



# Status of the SciGlass barrel electromagnetic calorimeter in DD4hep

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# Status

- » remove Outer MPGD from EcalBarrel envelope #139 - Merged  
Resolves the MPGD overlap
- » Updated SciGlass barrel ECal design #45 - Merge imminent
  - Implements SciGlass geometry according to the design
  - Implements mock supports (wedge, carbon fiber frame)
- » Add one (two?) towers - TBD

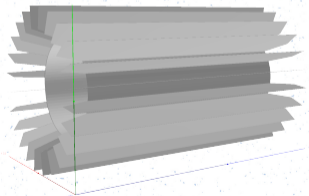
# Support structure: Wedge box

## Suggested design:



“The bottom component is a thin skinned box (1-2mm) thick aluminum plate which sits around the towers to protect them during insertion or removal”

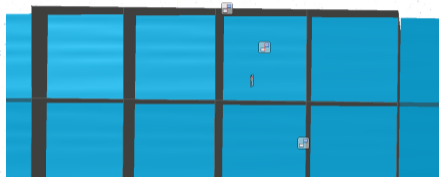
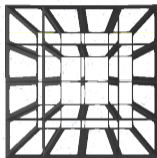
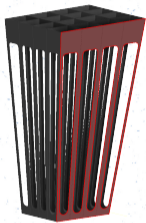
## Implementation in geometry:



- » A 2 mm thick tube with  $r = 80$  cm
- » A 2 mm thick radial “flaps”  
Not enough space between sectors to fit double wall thickness (corresponding to adjacent wedge boxes)
- » Walls on the end caps are not implemented yet
- » Middle and top parts (back of the detector) are not implemented

# Support structure: Carbon fiber frame

## Suggested design

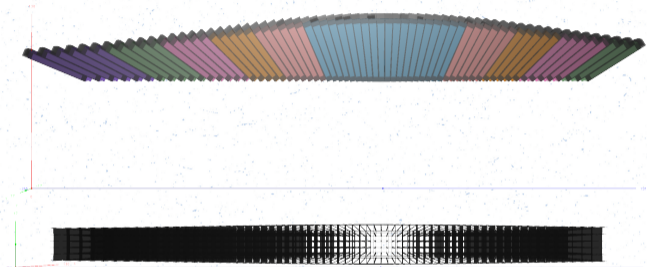


"...each tower would have it's own "tube" but they would be glued together in some manner to create a single "monolithic piece" which would leave a gap of .25mm of space around the towers..."

- » Older design for a 4-tower wide wedges (the current design is 5 rows per sector)
- » Extends past the tower towards a single plane (what happens at larger  $\eta$ 's?)
- » Round cutouts

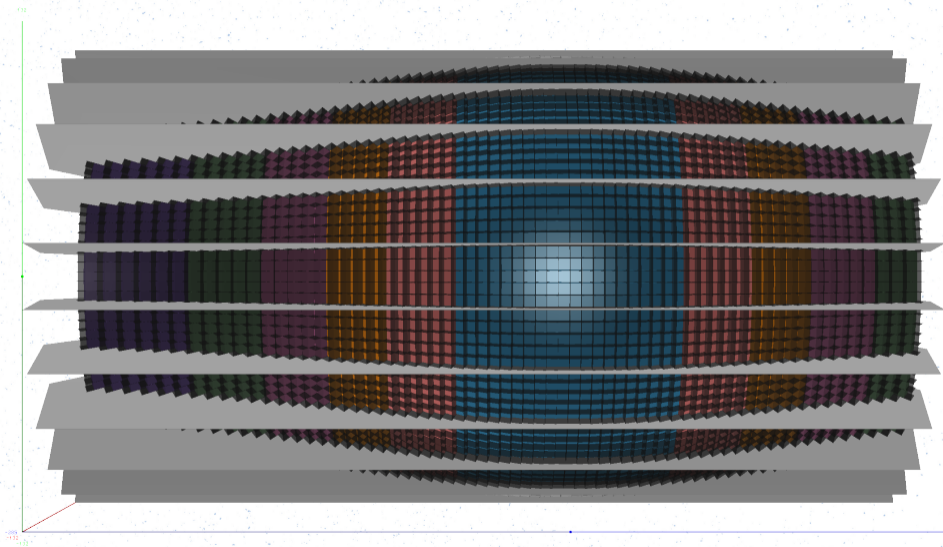
# Support structure: Carbon fiber frame (Cont'd)

## Implementation in geometry



- » Approximate dimensions
- » Overhangs don't extend to a common plane
- » Sharp cutouts

# Summary: current look



# Official EPIC detector benchmarks: summary

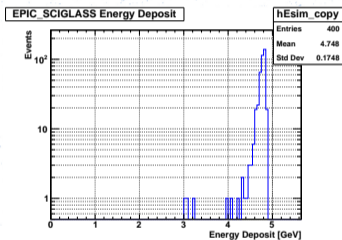
“PANDA-like” is using the old geometry without any supporting material.  
“Tiltless” is using the present geometry.

| Value   | PANDA-like            | Tiltless              |
|---|-----------------------|-----------------------|
| $\langle E_{\text{dep.}} \rangle$ for 5 GeV electrons | $4.748 \pm 0.175$ GeV | $4.626 \pm 0.402$ GeV |
| $\langle N_{\text{hits}} \rangle$ for 5 GeV electrons | $93 \pm 57$           | $94 \pm 44$           |
| $\langle E_{\text{dep.}} \rangle$ for 5 GeV photons   | $4.665 \pm 0.320$ GeV | $4.404 \pm 0.916$ GeV |
| $\langle N_{\text{hits}} \rangle$ for 5 GeV photons   | $86 \pm 39$           | $83 \pm 33$           |
| $\langle E_{\text{dep.}} \rangle$ for 5 GeV $\pi^0$   | $4.76 \pm 0.115$ GeV  | $4.34 \pm 1.039$ GeV  |
| $\langle N_{\text{hits}} \rangle$ for 5 GeV $\pi^0$   | $87 \pm 19$           | $88 \pm 44$           |

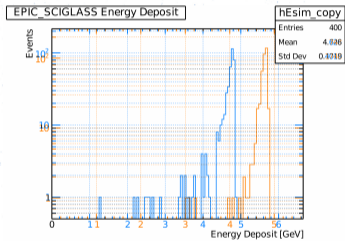
Plots are in the backup.

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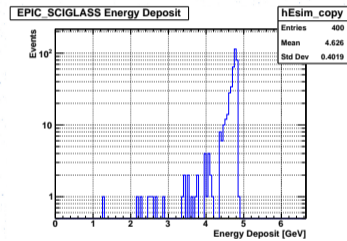
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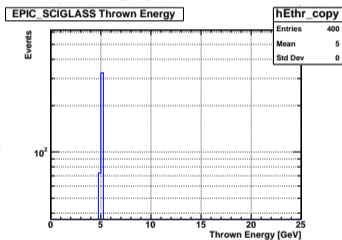
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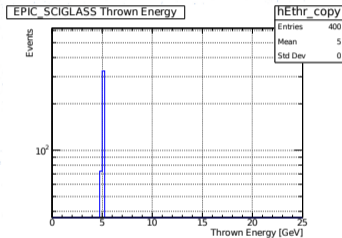


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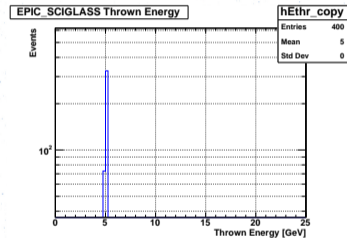
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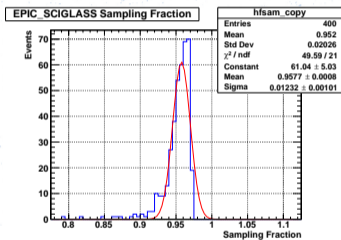


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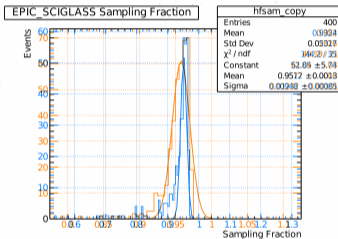


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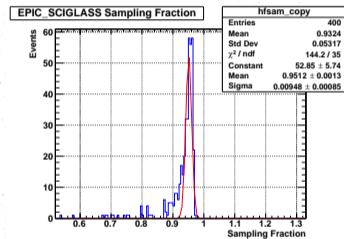
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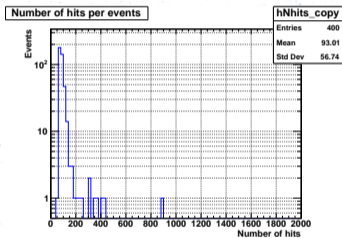
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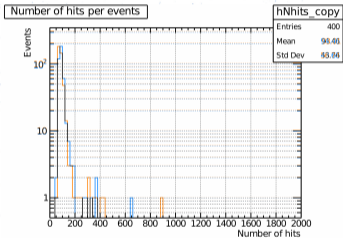
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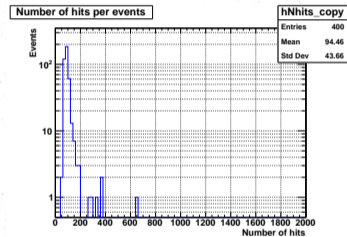
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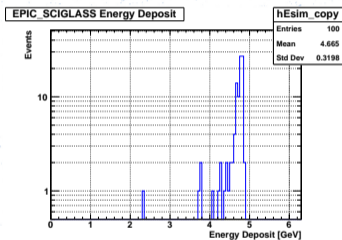
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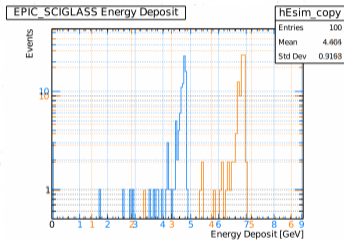
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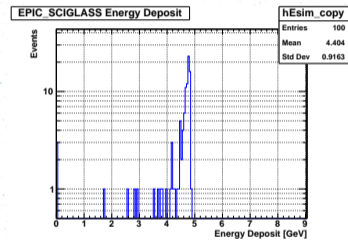
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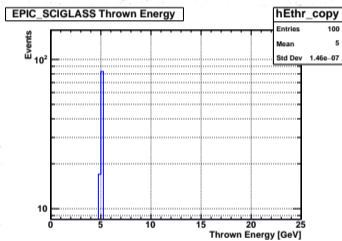


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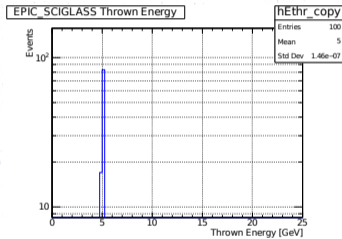


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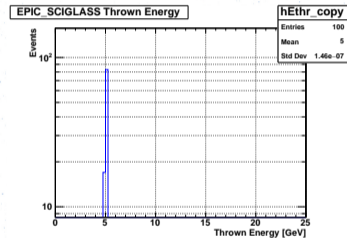
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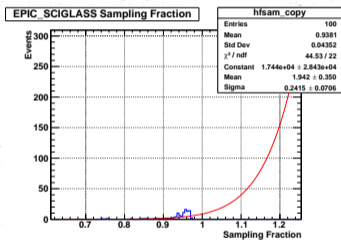


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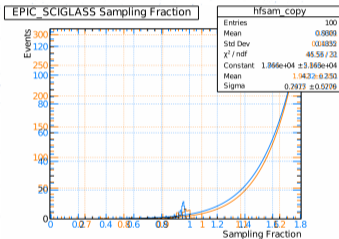


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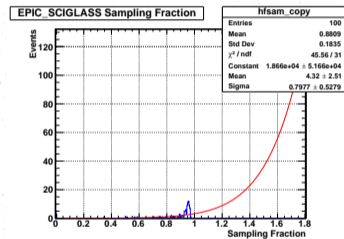
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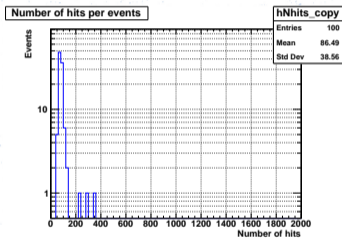


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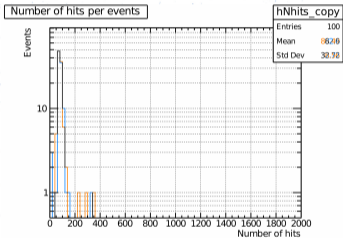


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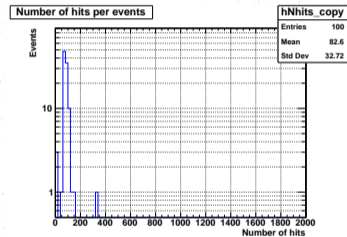
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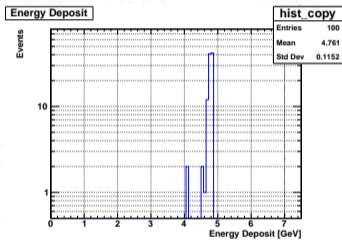


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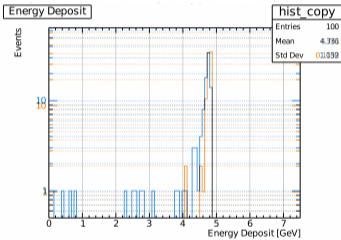


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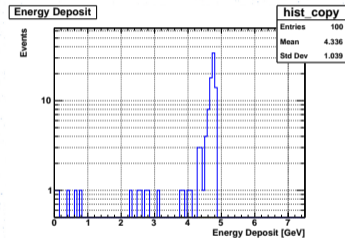
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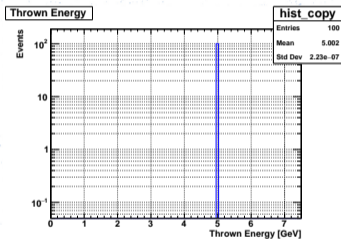


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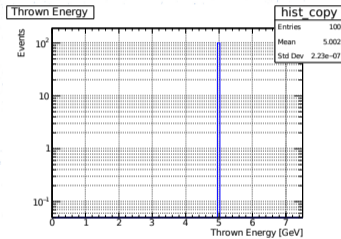




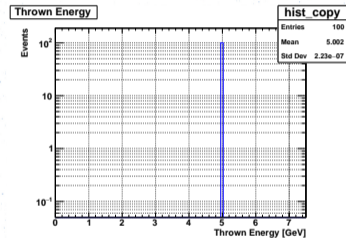
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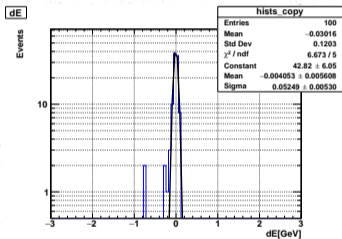
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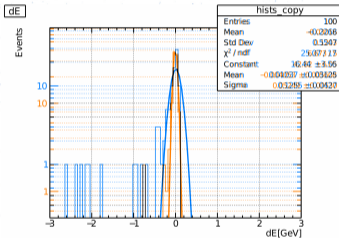
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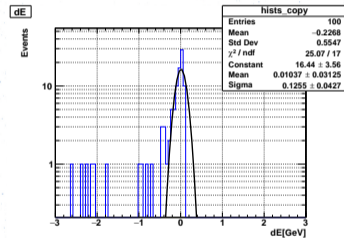
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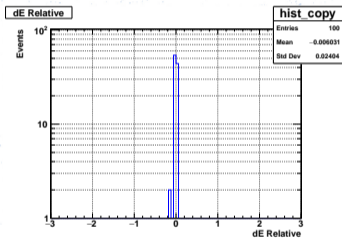


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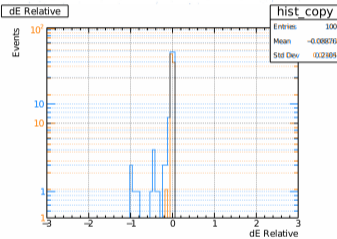


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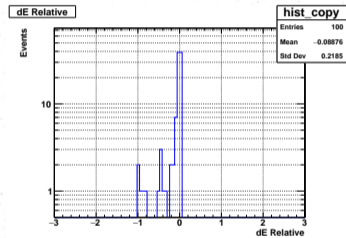
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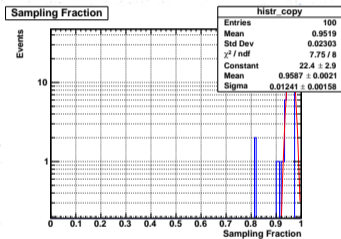
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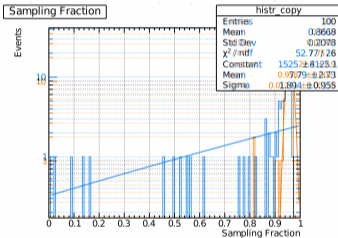
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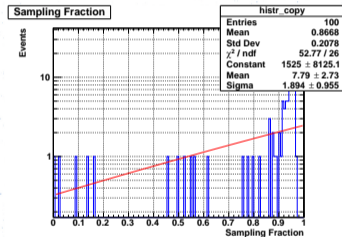
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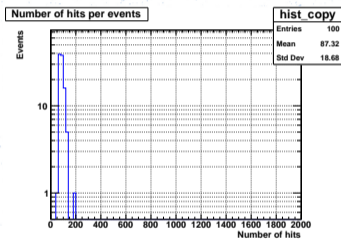
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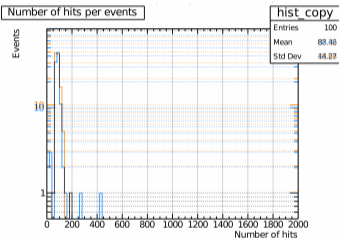
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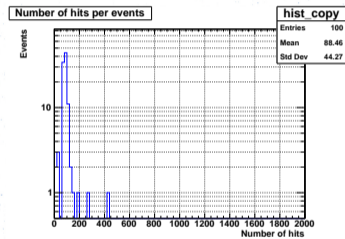
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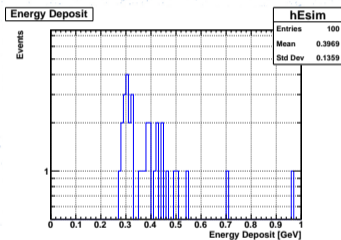


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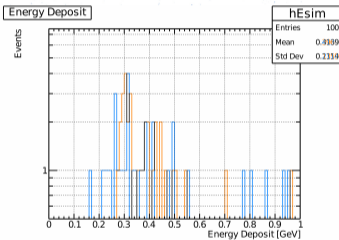


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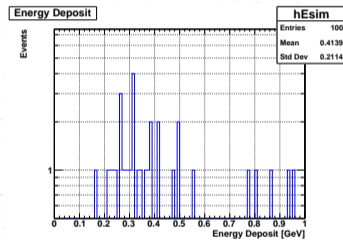
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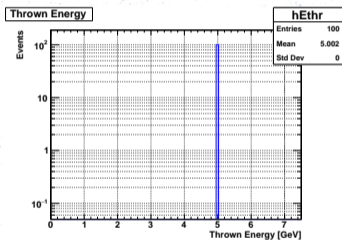
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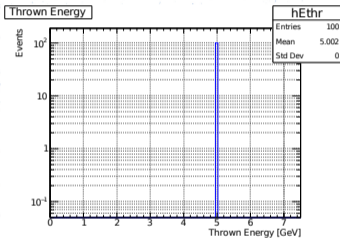
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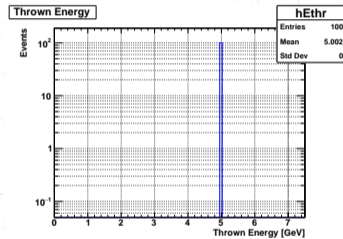
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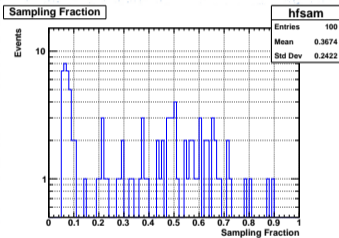


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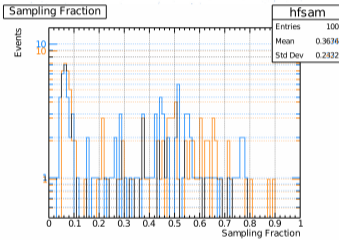


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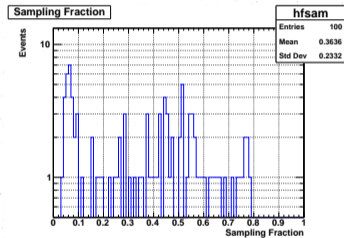
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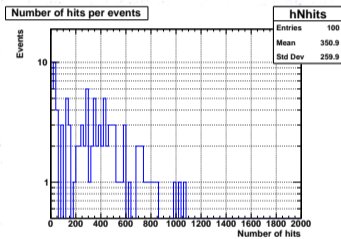
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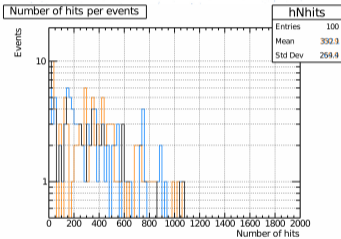


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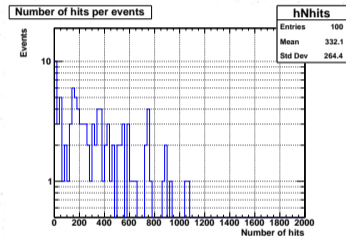
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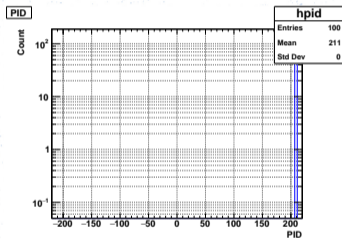
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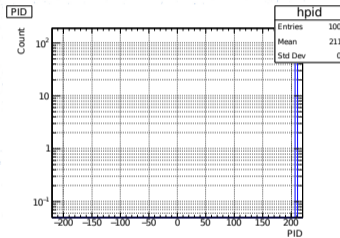
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tiltless

