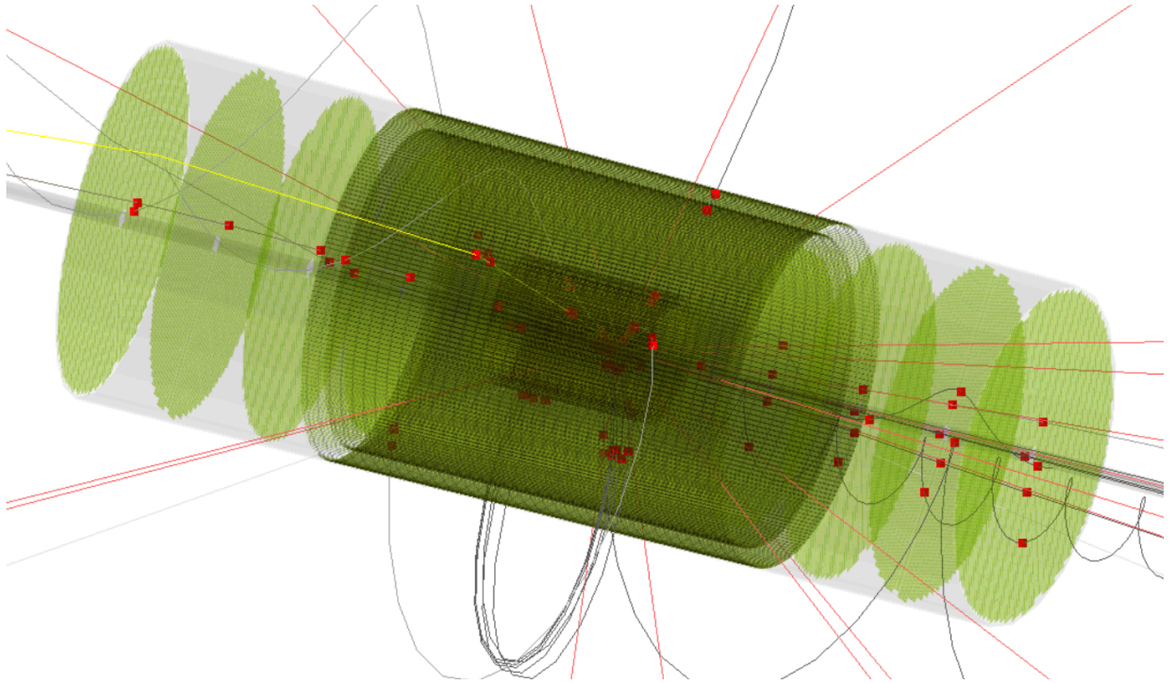
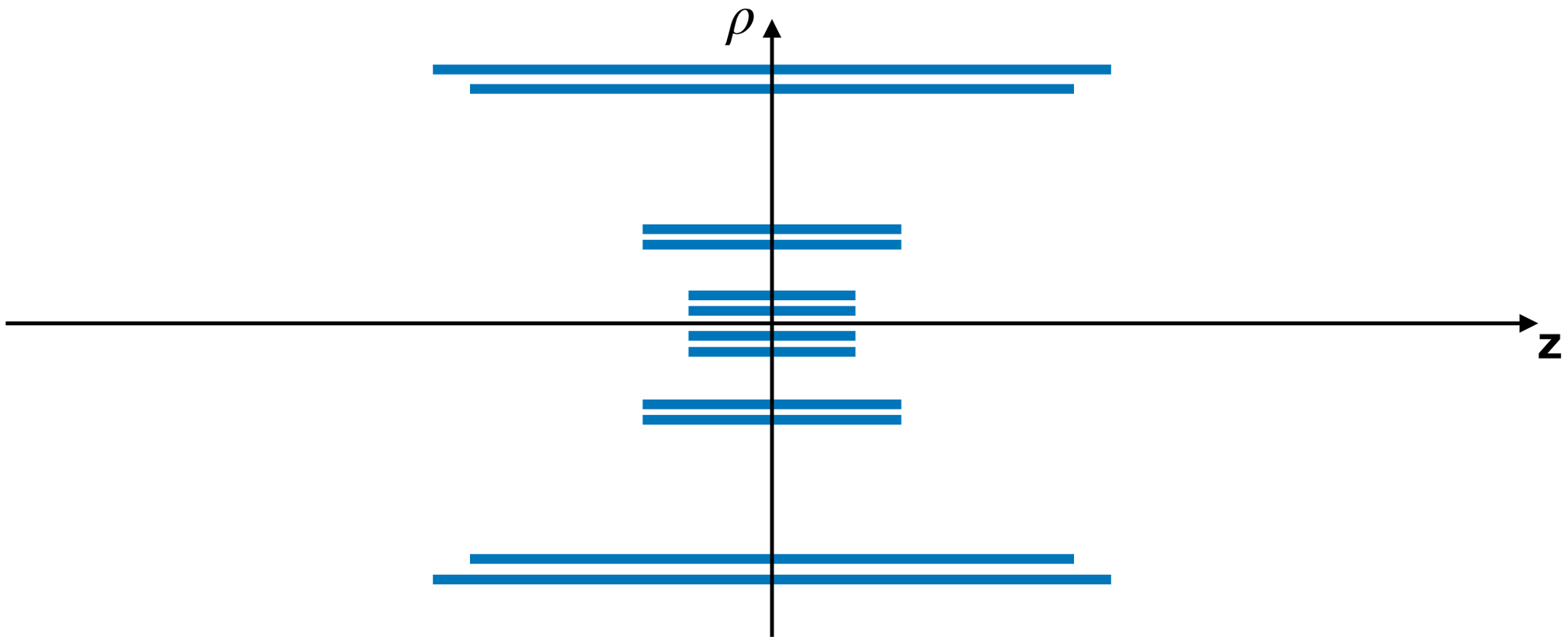
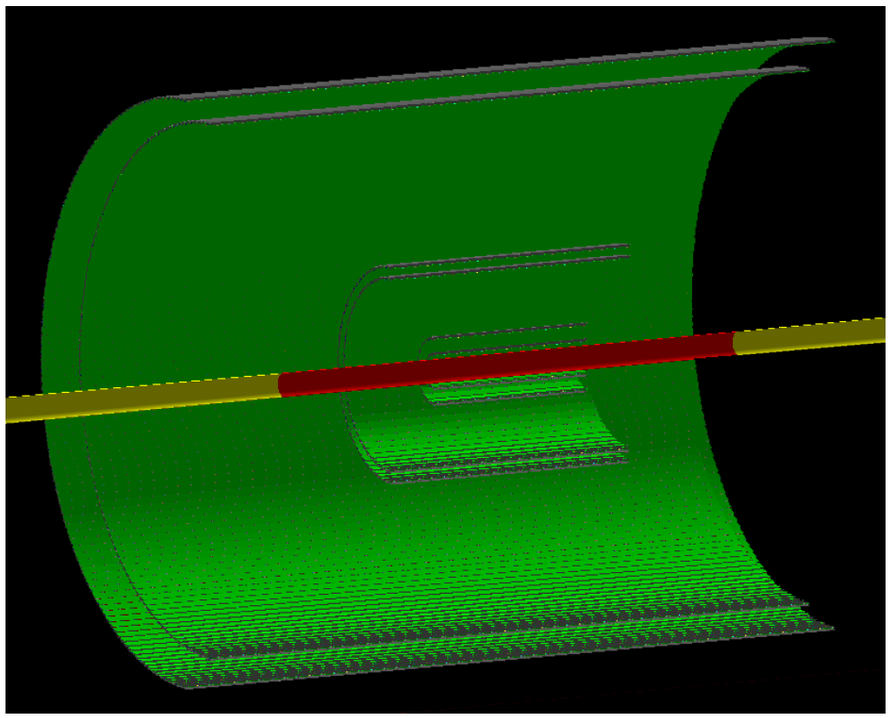
All-Si Tracker material-scan



Rey Cruz-Torres

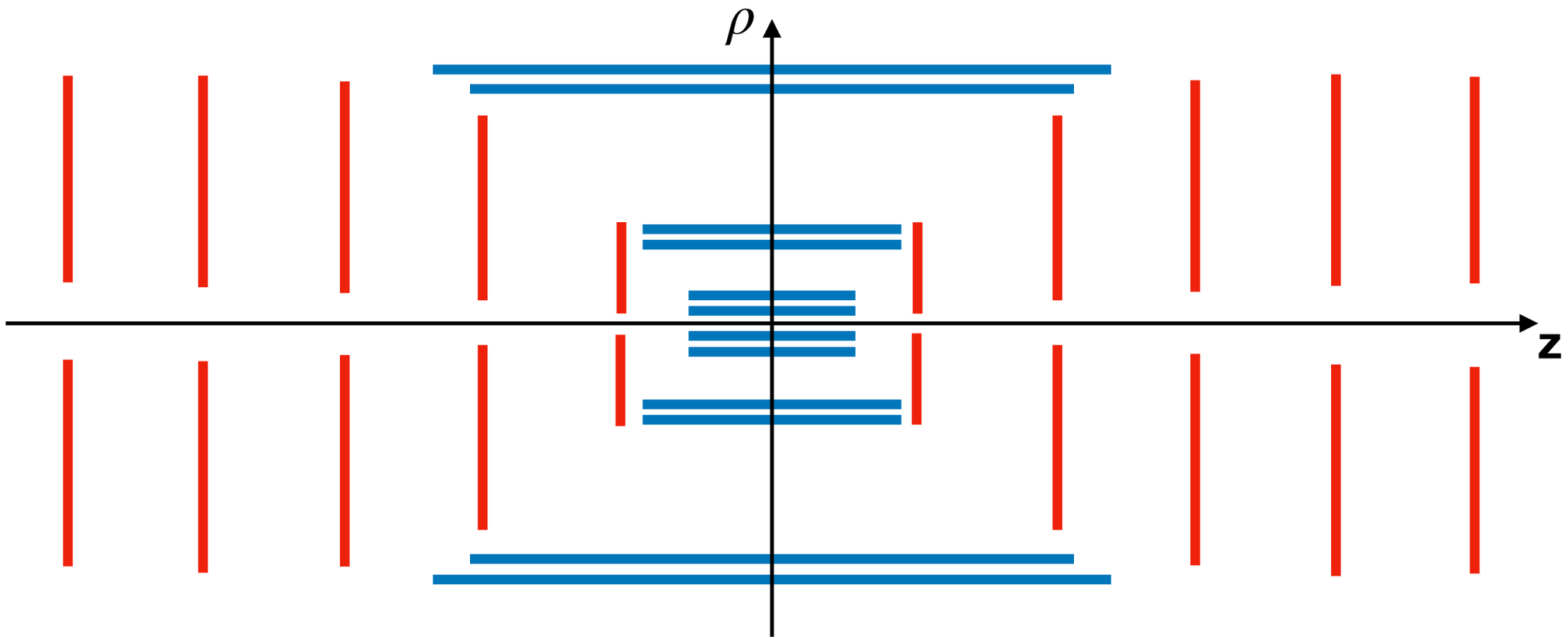
All-Silicon Tracker Geometry

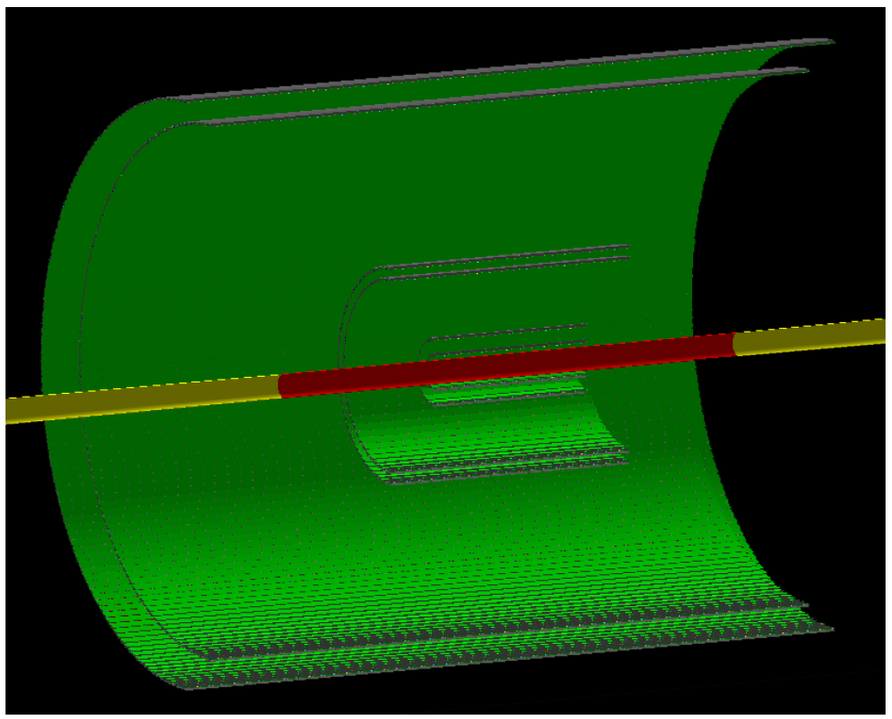




Barrel

All-Silicon Tracker Geometry

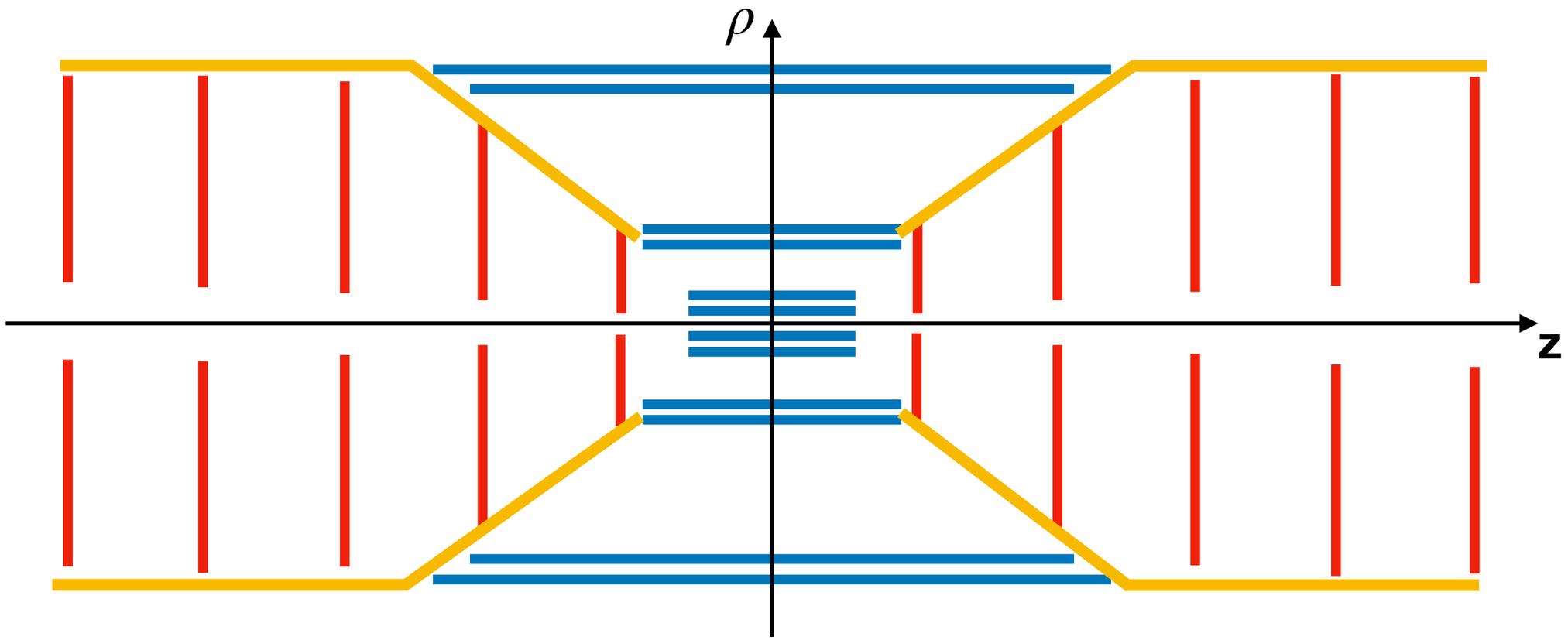


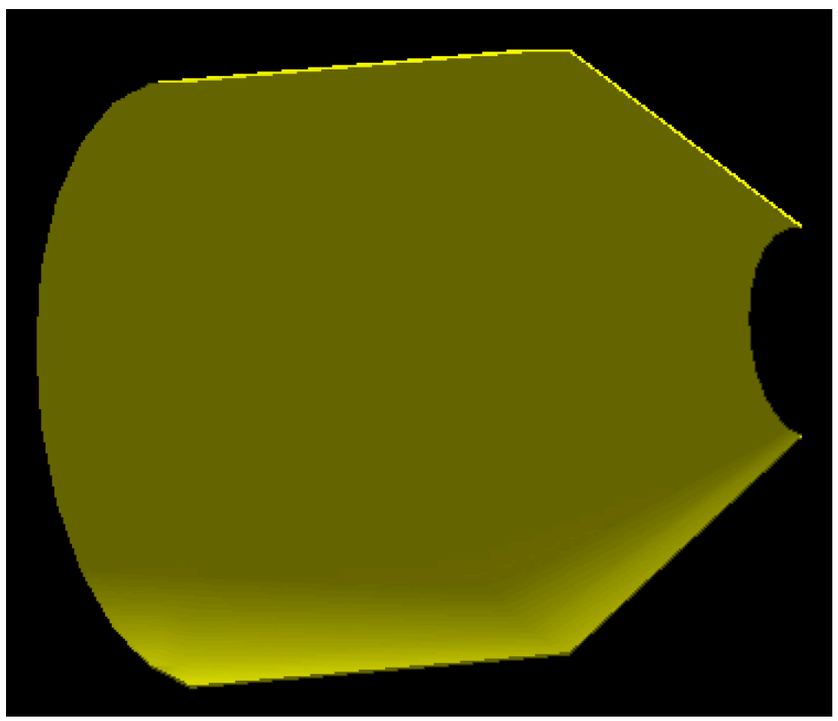


Barrel

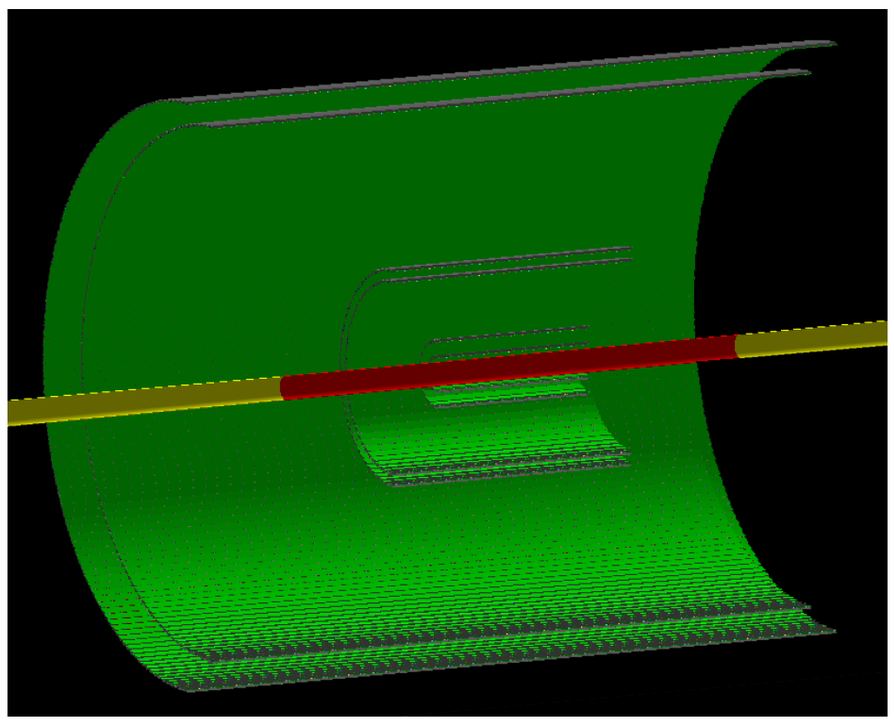
5F+5B Disks

All-Silicon Tracker Geometry





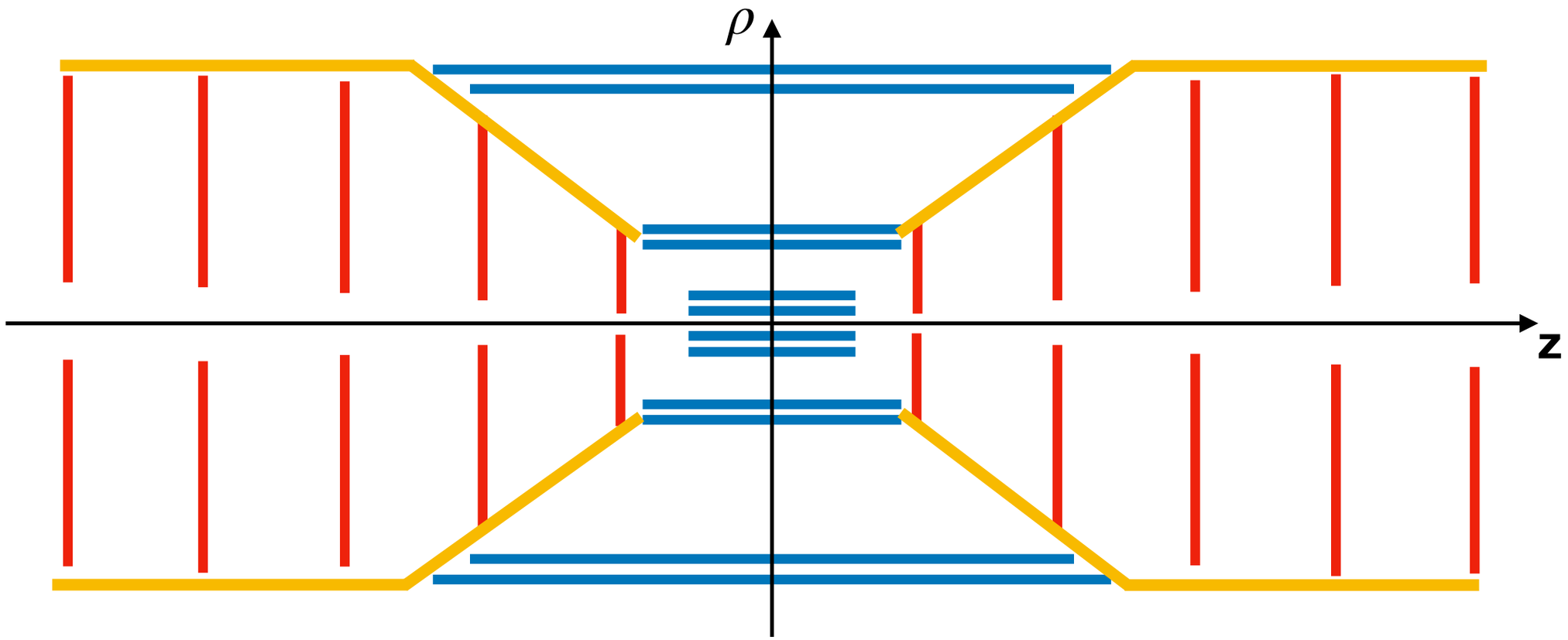
Al Support Structure

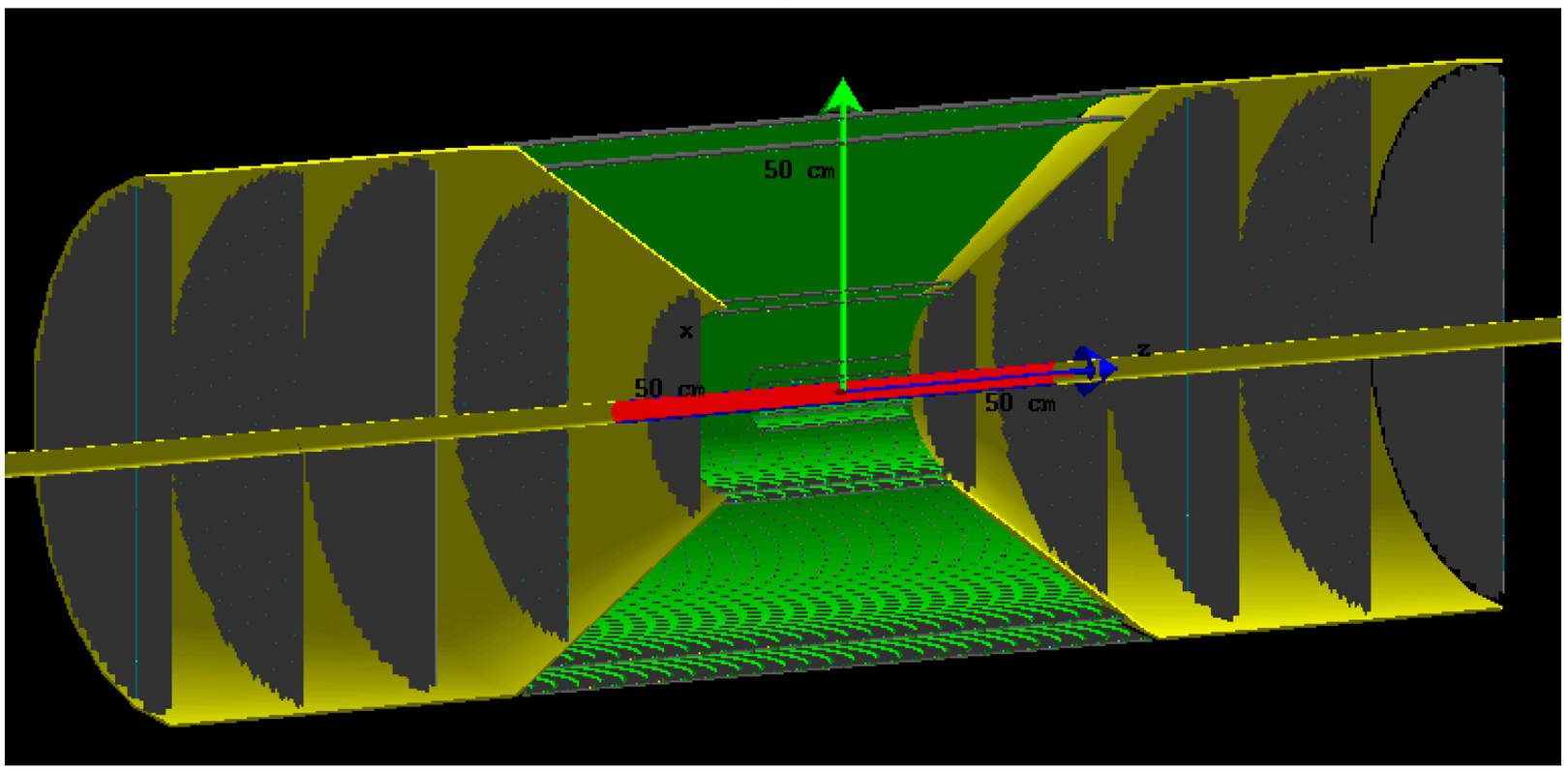


Barrel

5F+5B Disks

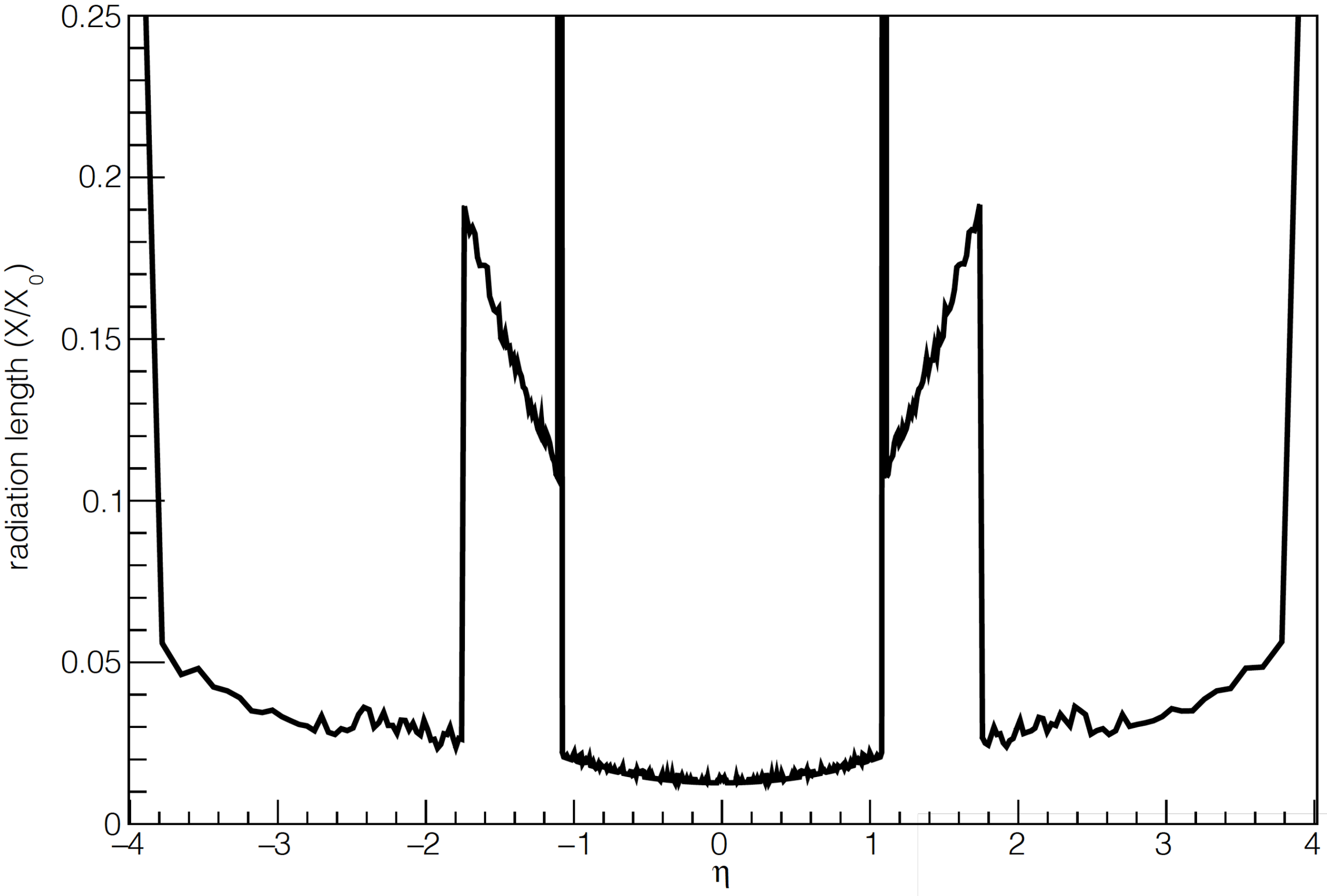
All-Silicon Tracker Geometry



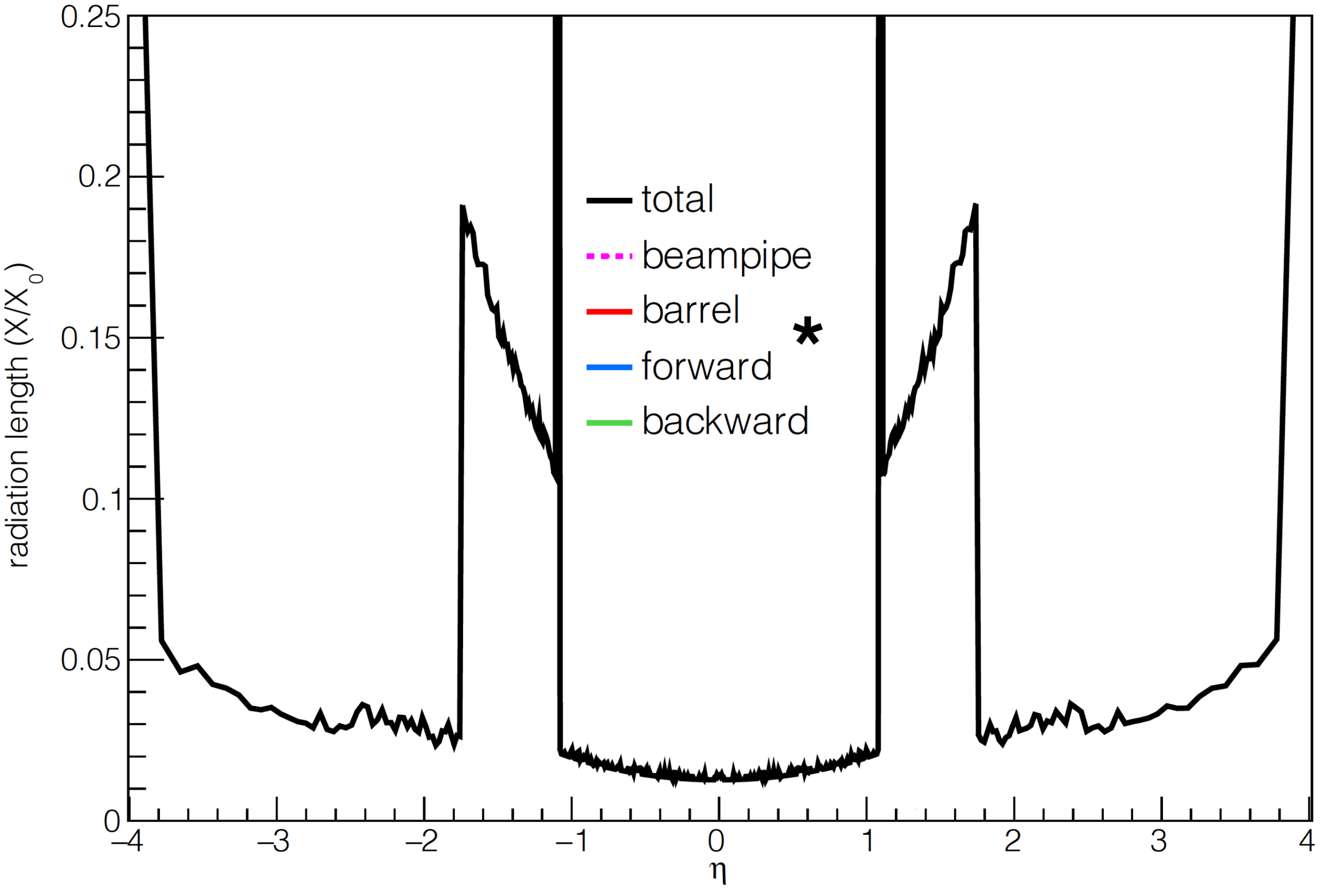


Geometry implemented by Ernst and Yue Shi in EICroot and loaded into Fun4All

Material Scan

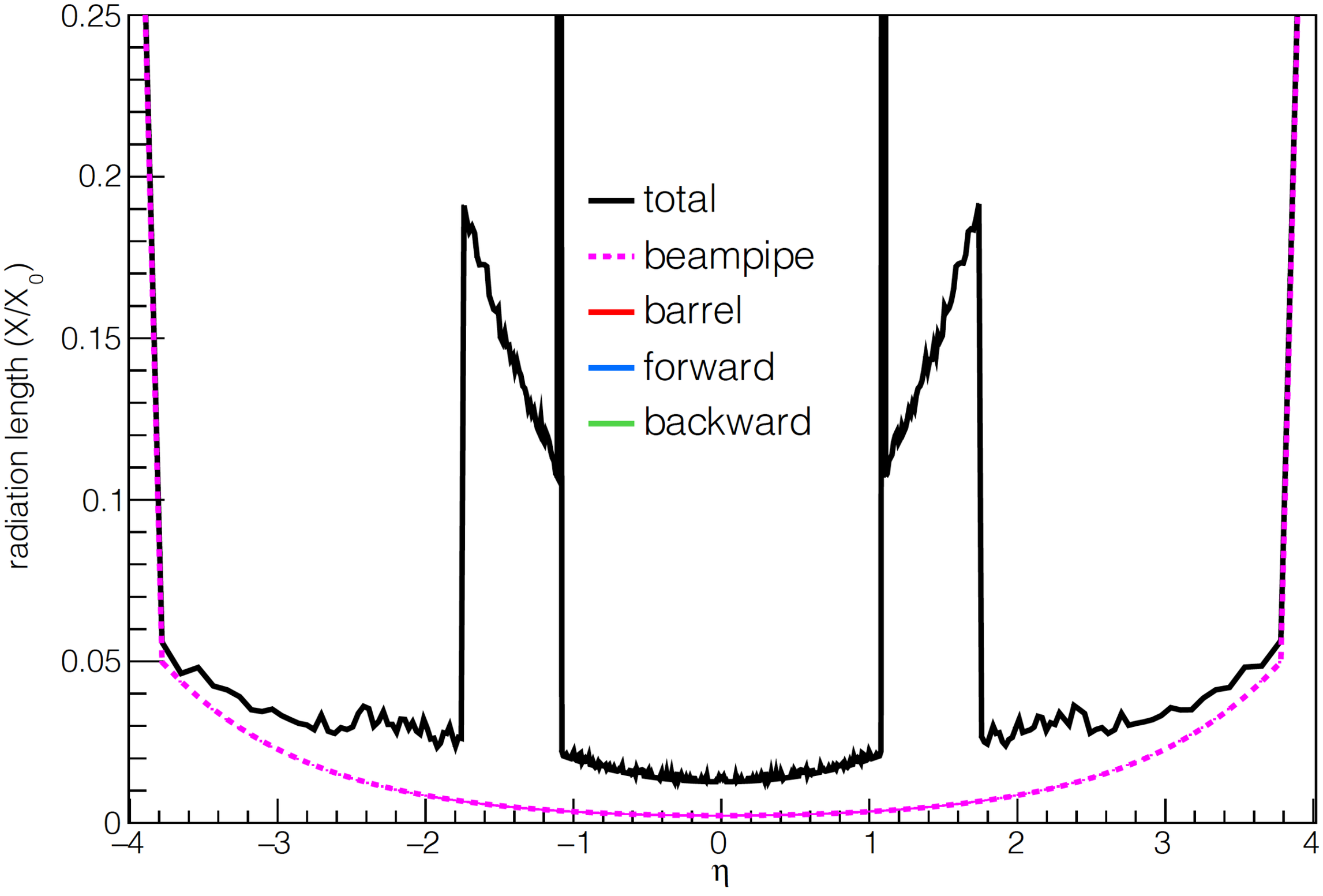


Material Scan

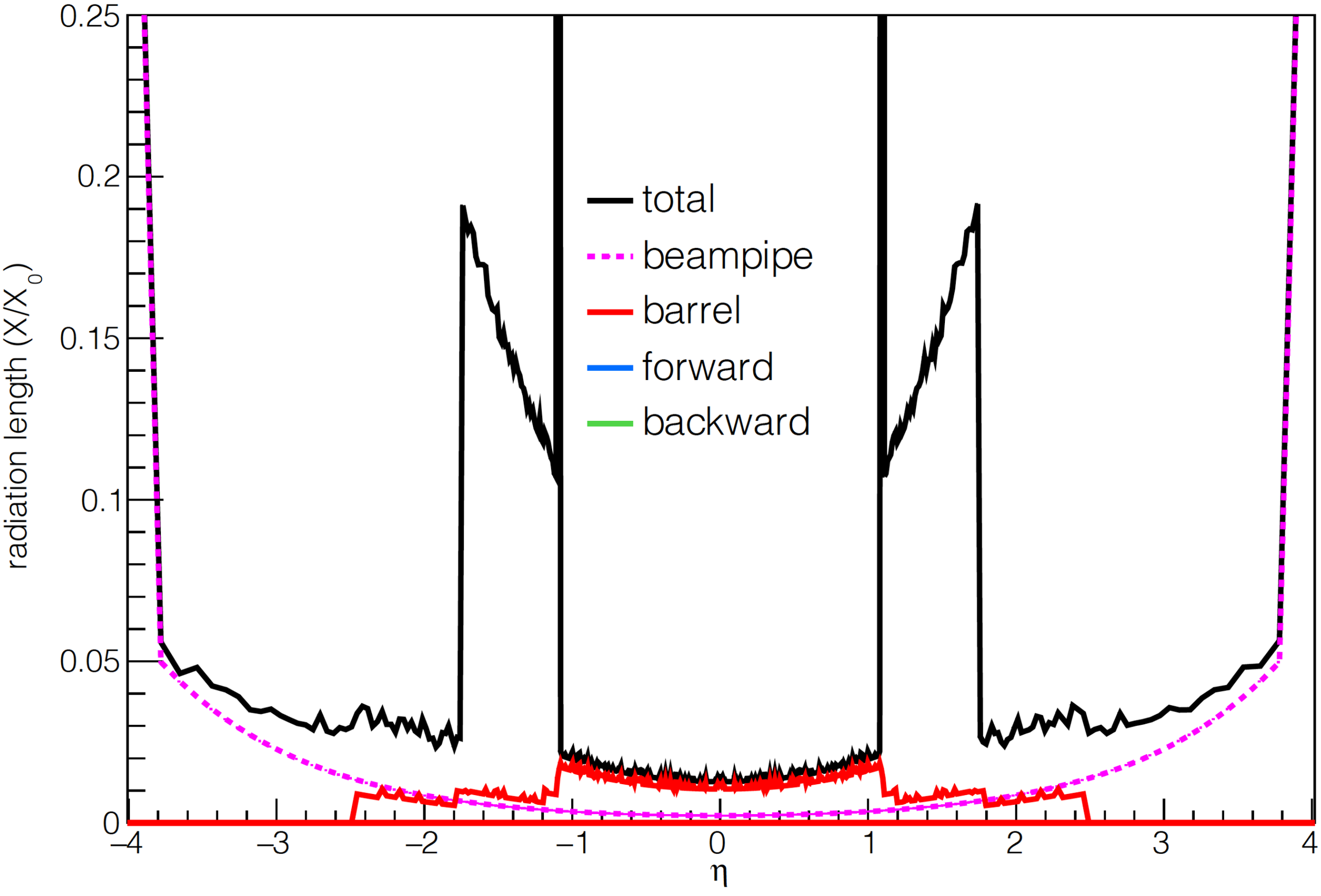


*** These are labels from the geometry file**

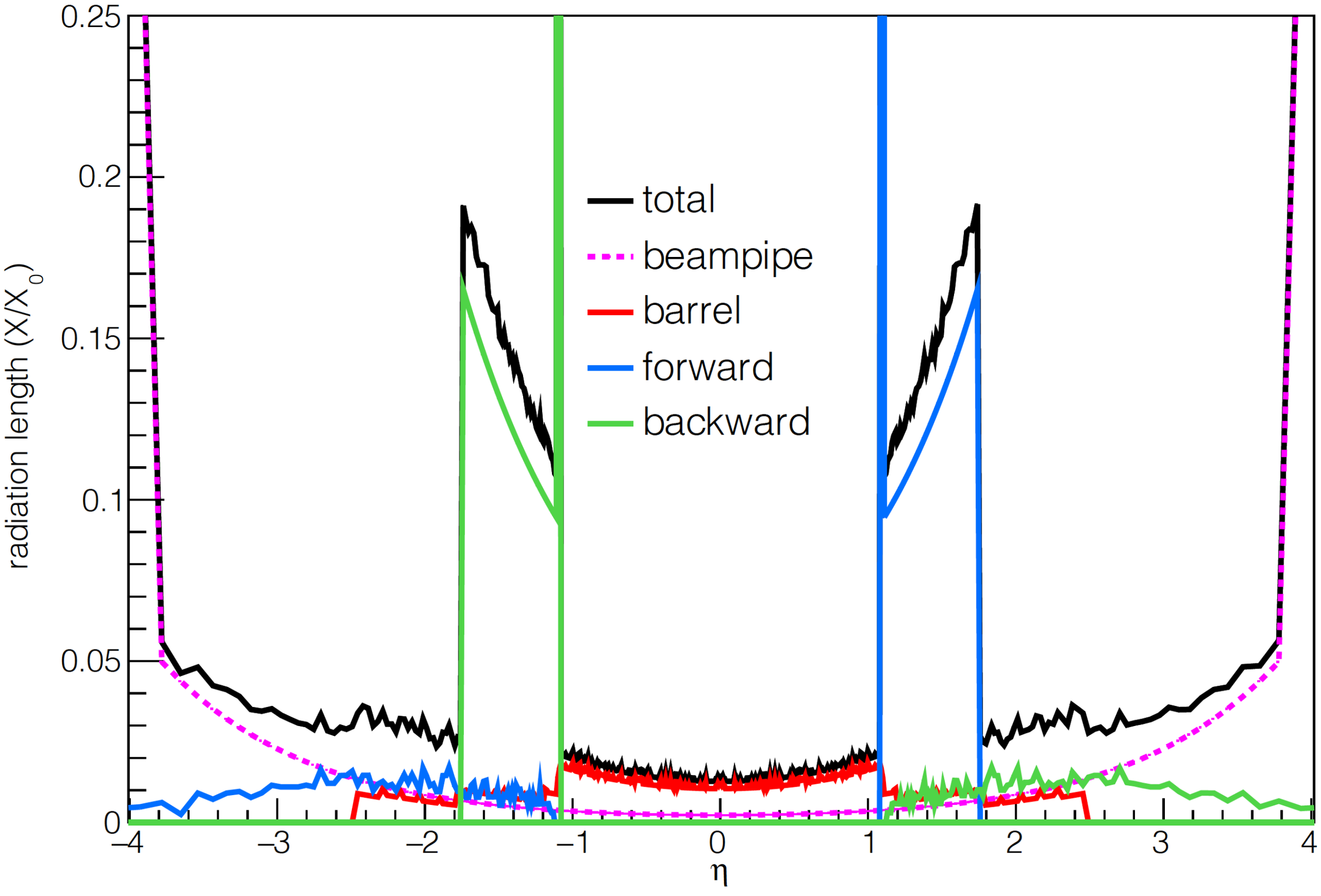
Material Scan



Material Scan



Material Scan

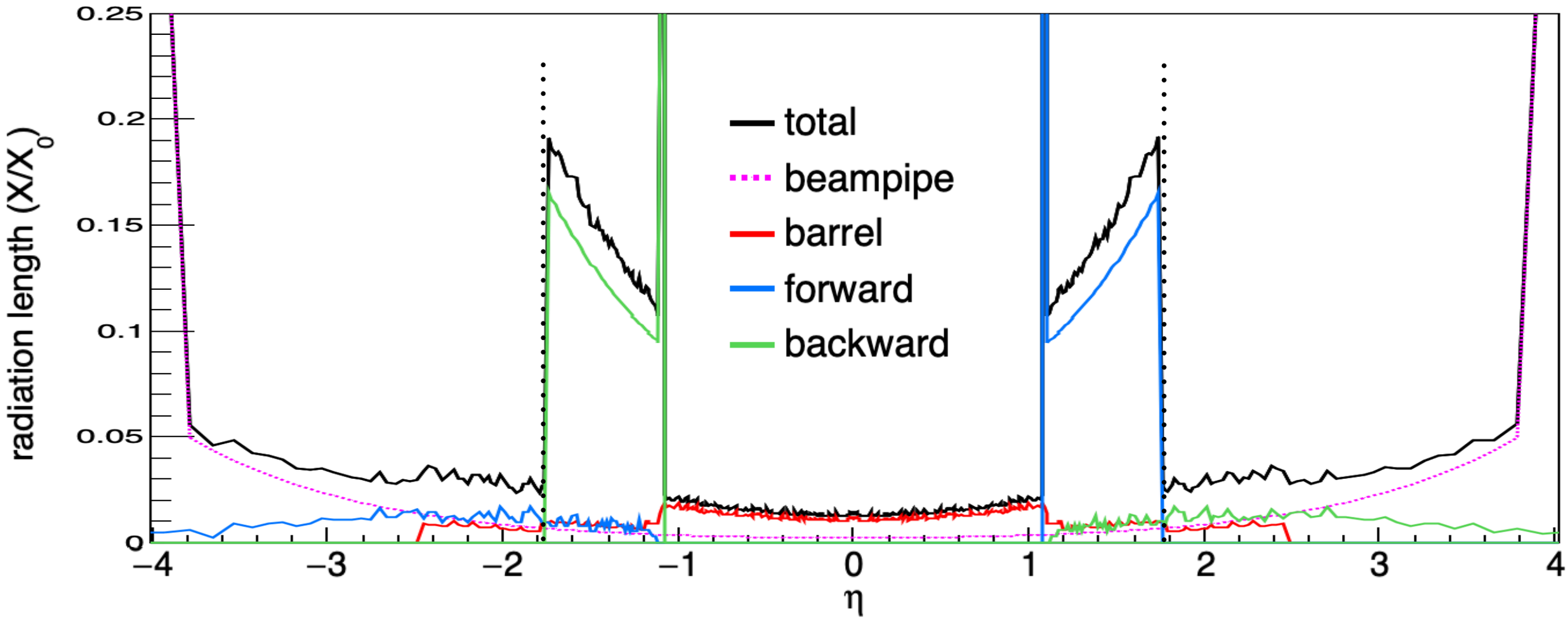


Questions

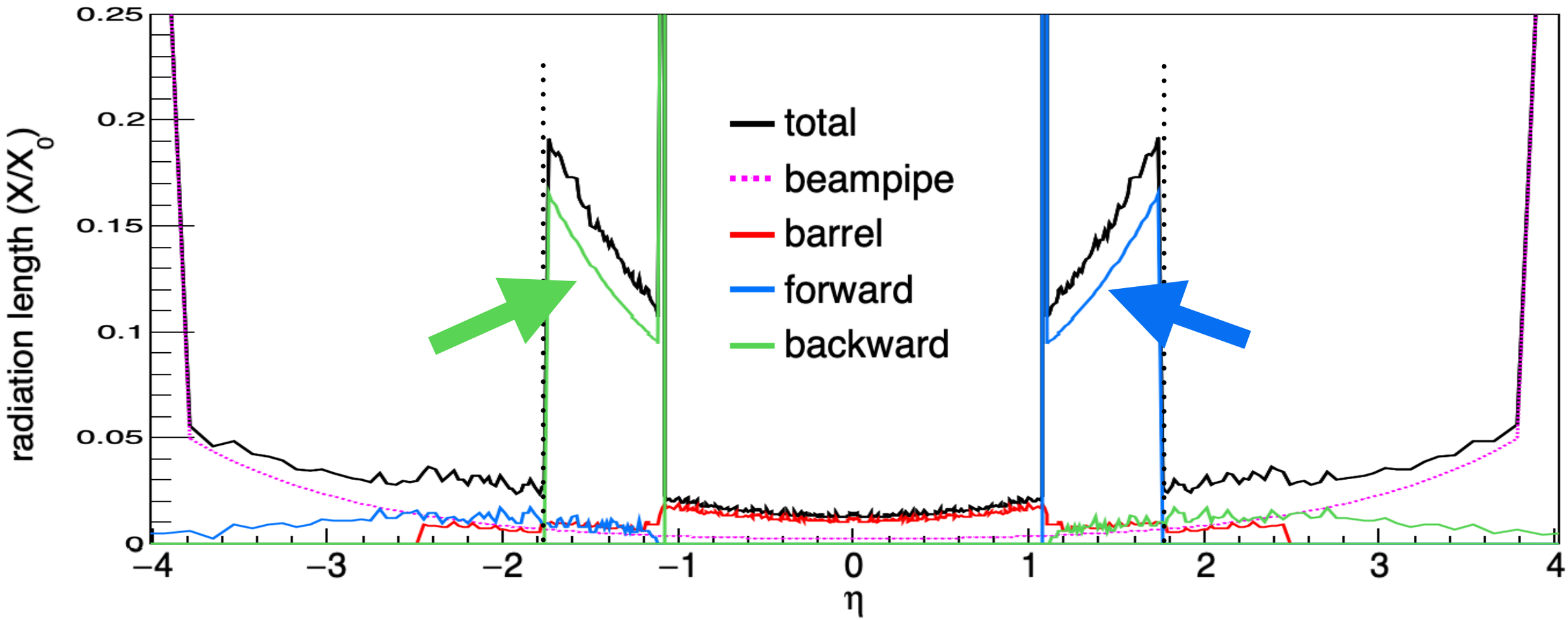
1. What are the ears right above the spikes at $\eta = \pm 1.1$?

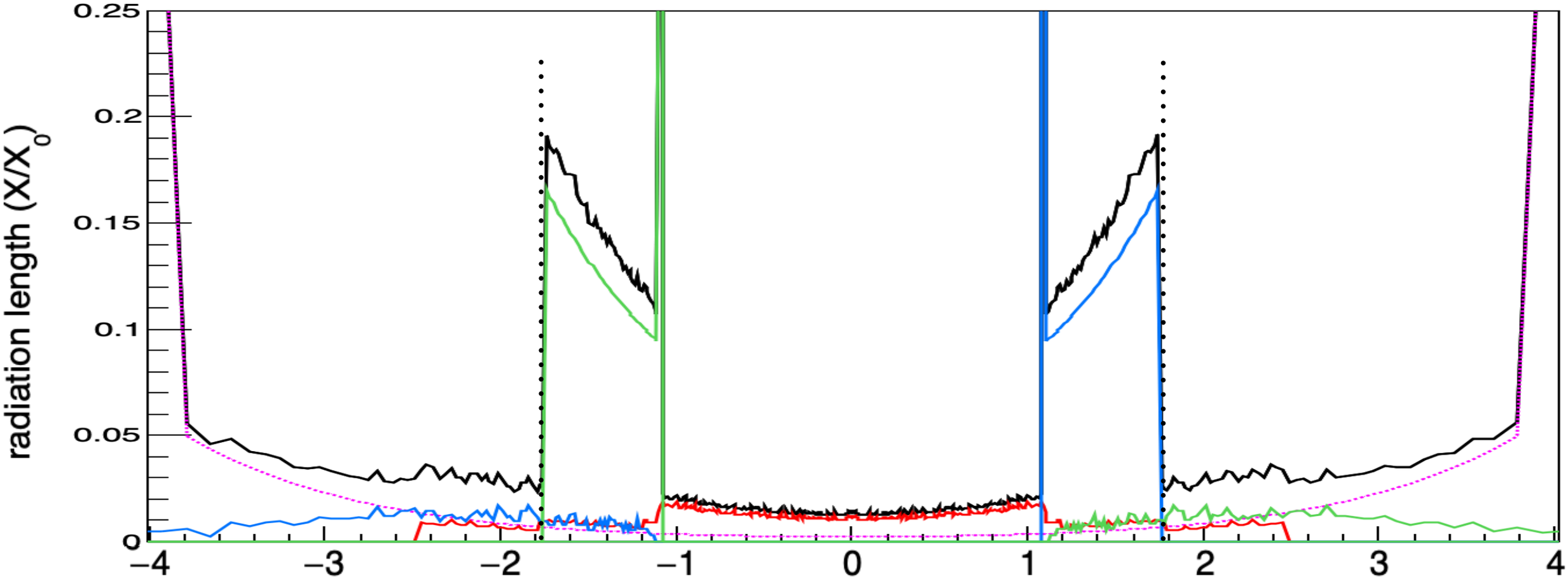
2. Does the barrel coverage make sense?

3. Why is there material in the forward region of the backward-labeled detector part?



1. What are the ears right above the spikes at $\eta = \pm 1.1$?




radiation length (X/X_0)
0.25
0.2
0.15
0.1
0.05
0
−4
−3
−2
−1
0
1
2
3
4
η
$\eta = 1.1$
$\eta = 1.75$

Aluminum Support Structure Contribution

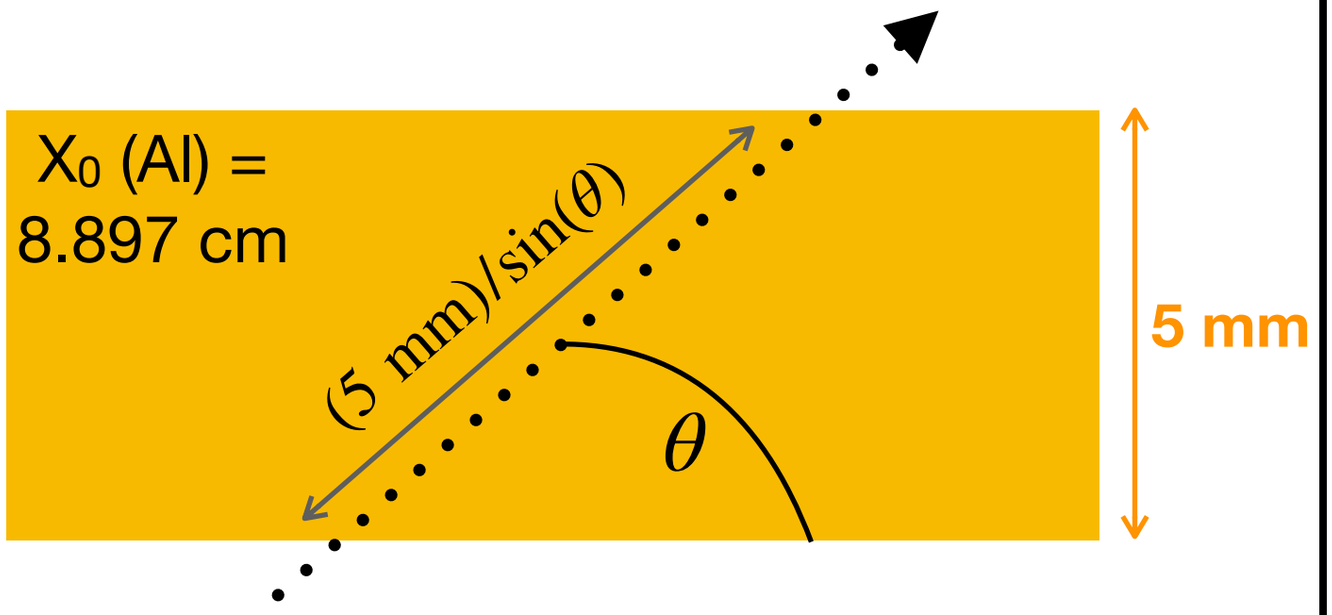
Back-of-the-envelope calculation

$@\ \eta = 1.1$

$X/X_0 = 0.094$

$@\ \eta = 1.75$

$X/X_0 = 0.167$

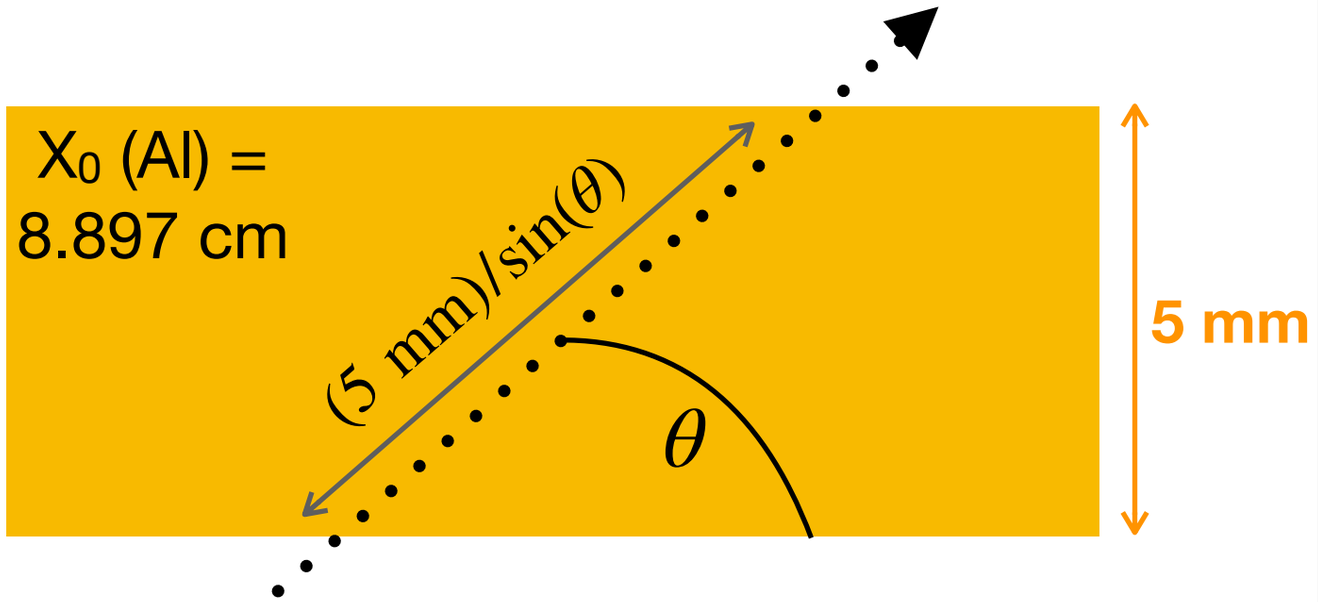


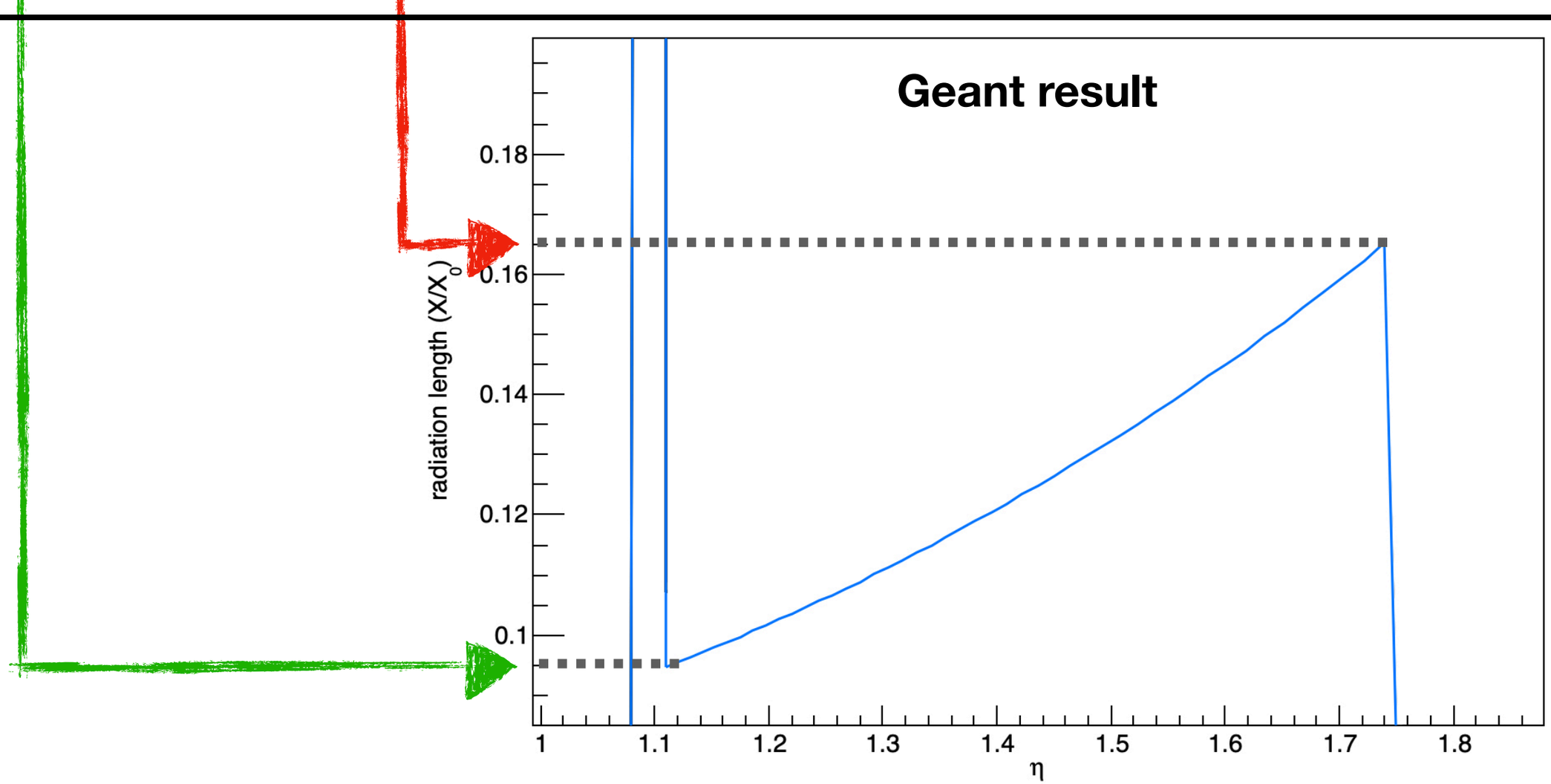
Aluminum Support Structure Contribution

Back-of-the-envelope calculation

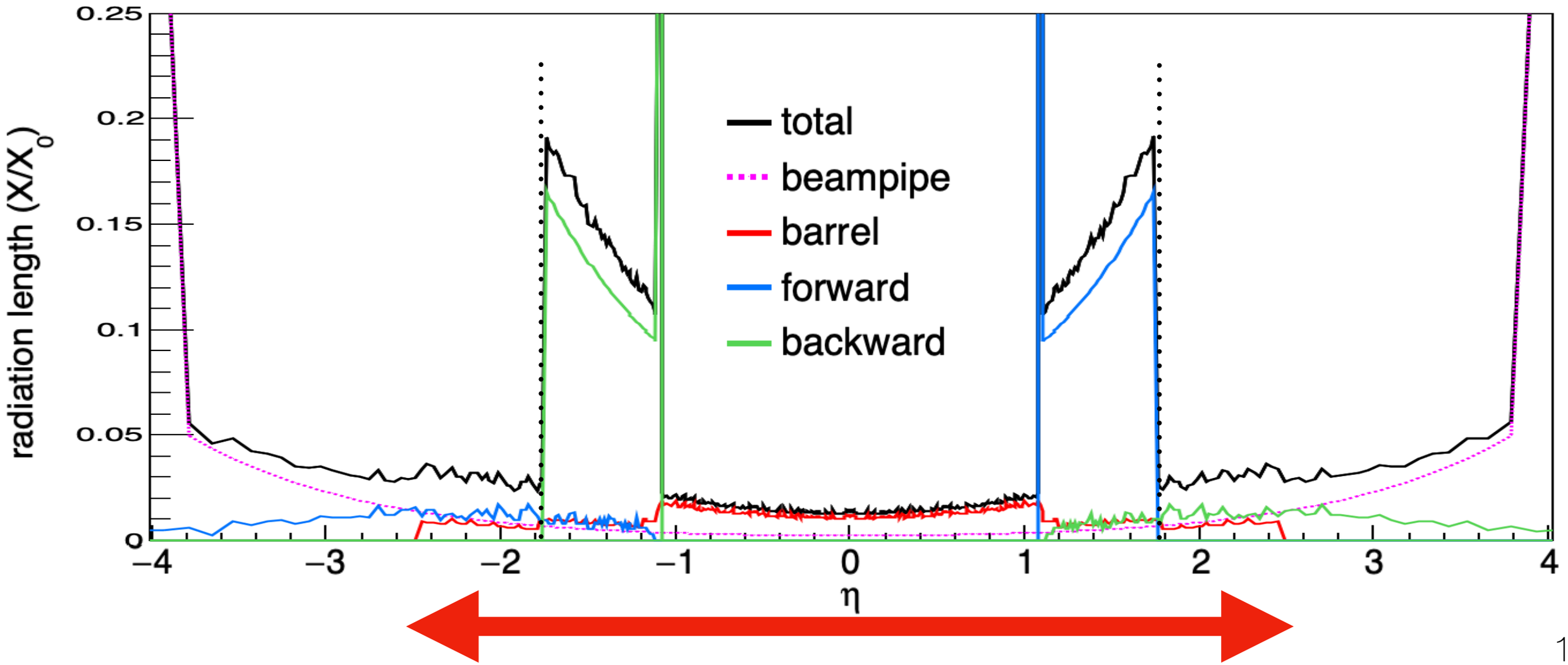
$@\ \eta = 1.1$ $@\ \eta = 1.75$

$X/X_0 = 0.094$ $X/X_0 = 0.167$

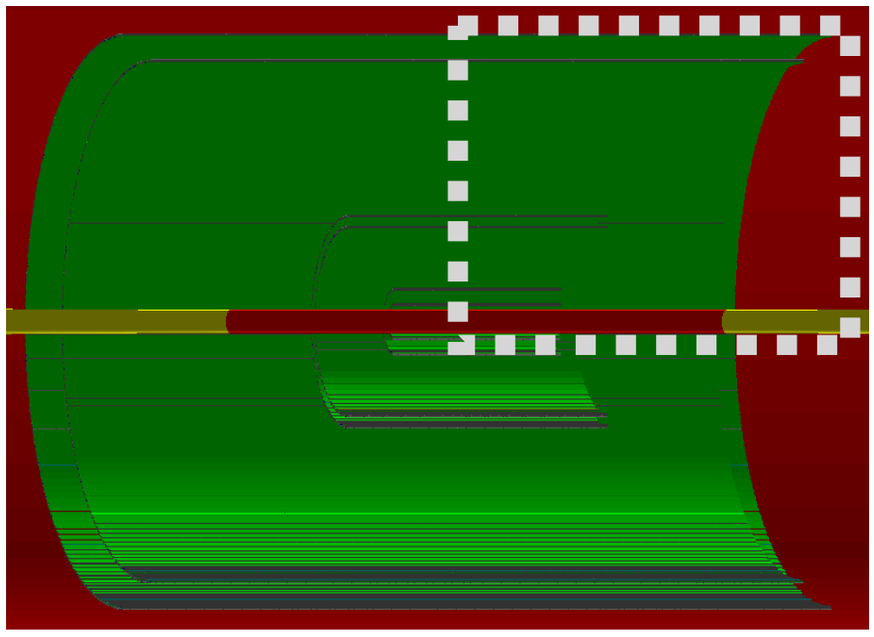


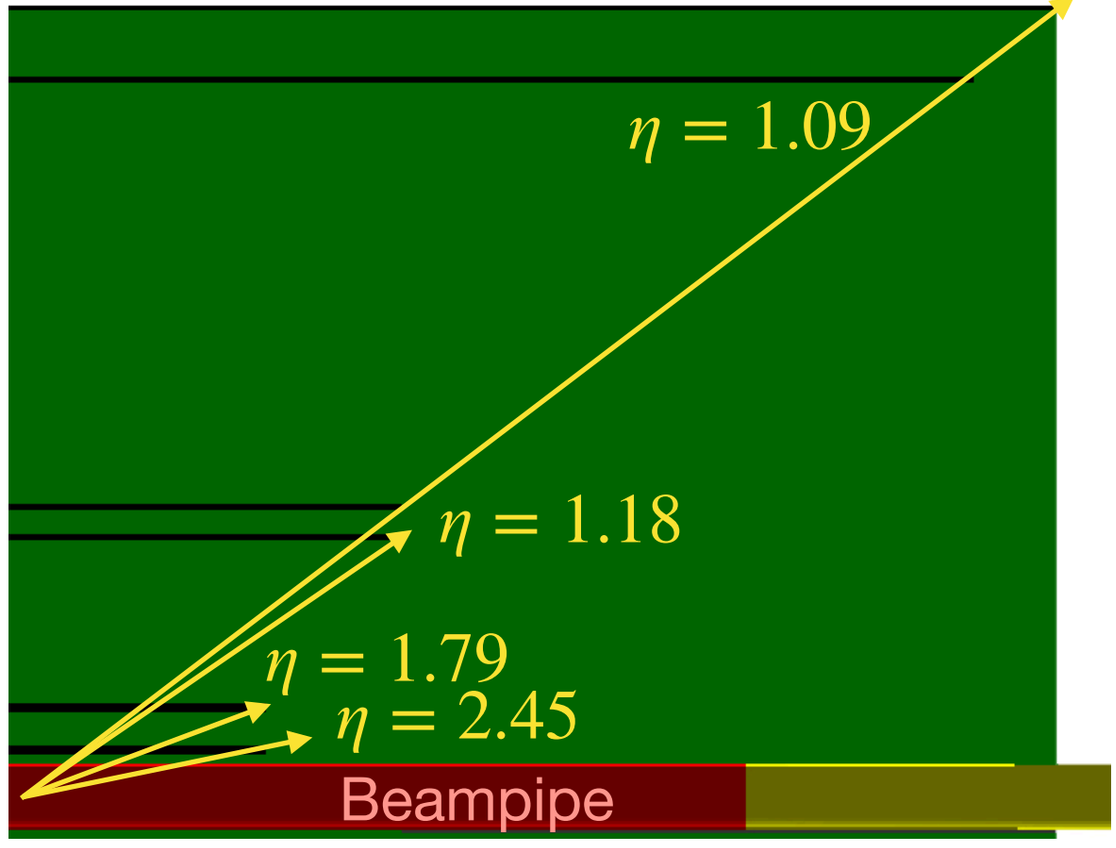


2. Does the barrel coverage make sense?



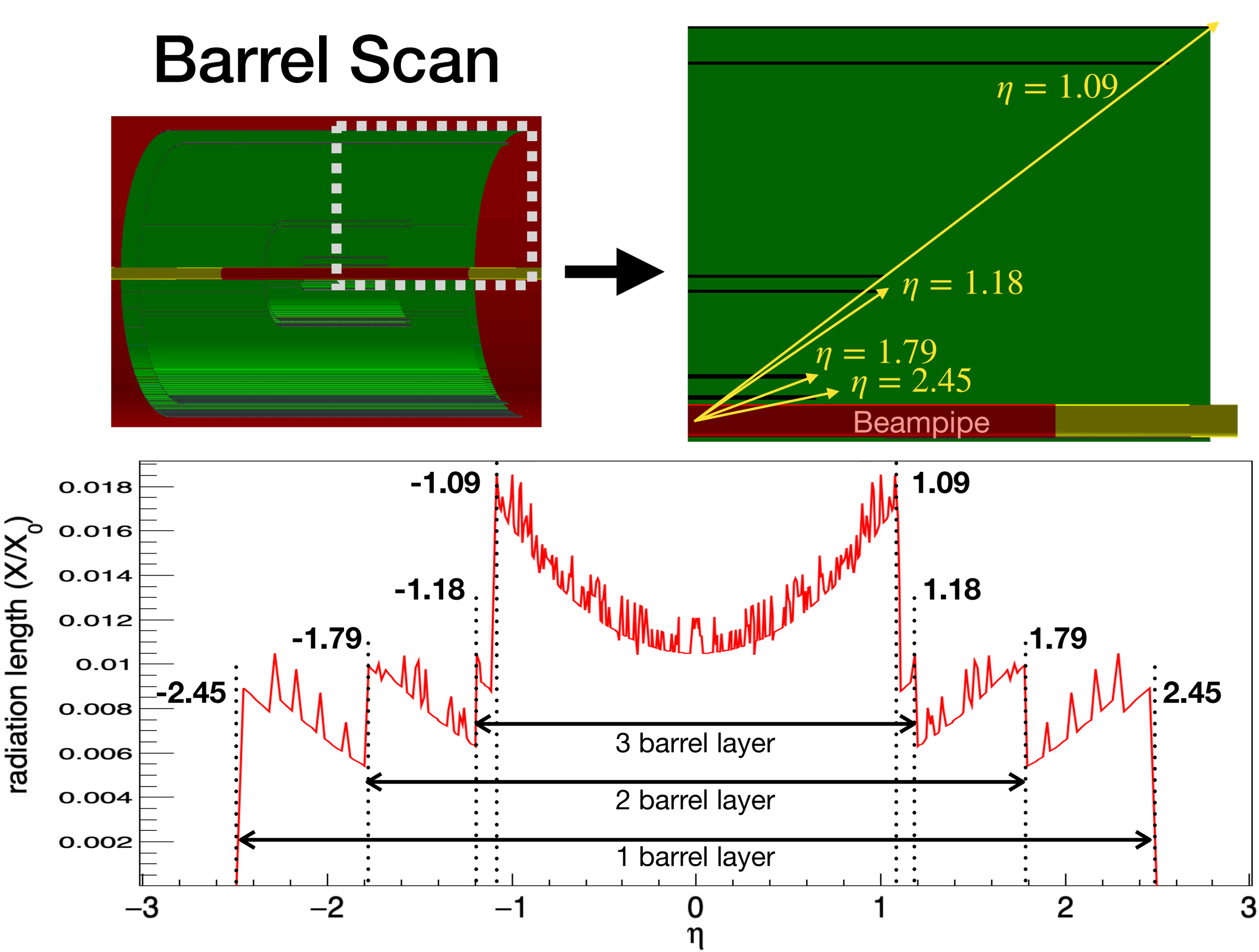
Barrel Scan



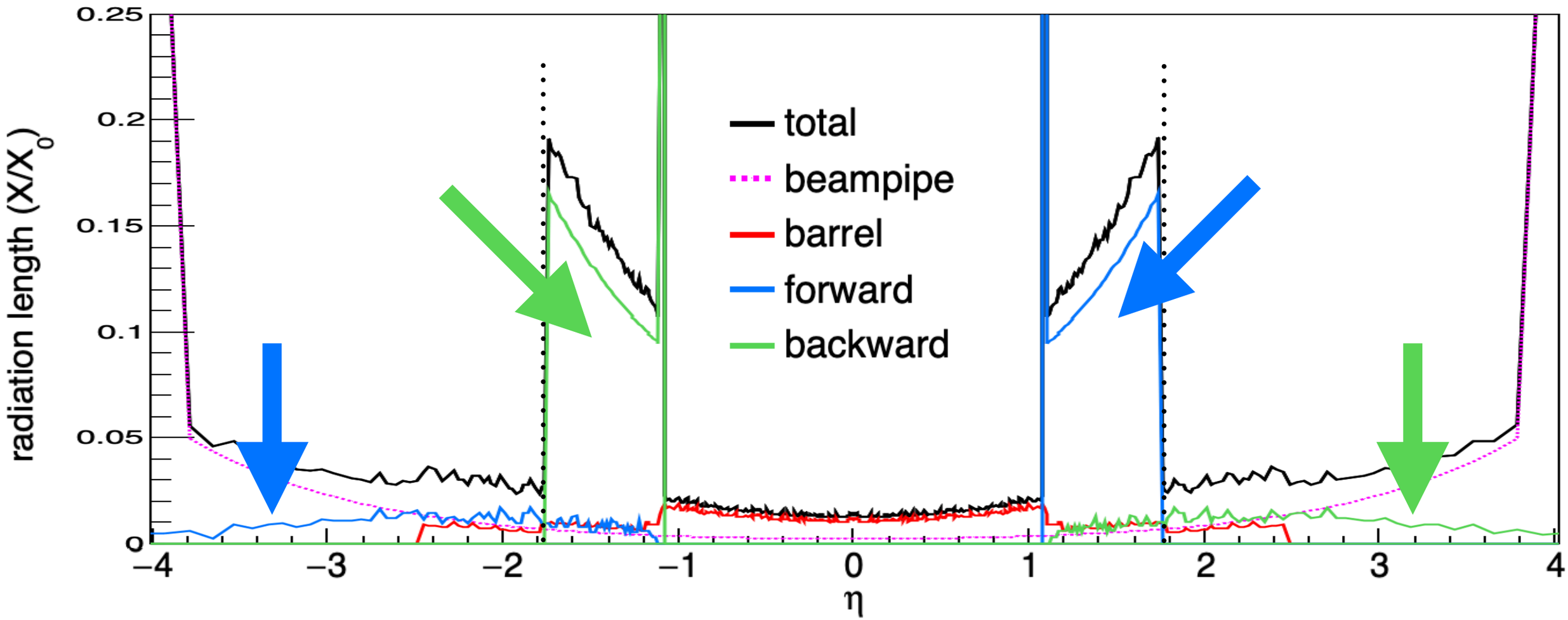


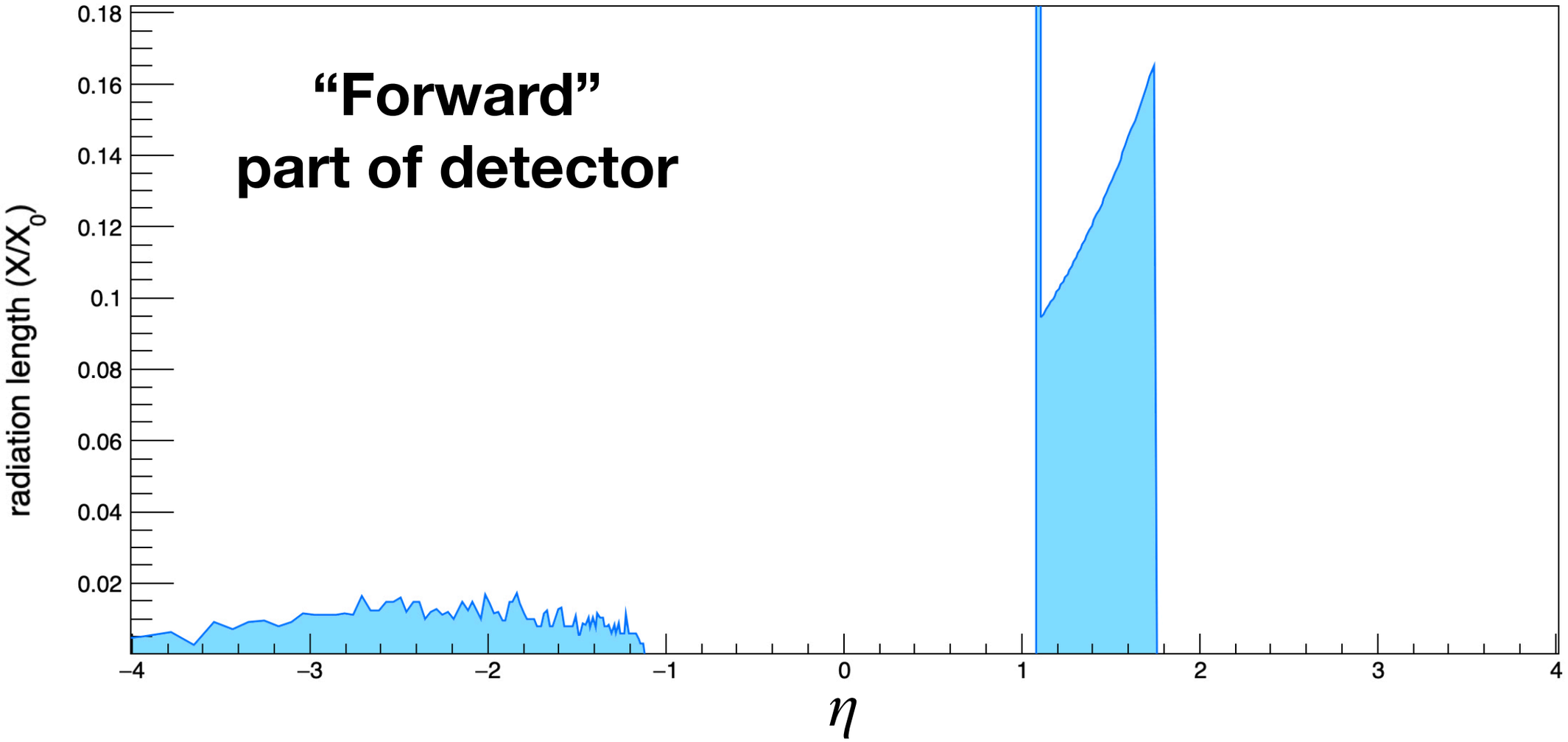
Barrel Scan

η = 1.09
η = 1.18
η = 1.79
η = 2.45
Beampipe

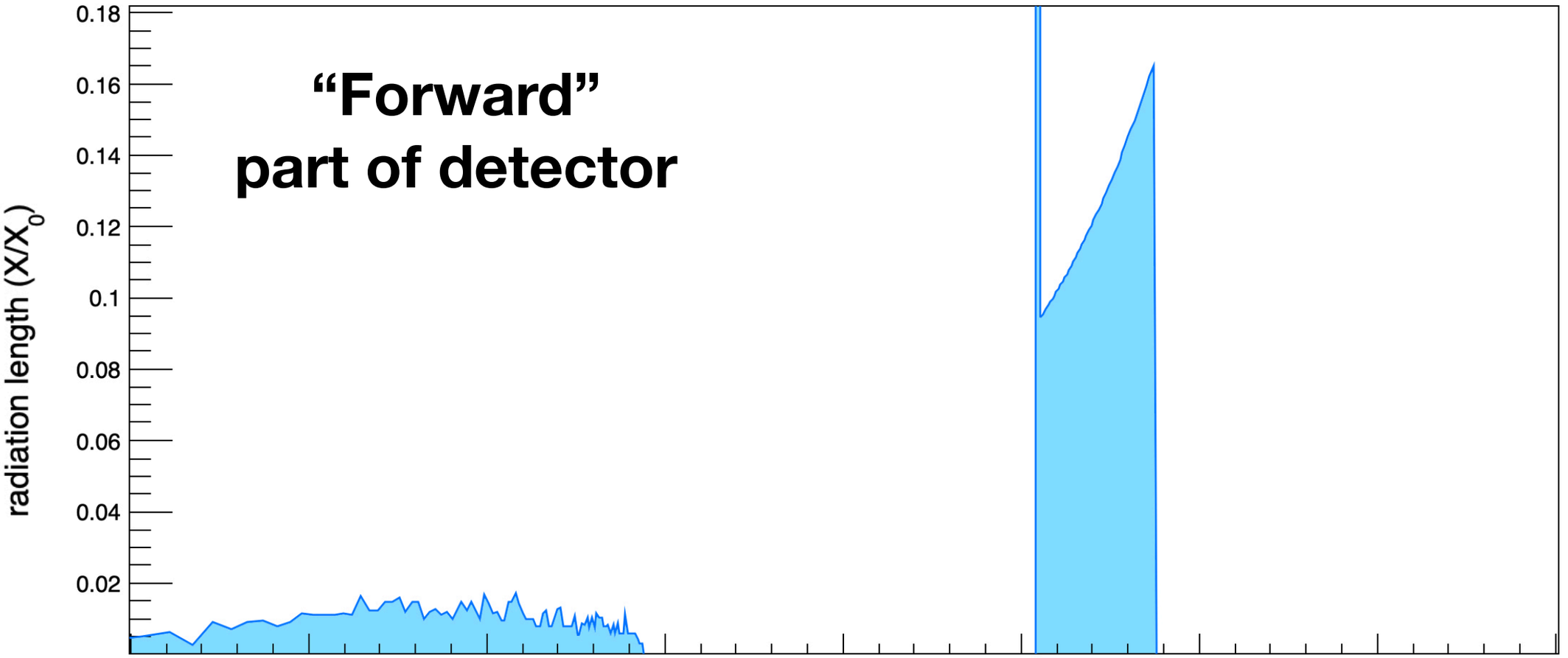

radiation length (X/X0)
0.018
0.016
0.014
0.012
0.01
0.008
0.006
0.004
0.002
-1.09
1.09
-1.18
1.18
-1.79
1.79
-2.45
2.45
3 barrel layer
2 barrel layer
1 barrel layer
–3
–2
–1
0
1
2
3
η

3. Why is there material in the forward region of the backward-labeled detector part?





Why do we see material both in the forward and backward regions for the forward-label part of the detector?


“Forward”
part of detector
radiation length (X/X0)
0.18
0.16
0.14
0.12
0.1
0.08
0.06
0.04
0.02
−4
−3
−2
−1
0
1
2
3
4
η

Summary and Conclusions

1. What are the ears right above the spikes at $\eta = \pm 1.1$?
   The cylindrical part of the Aluminum support structure

2. Does the barrel coverage make sense?
   Material scan does agree with detector geometry

3. Why is there material in the forward region of the backward-labeled detector part?
   forward-labeled part = forward Al + backward disks
   backward-labeled part = backward Al + forward disks