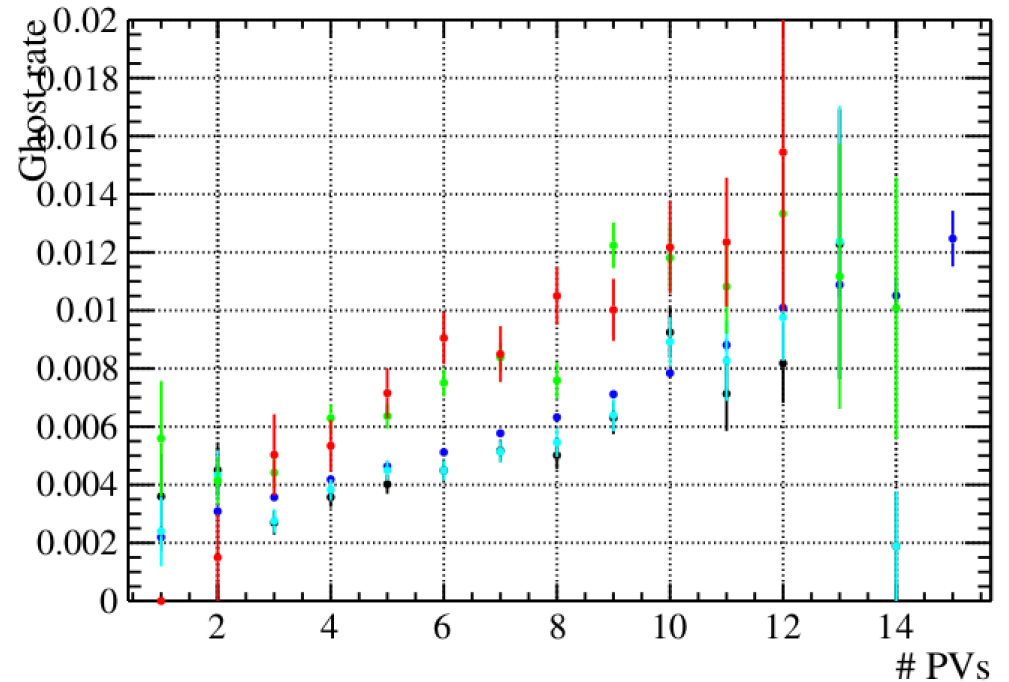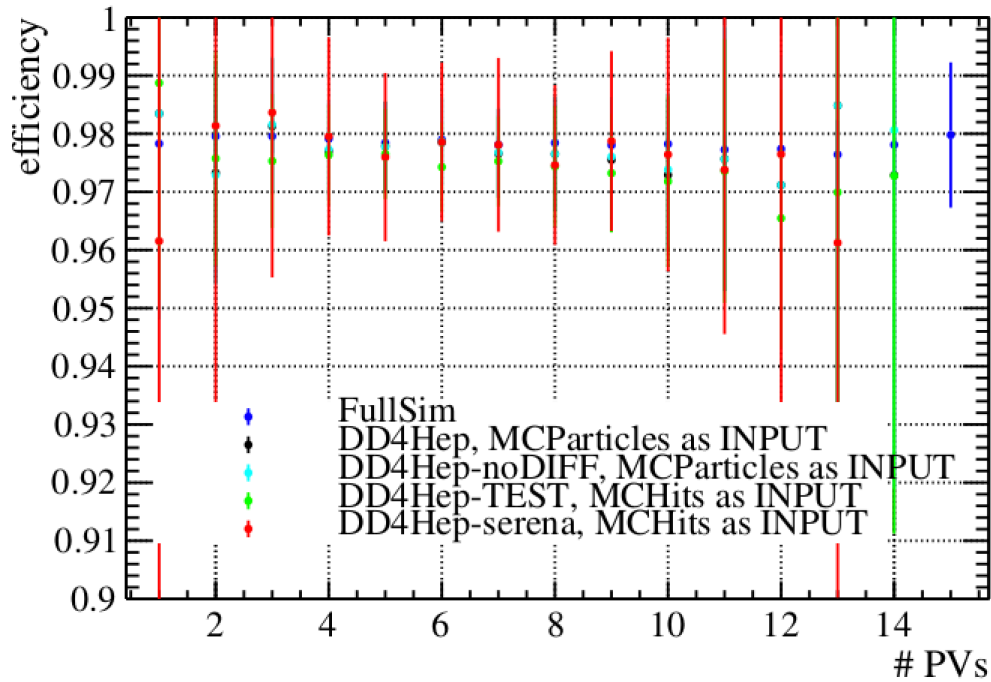# LHCb VeloPixel fast simulation

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TIMESPOT meeting - WP4

1 April 2021

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MChits as input - validation (U1)

FullSim

DD4Hep, MCParticles as INPUT

DD4Hep-noDIFF, MCParticles as IN

DD4Hep , MCHits as INPUT

FullSim-Serena MCHits as INPUT

Fix in the alignment

- zref = position of the L-shaped module
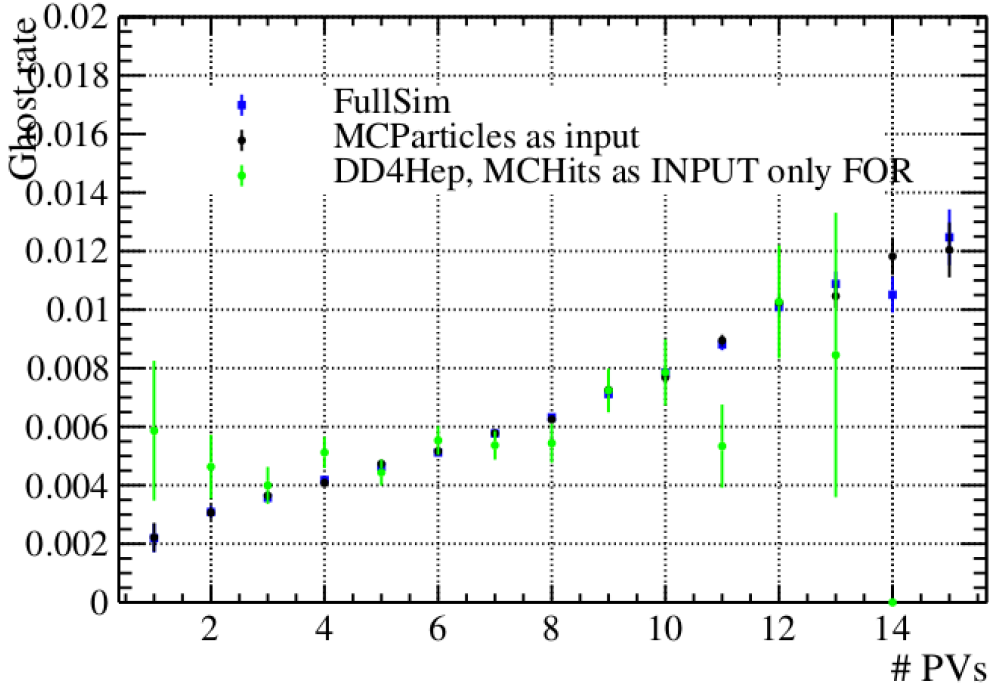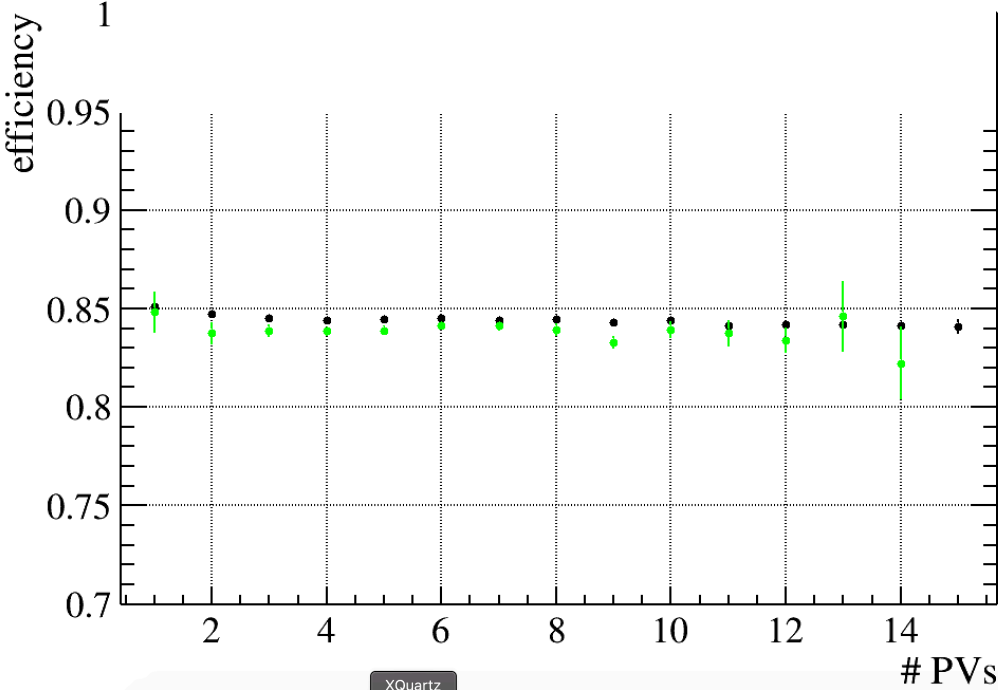 z = position of the hit in a certain sensor (3 chips) of the module

- From

```
# print d_x,d_y,d_z,z,zref
    x = x + d_x/abs(d_z)*(zref-z)
    y = y + d_y/abs(d_z)*(zref-z)
z = zref
```
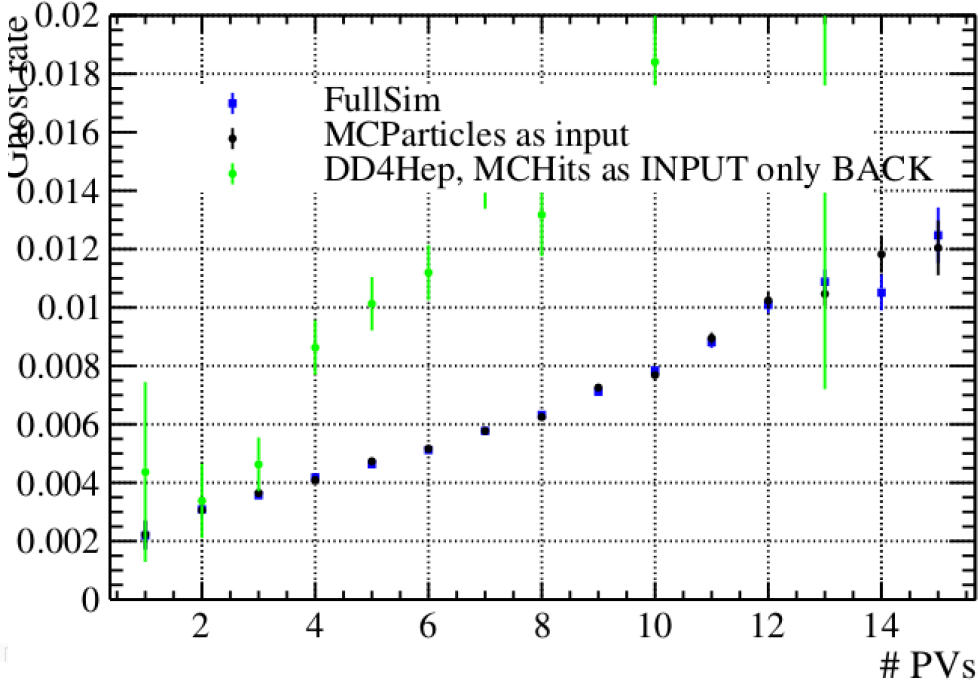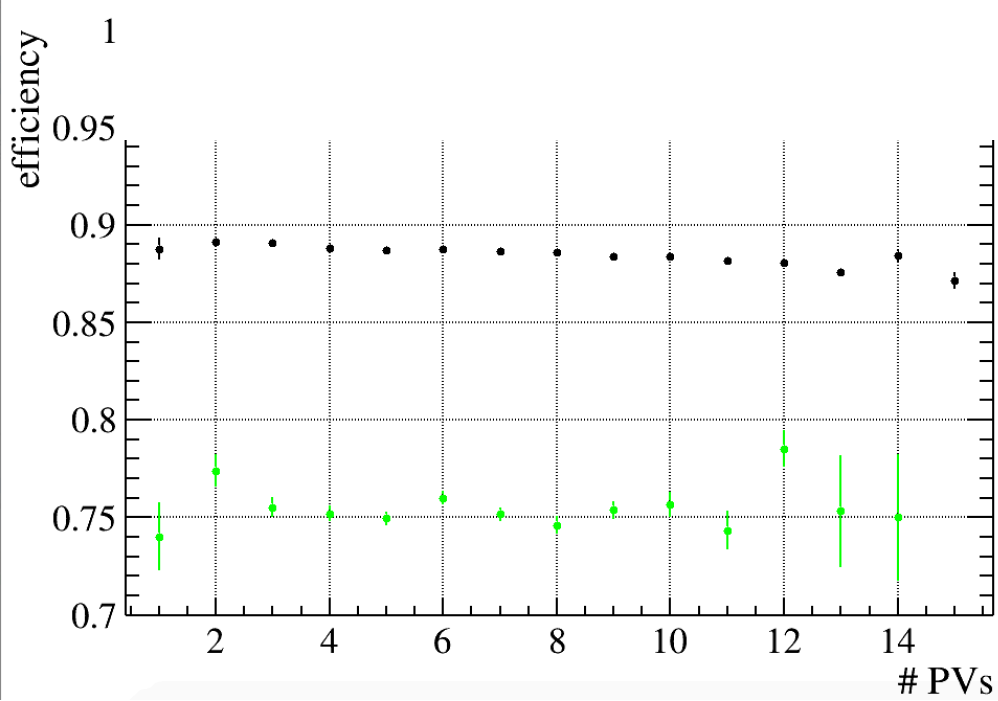
- To
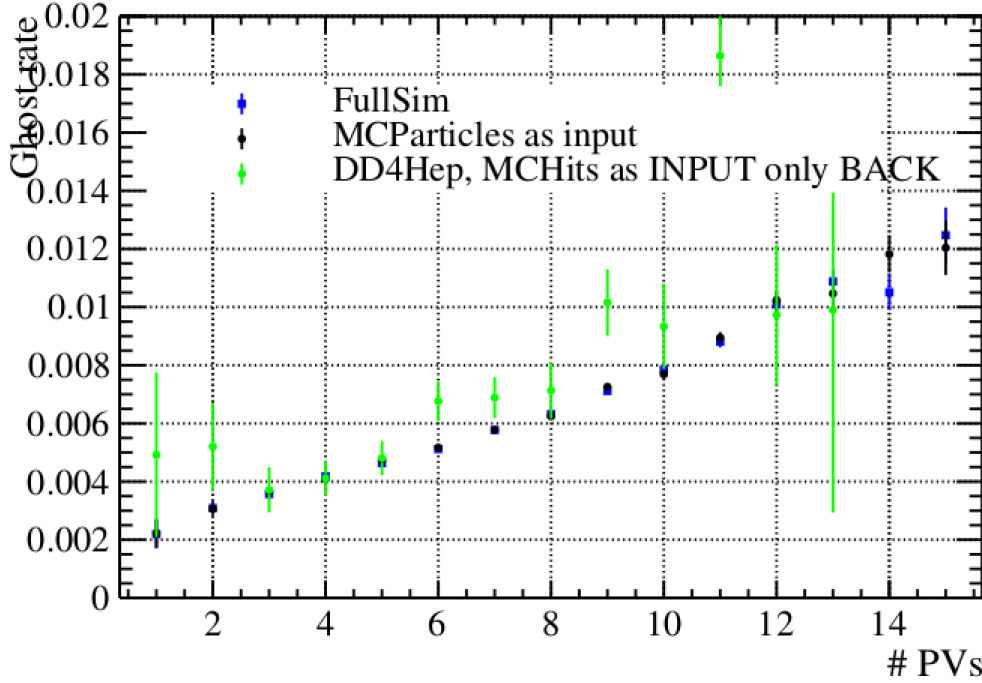
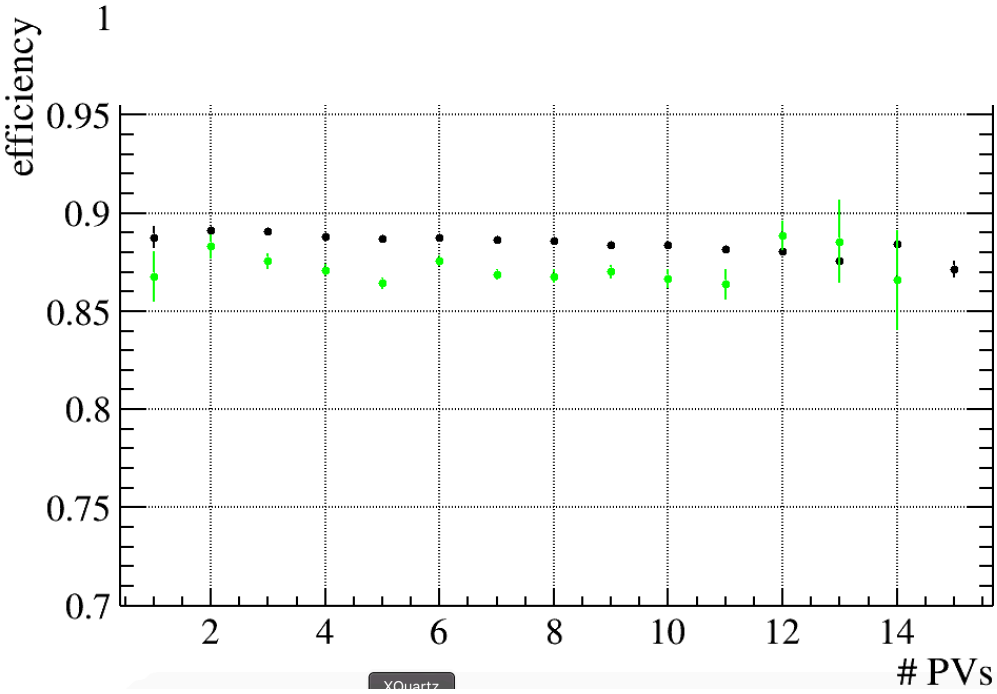```
    x = x + d_x/d_z*(zref-z)
    y = y + d_y/d_z*(zref-z)
z = zref
```
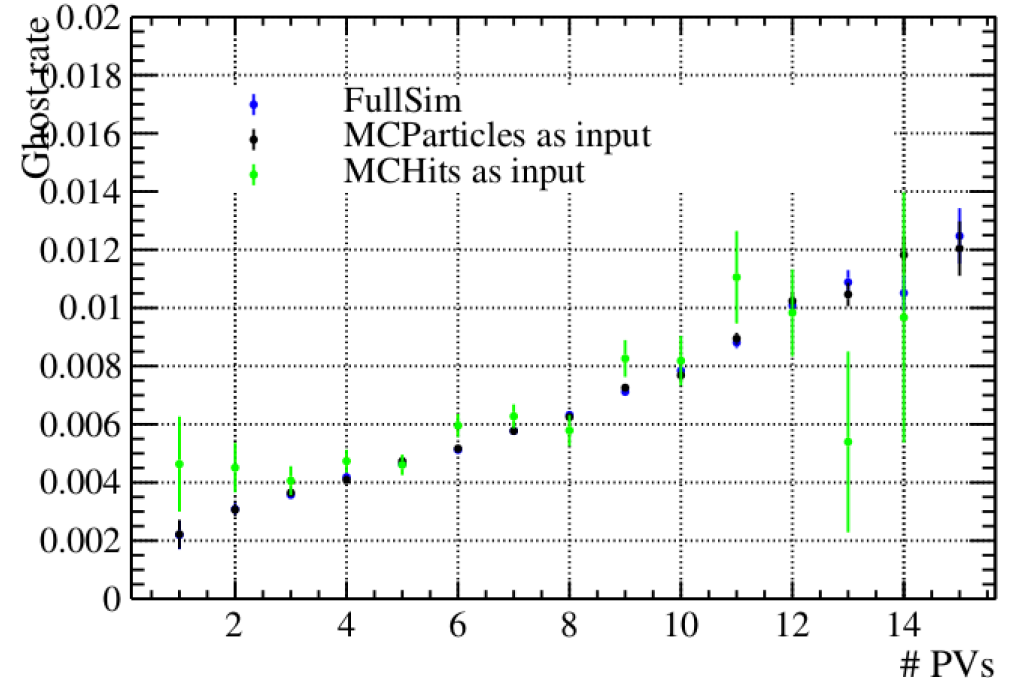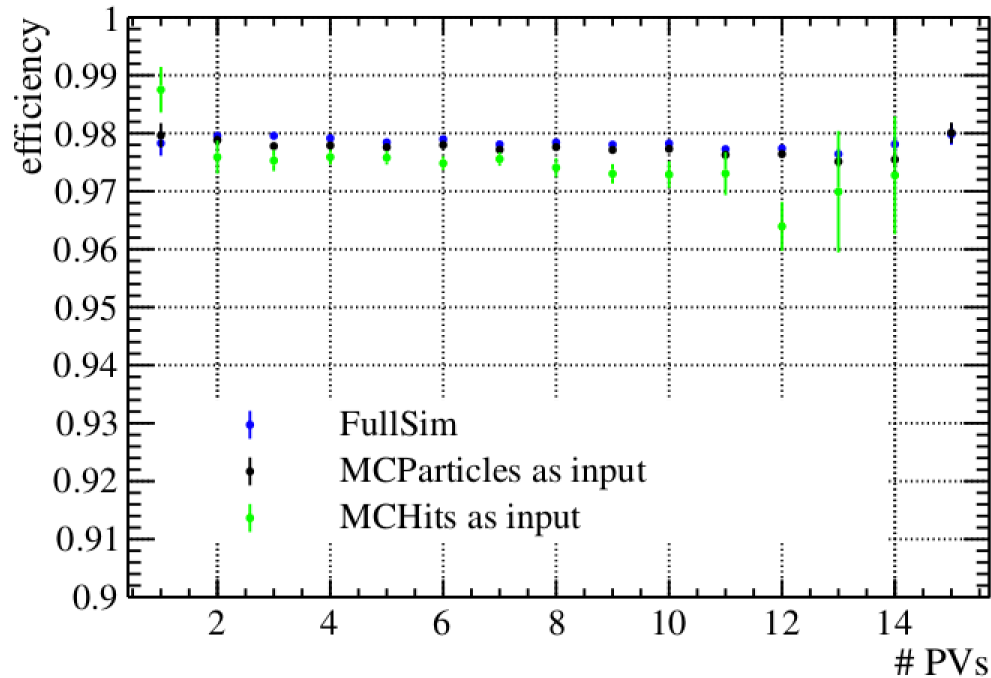
# Forward

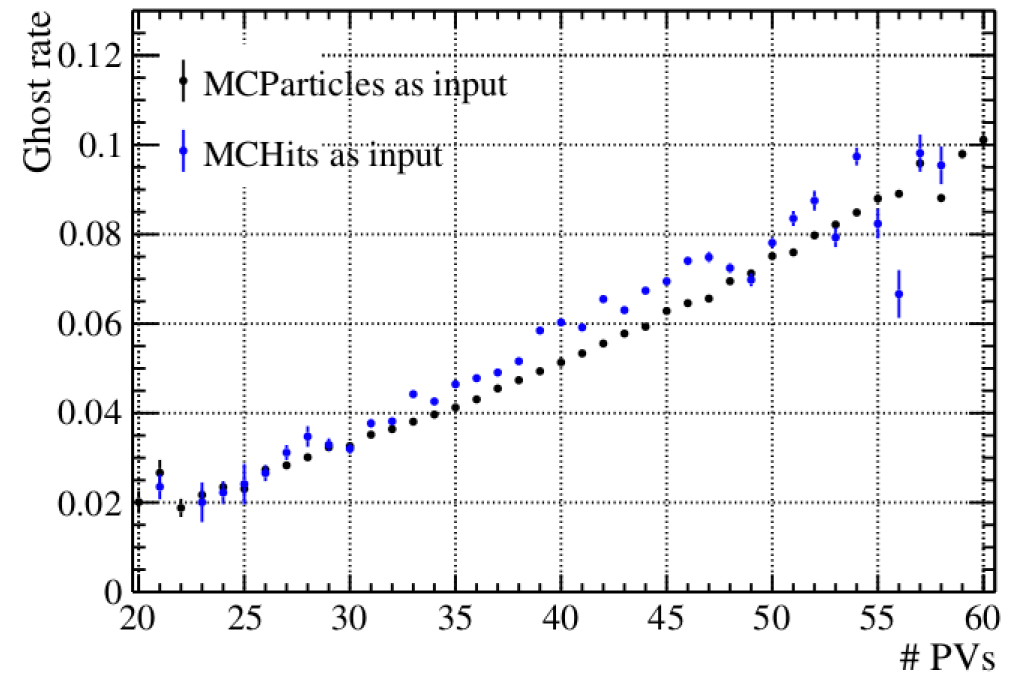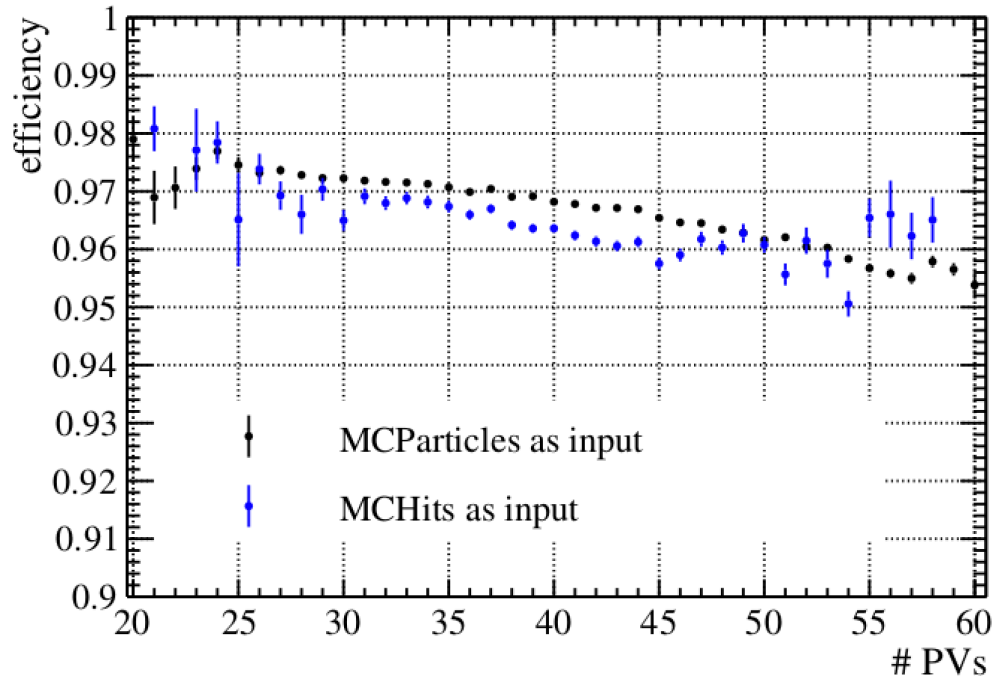# Backward

# Backward (after fix)

# Performances (after fix)

- Velo efficiency and ghost rate

# Upgrade 2 performances
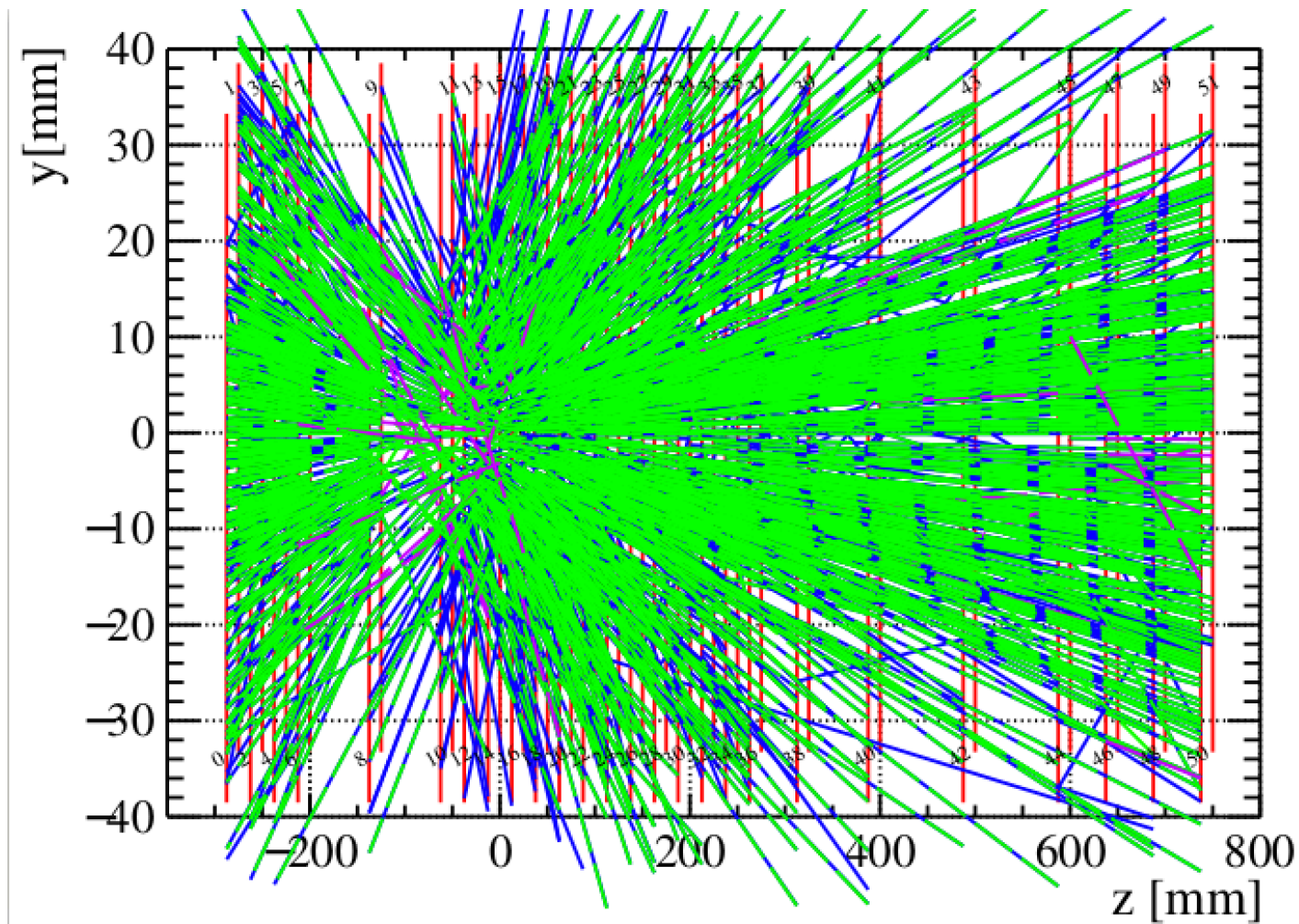
- Velo efficiency and ghost rate

# ZYAngle = 0

- Event **3005**
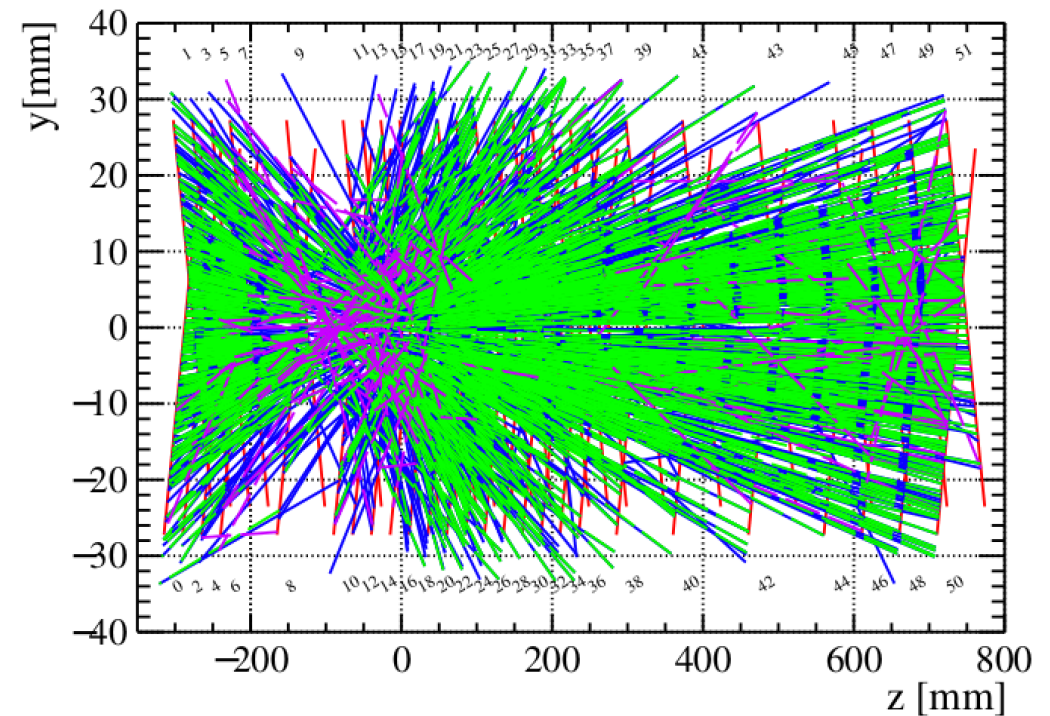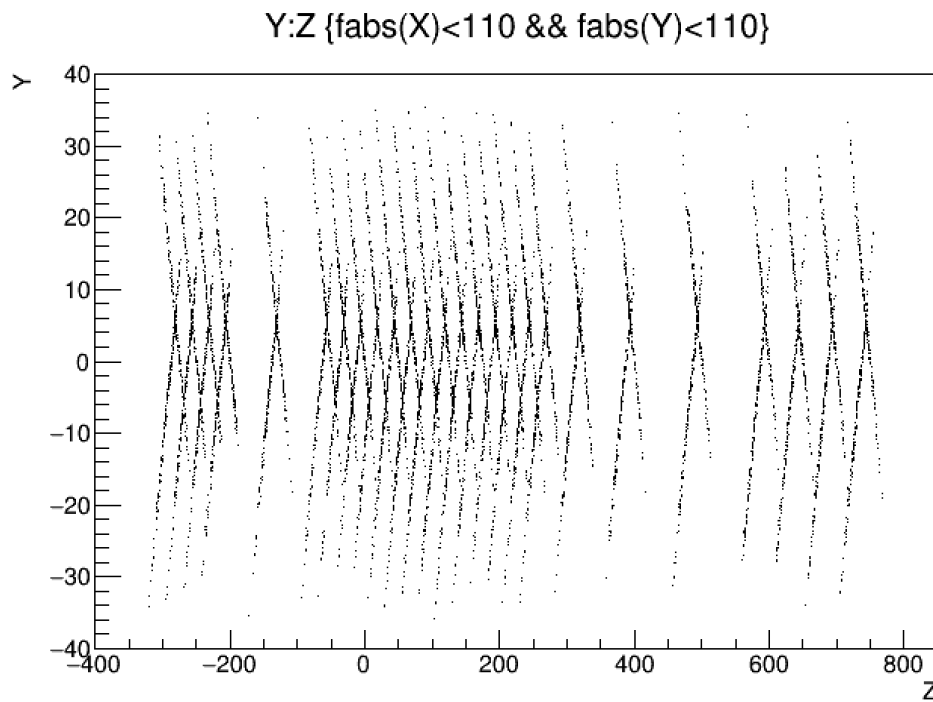
# ZYAngle = +- 45°          (preliminary test!)

- Event **3005**
  DD4Hep input

**Ghost rate x4.7
Efficiency x0.94
w.r.t. ZYAngle = 0°**

MyVelo output



Y:Z {fabs(X)<110 && fabs(Y)<110}

- As expected: inefficiency and higher ghost rate in backward region (due to wrong splinting)

# Things to do

- Add alignment (z->zref) with rotation in YZ
  [currently missing!
  Io avevo già fatto ma ci dev'essere un errore scemo…]

- Adjust splinting (positive and negative) or study performance only for forward tracks?

- Add holes for TimeSpot sensor, update previous results with MCParticles as input and compare the two as double check (align hole with pixel, modify width, noise, …)

- Study performances in a range from 0° to 10° with a step of 1° ?