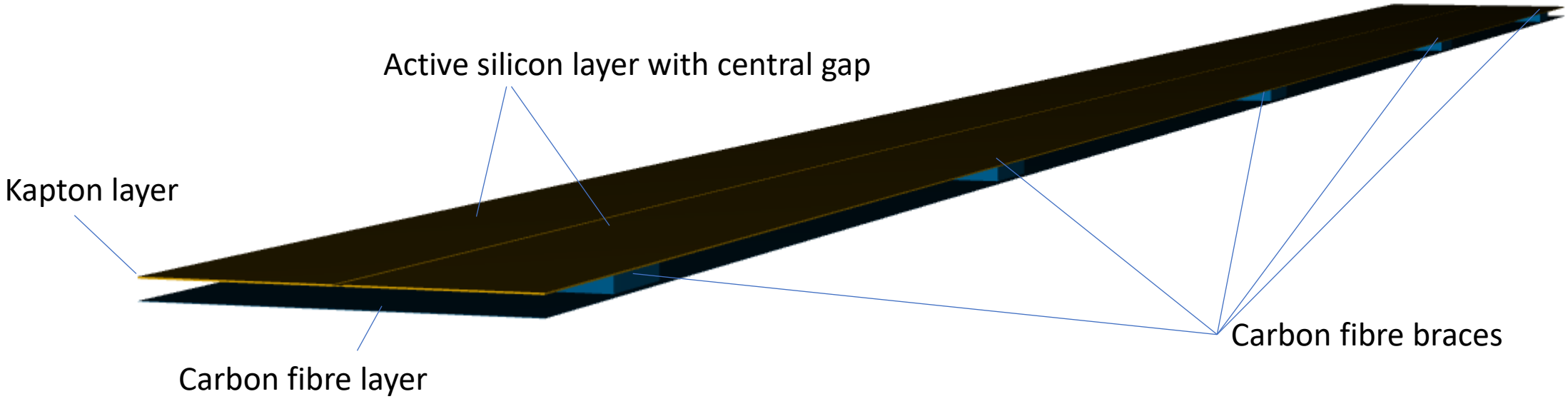
flat_OB geometry

Sam Henry, University of Oxford, 5 September 2025
Update to presentation given on 28 August

Proposed update to epic-main geometry – new silicon_barrel.xml to better match the CAD files.

- Carbon fiber braces to reproduce peaks on material thickness scan
- Gap in active silicon to reproduce dead area
- Castellated stave arrangement

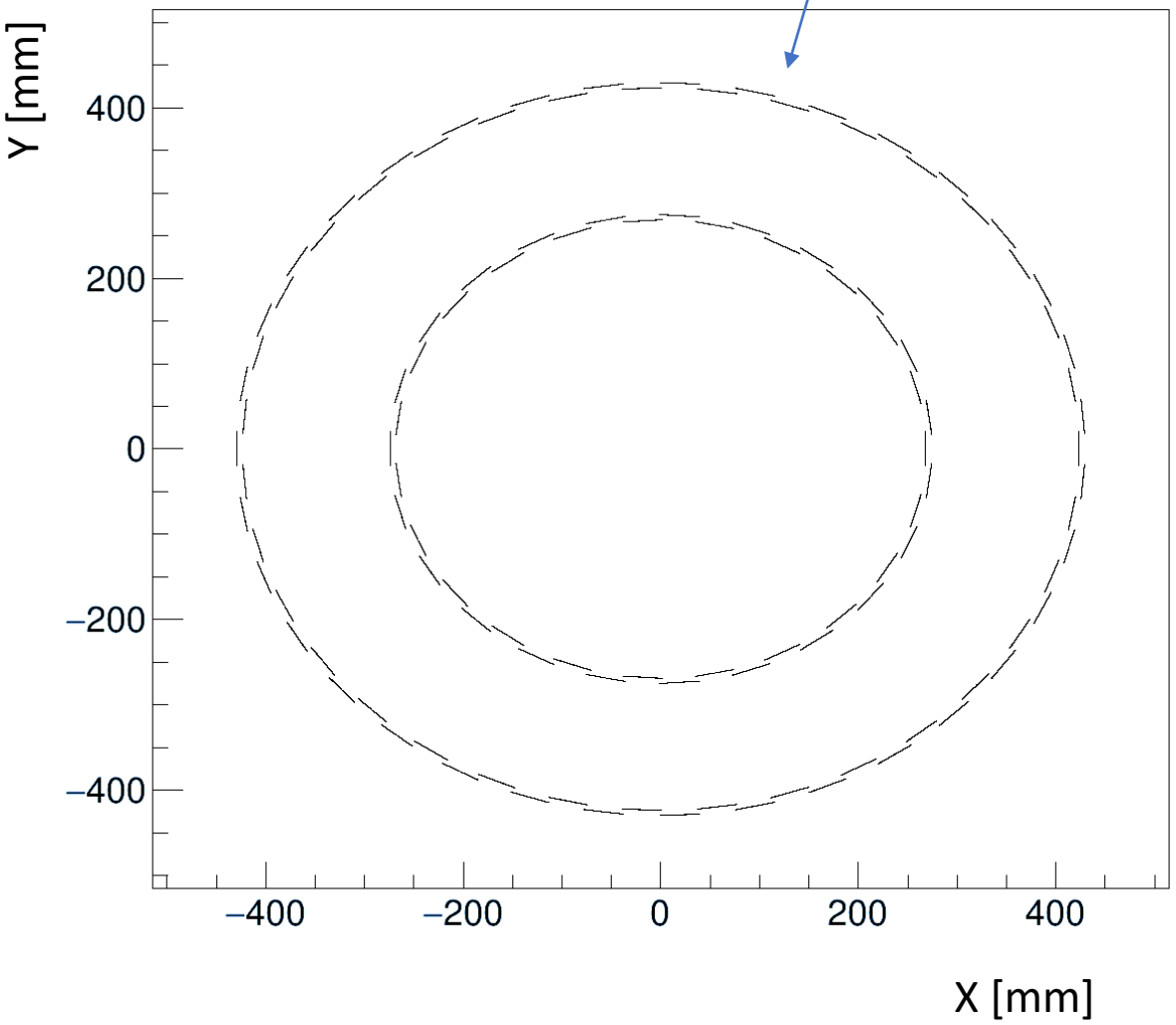
https://github.com/eic/epic/tree/flat_OB
https://github.com/eic/epic/pull/933
https://indico.bnl.gov/event/29542/#2-svt-ob-simulation-geometry-u



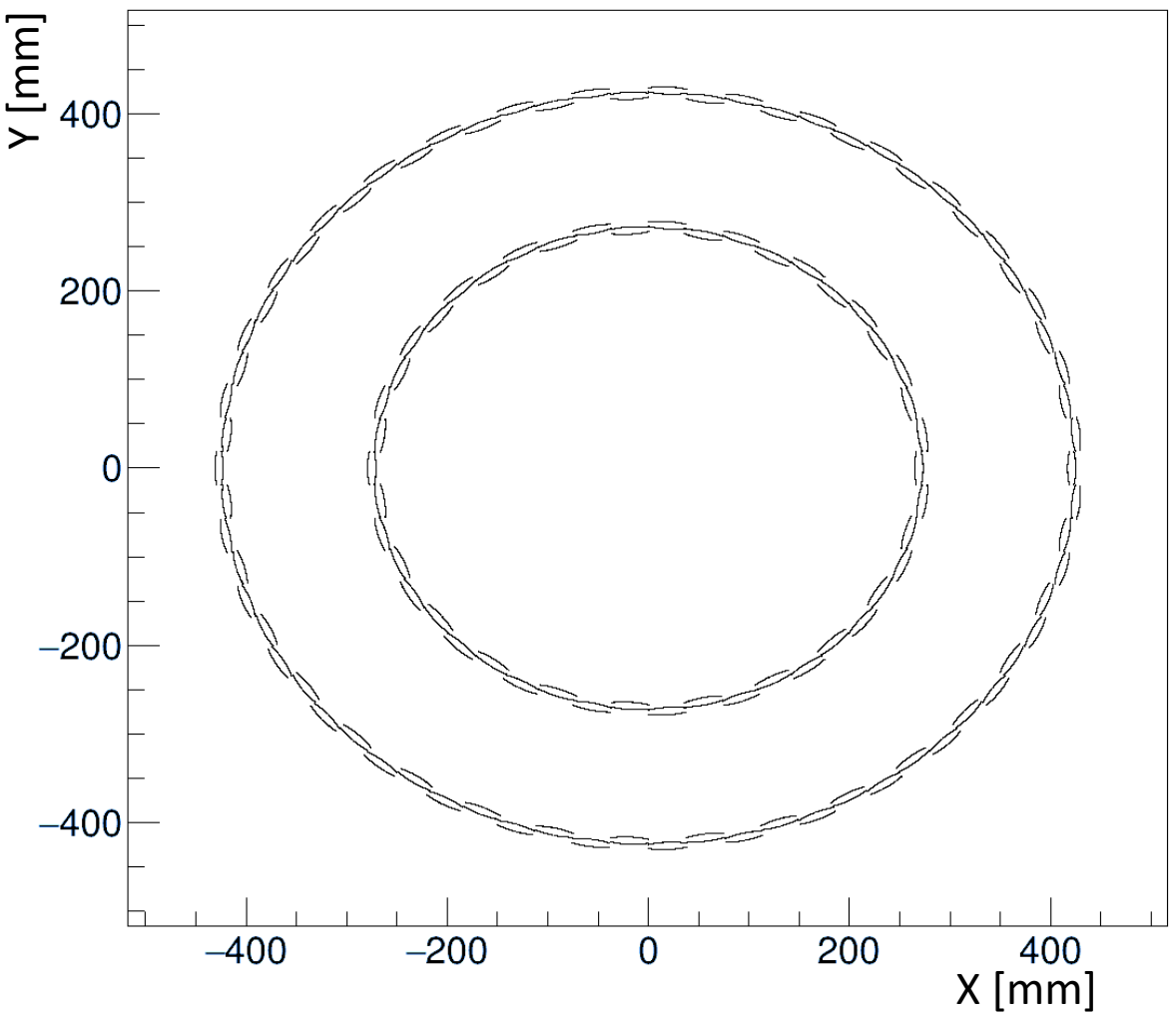
Hit Maps

Castellated staves – alternate staves have radius offset by 6mm

New flat_OB geometry



July CAD geometry



Note on barrel radii

- In the current design the staves should be positioned with the centre of the lower staves at radii of 269mm and 421mm, with alternate stave 6mm further out.
- In the current simulation geometry, the barrel layer envelopes are 270.5 – 301.0mm and 429.5 – 460.0mm. This needs to be updated, but this will also require updates to the inner support and silicon disk volumes to avoid overlaps
- Therefore, I have left the layer envelope unchanged, and moved the barrels further out so they fit inside the layer:

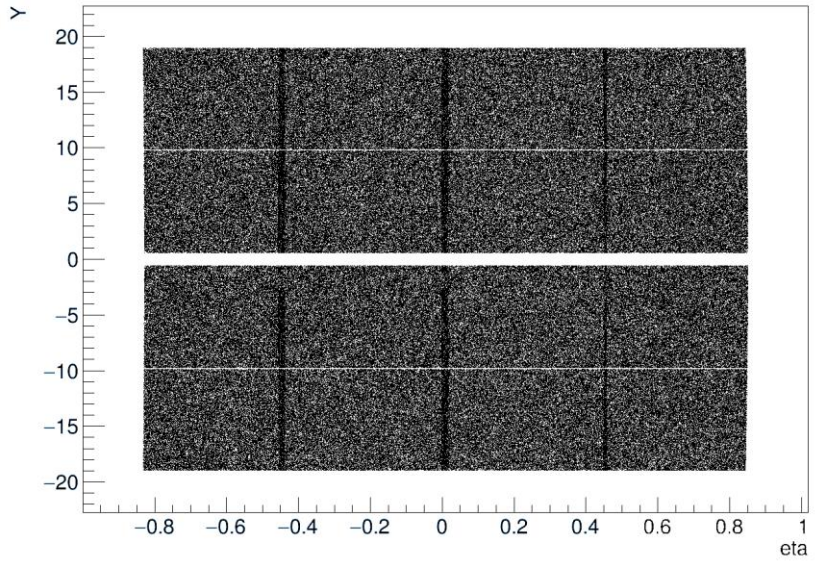
```
<constant name="SiBarrel1_radius_offset" value="5.5*mm" />
<constant name="SiBarrel2_radius_offset" value="9.5*mm" />
```

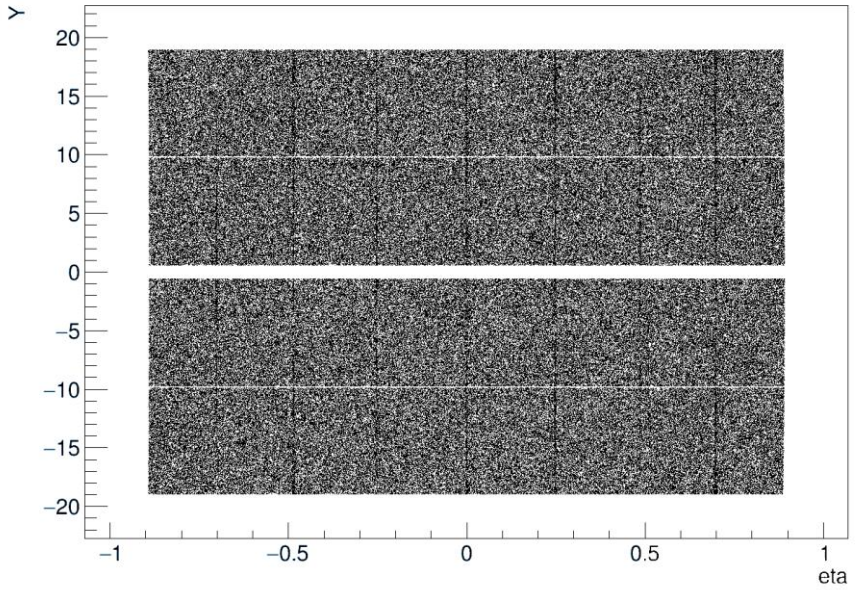
- This should be changed as soon as the inner support is updated.

Hit maps – single staves

Reproduce 1mm dead area in active silicon

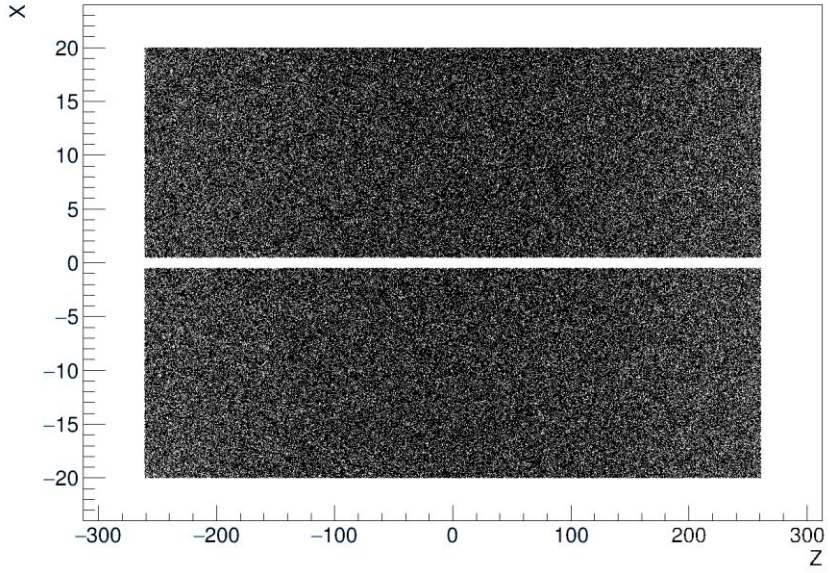
July CAD



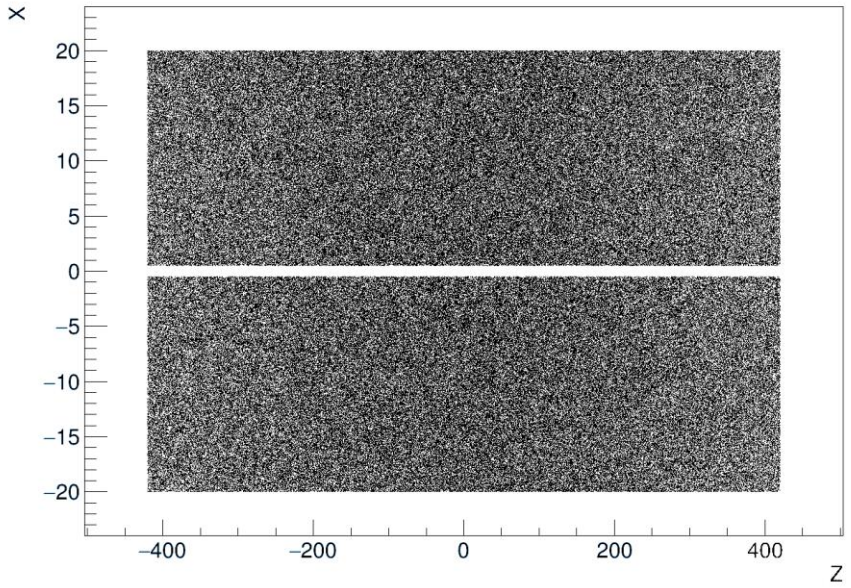


flat_OB

L3

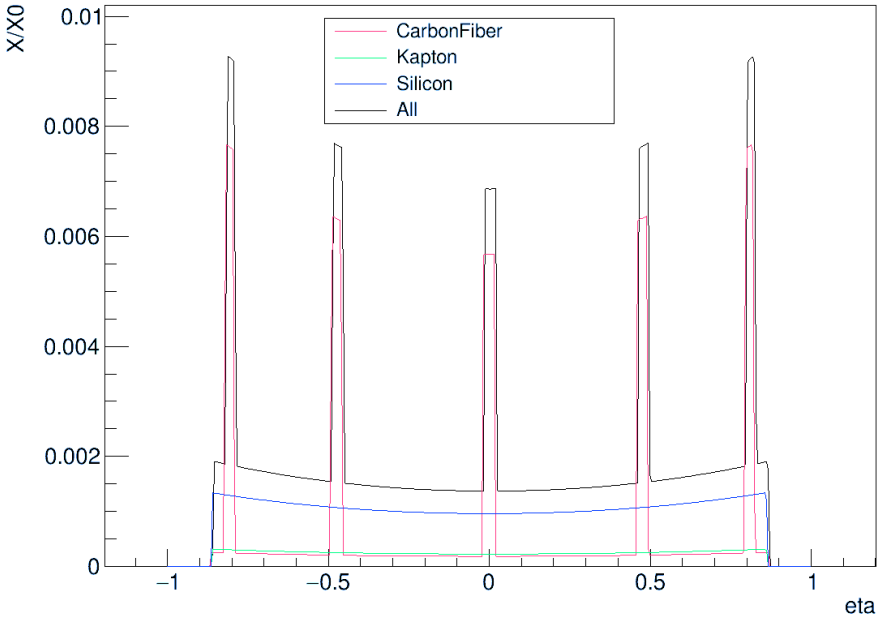


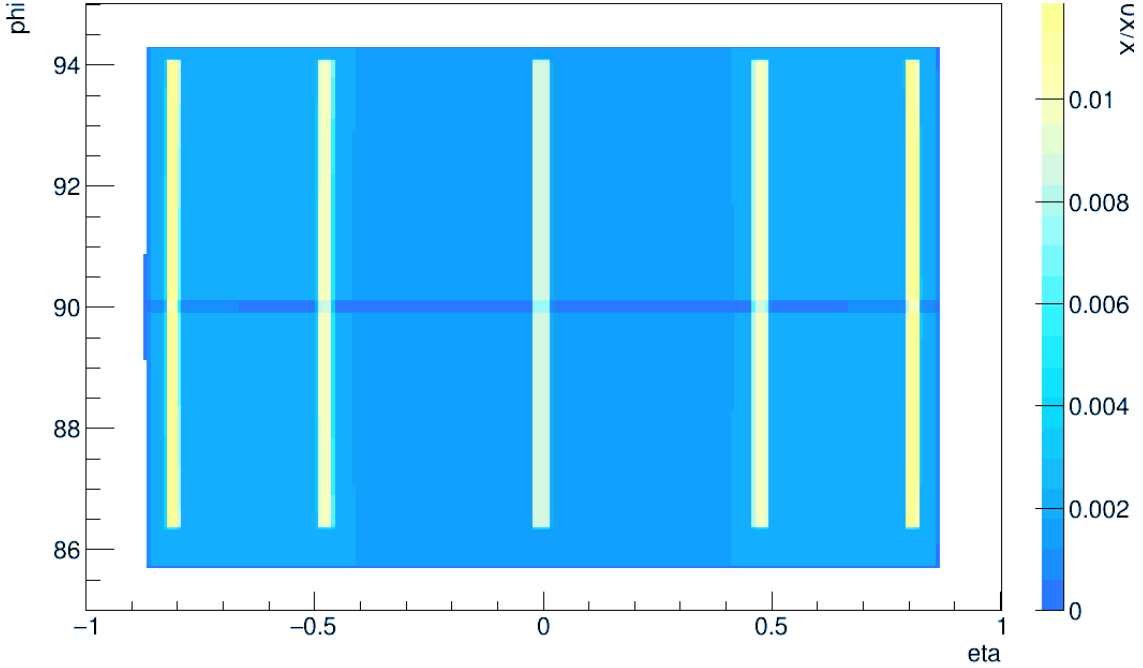
L4



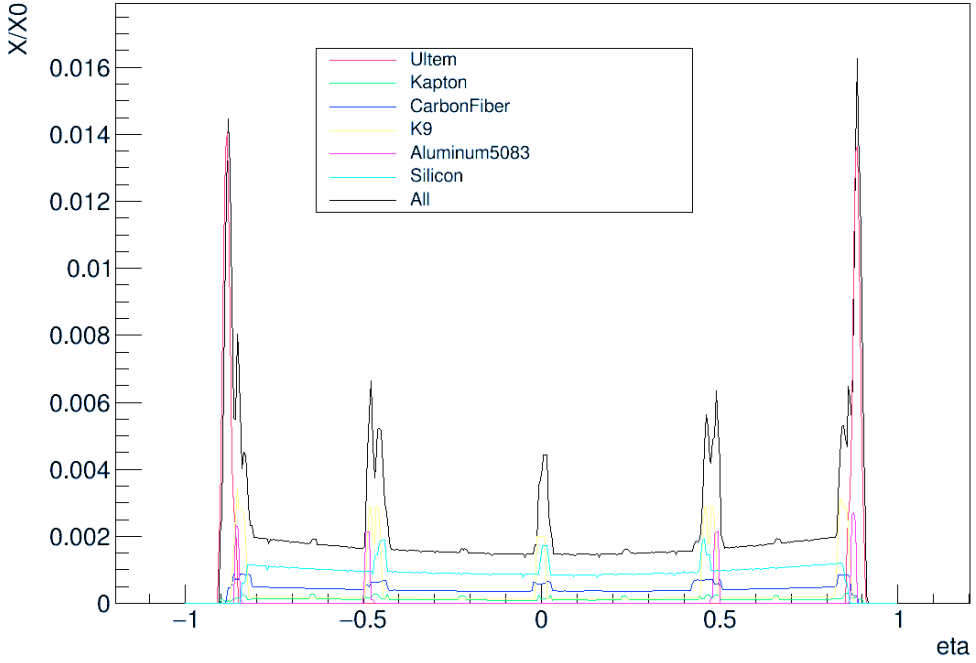
Single stave material scans – L3

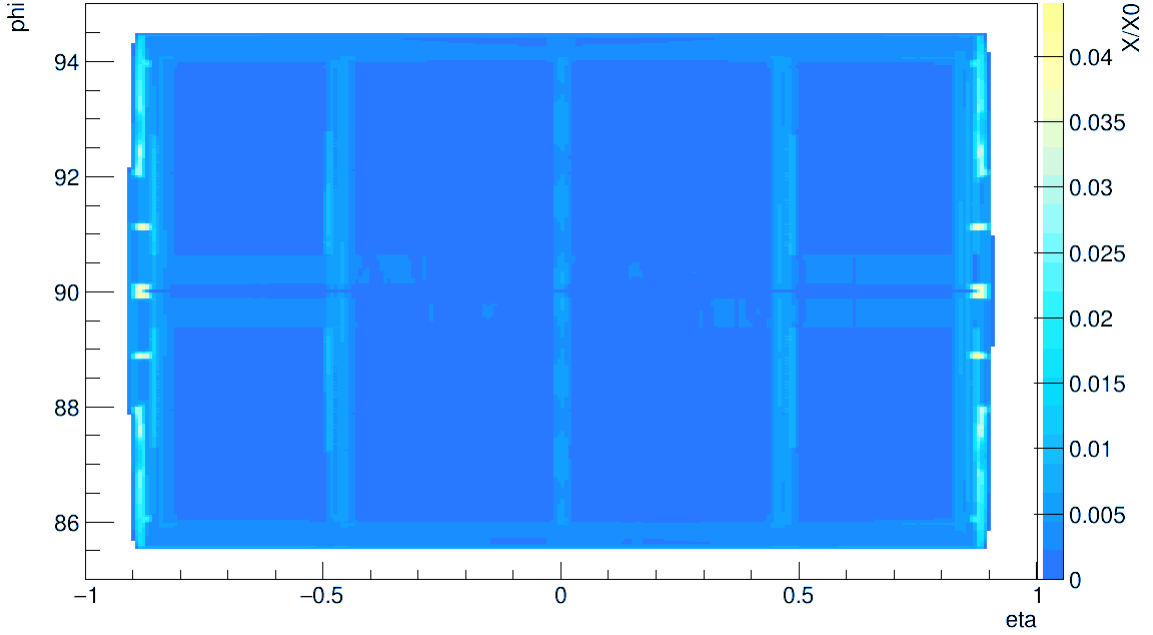
flat_OB





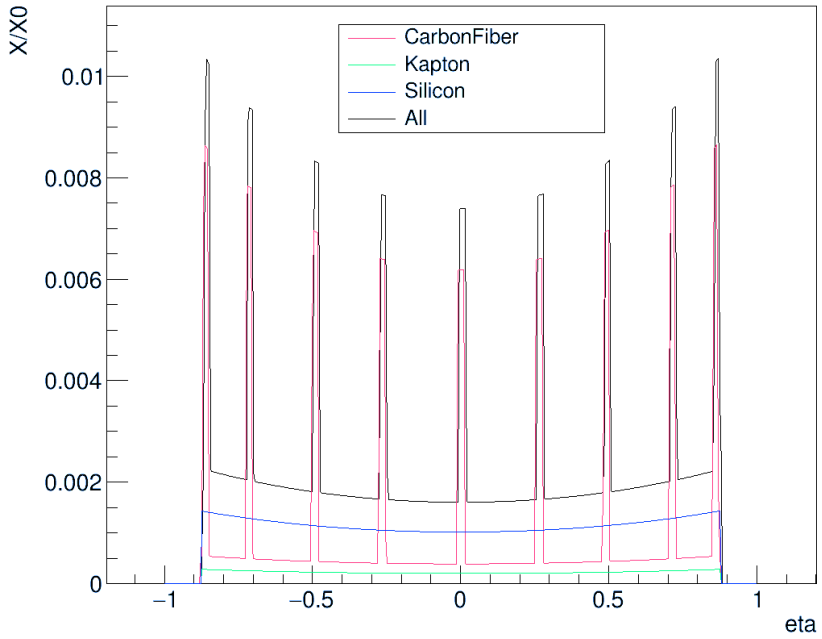
July CAD with Ultem and FPC

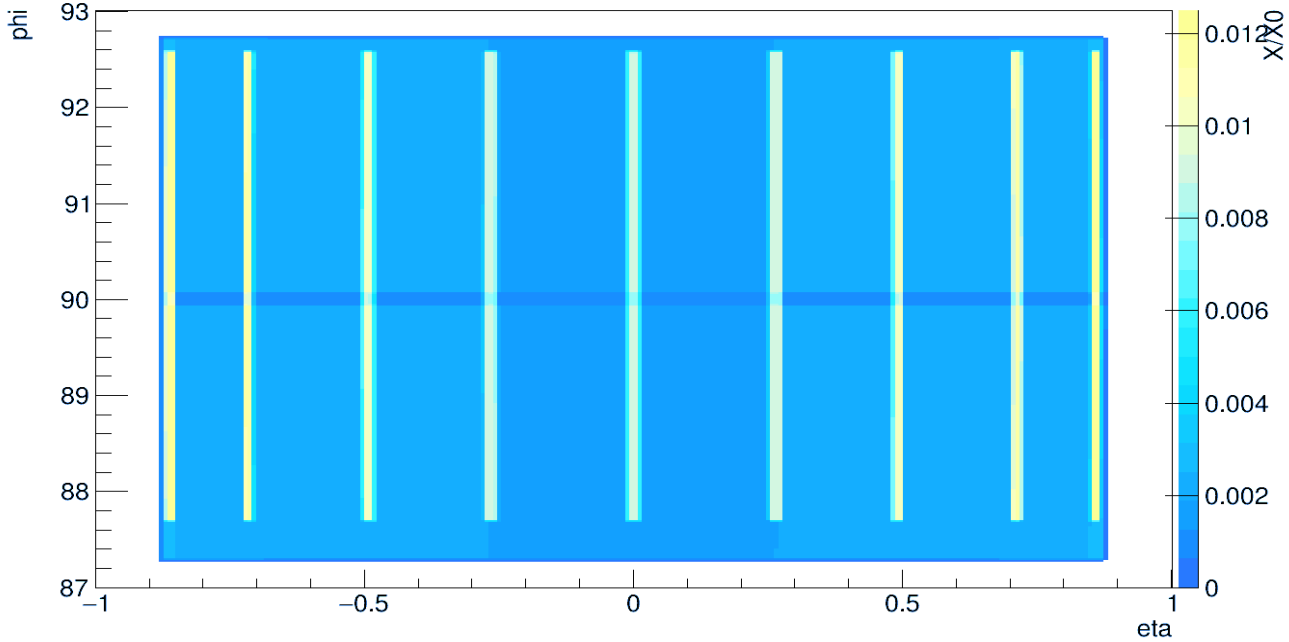




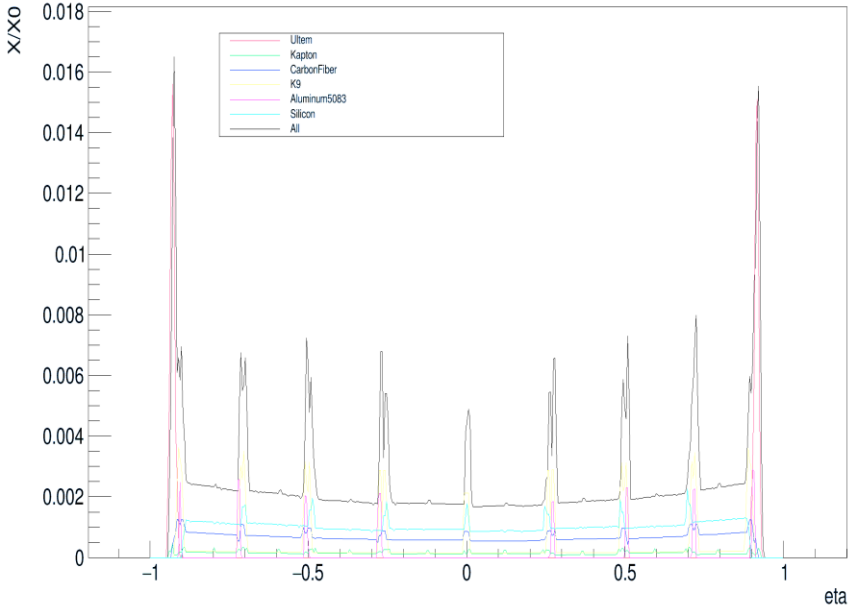
Single stave material scans – L4

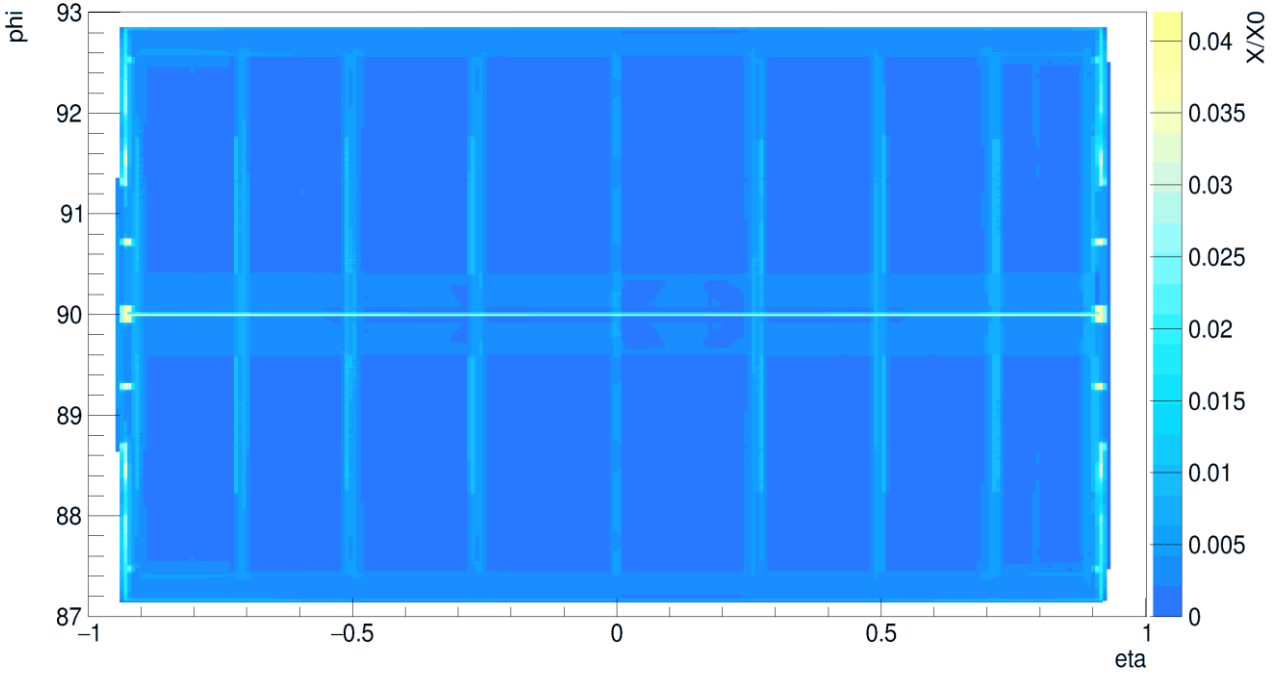
flat_OB





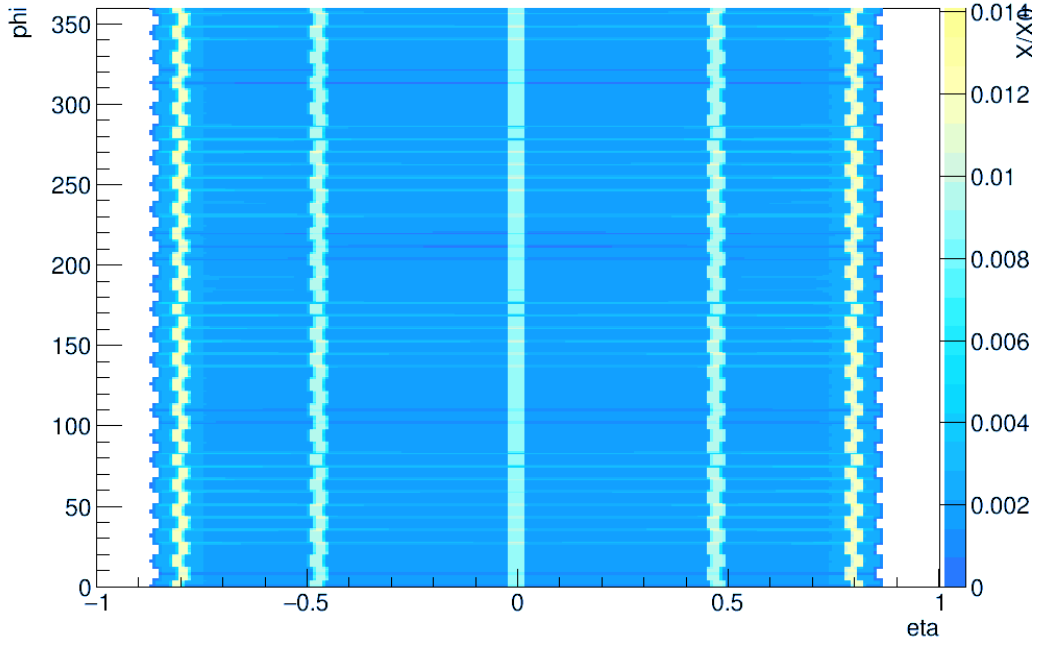
July CAD with Ultem and FPC

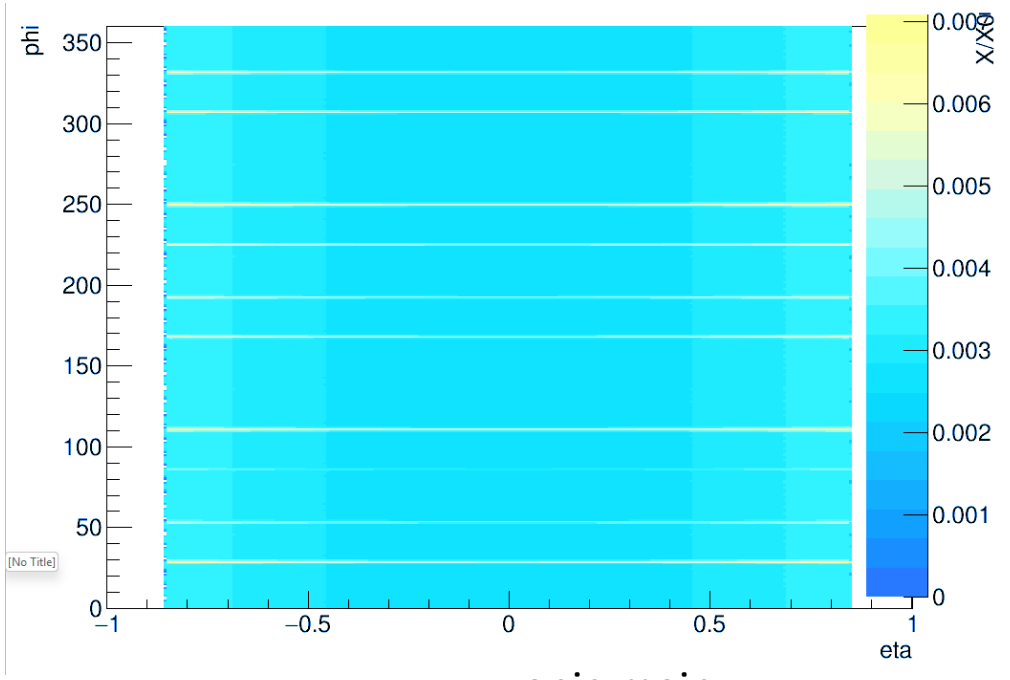




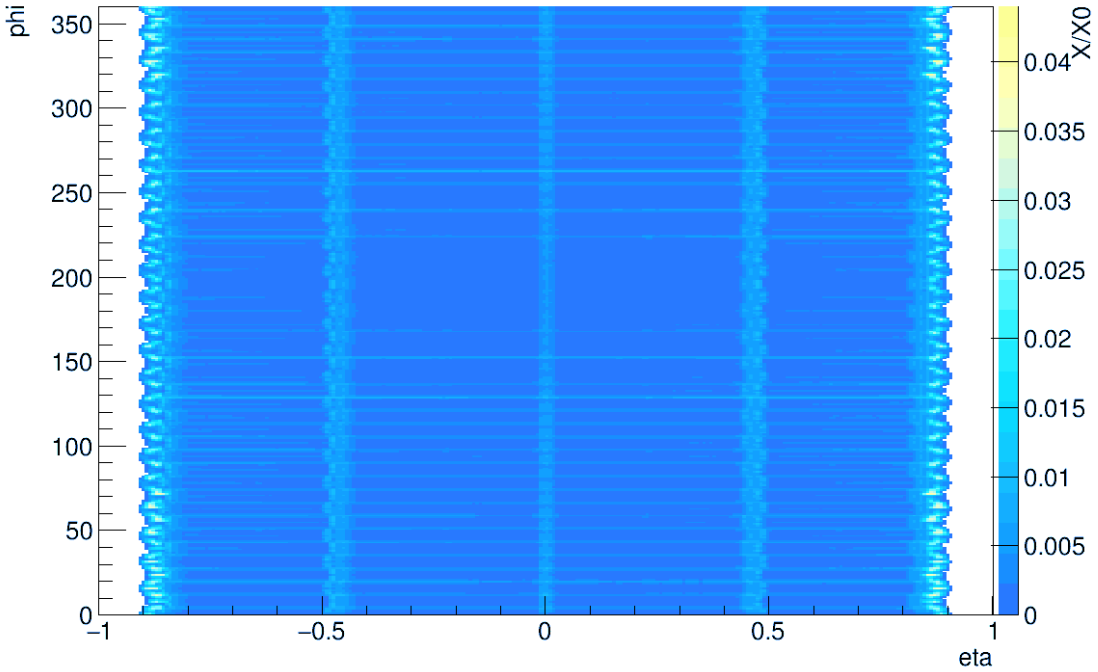
L3 full barrel Material scans

flat_OB





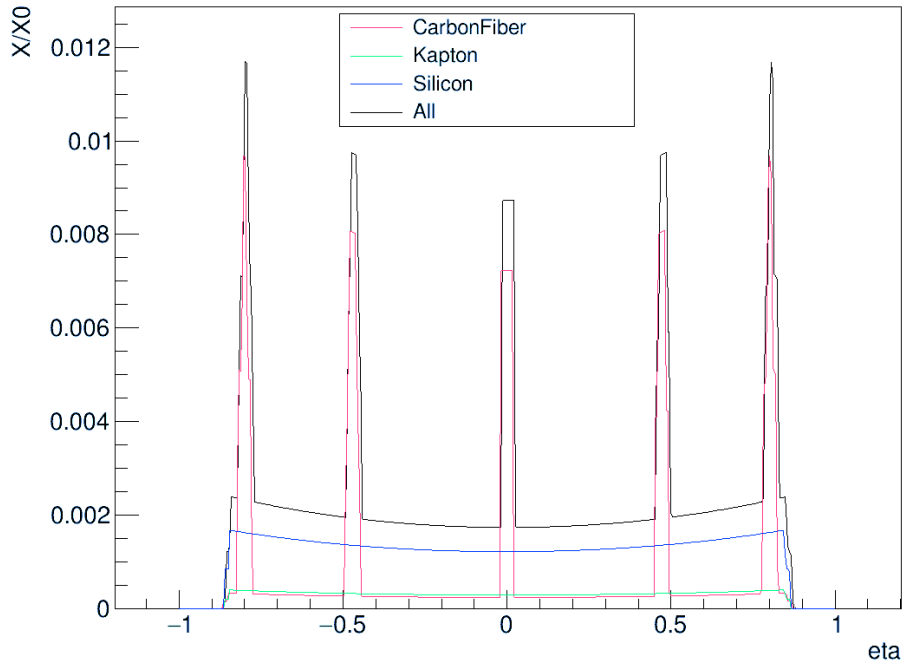
epic-main

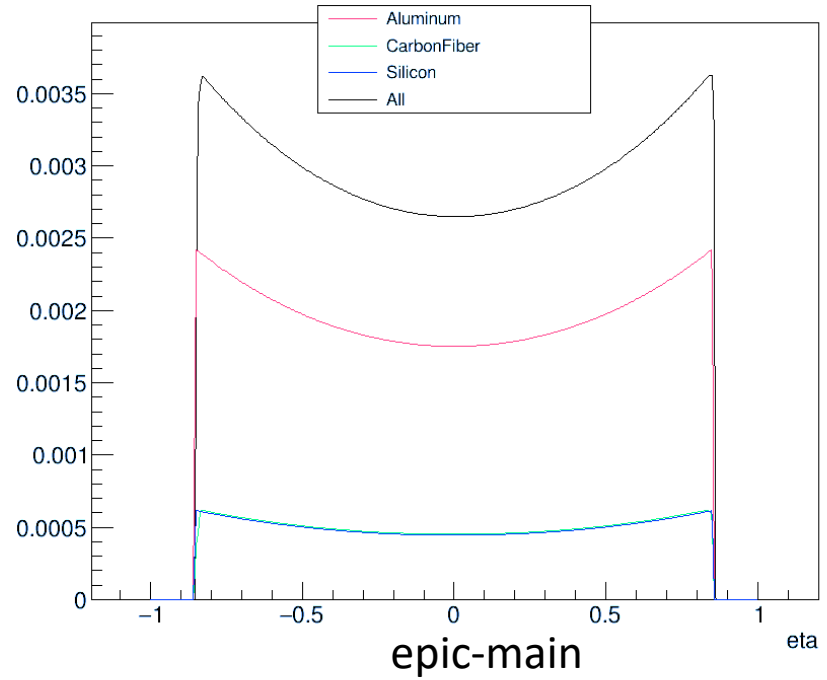


July CAD

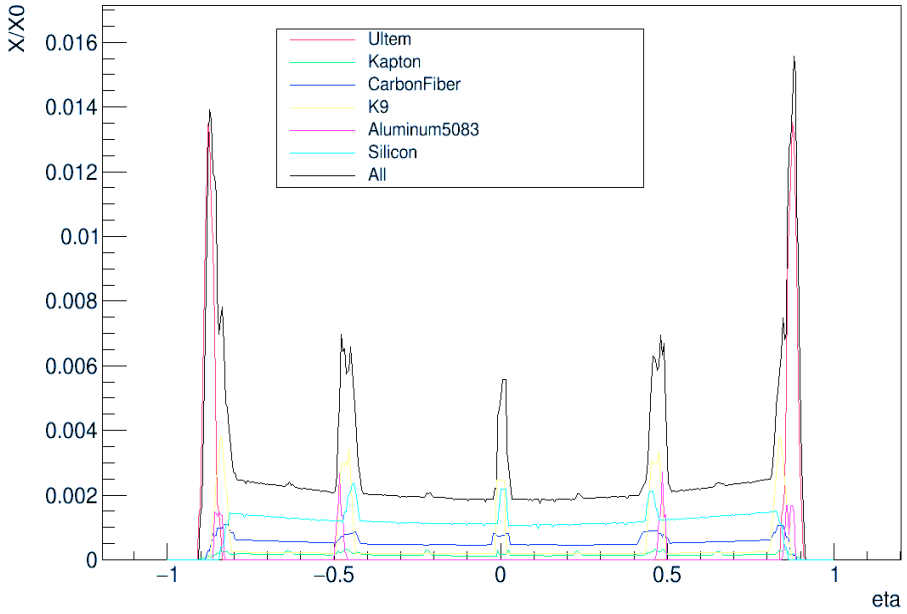
L3 full barrel
Material scans

flat_OB



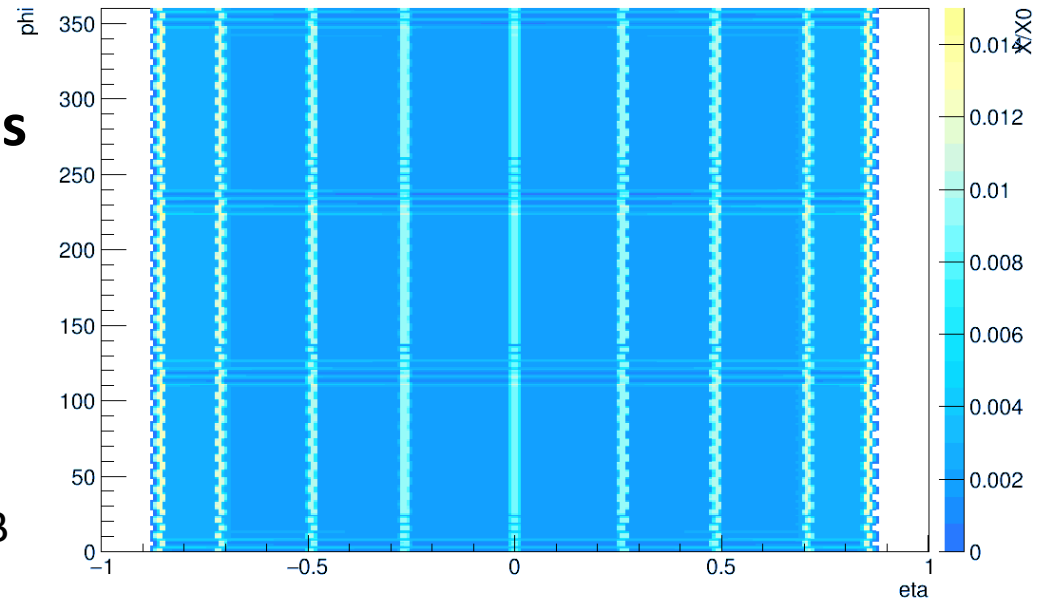


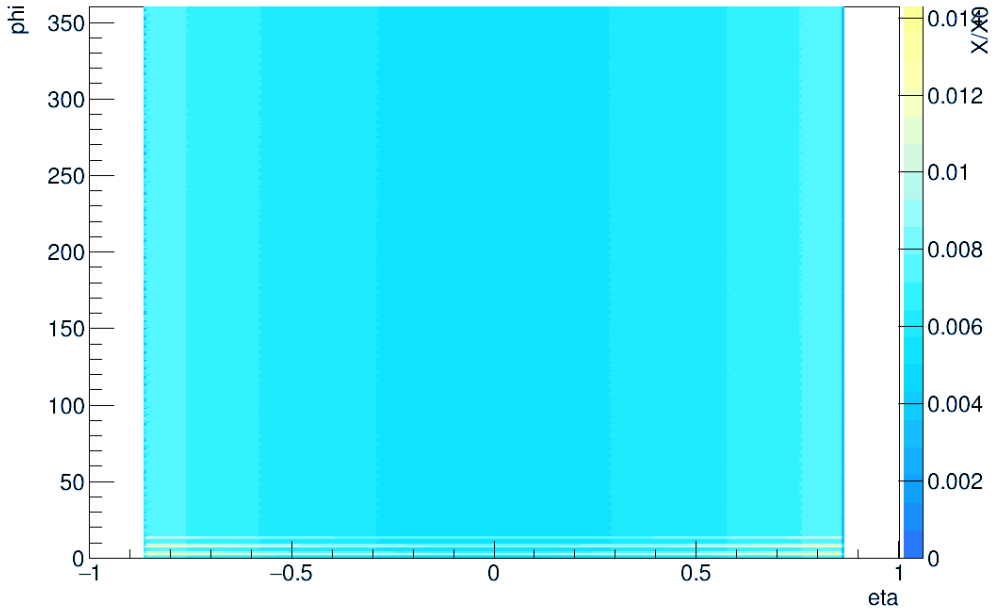
July CAD



L4 full barrel Material scans

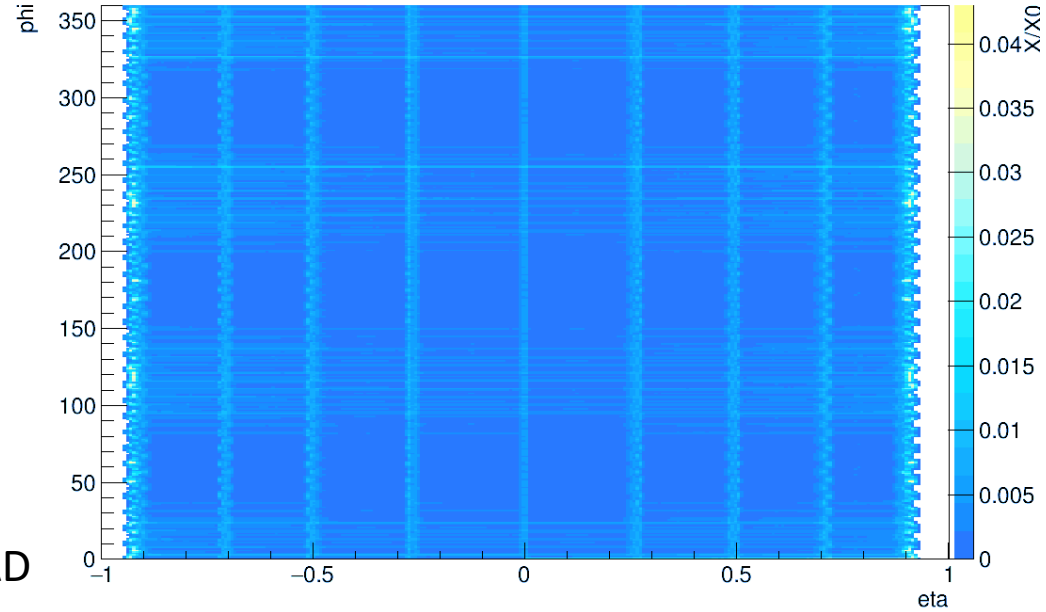
flat_OB





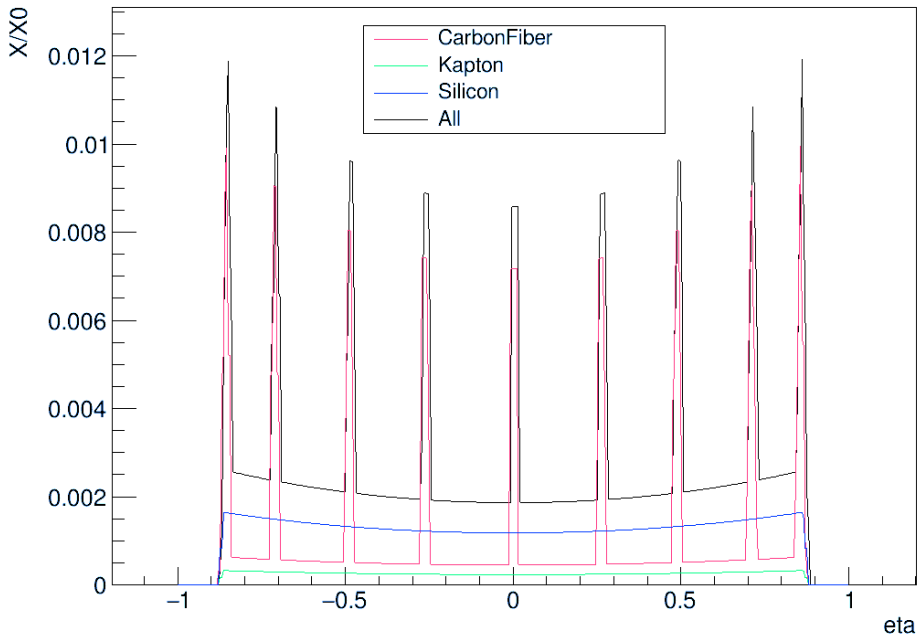
epic-main

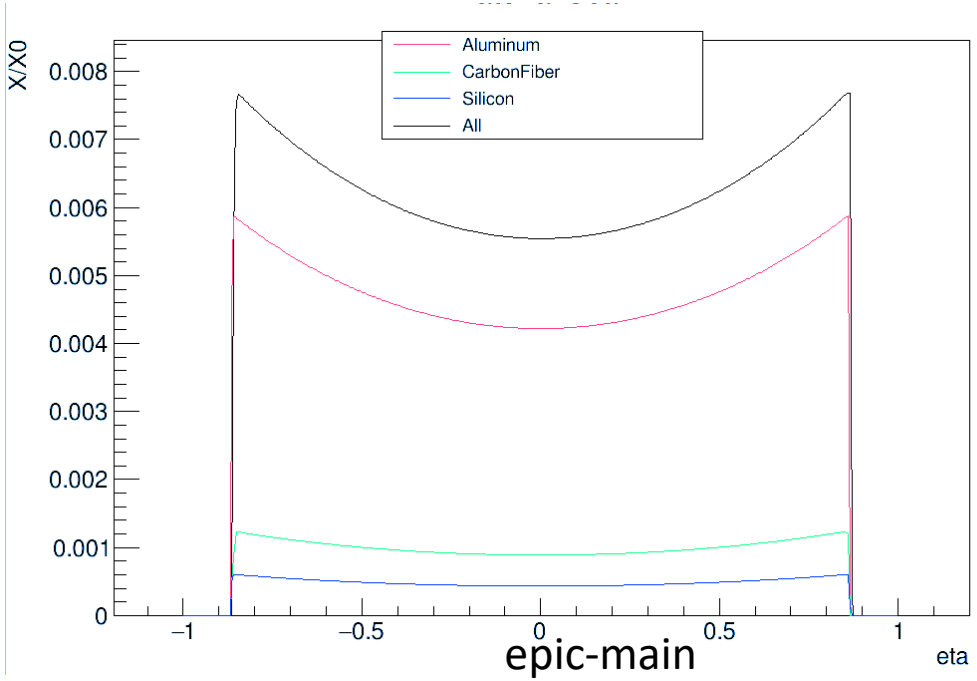
July CAD



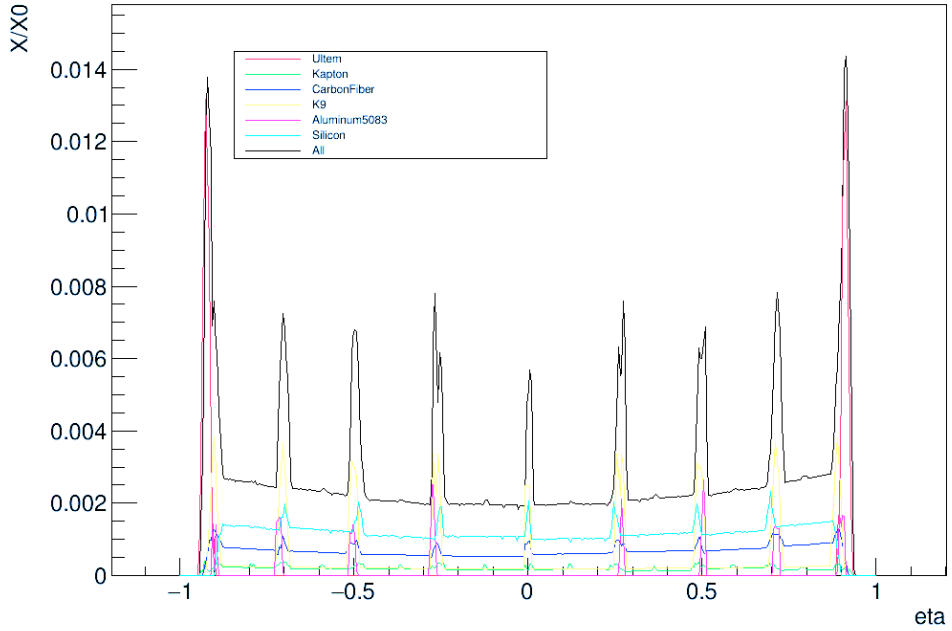
L4 full barrel Material scans

flat_OB



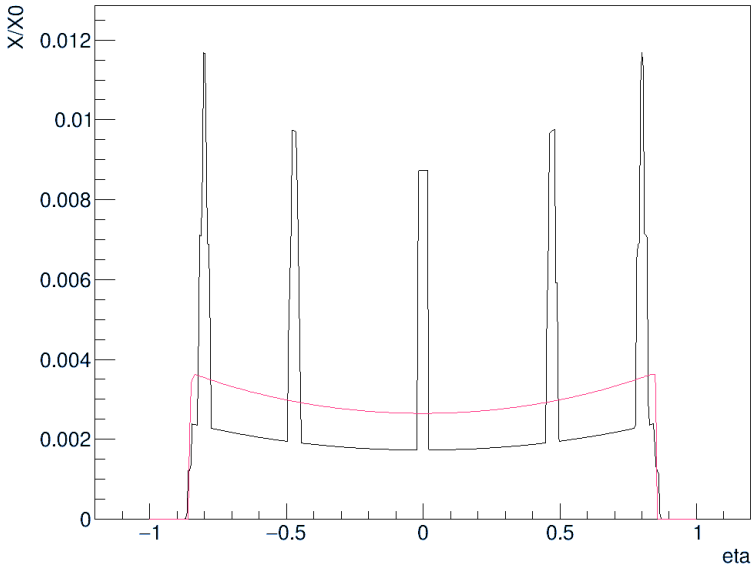


July CAD

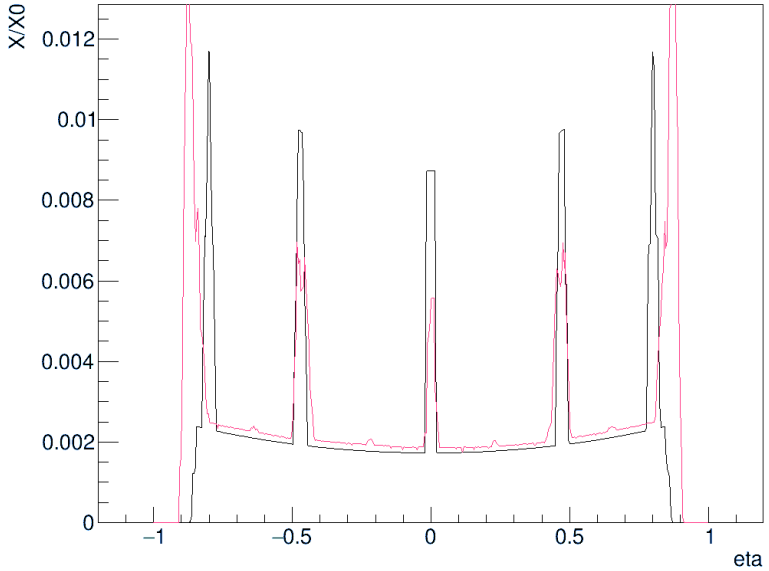


Comparisons

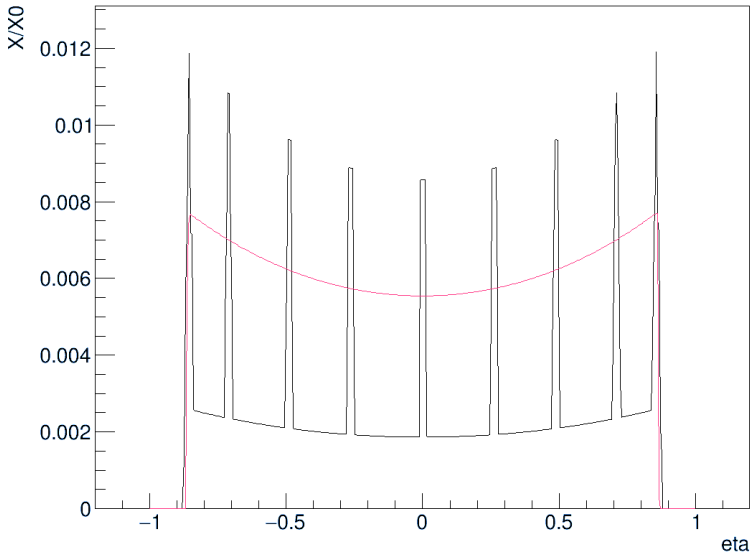
L3 flat_OB / epic-main average ratio 0.84



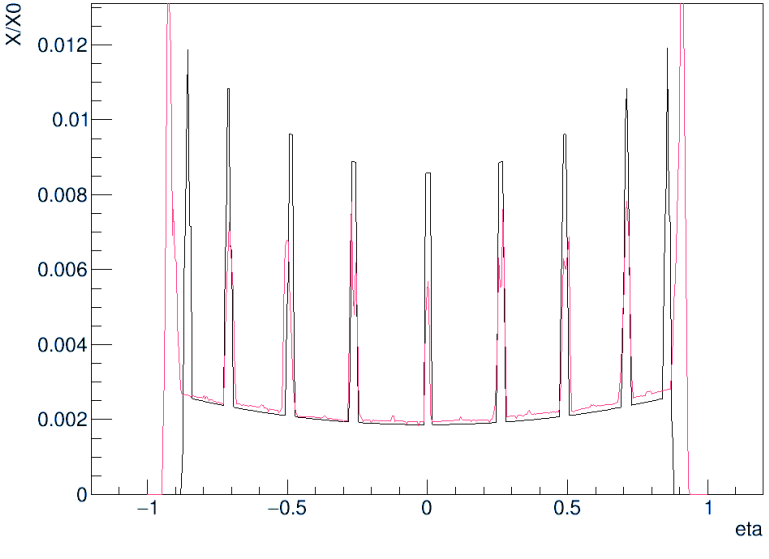
L3 flat_OB / July CAD average ratio 0.98



L4 flat_OB / epic-main average ratio 0.41

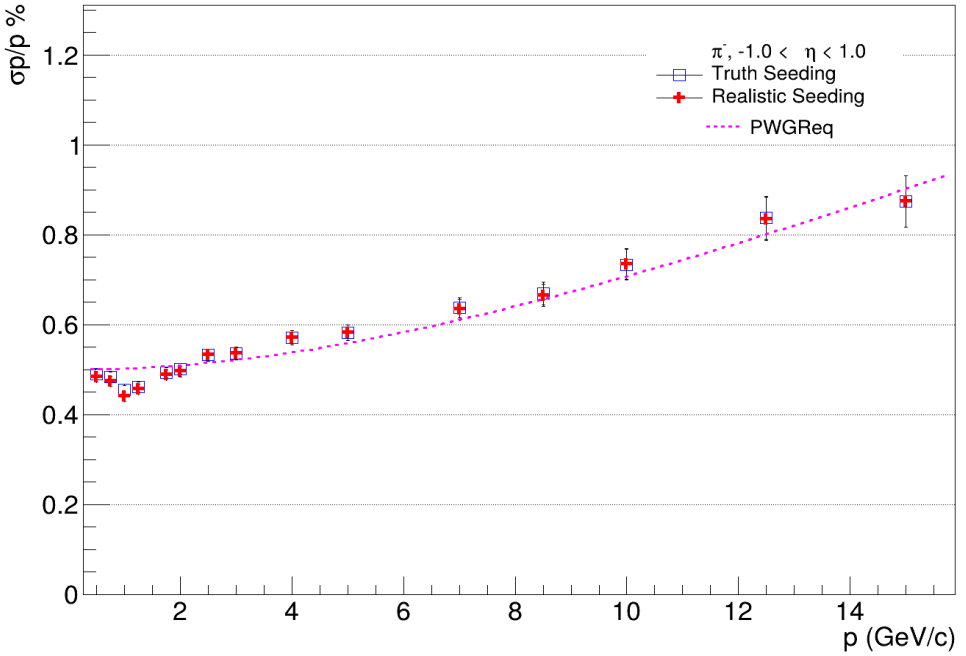


L4 flat_OB / July CAD average ratio 0.92

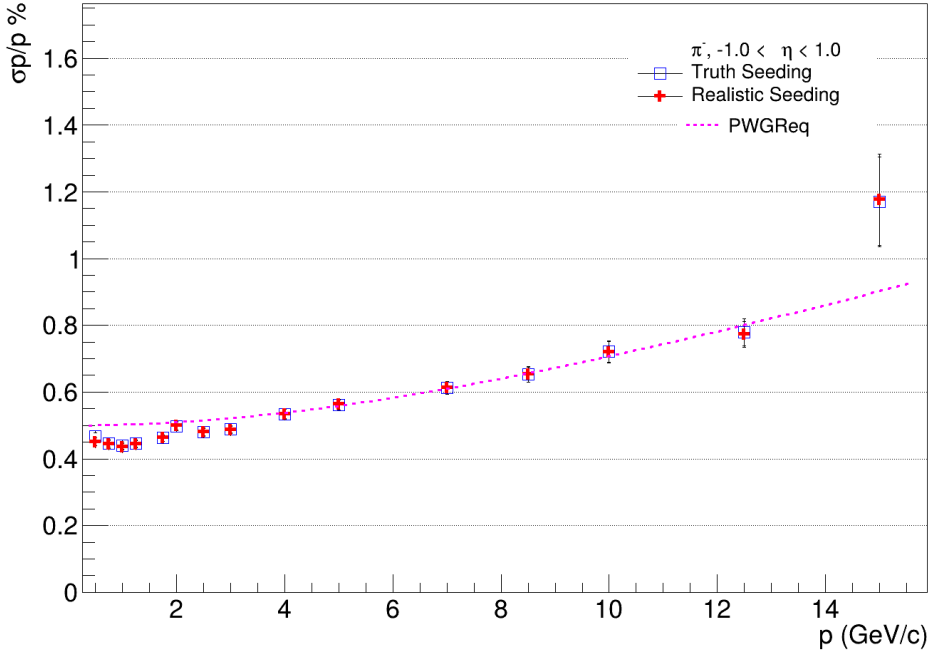


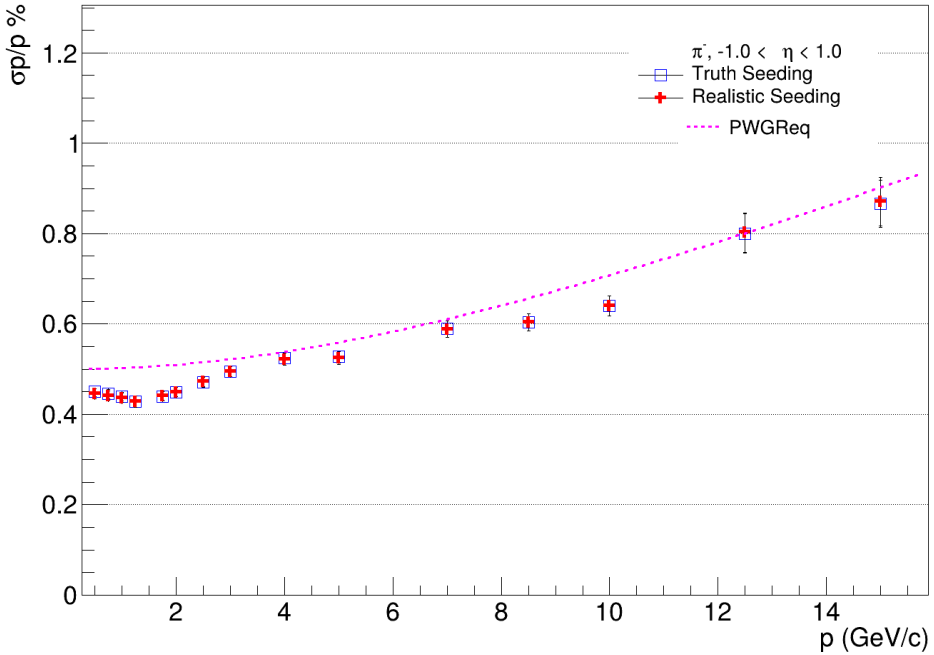
Tracking benchmark – momentum resolution

epic-main



flat_OB (with updated material map)

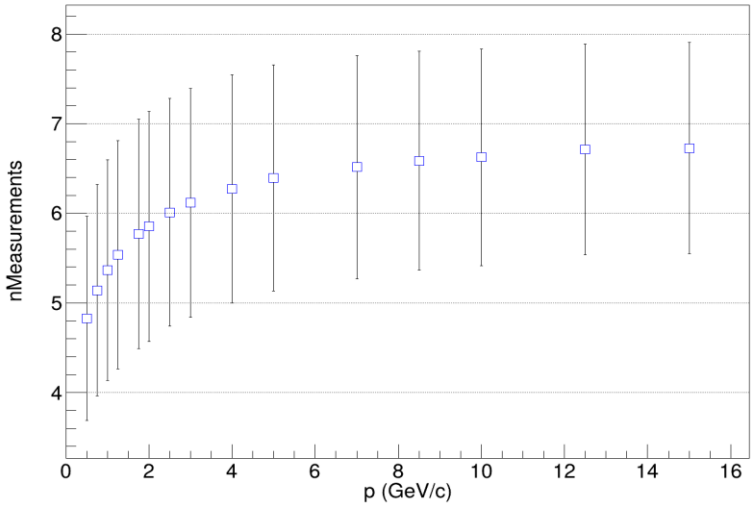




flat_OB v3
Changed stave widths
(with updated material map)

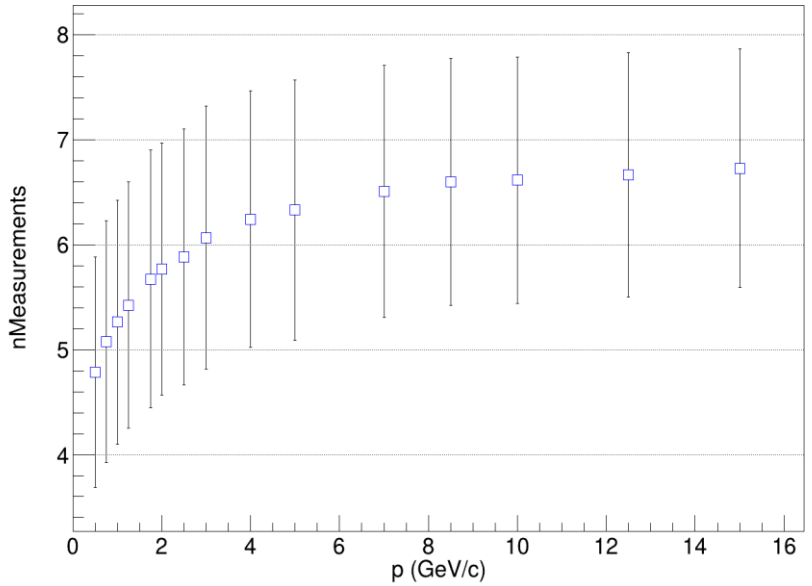
Tracking benchmark – number of measurements

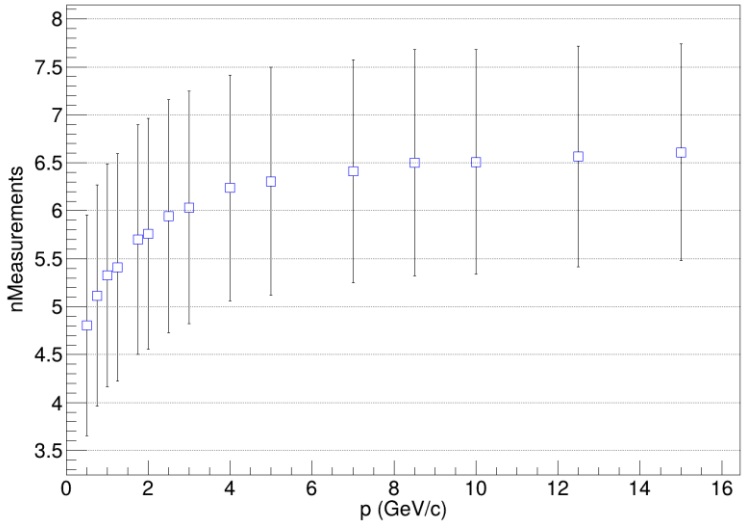
No noticeable change



flat_OB

epic-main





flat_OB
v3