

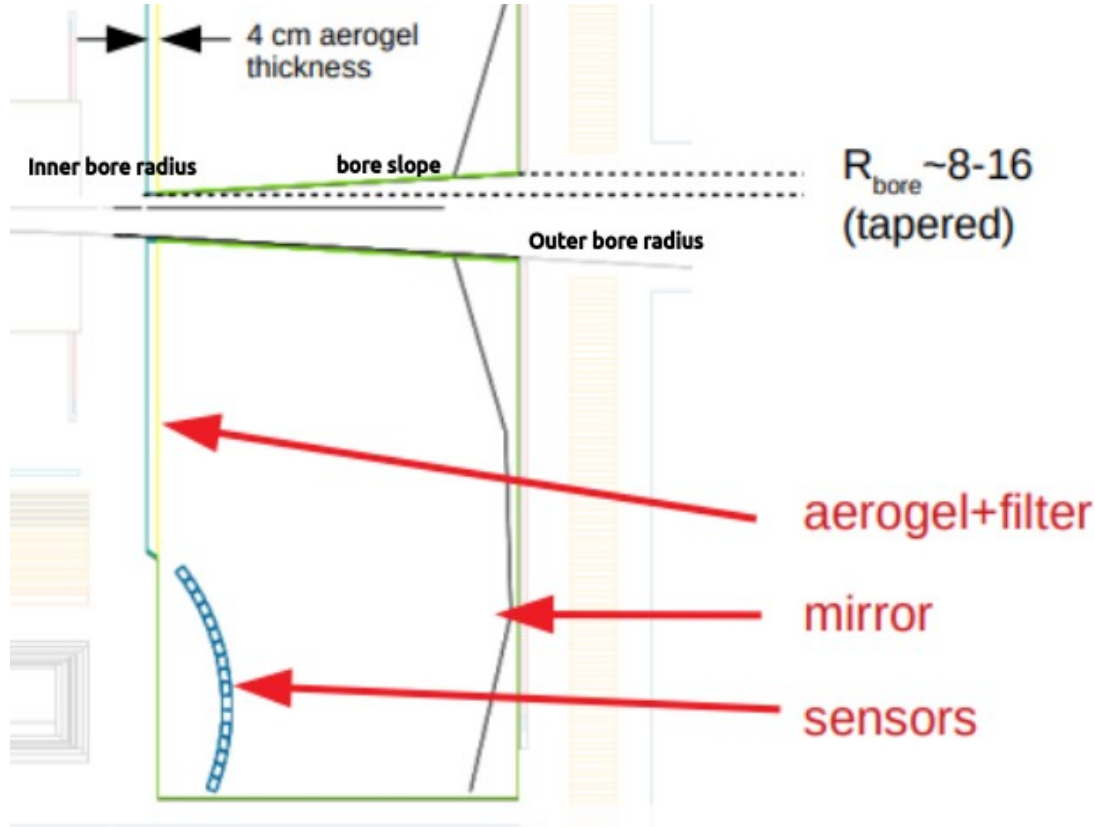
EIC dRICH simulations - beam pipe study

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On behalf of ePIC collaboration

Mar 6, 2024

Structure and dimensions of beam pipe



Beam pipe dimensions

- Inner bore radius = 8.621cm
- Outer bore radius= 15.478cm
- Bore slope =0.057

Investigate the effects of beam pipe inflation on detector performance particularly in high pseudorapidity regions.

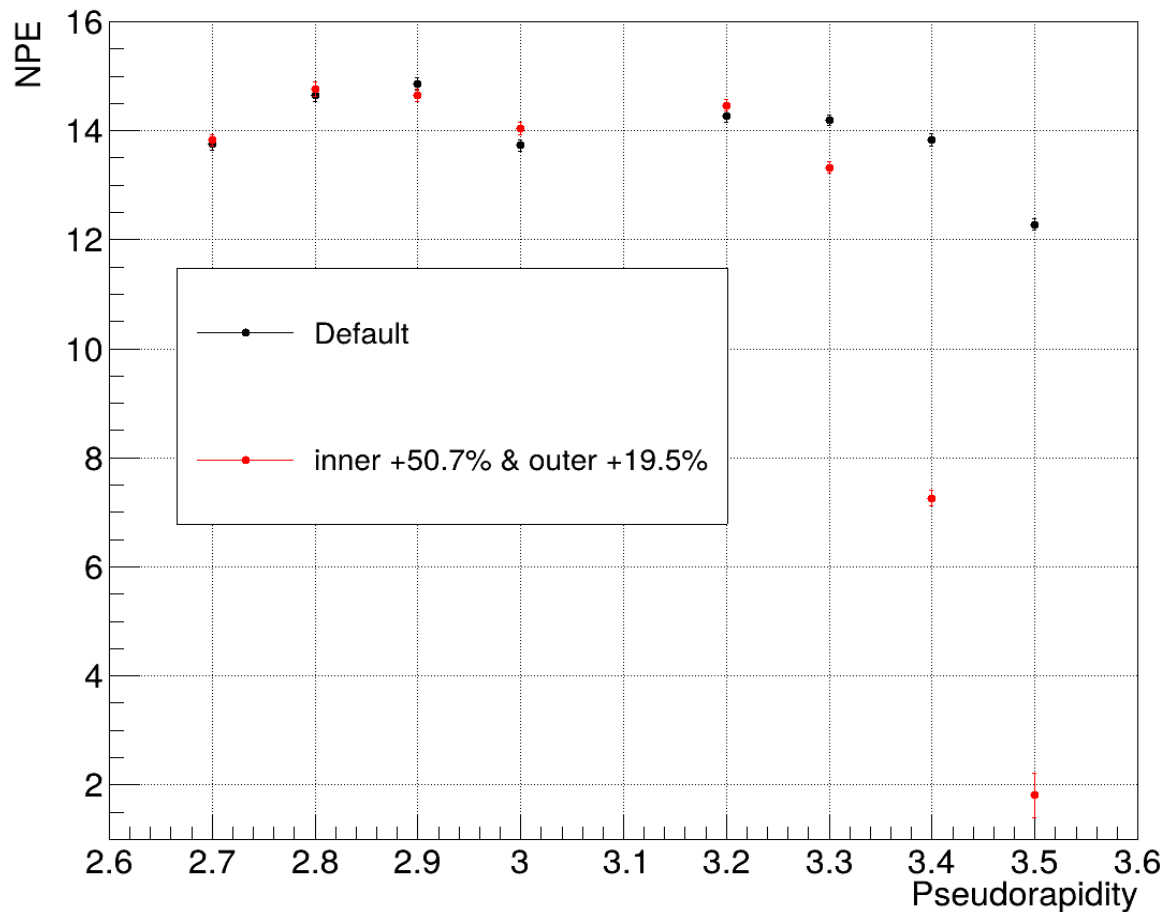
Current study is for Gas radiator:

- Momentum = 42 GeV
- $n = 1000$
- Particle Pion-
- Pseudorapidity b from 2.7 to 3.5
- Outer bore radius -
 - Default: Bore slope is 0.057 - Inner bore radius = 8.621cm outer bore radius = 15.478 cm
 - Inflated: Bore slope is 0.045 inner bore by 50.79 % = 13 cm and outer bore by 19.52% - 18.5 cm

Key Parameters Analyzed:

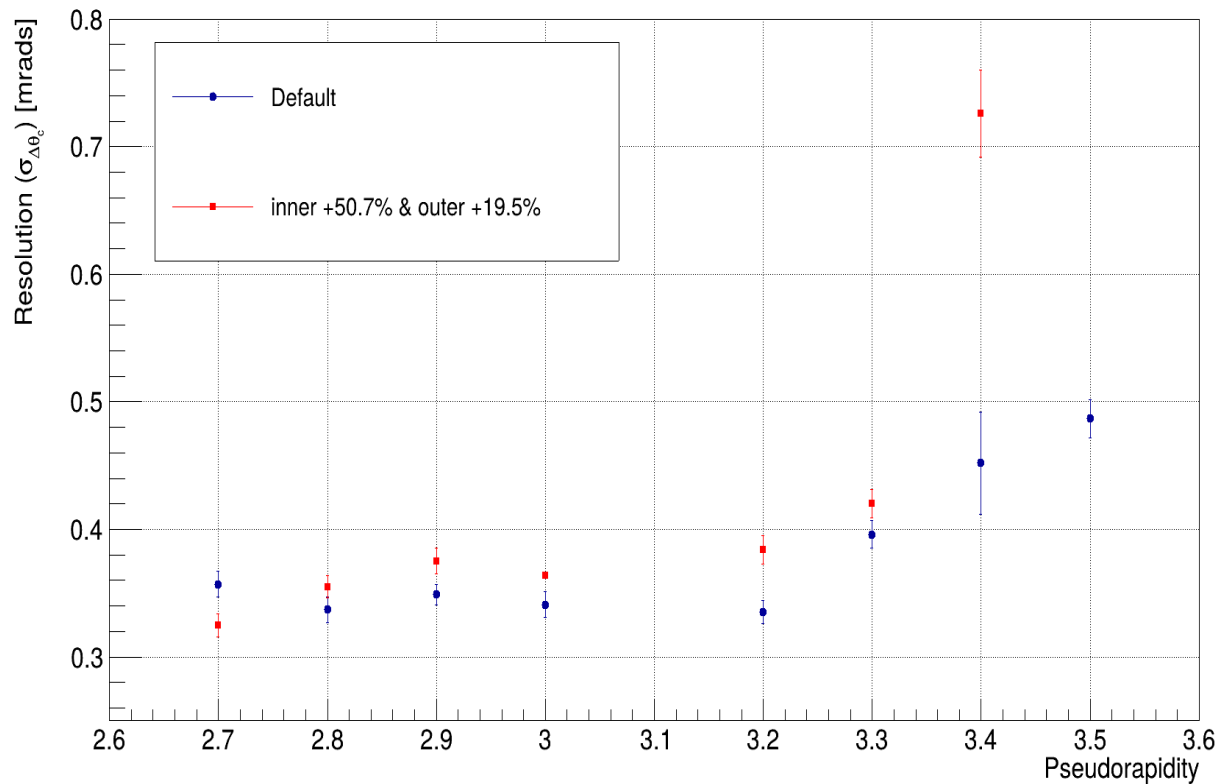
- NPE
- Ring resolution
- $N\sigma$ separation

NPE vs Pseudorapidity for inflated beam pipe for pion-



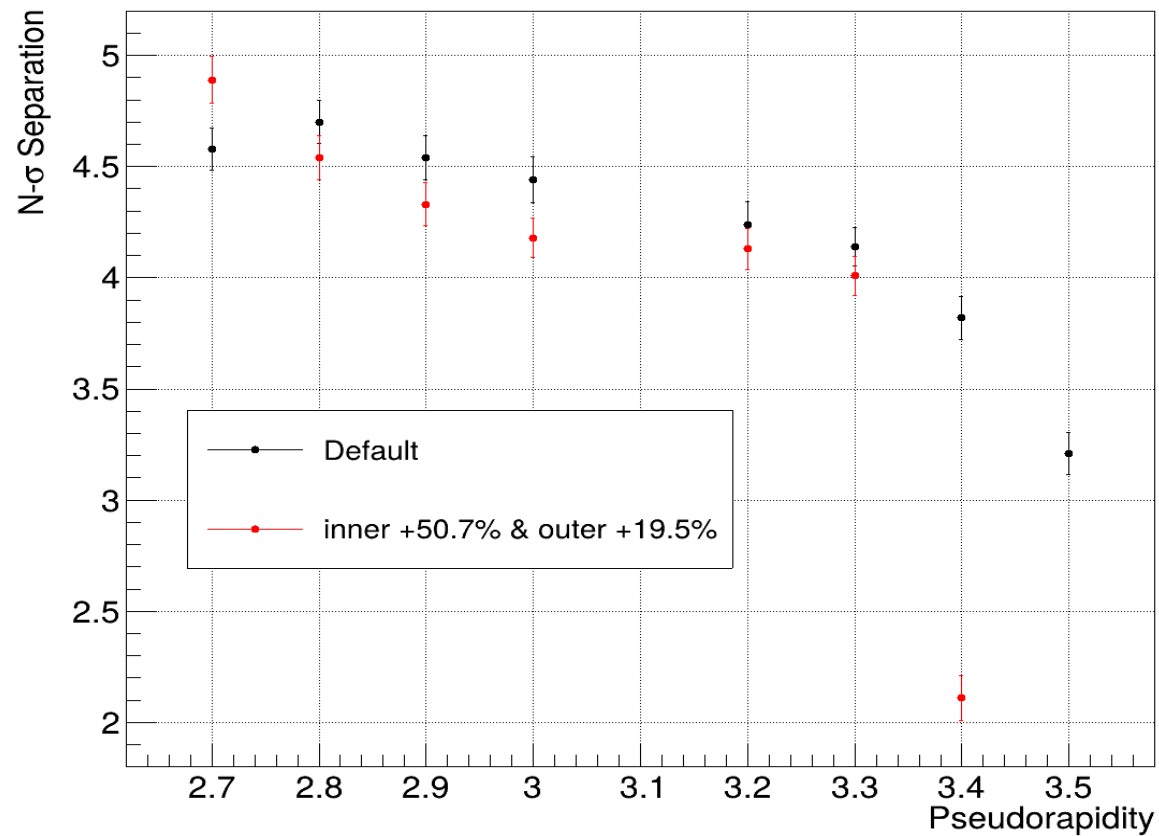
- Calculating NPE using poisson fit
- At higher pseudorapidity NPE starts to decrease (As expected)

Ring resolution ($\sigma_{\Delta\theta_c}$) with beam pipe inflations for pion-



- Fitted using gaussian.
- After inflation, the resolution decreases as we approach high pseudorapidity
- For $b = 3.5$, other parameters are not extractable

π/K N- σ Separation Comparison for inflated beam pipe



- N- σ separation is consistent until pseudorapidity 3.3.

Future plan:

- For momentum 50 Gev
- Inflate beam pipe for more test cases

Thank you

Extra – for $b = 3.5$ for inflated beam pipe

