All-Silicon Tracker Updates

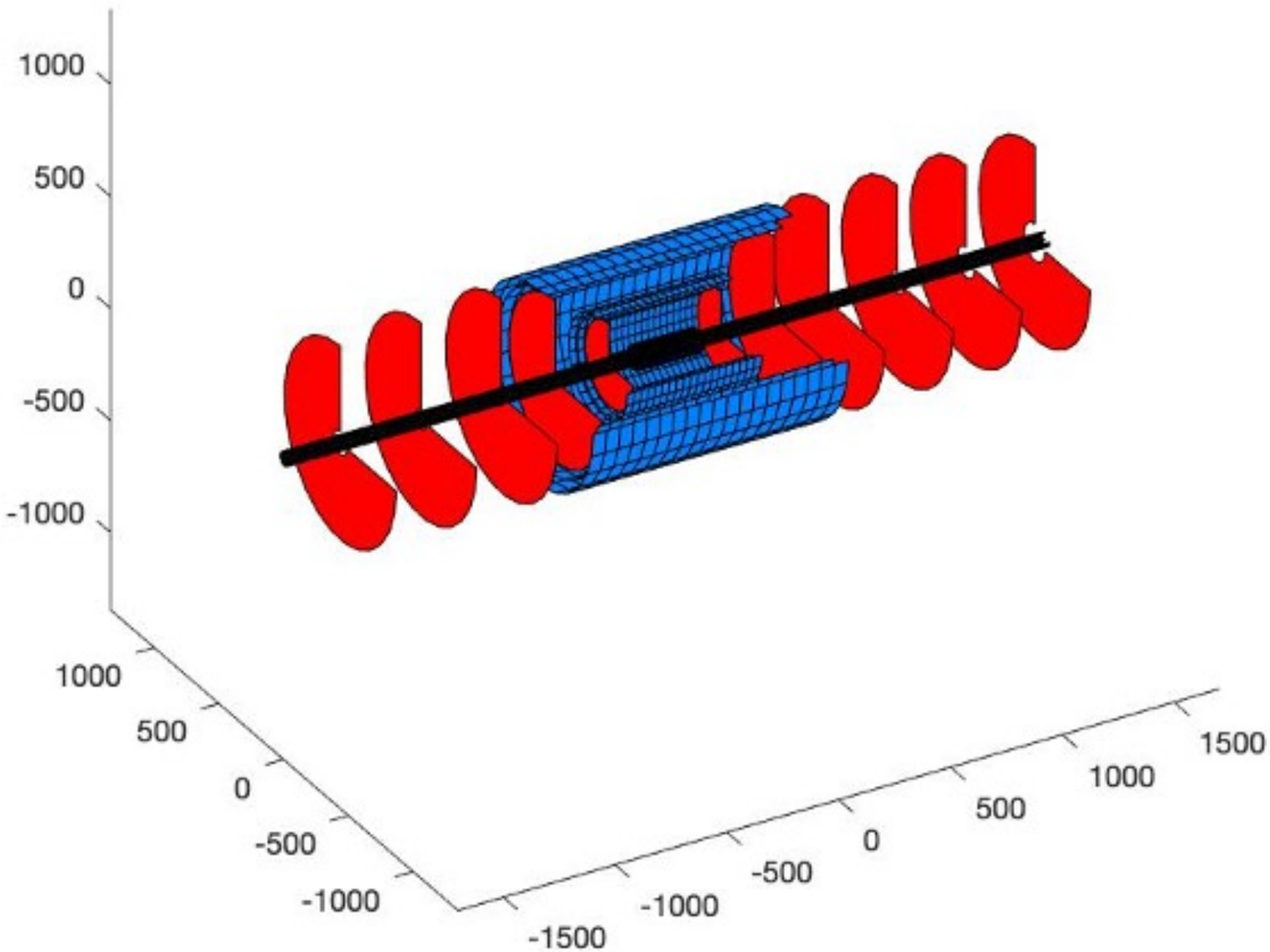
Rey Cruz-Torres

ATHENA Tracking Meeting

10/05/2021

Mirroring Fast-Simulation Studies

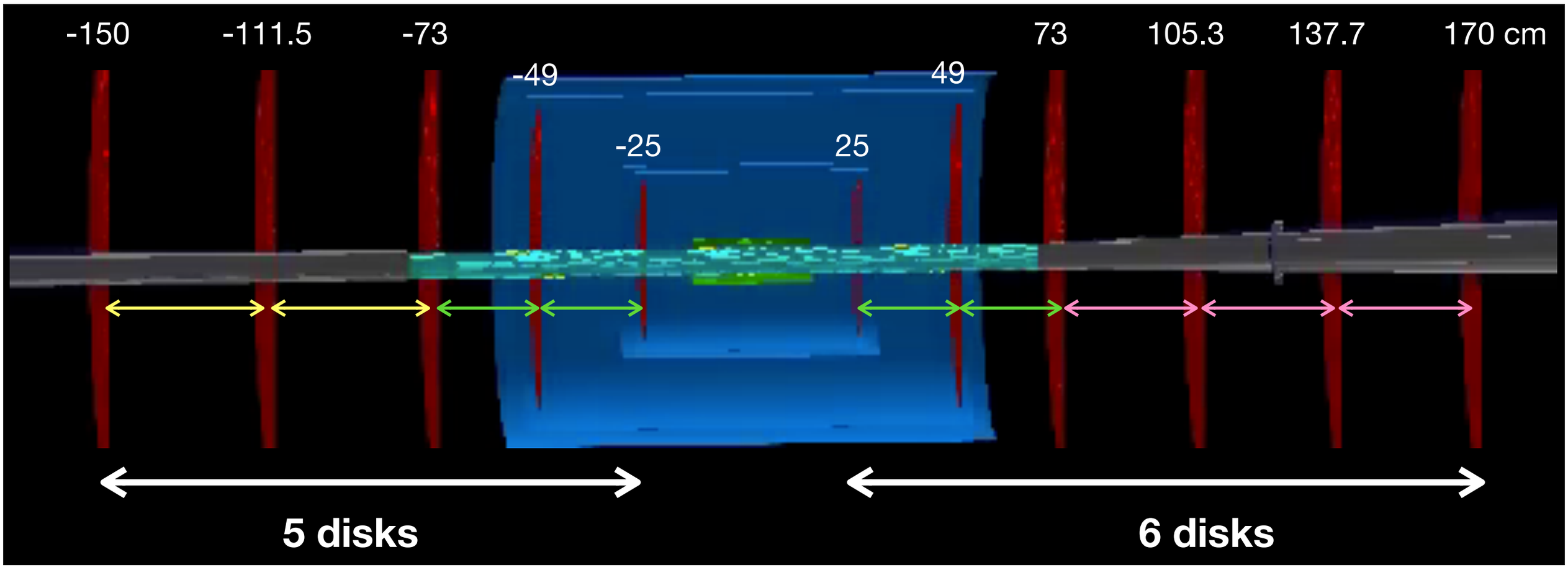
E. Sichtermann



3 vertex layers
Radii: 3.64, 4.45, 5.26 cm
Length: 28 cm

5 disks in backward endcap
6 disks in forward endcap

Updates to All-Silicon Tracker in Fun4All

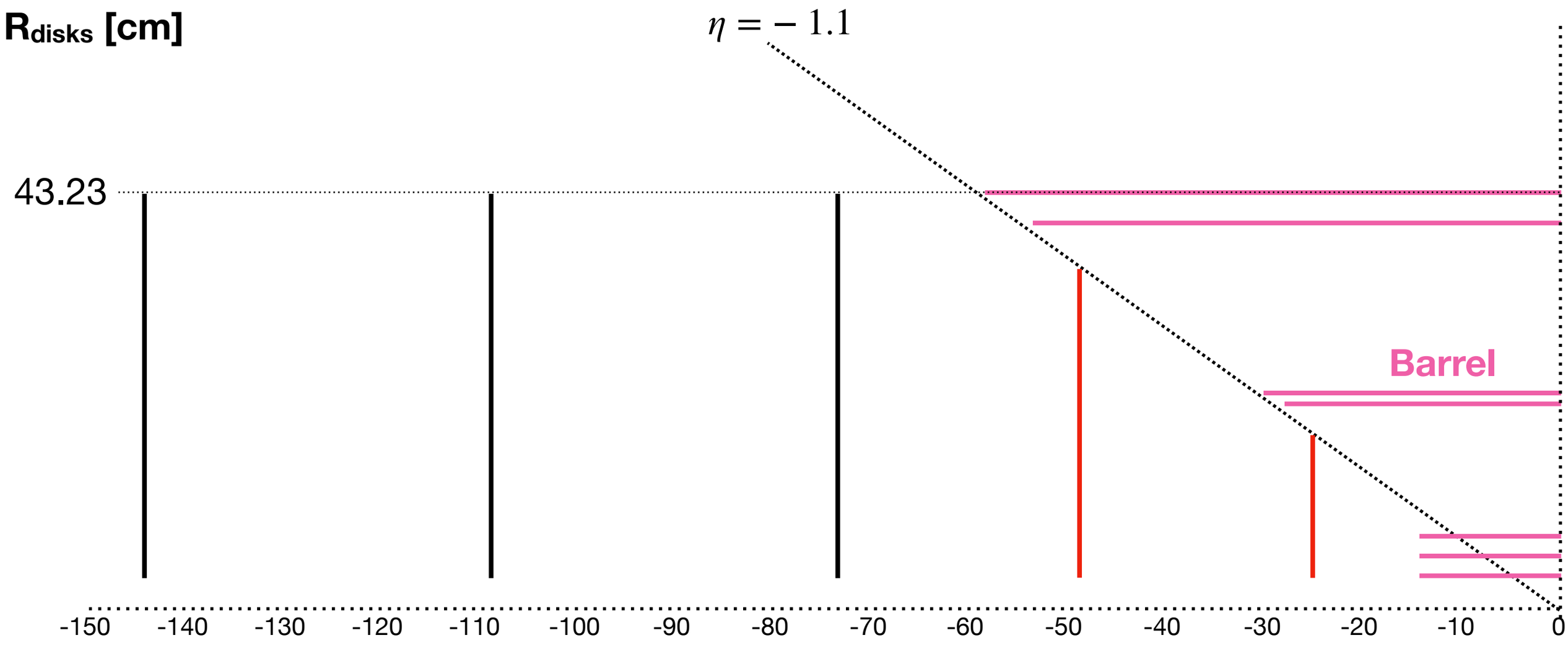


3 vertex layers
Radii: 3.64, 4.45, 5.26 cm
Length: 28 cm

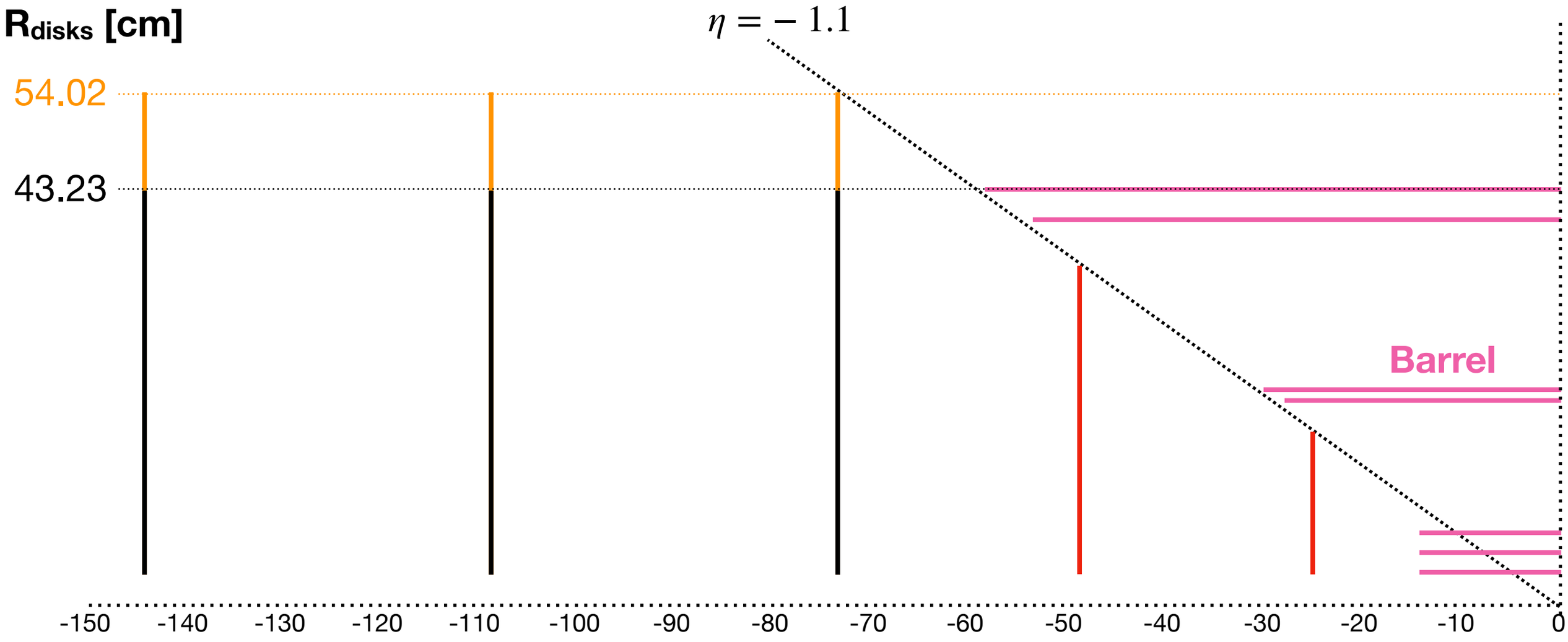
5 disks in backward endcap
6 disks in forward endcap

*all disks have X/X0 = 0.24% regardless of radius

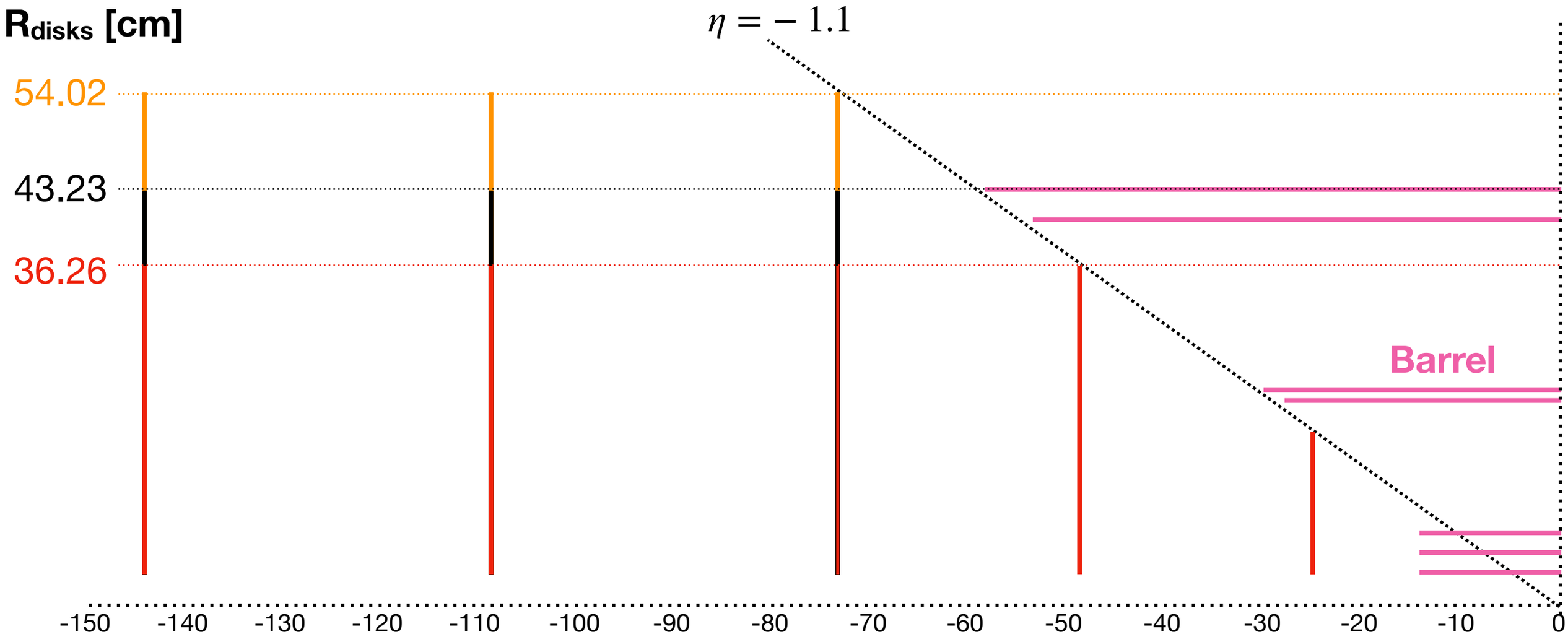
“Nominal” All-Silicon Tracker



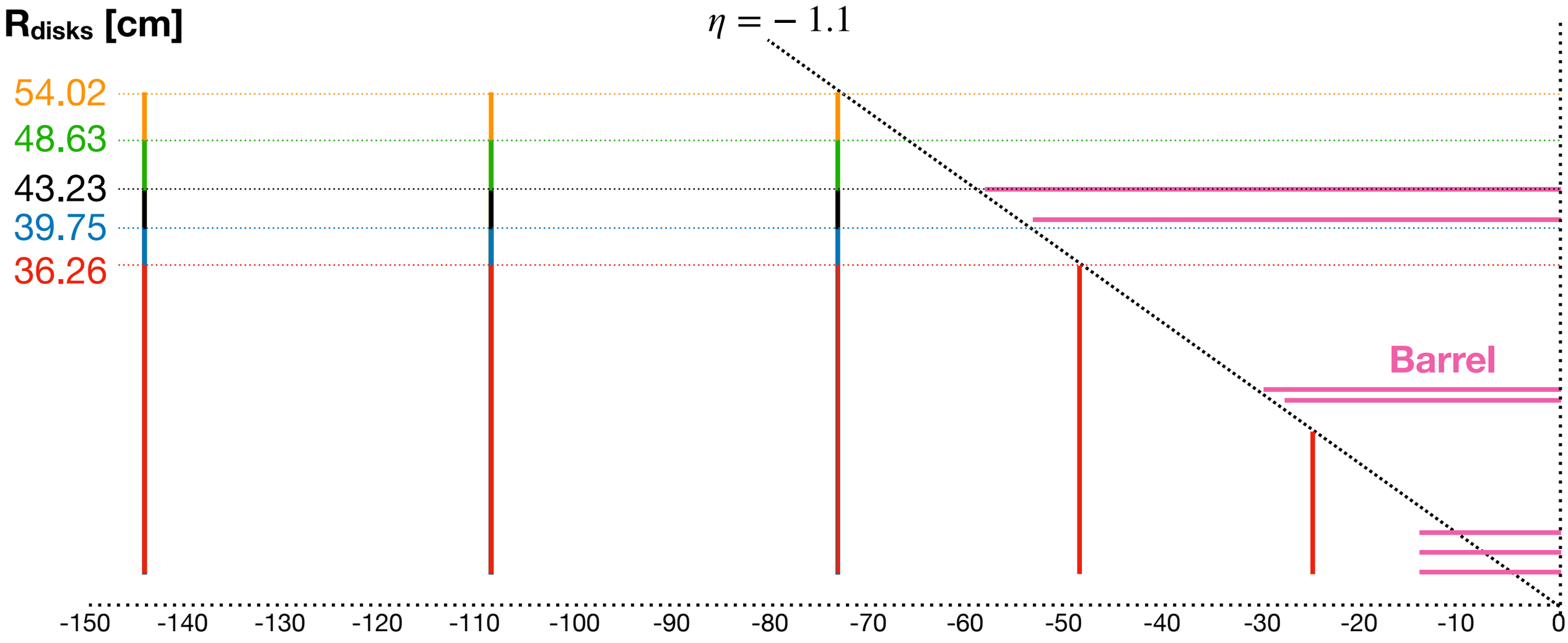
Increasing 3 highest-|z| R_{out} to make 3rd disk projective



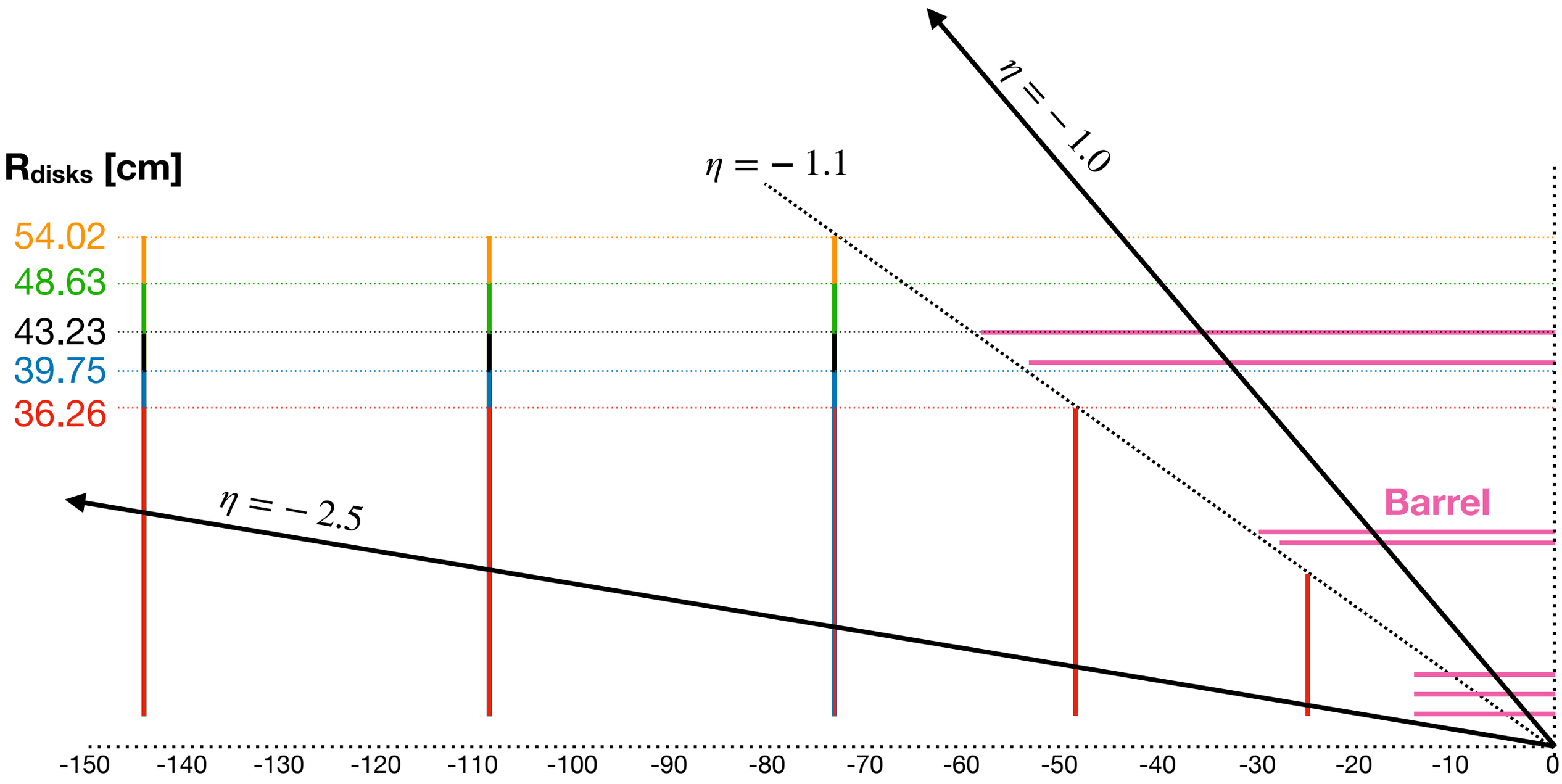
Reducing 3 highest-|z| R_{out} to match 2nd disk



Extra configurations



Generation Parameters



$$p \in [0,18]\ \mathrm{GeV}/c$$

$$\eta \in [-2.5, -1]$$

B = ATHENA (21/05/07) and (21/09)

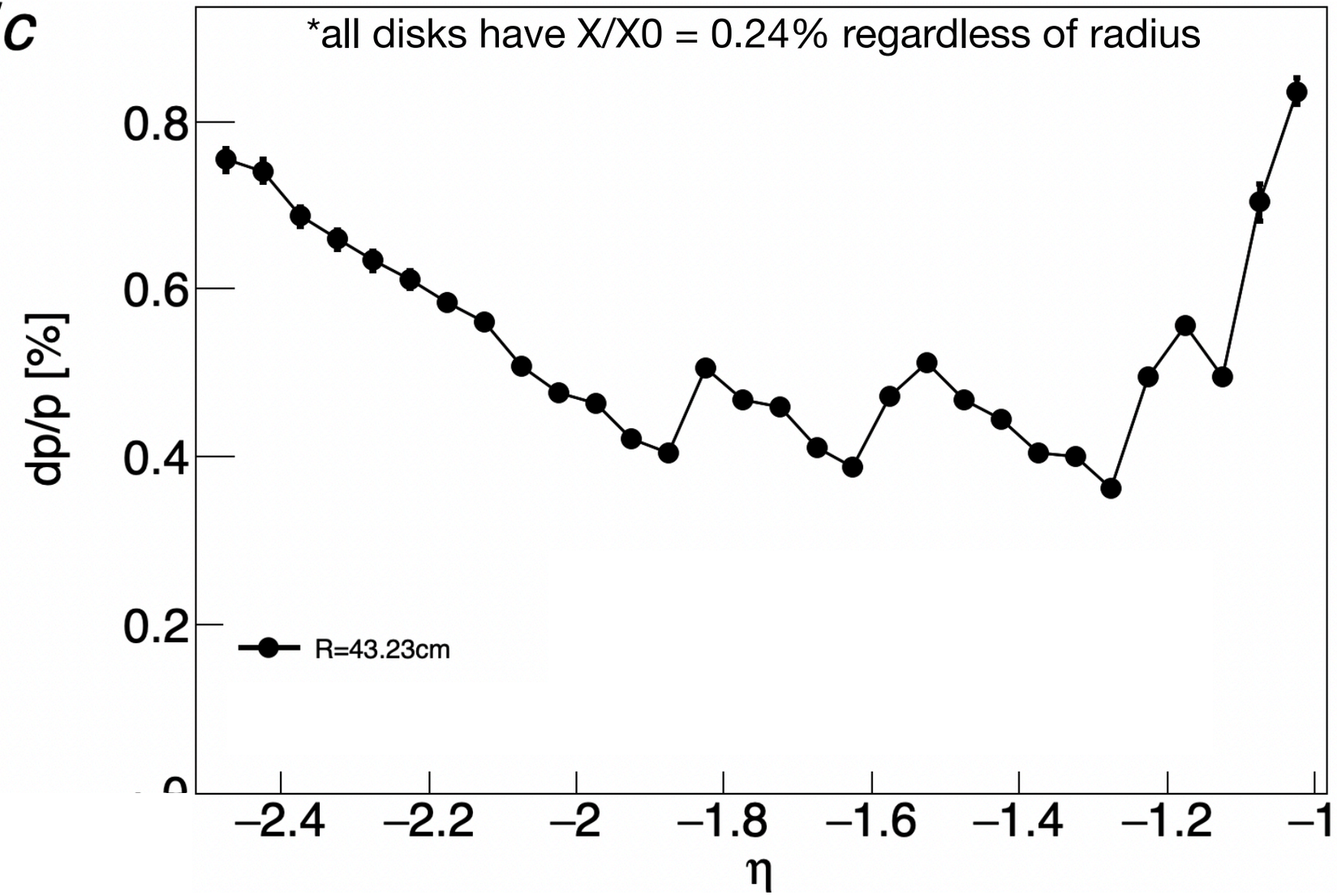
Baseline dp/p performance

16.0 < p < 18.0 GeV/*c*

B = ATHENA (21/05/07)

R_{disks} [cm]

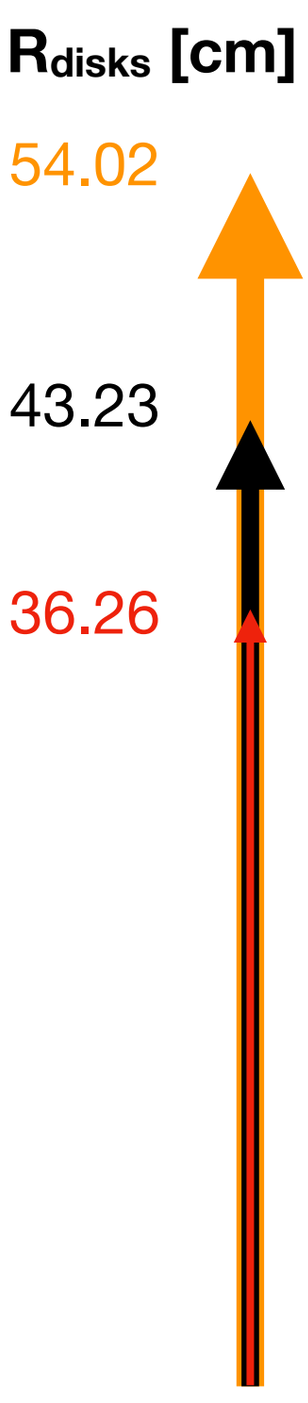
43.23

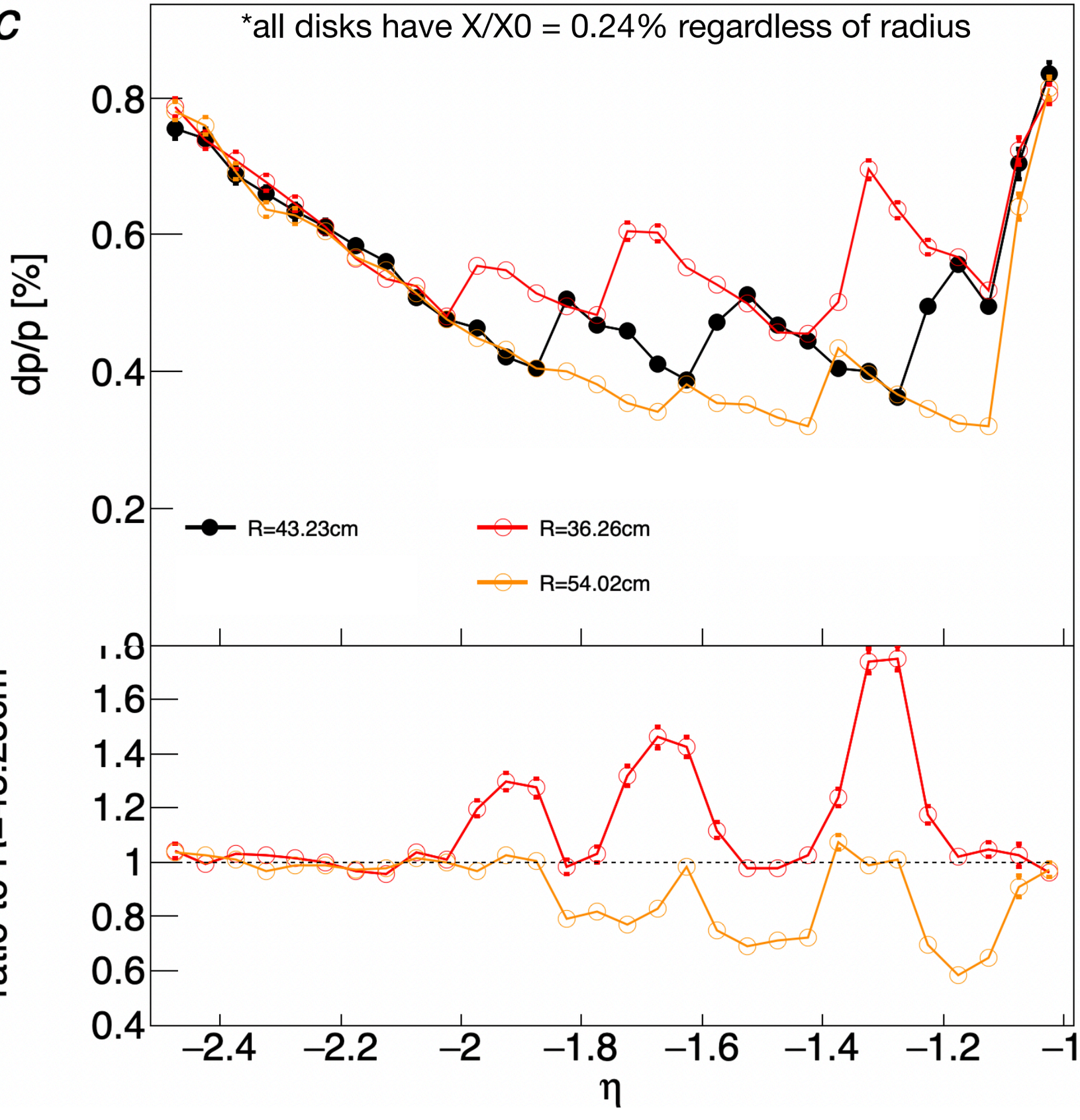


Comparison to variations

16.0 < p < 18.0 GeV/*c*

B = ATHENA (21/05/07)

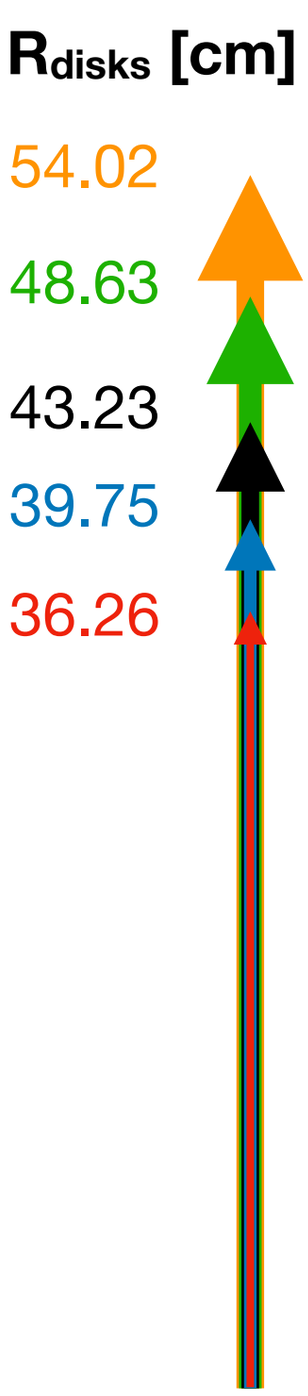


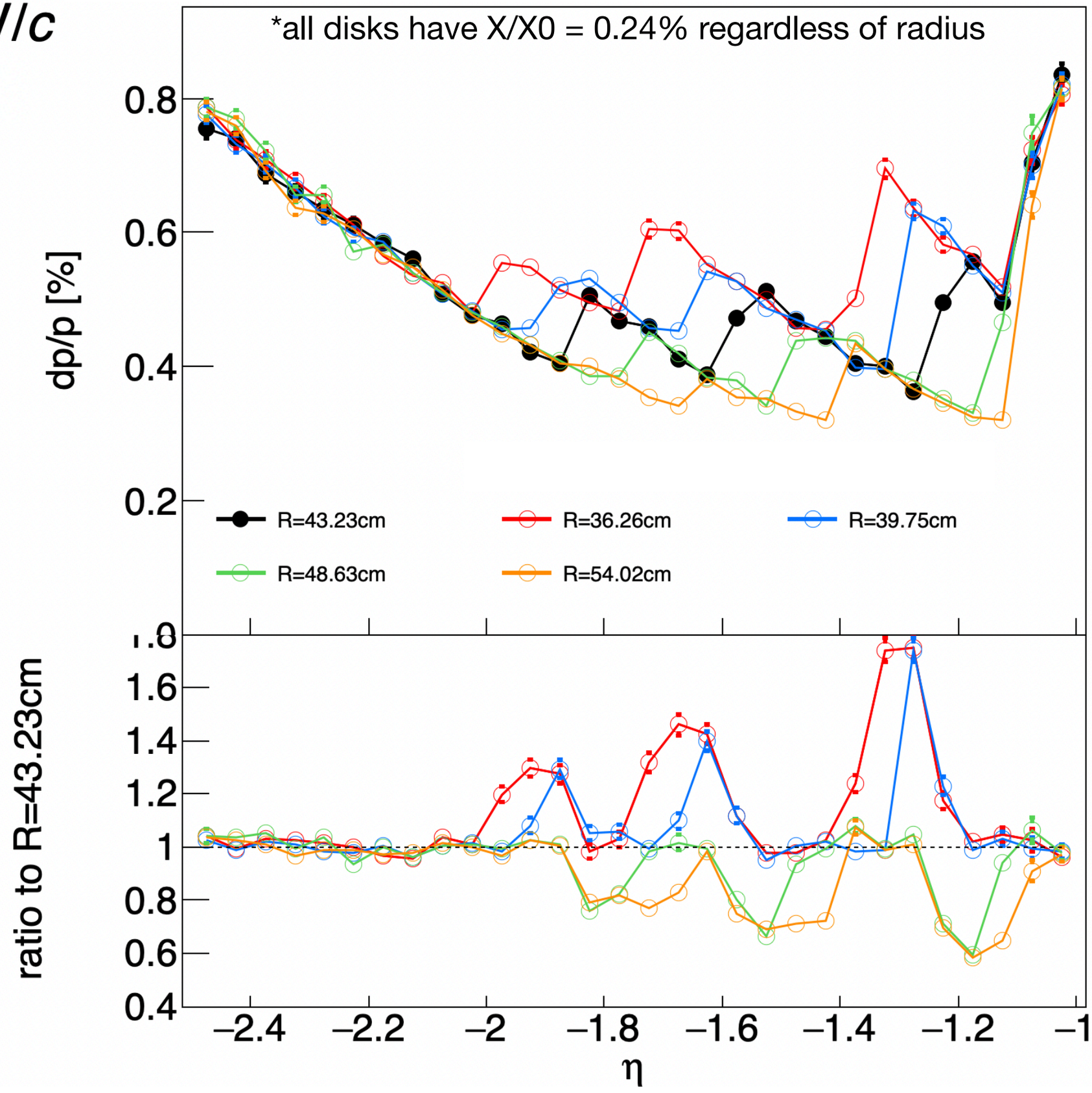


Comparison to variations

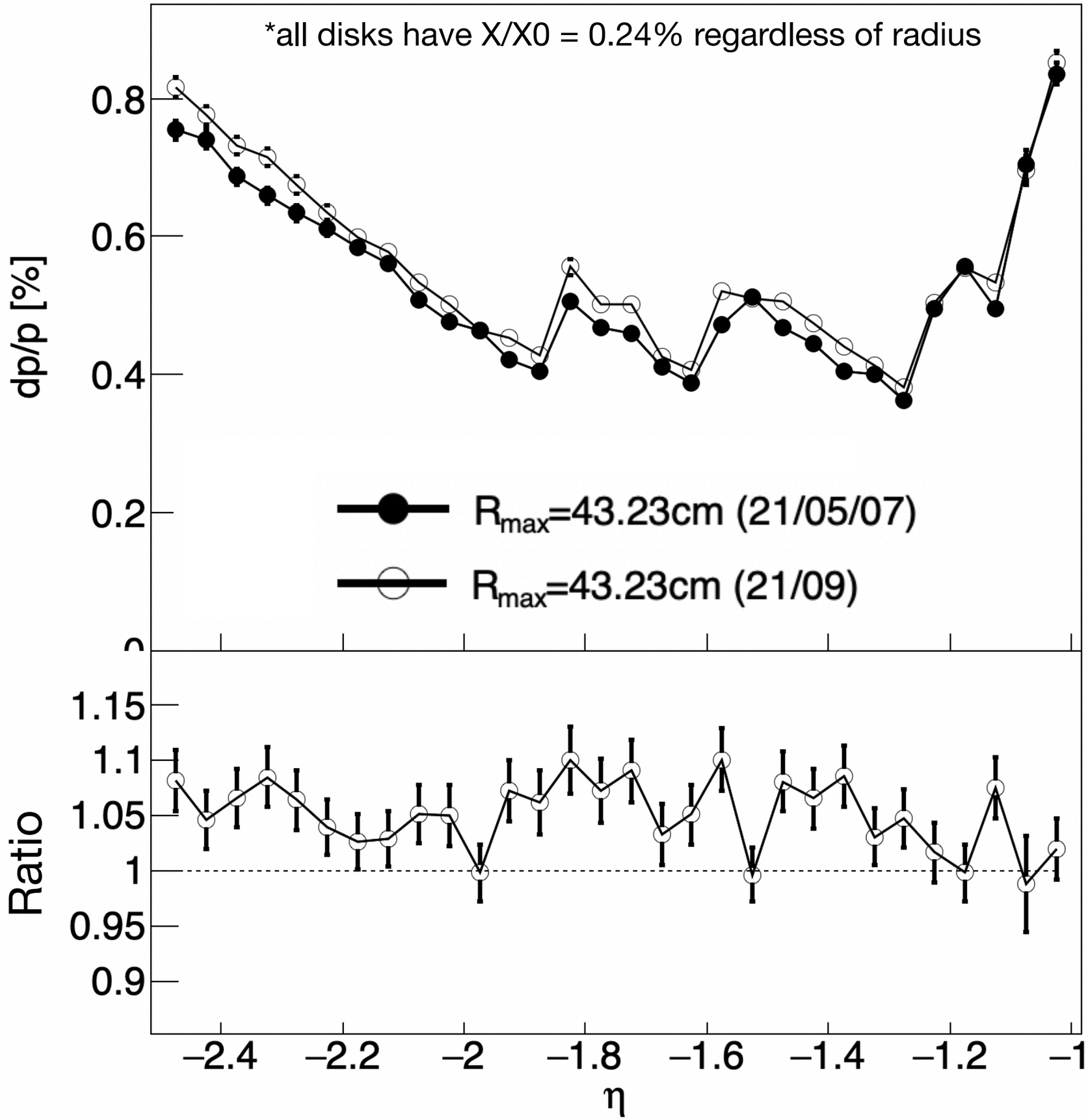
16.0 < p < 18.0 GeV/*c*

B = ATHENA (21/05/07)





B-field Comparison



Summary

- New geometry (asymmetric detector making use of available space) implemented in Fun4All following studies presented last week

- Study of dp/p impact from changing 3 highest-|z| disk outer radii in electron-going direction

- Disk material budget kept at 0.24% X0 regardless of radii (may need revisiting)

- dp/p with new (Sept) magnetic-field map is marginally but systematically above that with May map