

Hybrid Tracker Fun4All Simulation Updates

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ATHENA Tracking Working Group

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Updates

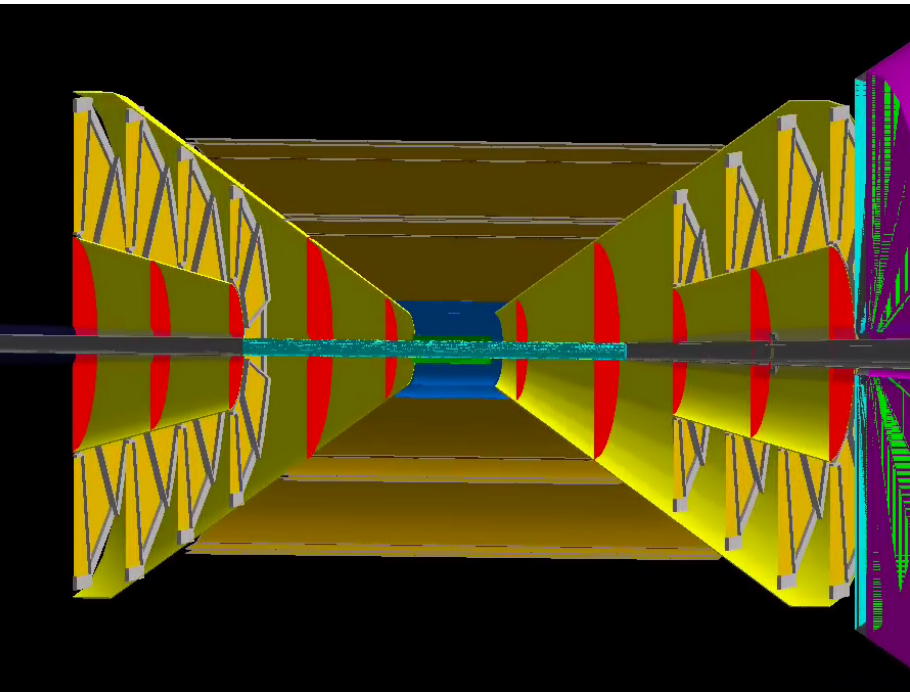
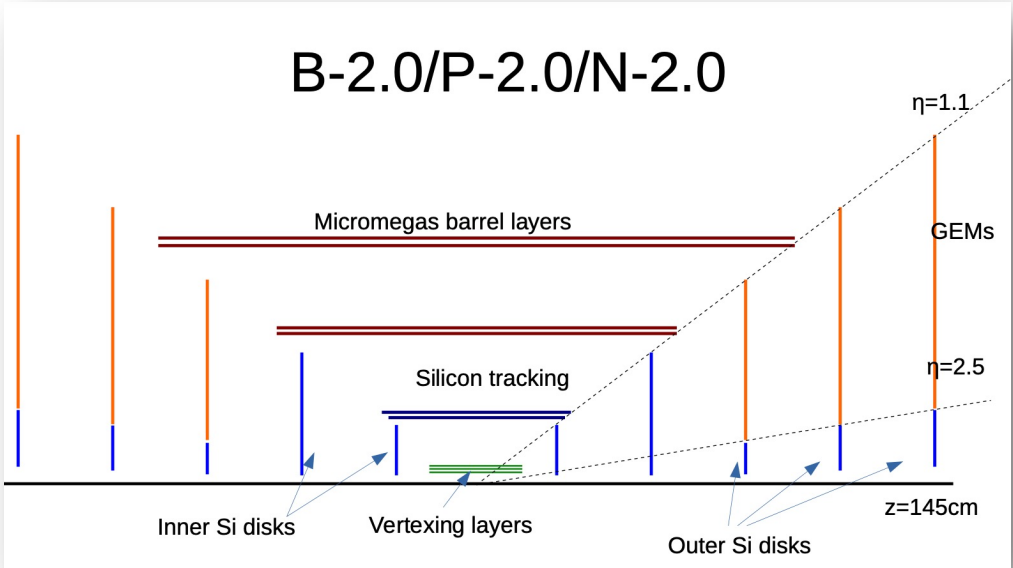
- Updated B-Field
 - Shifted 25 cm in rear direction
- New projective hybrid design
 - Overlap of technologies
 - Larger Si disk acceptance
- Study of momentum resolution in the Barrel-Endcap transition region
- Study of the momentum resolution in the GEM Endcap to Si Endcap transition region
- Comparison of finely eta-binned and fixed eta simulation input
- Material scan of new configuration

Updated Design

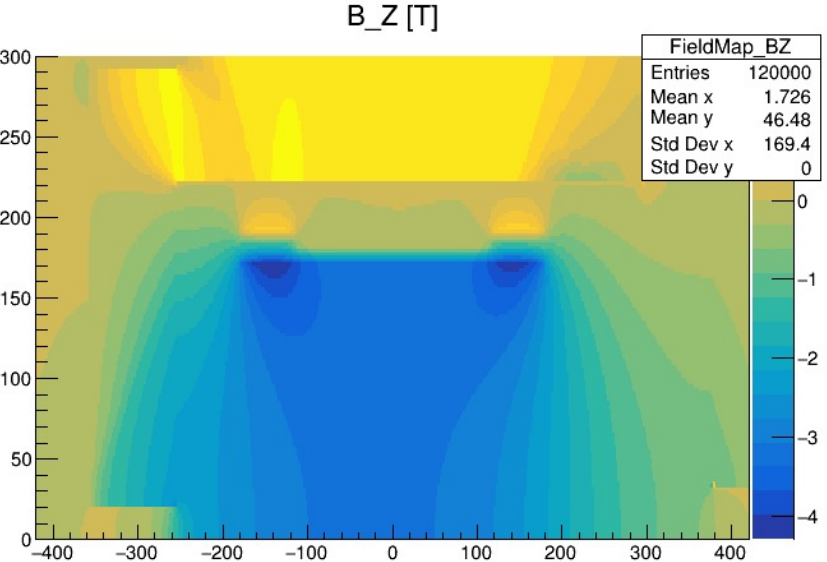
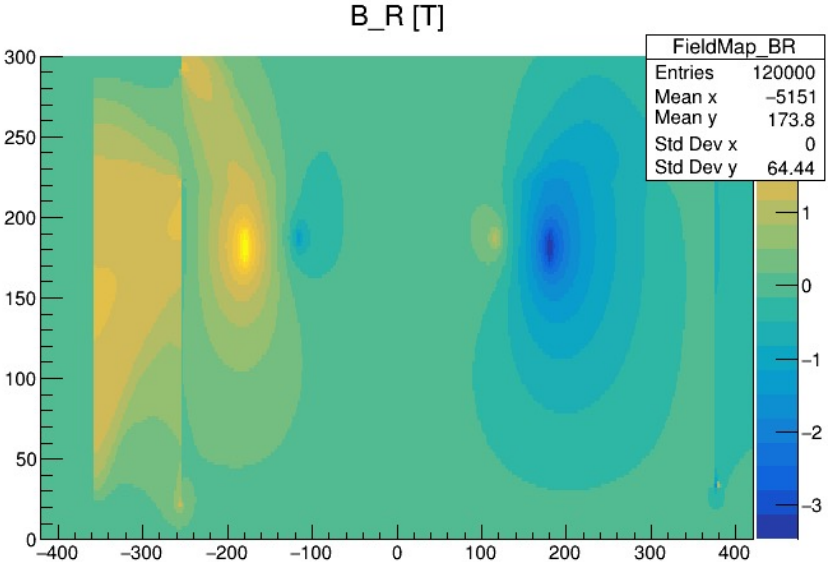
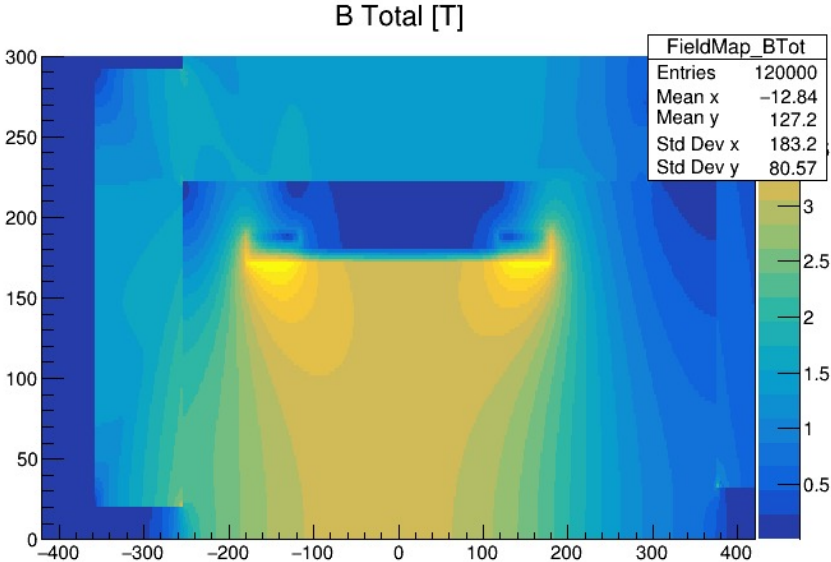
Symmetric design, following studies will focus on rear direction

- New inner projective cone along 2.0 instead of 2.5
- Si vertex tracking layers length reduced from 42cm to 30cm
- Two innermost Si disks are now projective to 1.1 (overlap of technology)
- 3 projective GEM disks + 1 GEM disk to supply larger lever arm

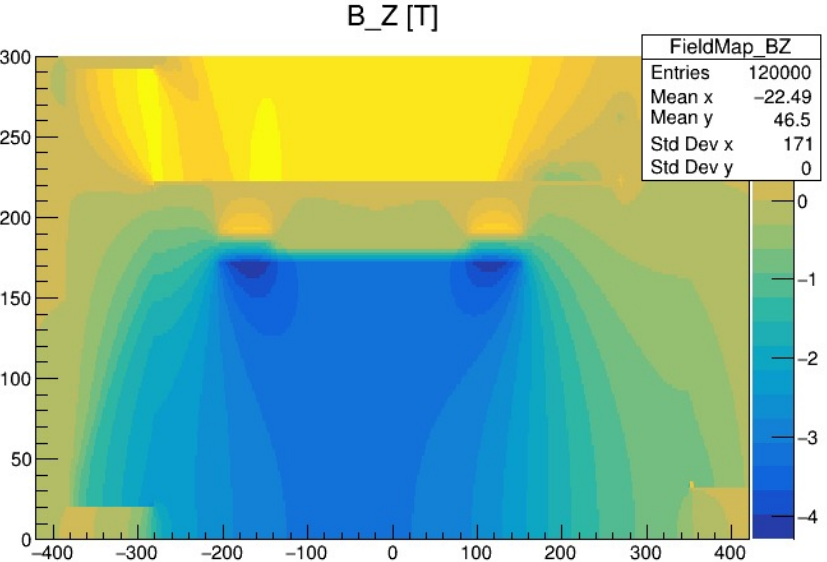
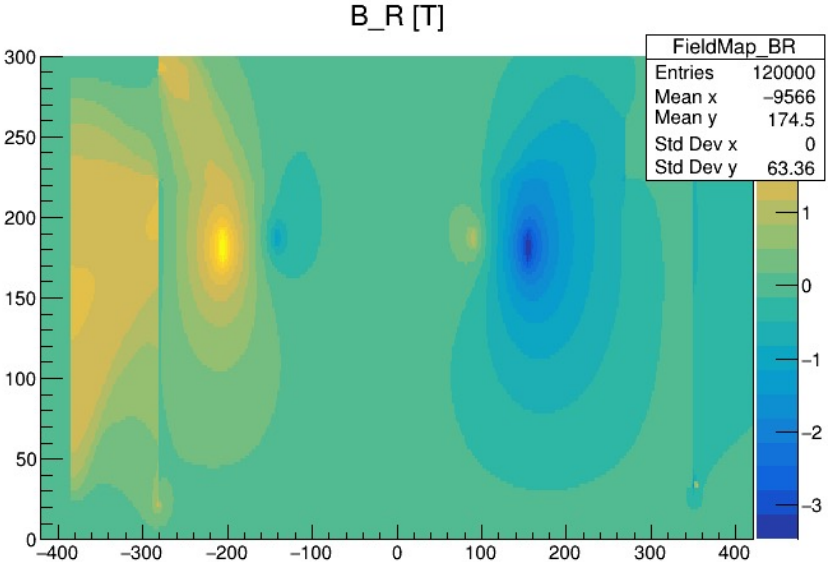
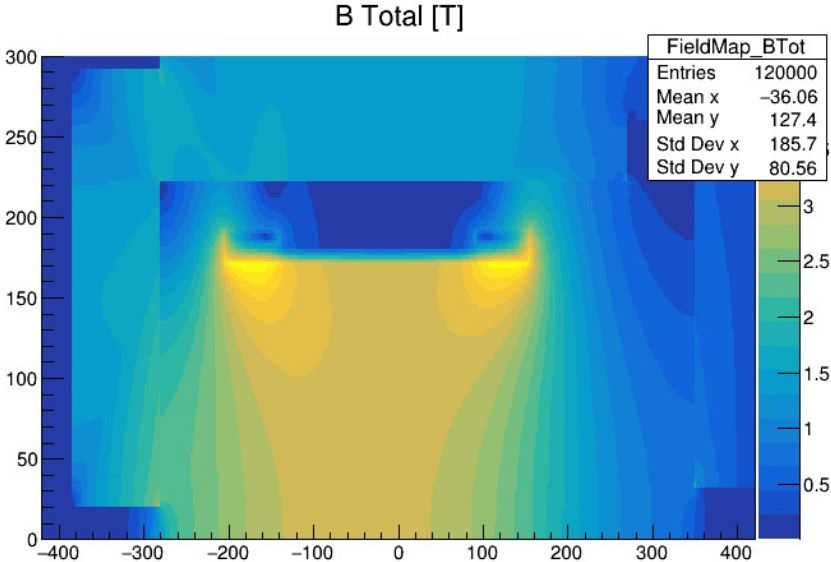
Layout discussed last week



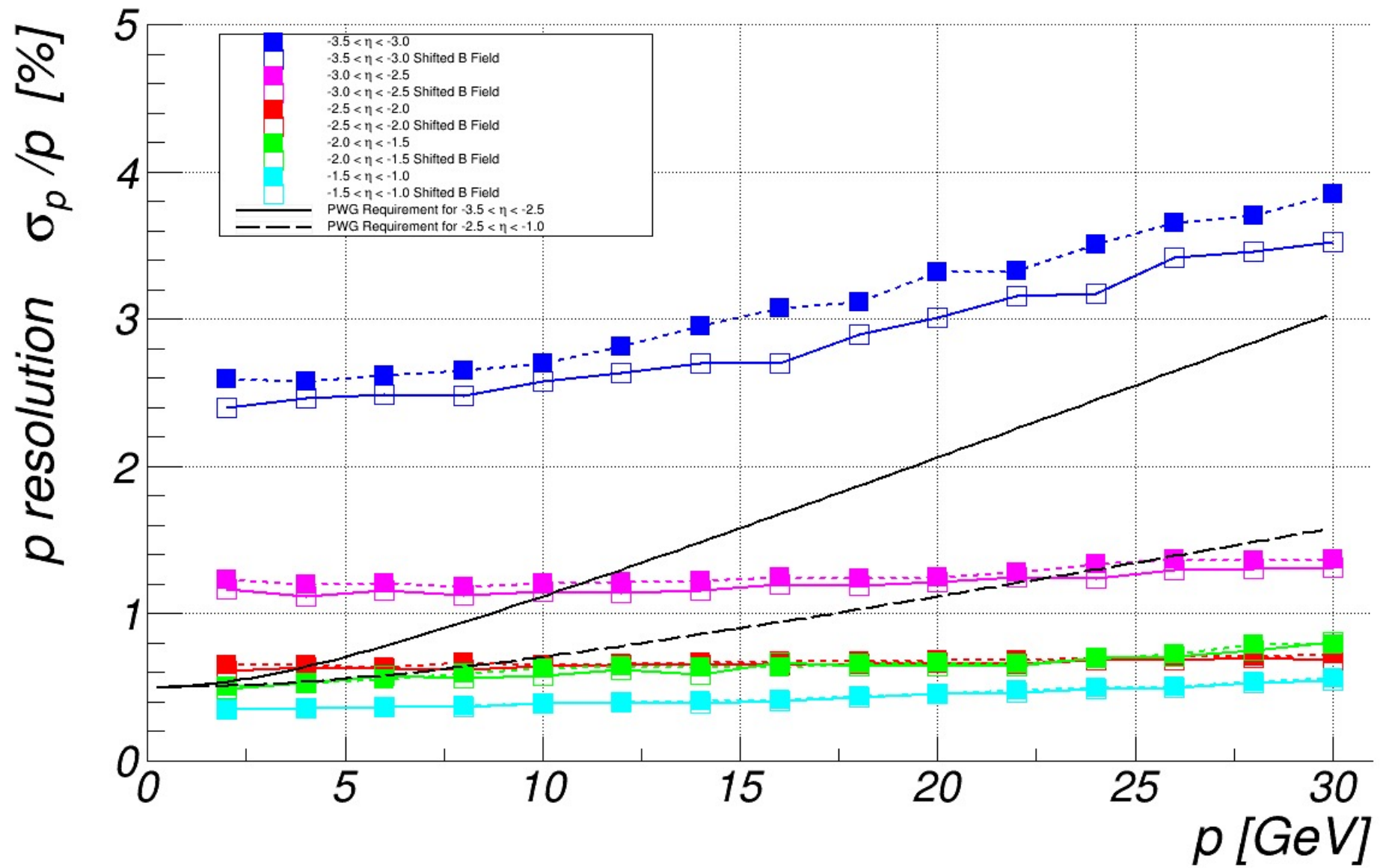
Original ATHENA 05/07 Field Map



Shifted ATHENA 05/07 Field Map



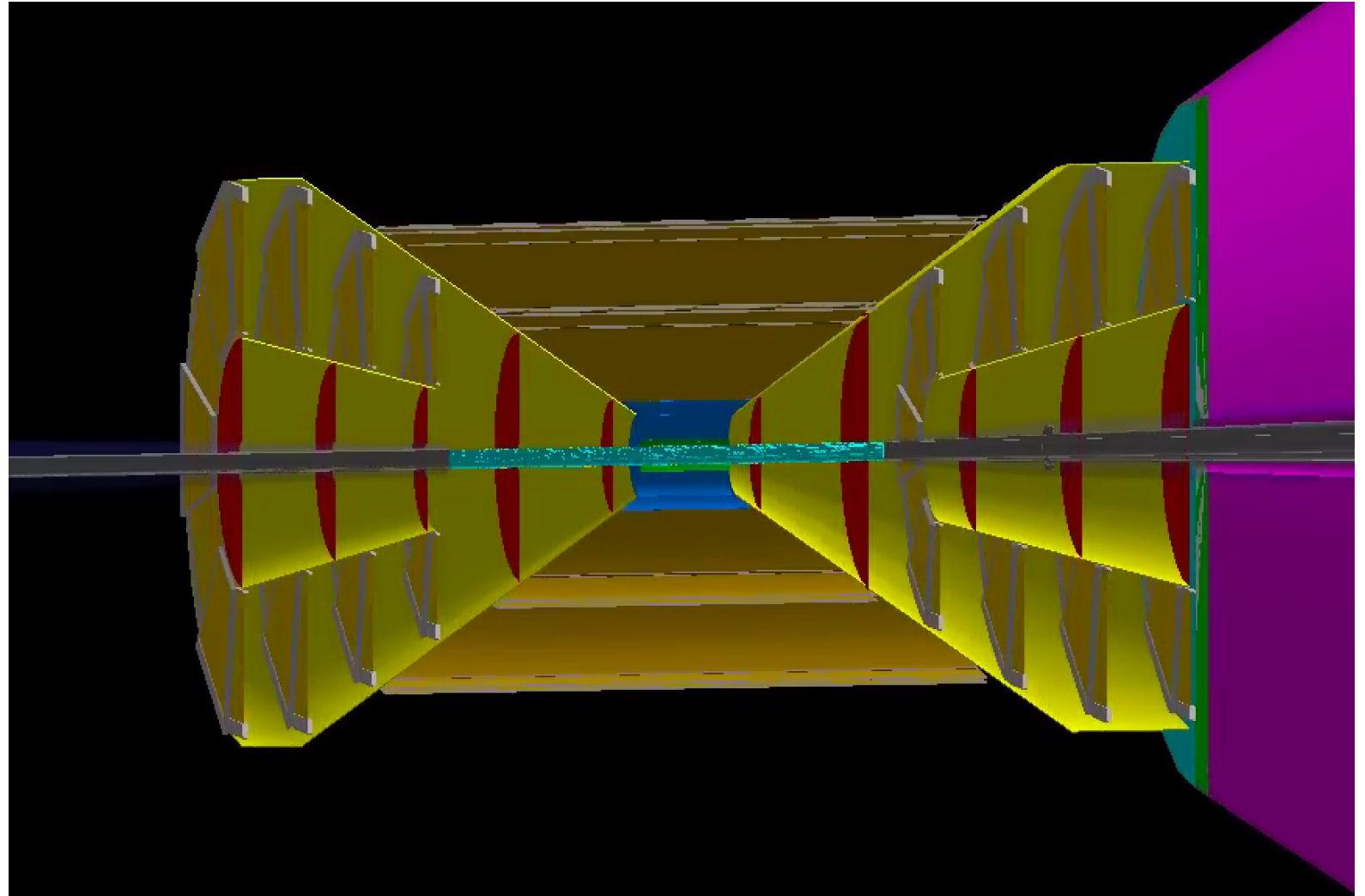
Momentum Resolution – Comparison with Shifted B Field



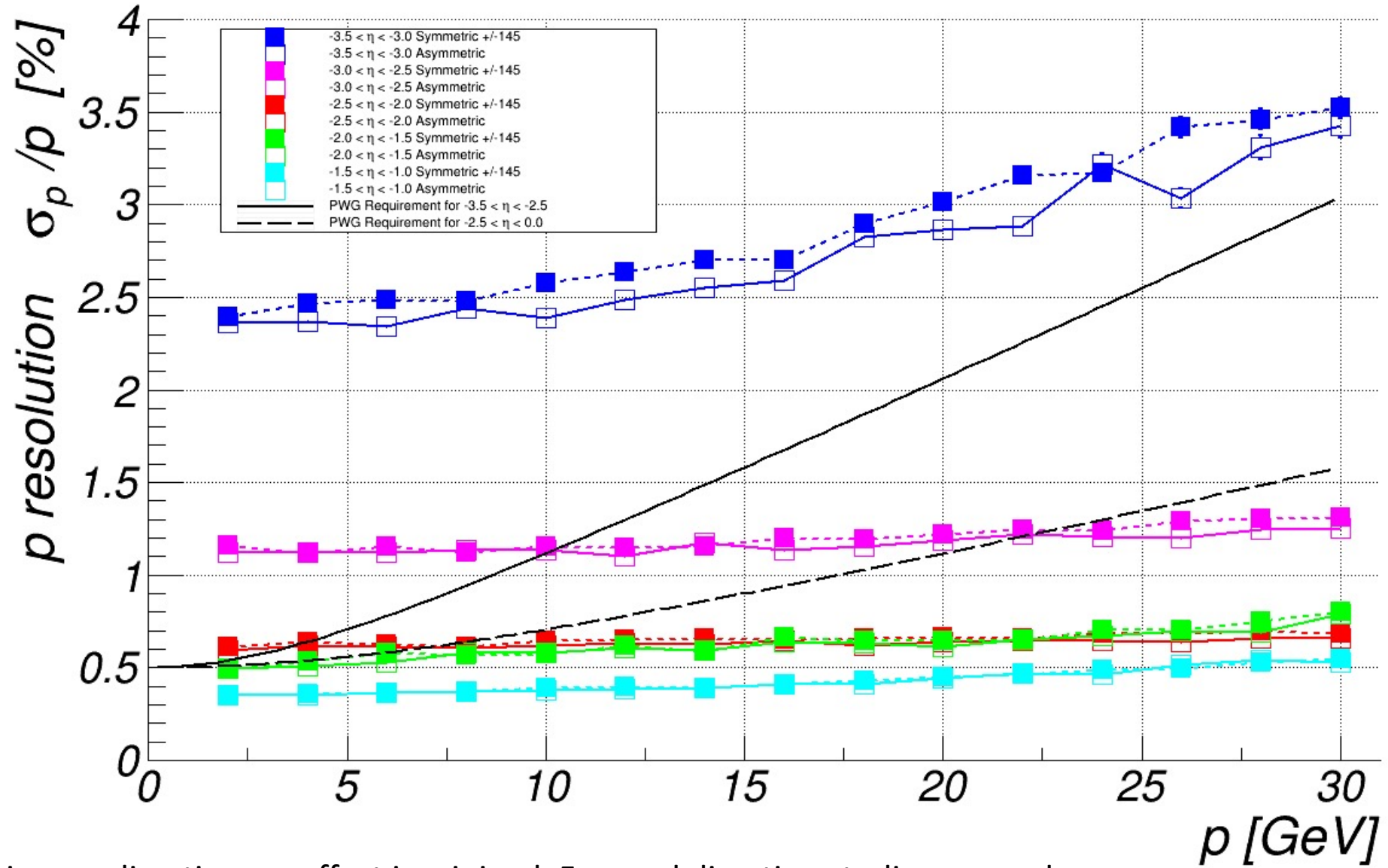
Modified Detector Configuration – Maximum Lever Arm

Slightly modified from the symmetric version shown earlier.

Extending to -150 and +170 in z (from 145)
Disks have same starting position, final disk is at maximum $|z|$ and other disks are evenly spaced



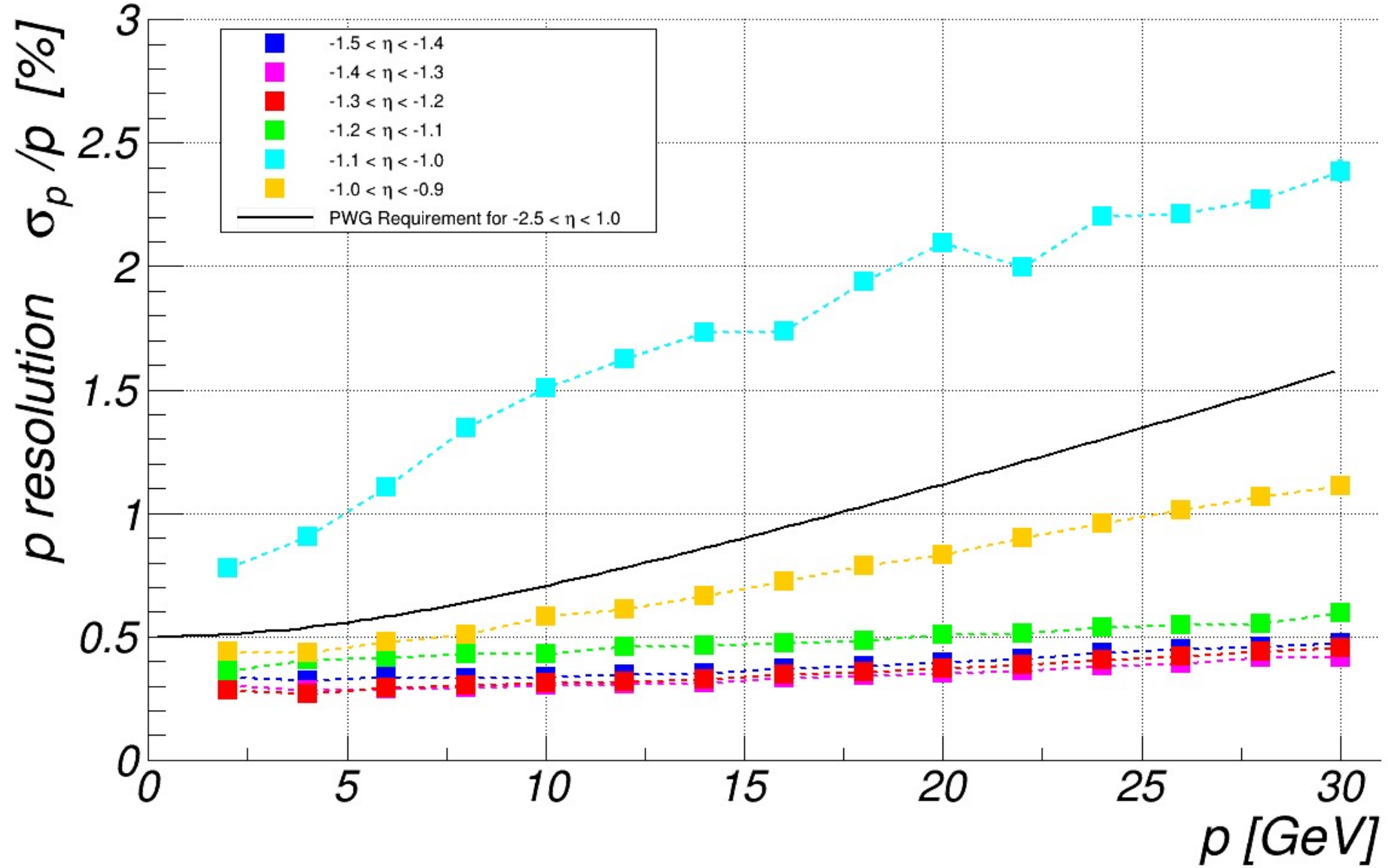
Momentum Resolution – Rear Direction, Detector Comparison



Only 5cm shift in rear direction, so effect is minimal. Forward direction studies are underway.

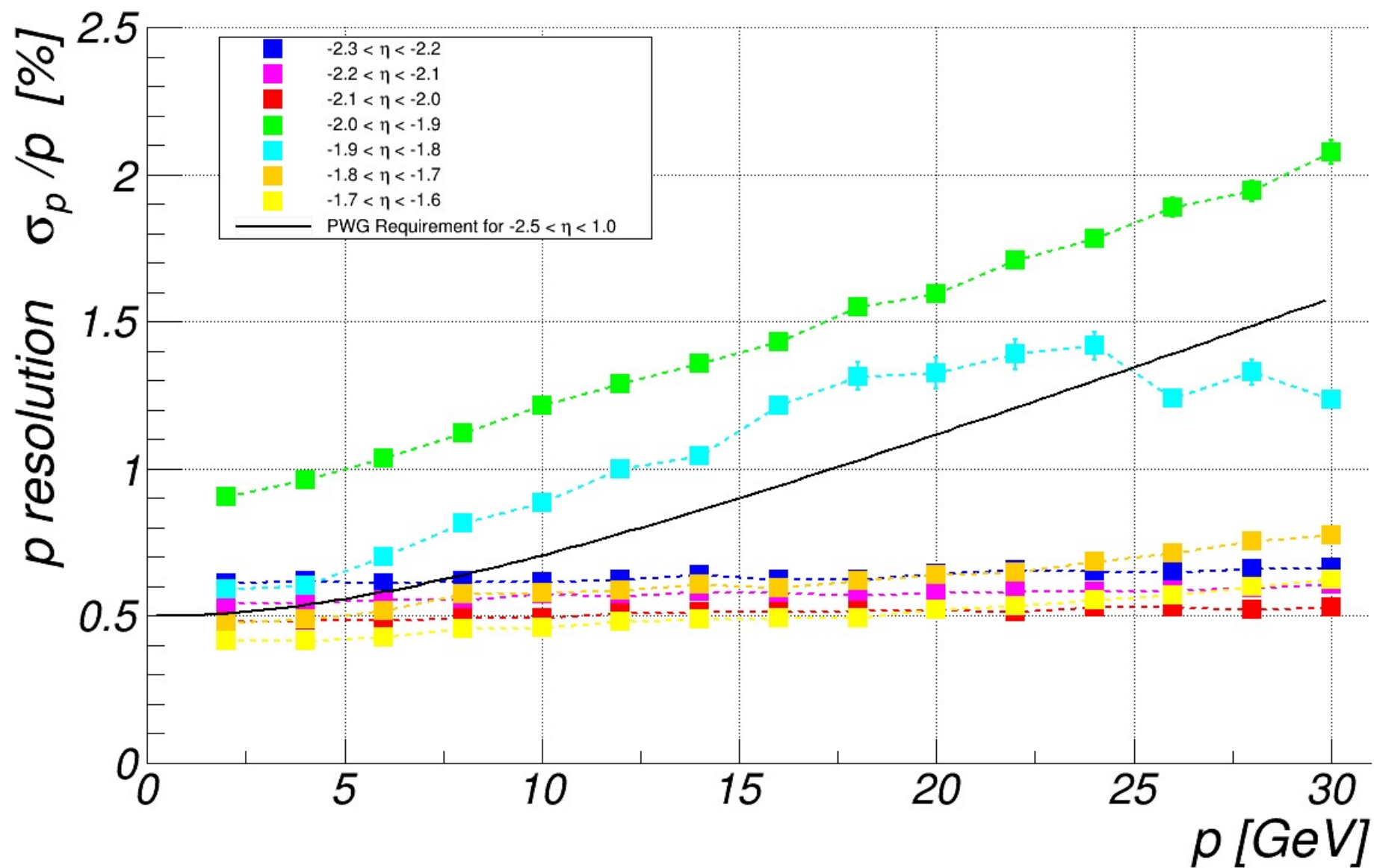
Barrel to Rear Endcap Transition – Momentum Resolution

-1.1 corresponds to the large projective cone, poor performance is expected

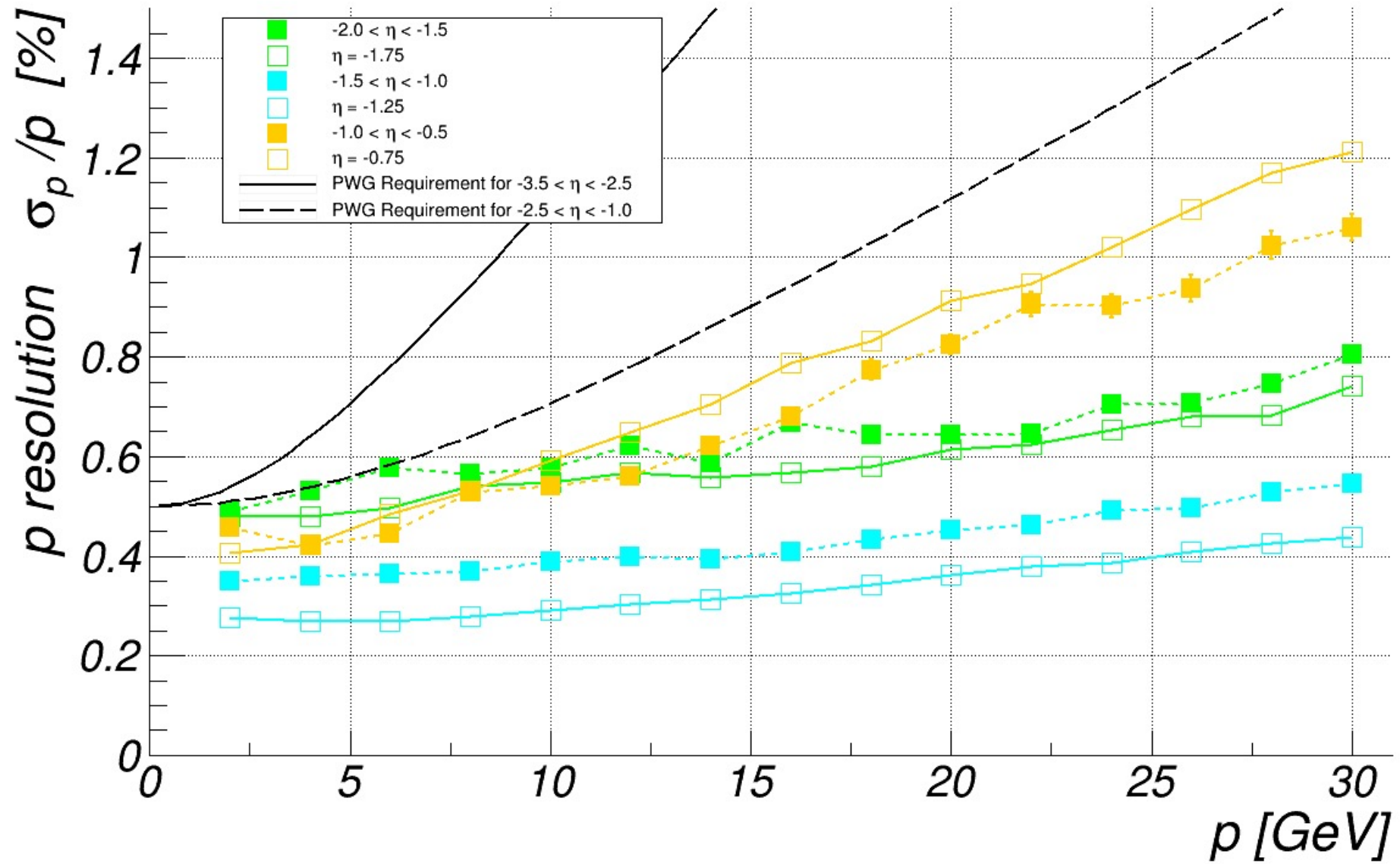


Si+GEM Endcap to All-Si Endcap Transition – Momentum Resolution

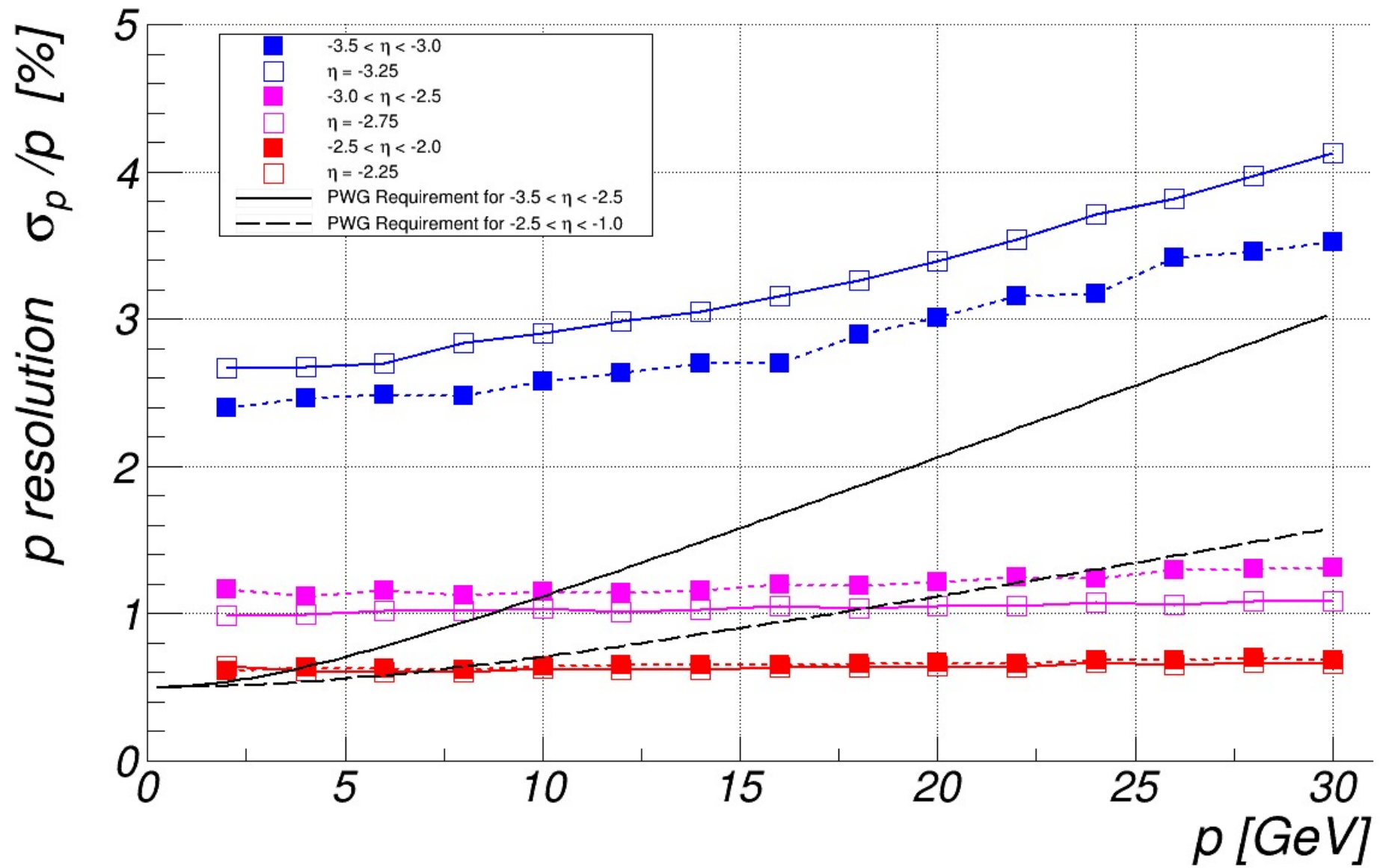
-1.9 to -2.0 contains the projective support/services cone



Fixed Vs Integrated Eta – Low |Eta|

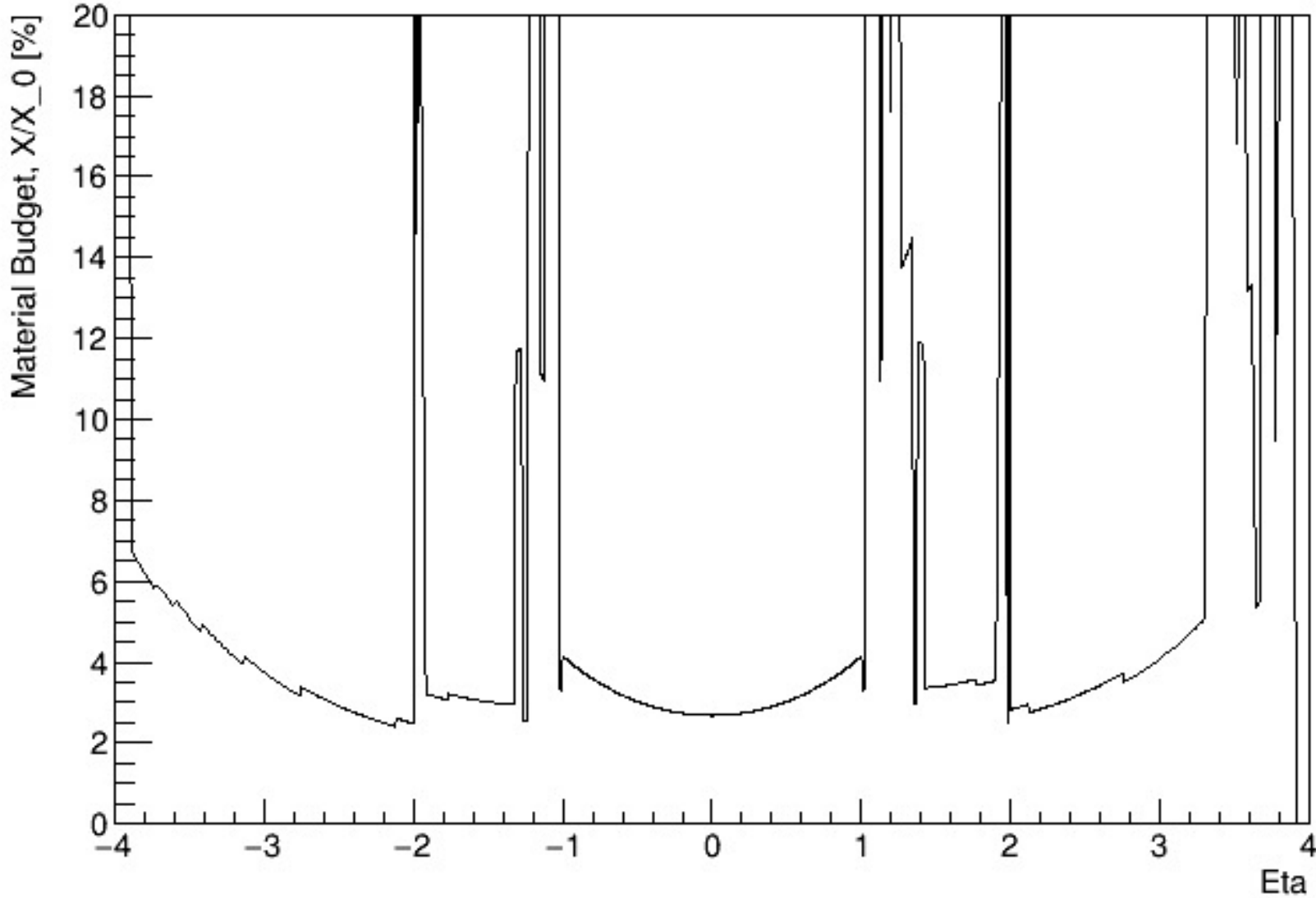


Fixed Vs Integrated Eta – High |Eta|

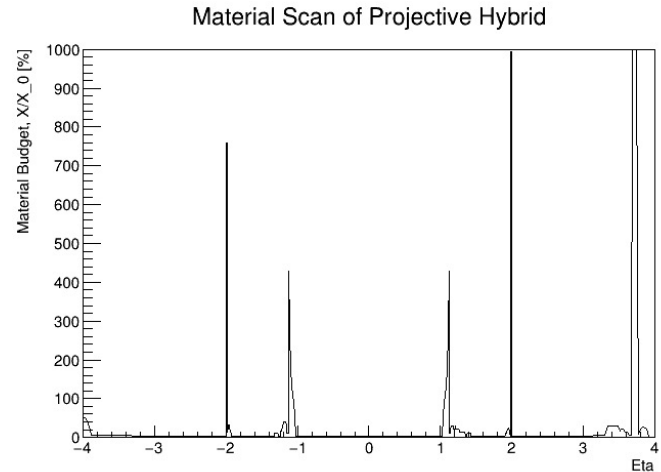


Material Scan of New Design

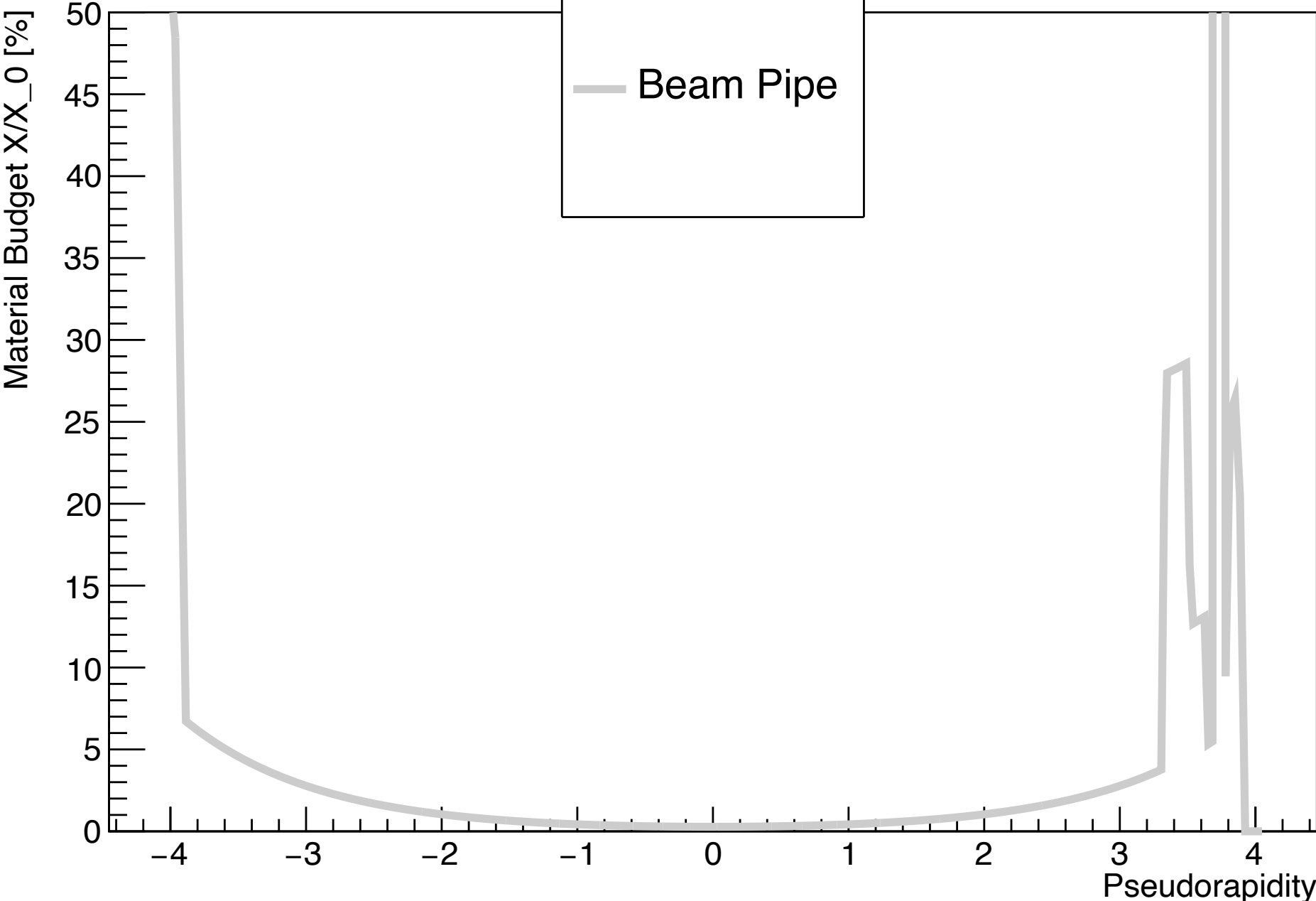
Material Scan of Projective Hybrid



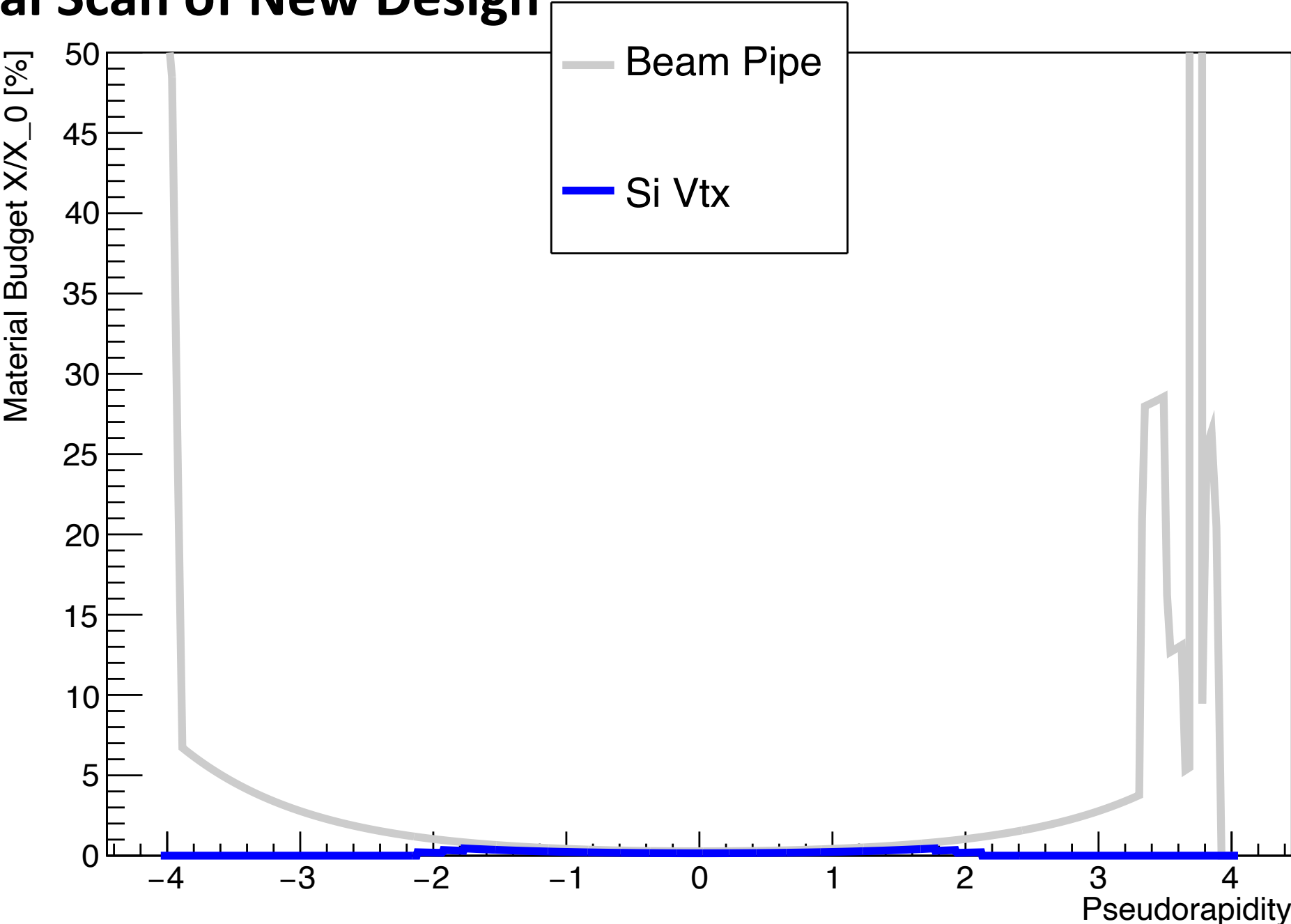
Material near $|\eta| = 2$ has $X/X_0 \sim 10$



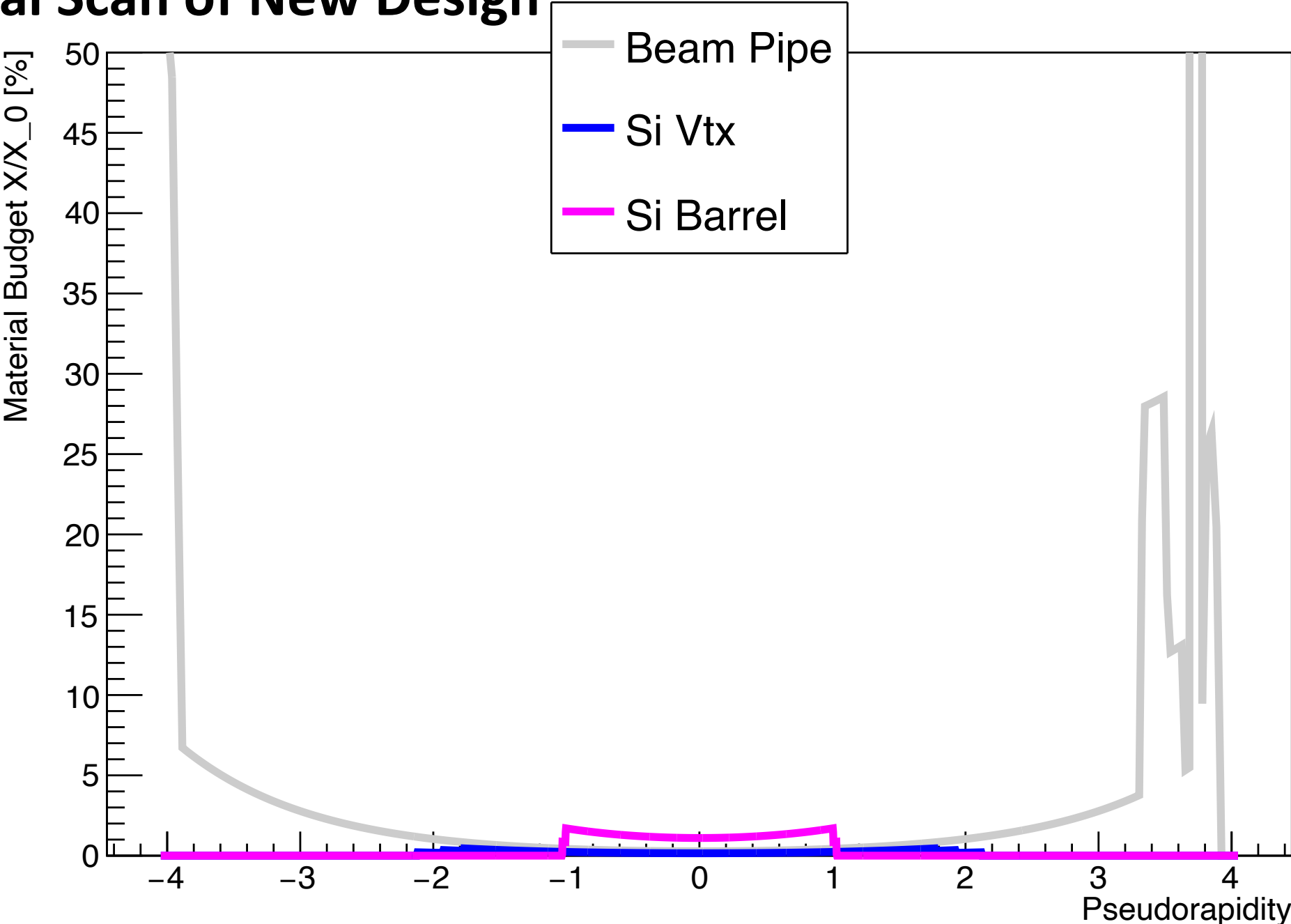
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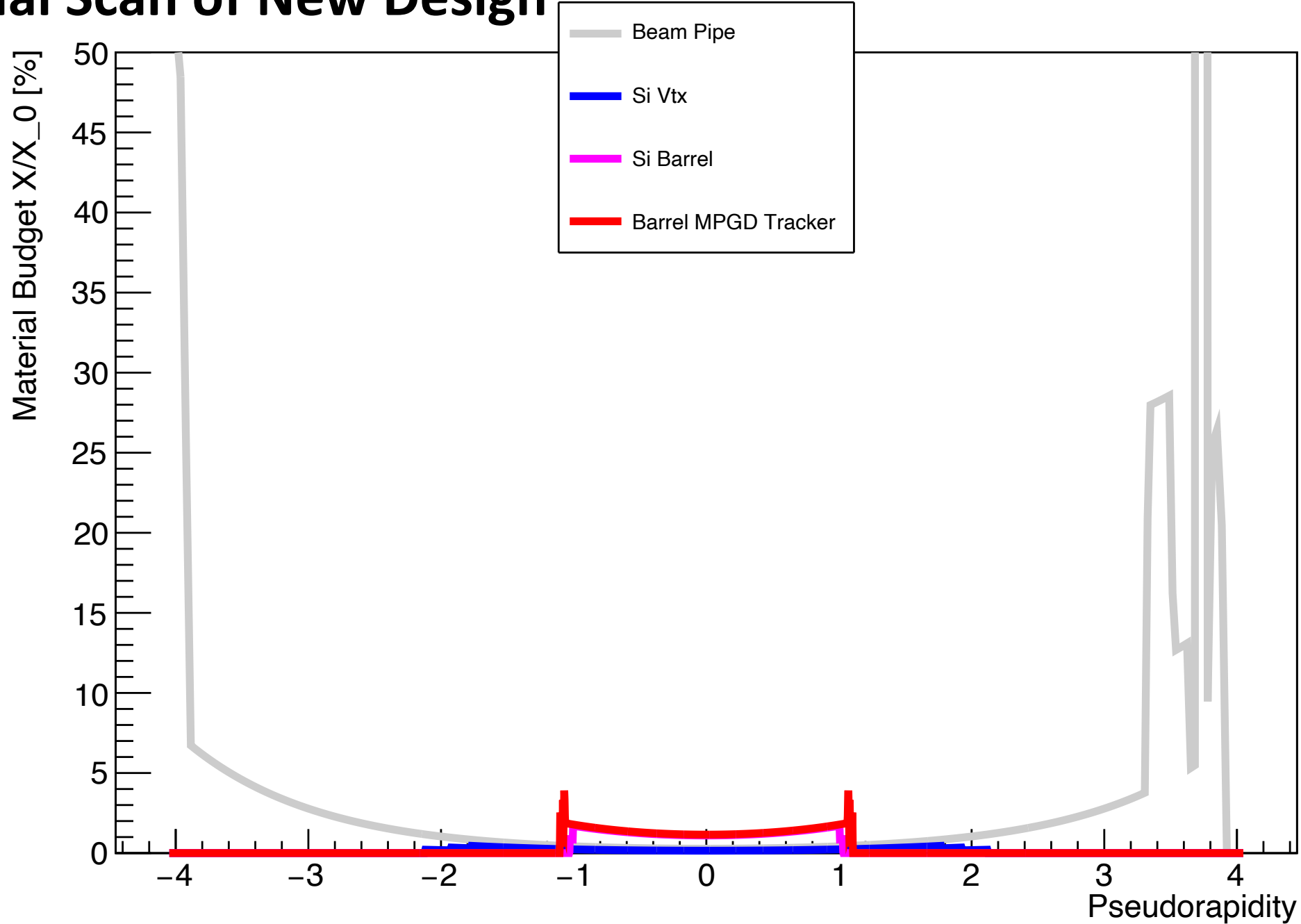
Material Scan of New Design



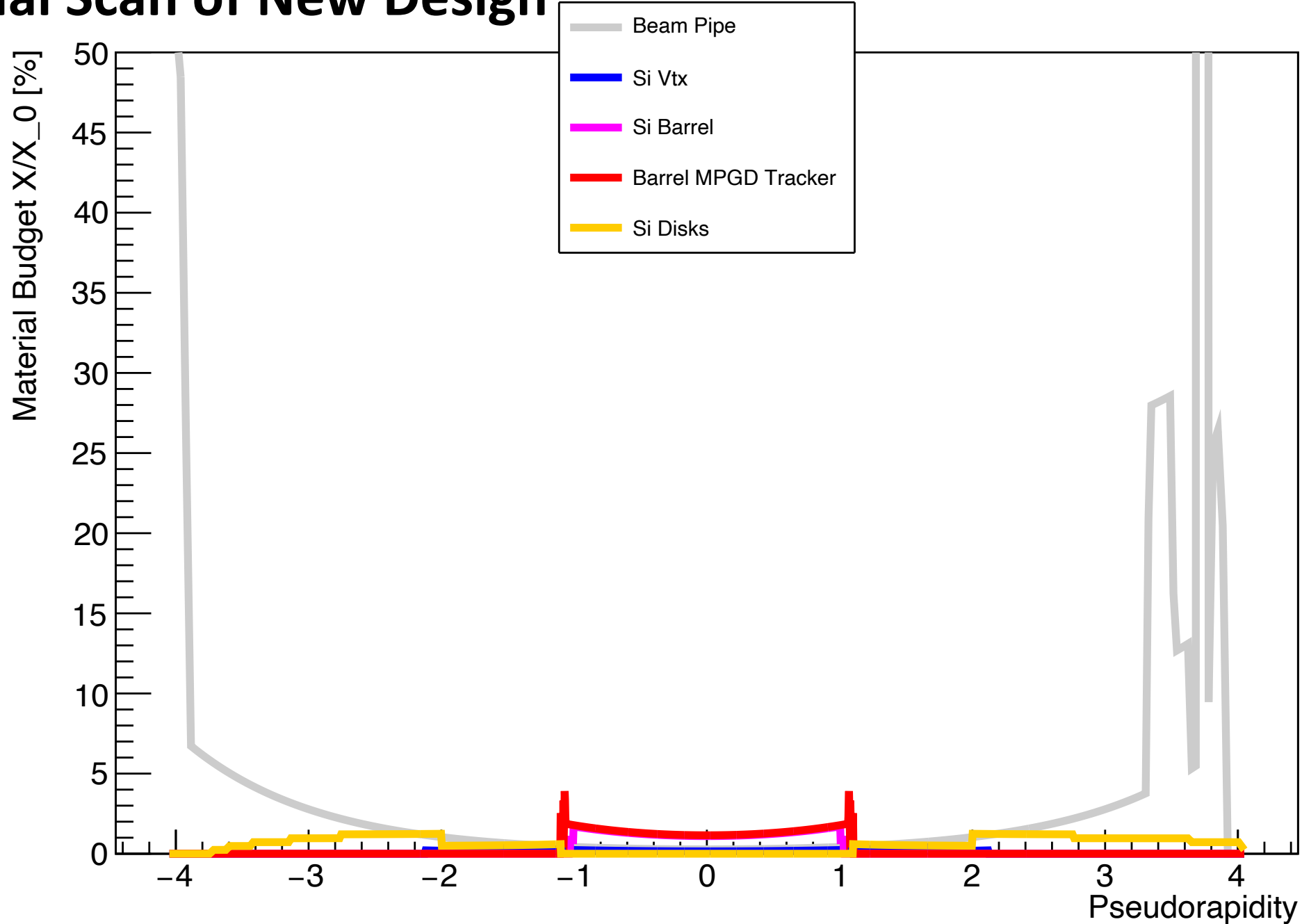
Material Scan of New Design



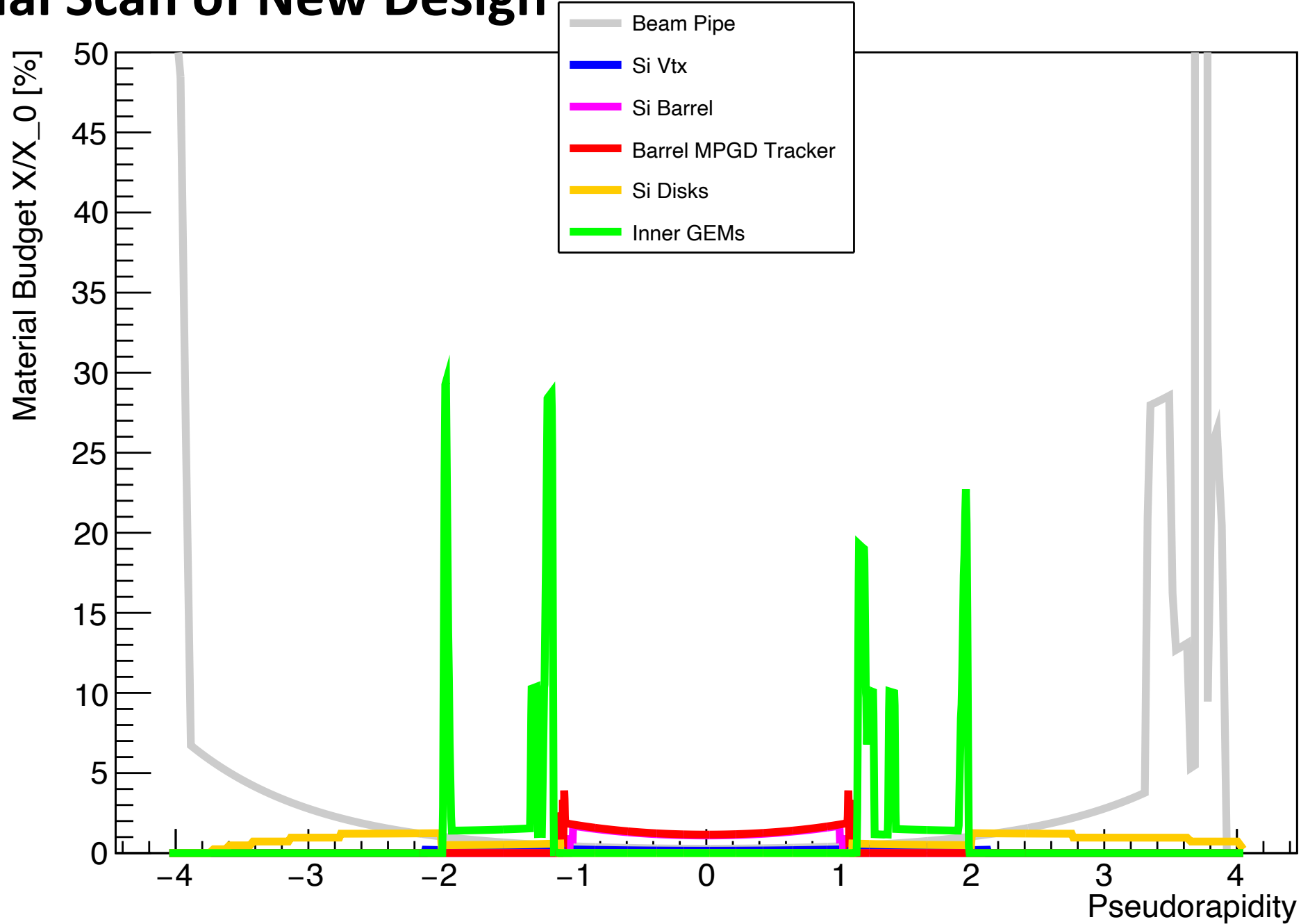
Material Scan of New Design



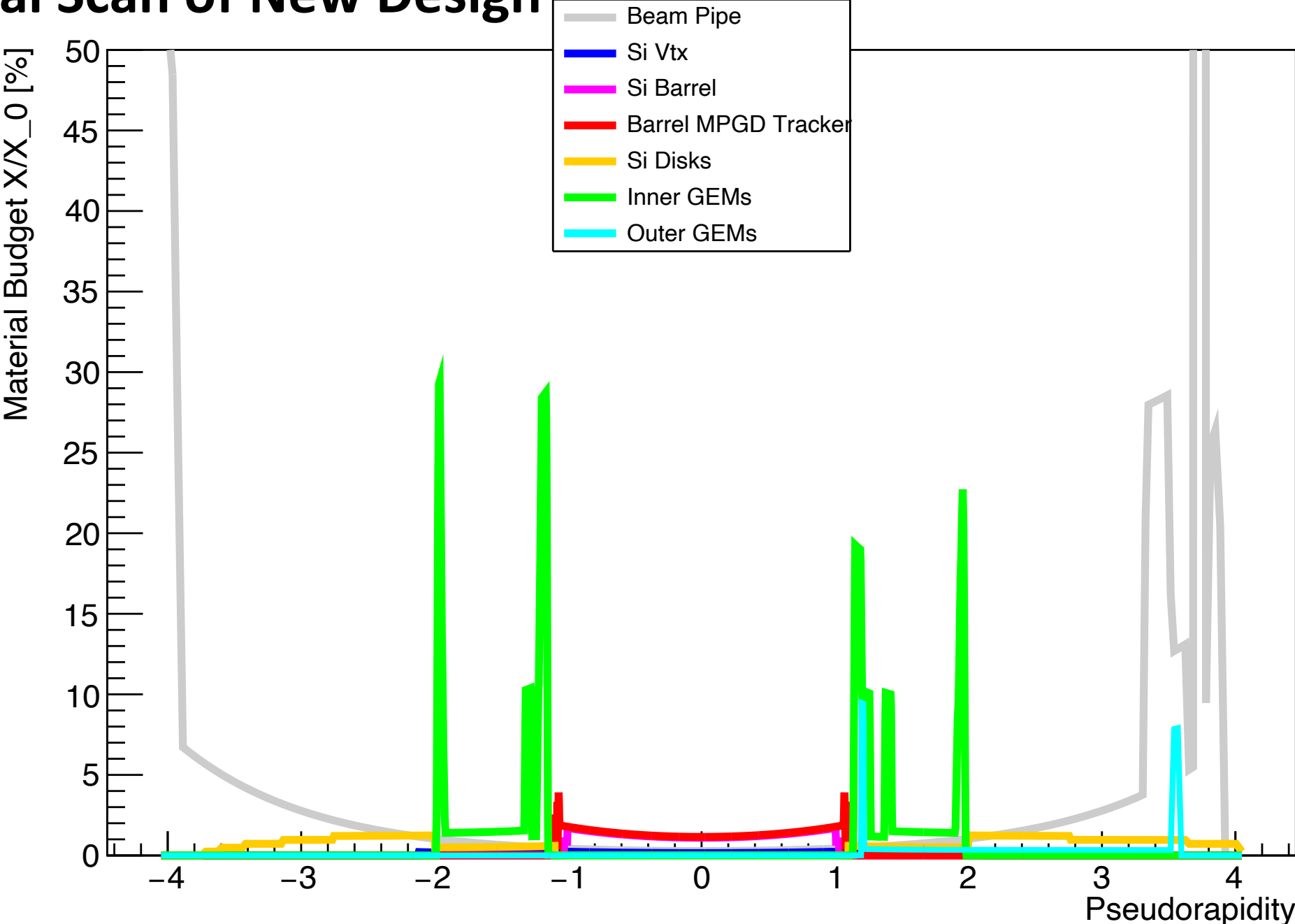
Material Scan of New Design



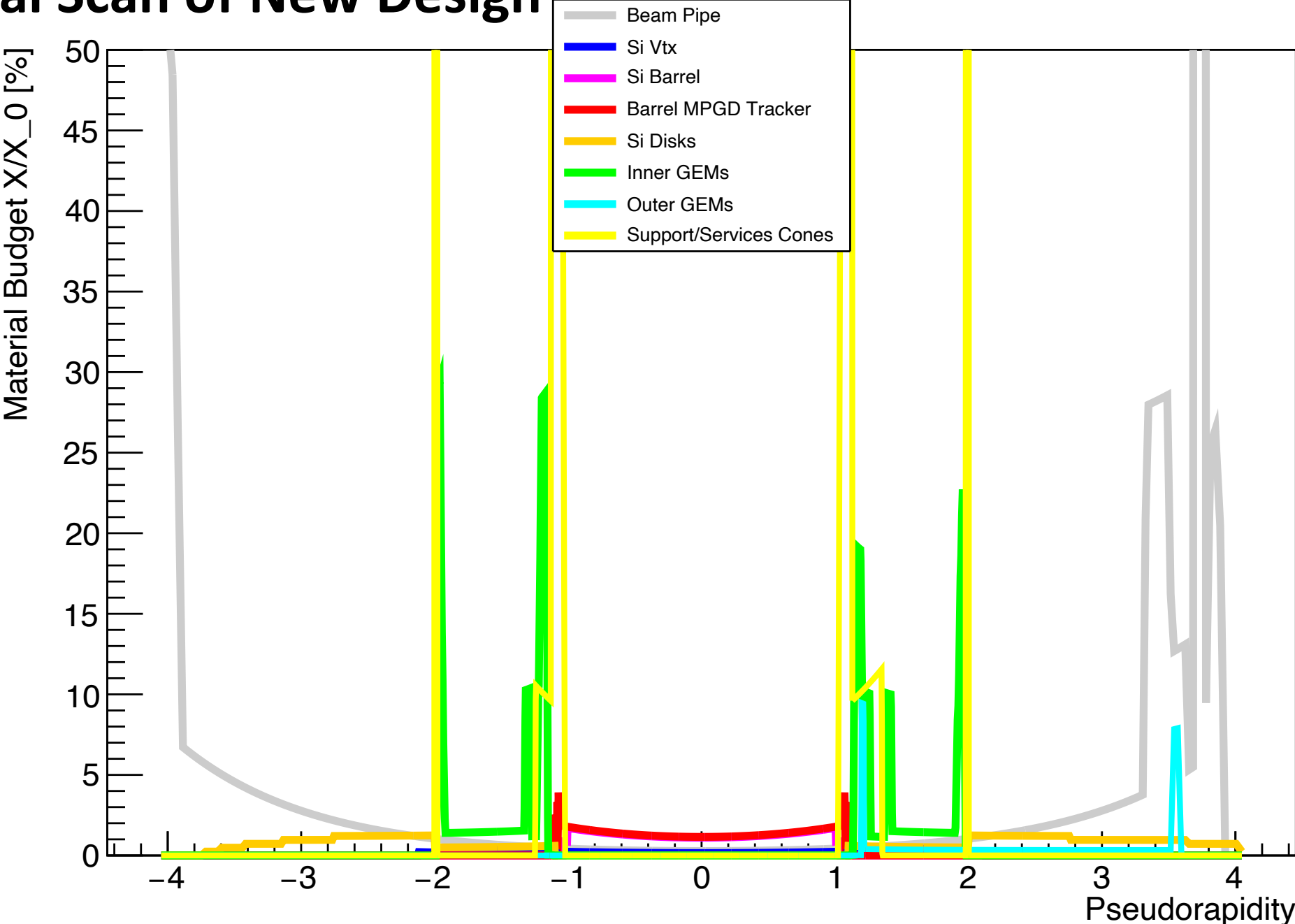
Material Scan of New Design



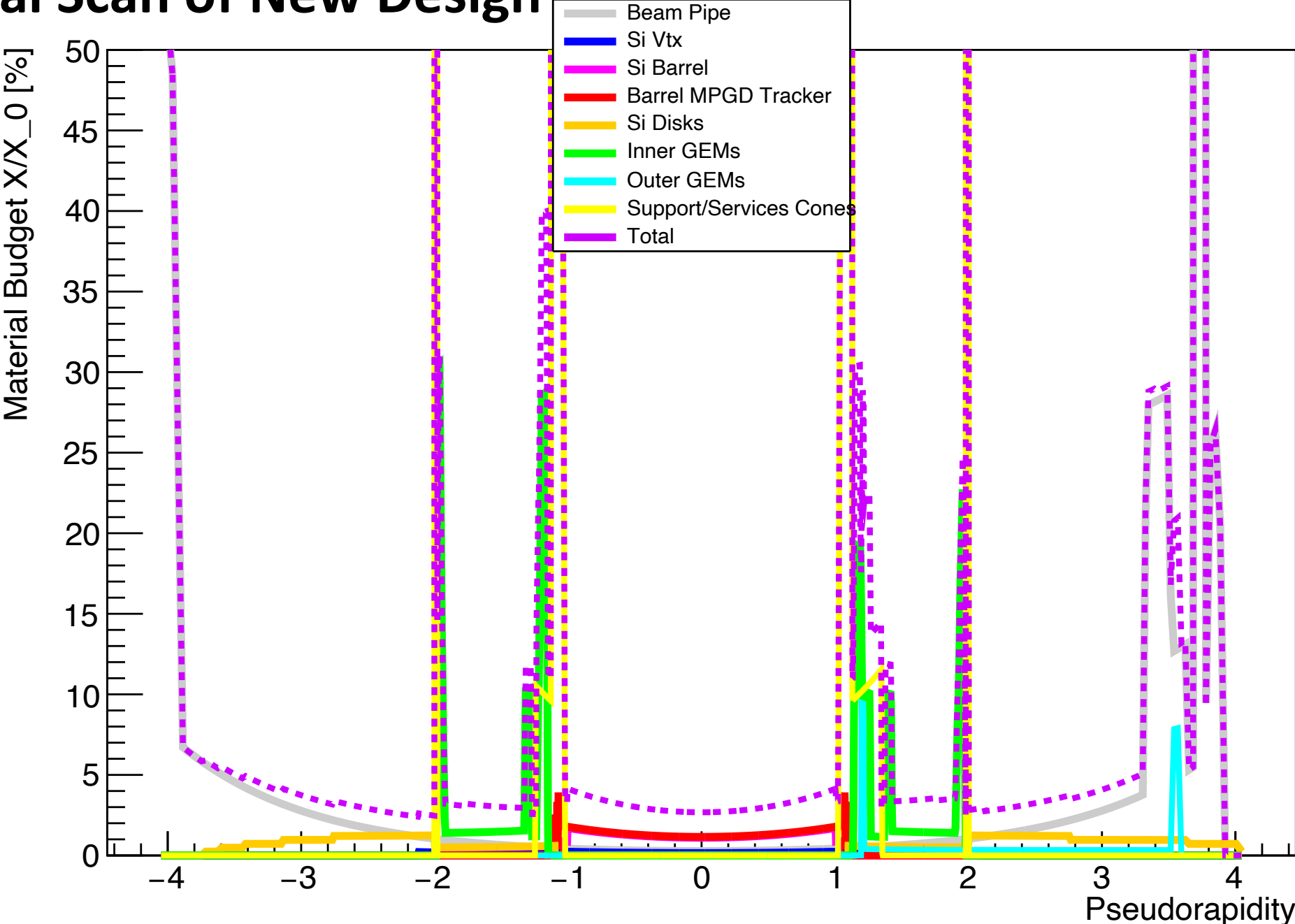
Material Scan of New Design



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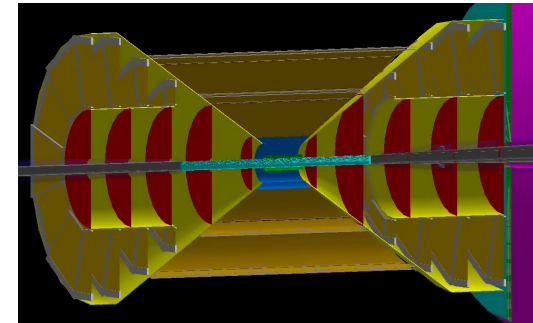


Material Scan of New Design



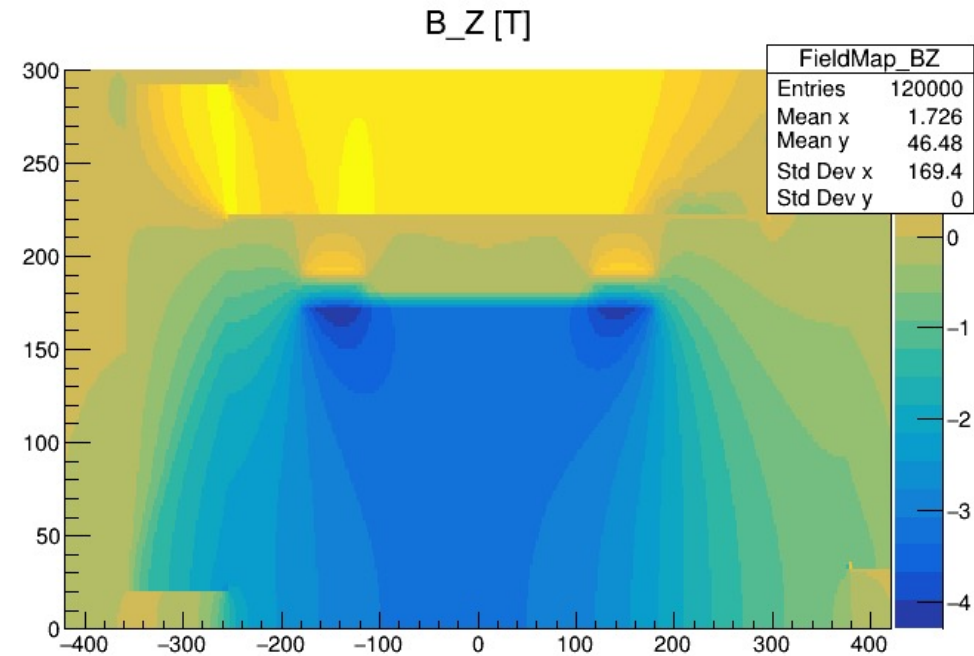
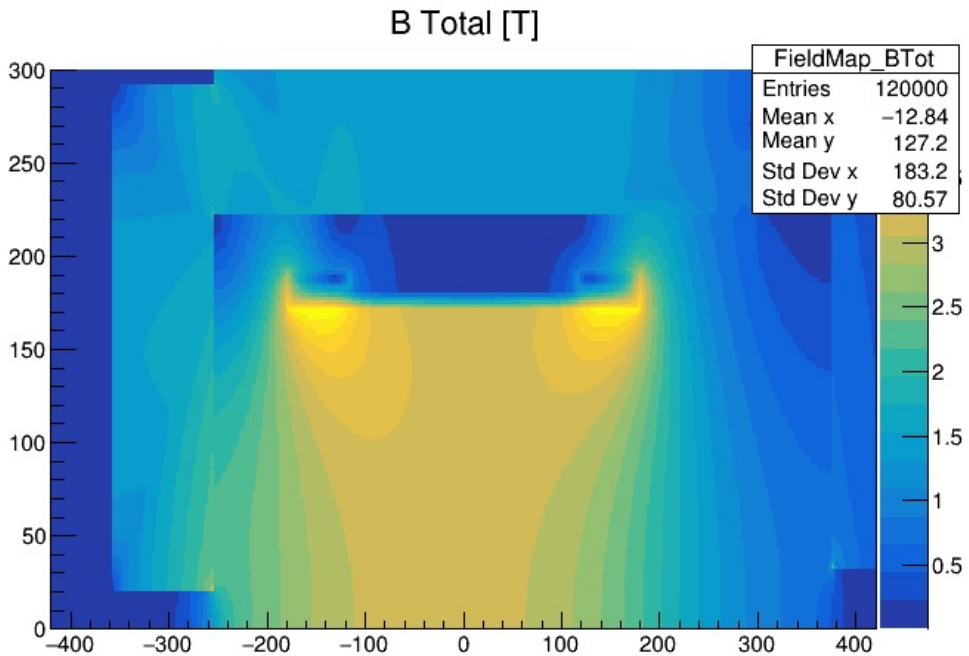
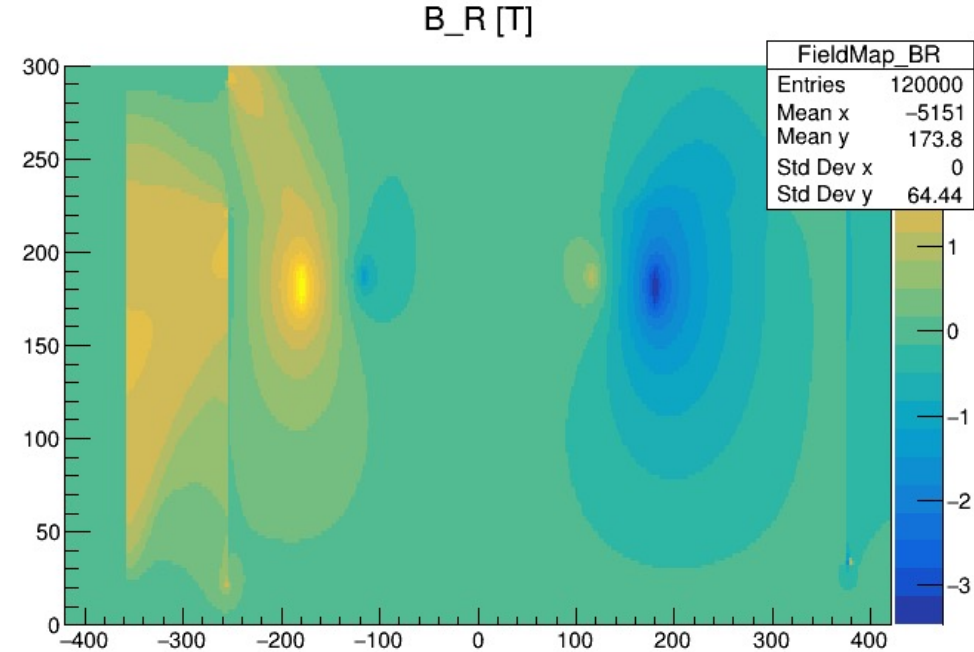
Summary

- To Do:
 - Study and compare a configuration with non-projective Si disks
 - Optimization studies
 - Forward region studies
 - Angular resolution
 - More detailed studies regarding the shifted magnetic field

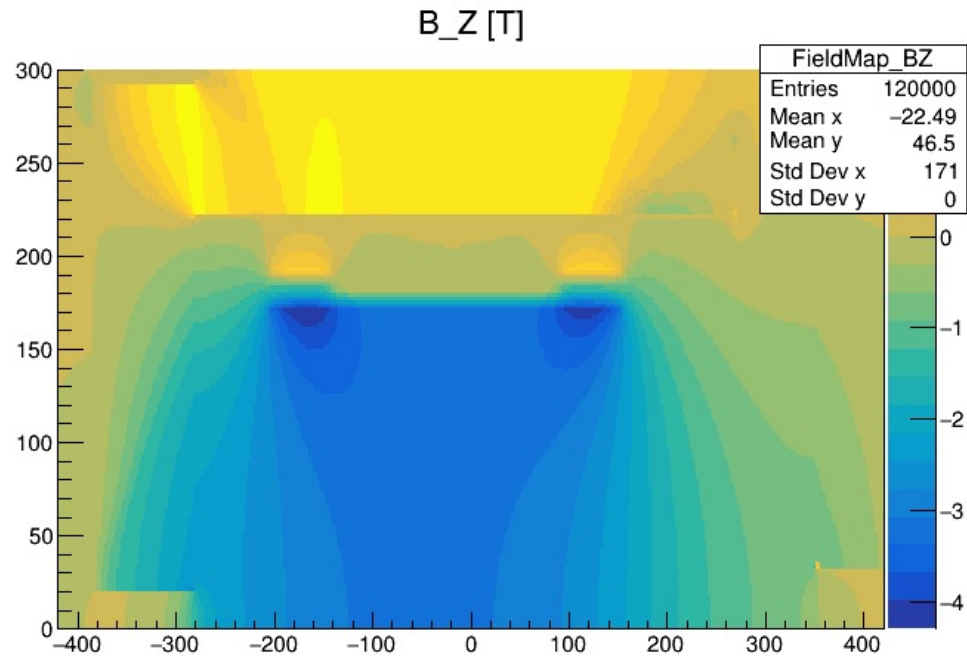
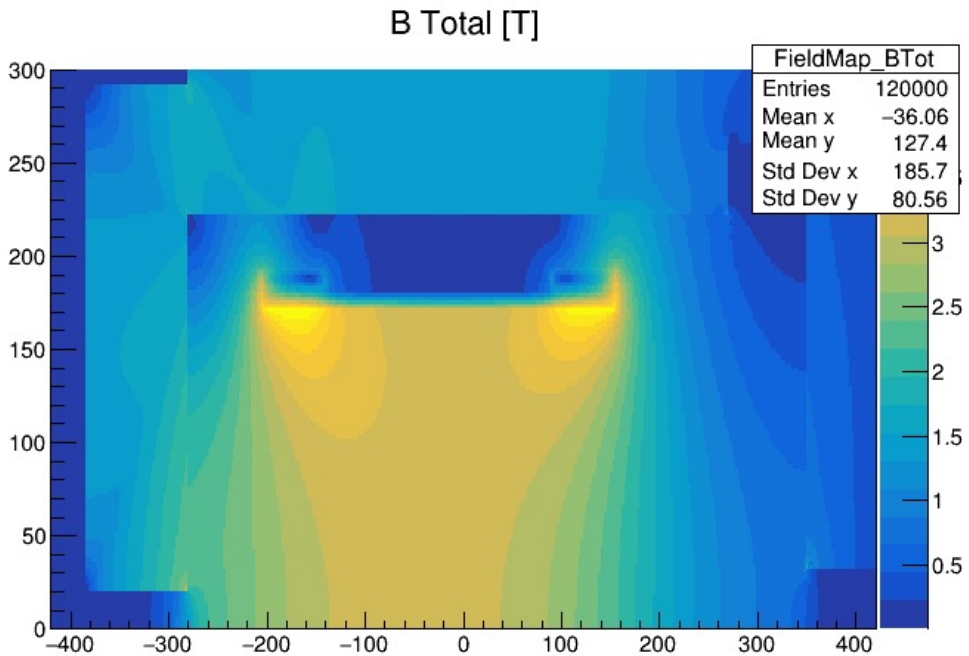
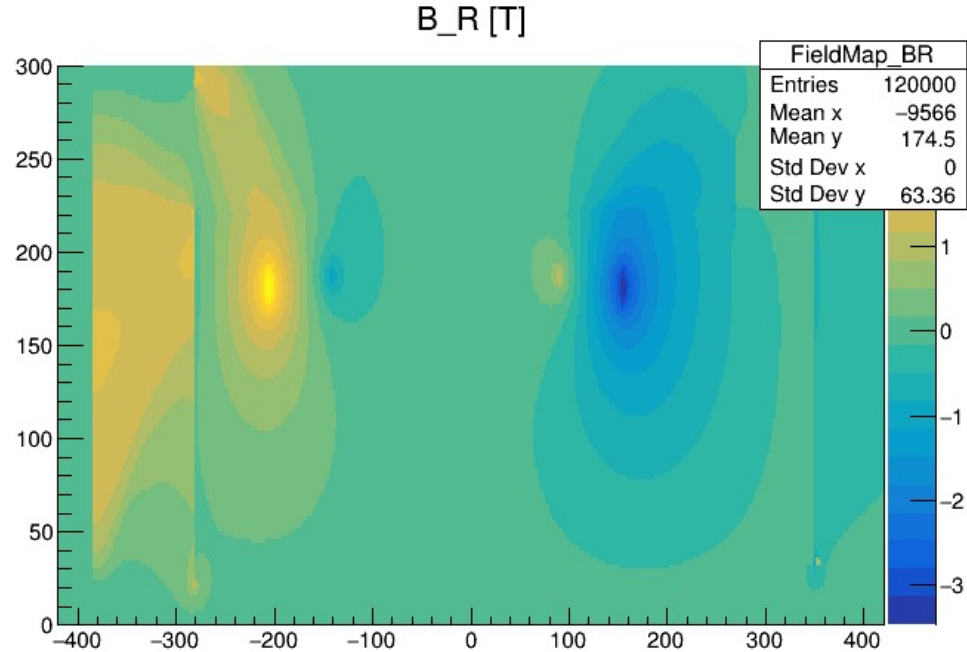


Backup Slides

Original ATHENA 05/07 Field Map

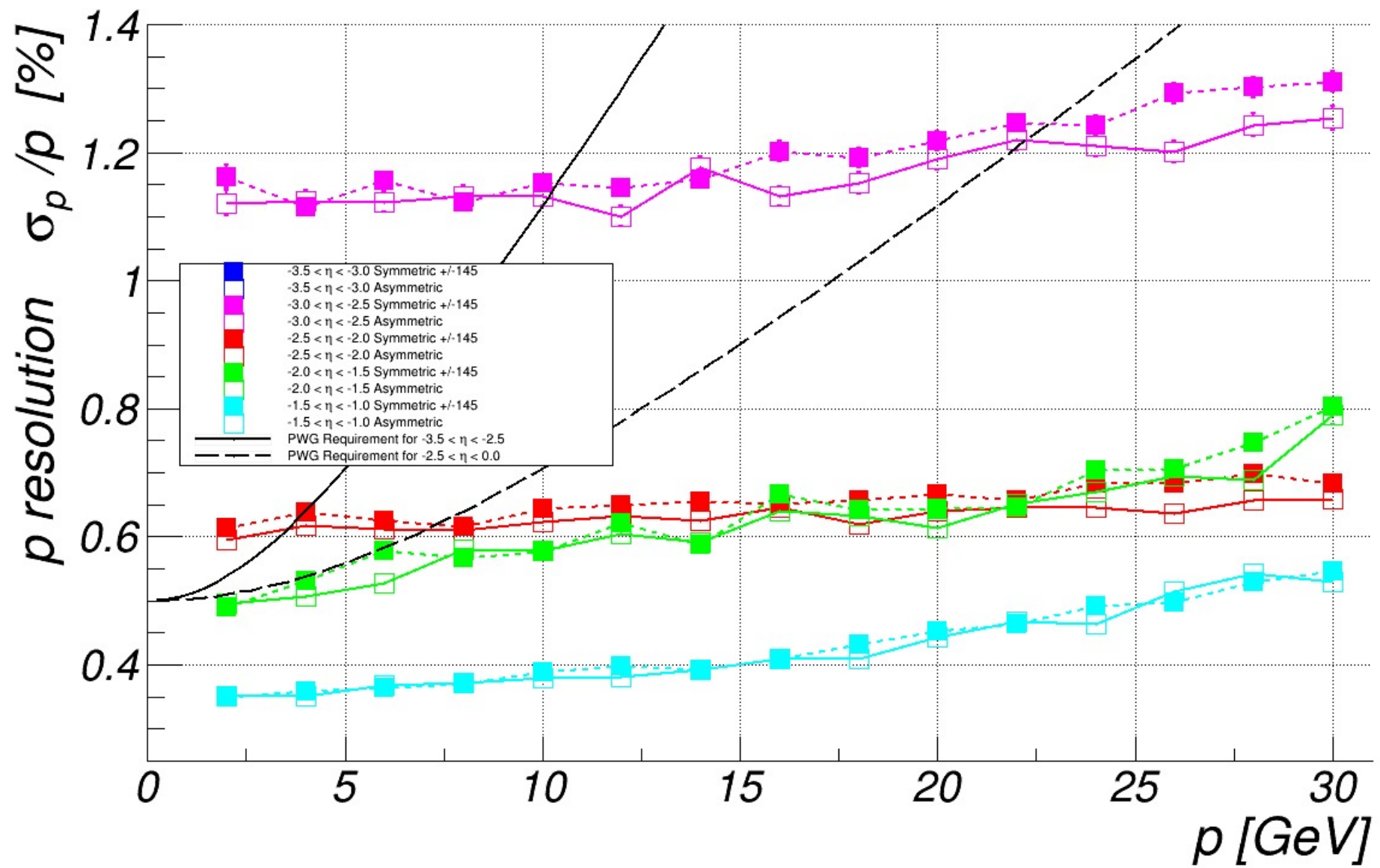


Shifted ATHENA 05/07 Field Map

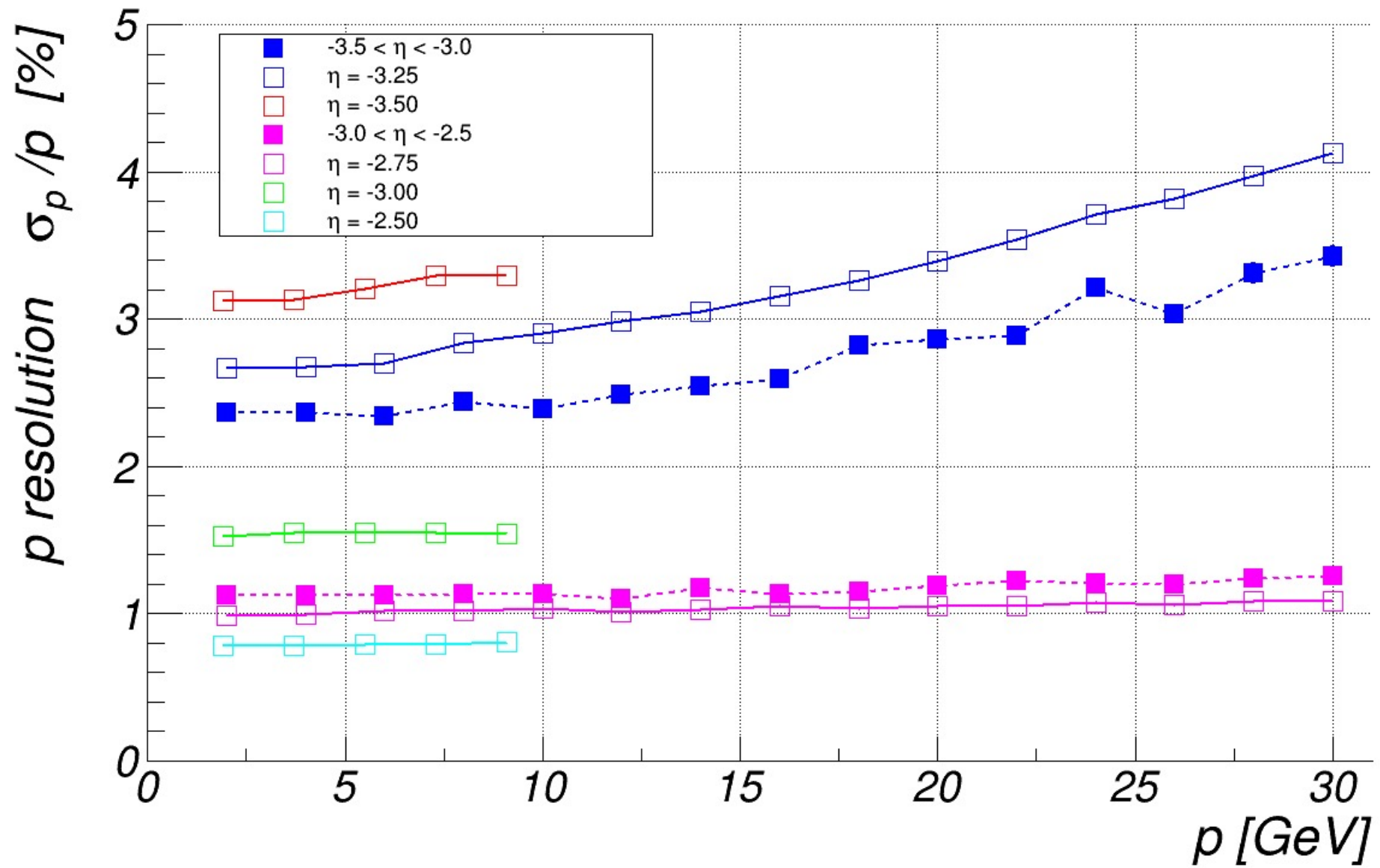


Momentum Resolution – Rear Direction, Detector Comparison

Zoomed



Fixed Vs Integrated Eta – Including Bin Edges



Fixed Vs Integrated Eta – Including Bin Edges

