

PXD Hits in Reconstructed Tracks

Vladimir Chekelian, Fernando Abudinen, Luigi Li Gioi (MPI)

decay channel: $B_d \rightarrow J\psi(\mu^+\mu^-)K_S(\pi^+\pi^-)$

releases: MC10-BGx0, v1.0b-BGx0, v1.0-BGx1
MC9-BGx0, MC9-BGx1, v0.8b-BGx0

ntuple: “pi” tracks from “fillParticleList(‘pi+:all’,’ ’)”

Outlook and Summary:

1. MC10: no tracks with the only PXD-hit in PXD1

→ PXD1 is the only chance in the gap region of PXD2 (~1%)

- should one apply special treatment in this region ?

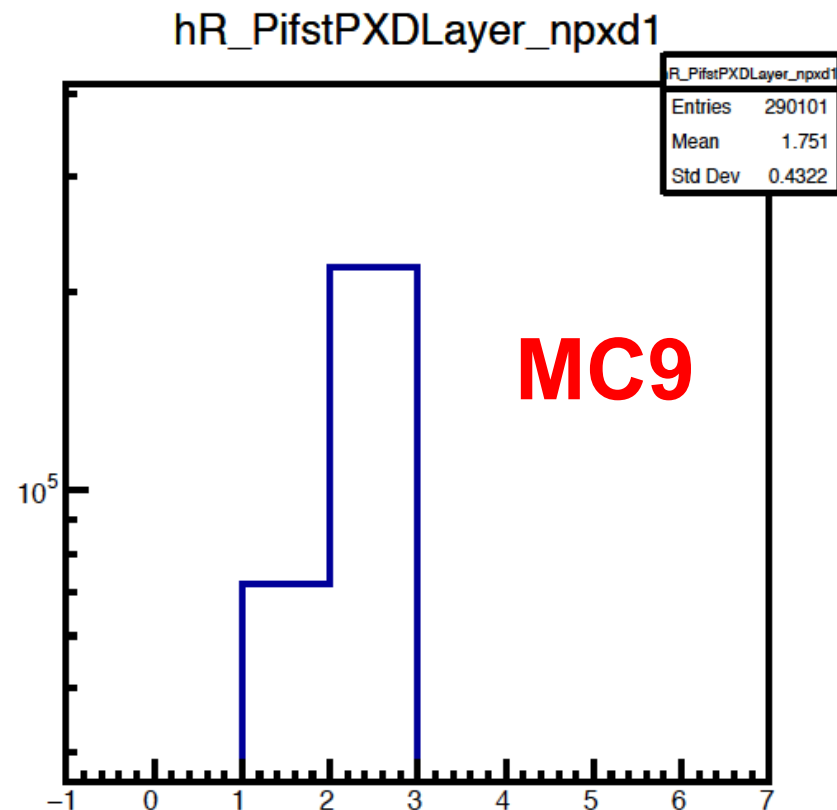
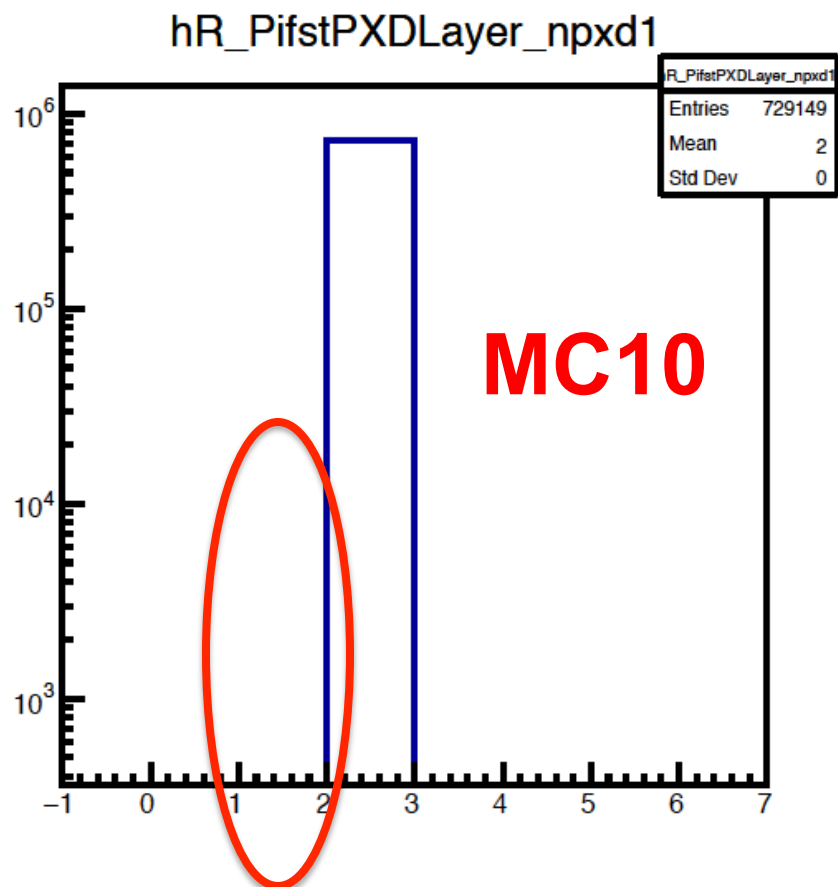
→ very low fraction of PXD1-only tracks even in MC9 - is it fine ?

2. Drop in the PXD hit efficiency at $\theta \sim 45^\circ$ due to inactive areas where two PXD halves are glued at $z=14\text{mm}$ (PXD1) and $z=19\text{mm}$ (PXD2)

→ in MC description the gap is 0.850&0.821mm in PXD1&PXD2

- is it sufficiently accurate ?

nPXDHits=1: firstPXDLayer



missing PXD1-only tracks in MC10

PXD hits in MC releases 1.0, 0.9, 0.8

MC10 (and pre-releases): *no tracks with the only PXD-hit in PXD1*

MC9 and before: *there are PXD1-only tracks but at very low level*

A. All tracks with nPXDHits=1 (without any selection)

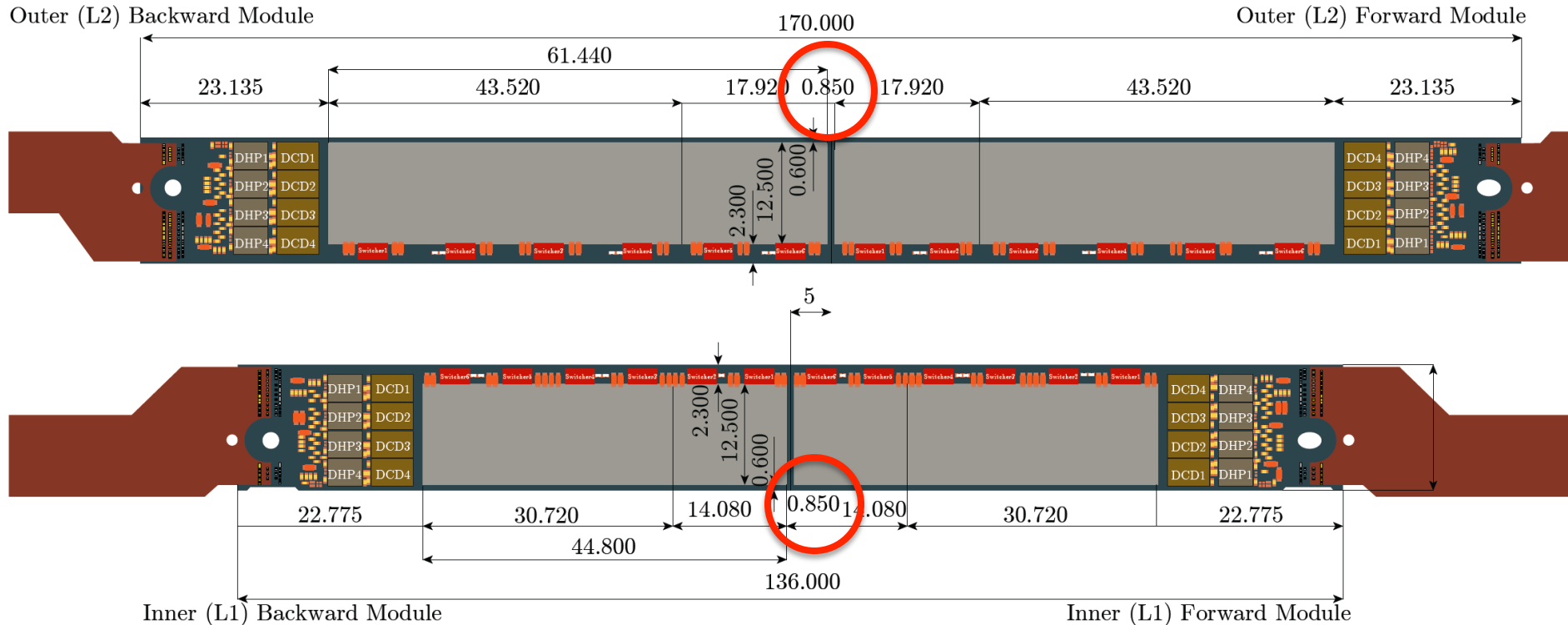
	total	firstPXDLayer=1(PXD1)	
MC10-BGx0	729149	0	\ MC10 (and 1.0b)
v1.0b-BGx0	145582	0	no tracks with hit in PXD1 only !
v1.0b-BGx1	189199	1	/
MC9-BGx0	290101	7100 (2.5%)	\ MC9 and before:
MC9-BGx1	105842	3800 (3.6%)	very low fraction of PXD1-only tracks
v0.8b-BGx0	827586	22000 (2.7%)	/ ~97% of one-hit tracks are in PXD2 !

B. Selected good tracks ($P_t > 0.4$, $-0.02 < z_0 < 0.04$, $d_0 < 0.005$, within 5 degree around $\phi_0 = 0, 90, 180, 270^\circ$)

	all	npxd=0 (in peak) %(%)	npxd=1 (in peak) %(%)
MC10-BGx0	318523	8189(~3310) 2.6(~1.0)	7753(~4785) 2.4(~1.5)
v1.0b-BGx0	63539	1618(~650) 2.6(~1.0)	1466(~920) 2.3(~1.5)
v1.0b-BGx1	62208	1554(~500) 2.5(~0.8)	2074(~1000) 3.3(~1.6)
MC9-BGx0	91779	5703(no) 6.2(no)	13675(~3850) 15.0(~4.2)
MC9-BGx1	32255	4137(no) 12.8(no)	2576(~1100) 8.0(~3.4)
v0.8b-BGx0	305630	16754(no) 5.5(no)	44348(~14000) 14.5(~4.6)

"peak" means enhancement of tracks in the region of the dead areas in PXD1 and PXD2 (~45 degree)

Geometry of PXD1 and PXD2



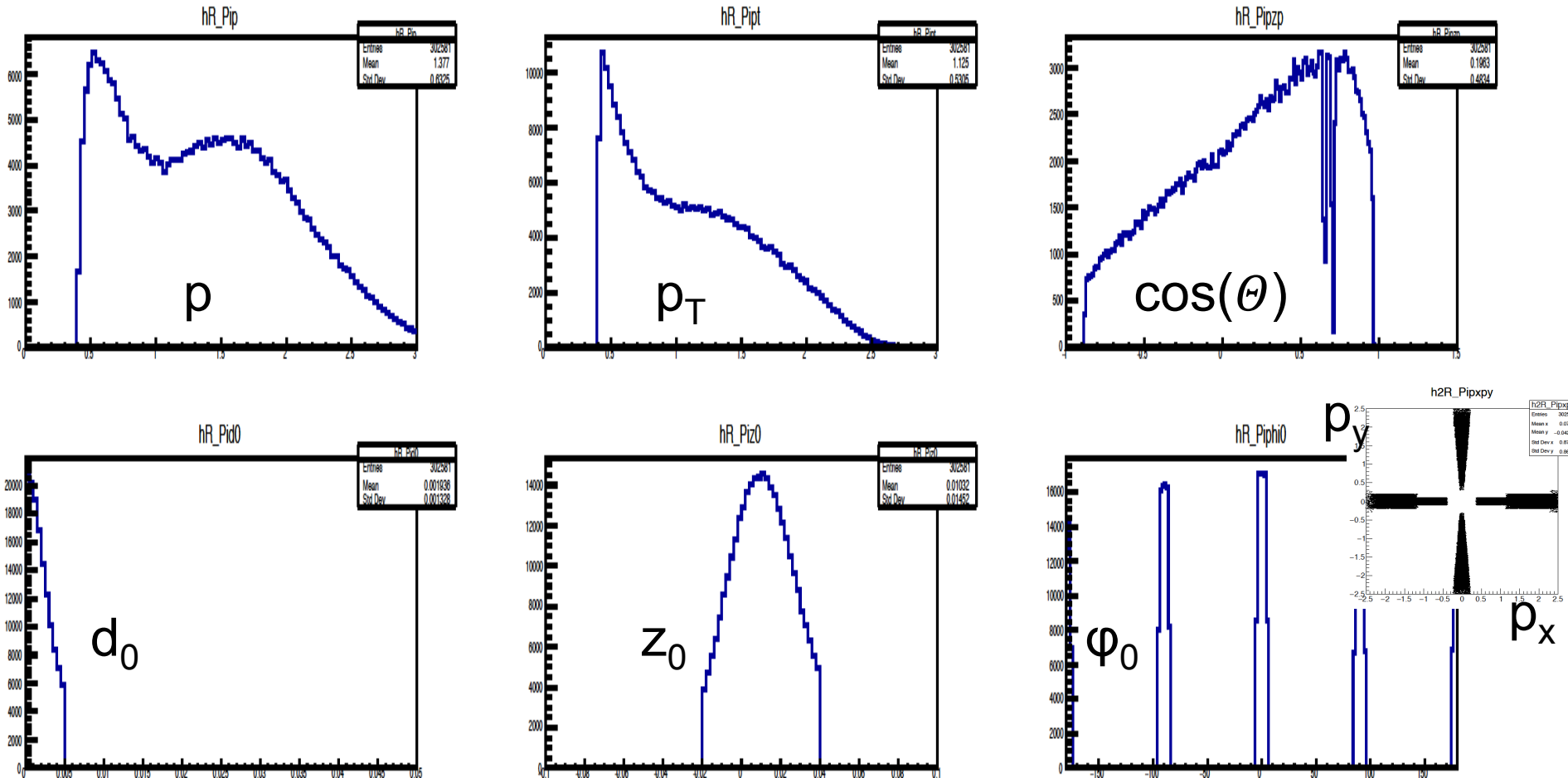
Geometry description in `pxd/data/PXD-Components.xml`

PXD1: gap 0.850mm between active areas from $z=13.5755$ to $z=14.4255$ mm

PXD2: gap 0.821mm between active areas from $z=18.5895$ to $z=19.4105$ mm

Selection of (good and straight) tracks

$p_T > 0.4$, $-0.02 < z_0 < 0.04$, $d_0 < 0.005$, within 5 degree around $\phi_0 = 0, 90, 180, 270^\circ$

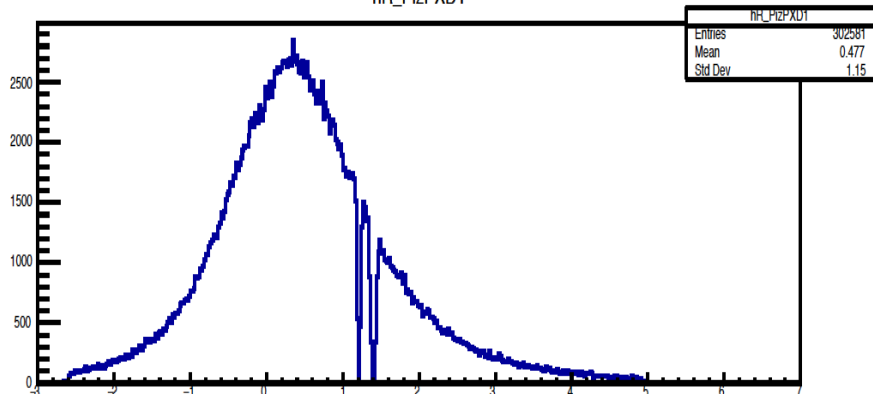


MC10: $n\text{PXDHits} \geq 2$

$z(\text{PXD1,2})$ - calculated from θ and R

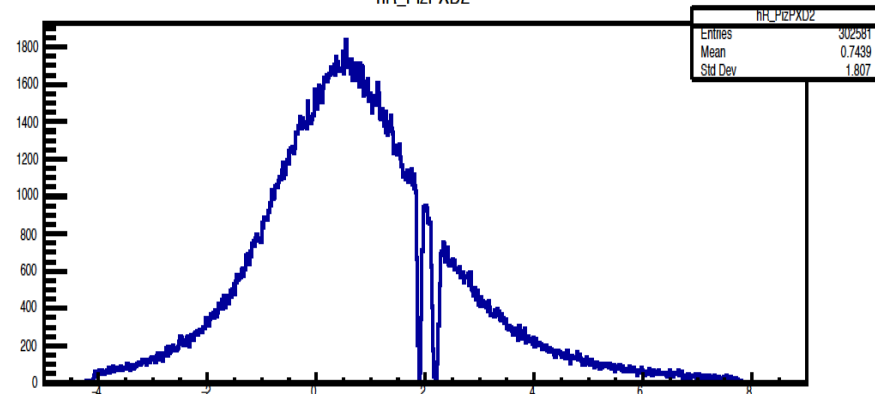
$z(\text{PXD1})$ at $R = 1.4$ cm

hR_PizPXD1

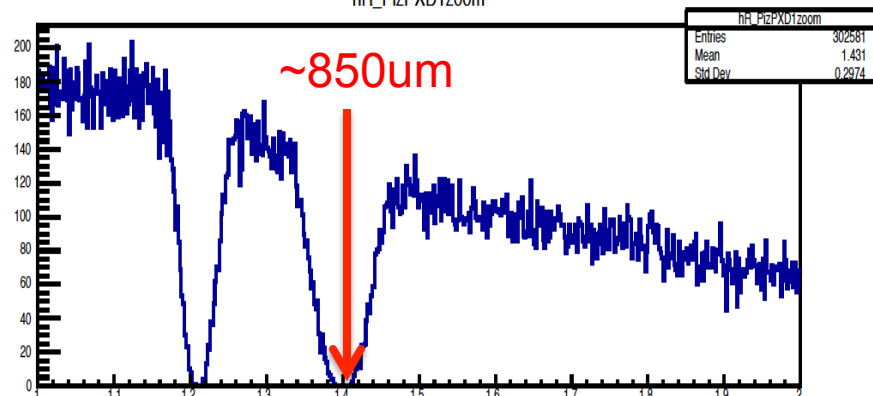


$z(\text{PXD2})$ at $R = 2.2$ cm

hR_PizPXD2

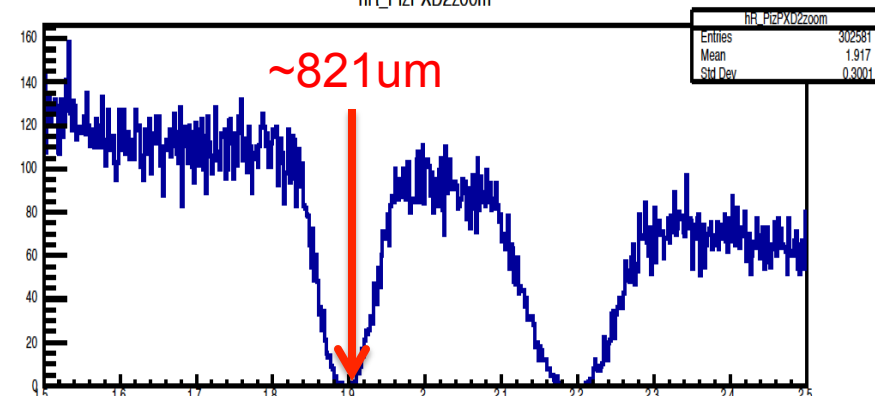


hR_PizPXD1zoom



**$z=14\text{mm}$ (PXD1)
 $n\text{PXDHits}=1$**

hR_PizPXD2zoom

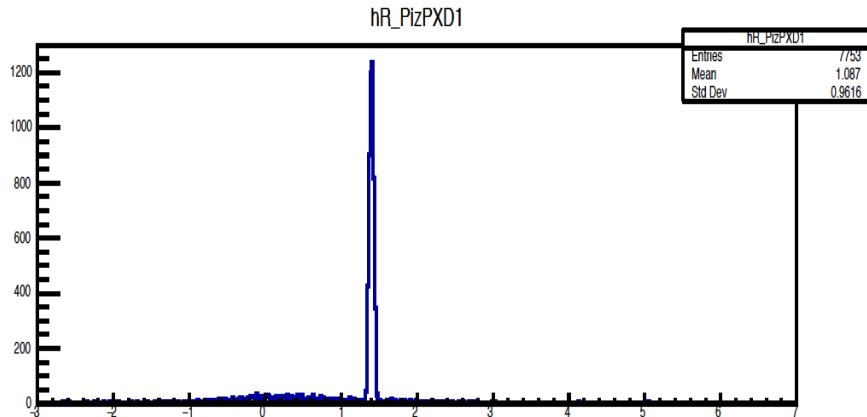


**$z=19\text{mm}$ (PXD2)
 $n\text{PXDHits}=0$**

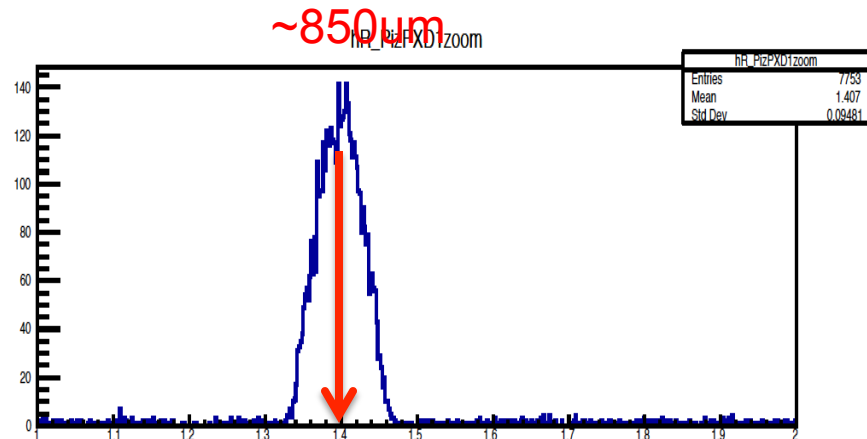
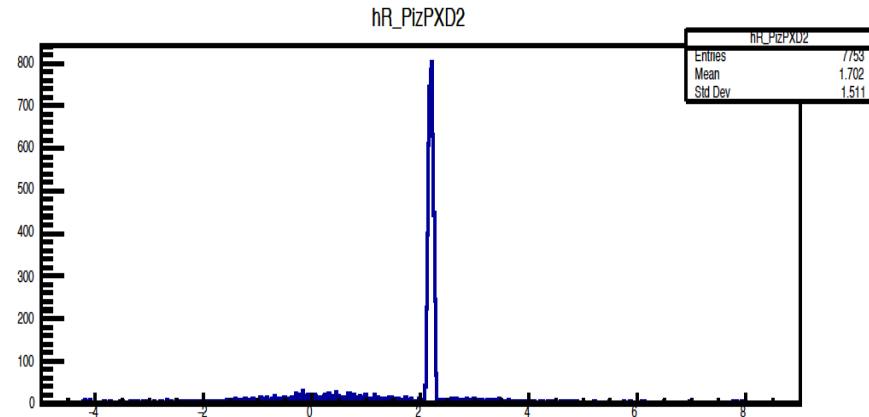
MC10: nPXDHits = 1

$z(\text{PXD1,2})$ - calculated from θ and R

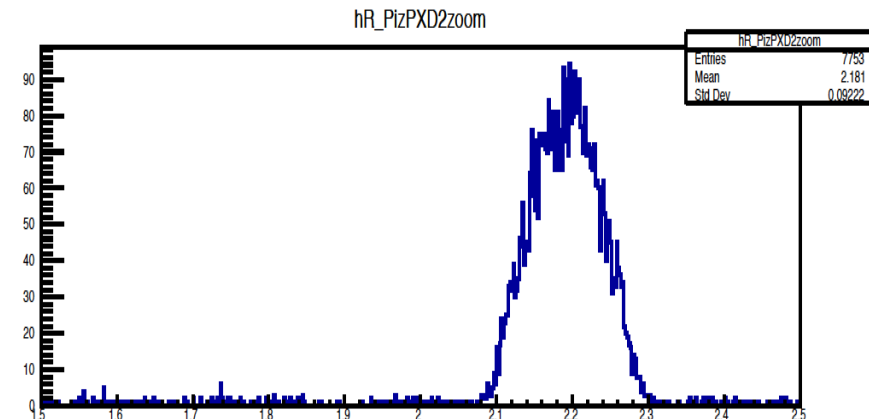
$z(\text{PXD1})$ at $R = 1.4$ cm



$z(\text{PXD2})$ at $R = 2.2$ cm



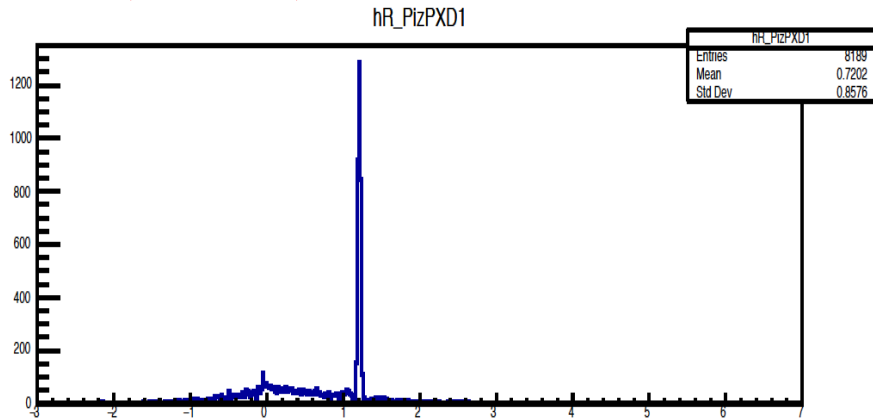
**$z=14\text{mm (PXD1)}$
 $n\text{PXDHits}=1$**



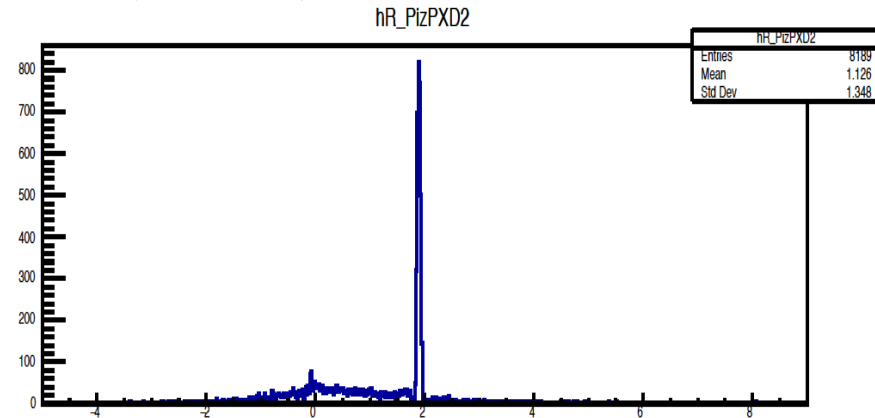
MC10: $n\text{PXDHits} = 0$

$z(\text{PXD1,2})$ - calculated from θ and R

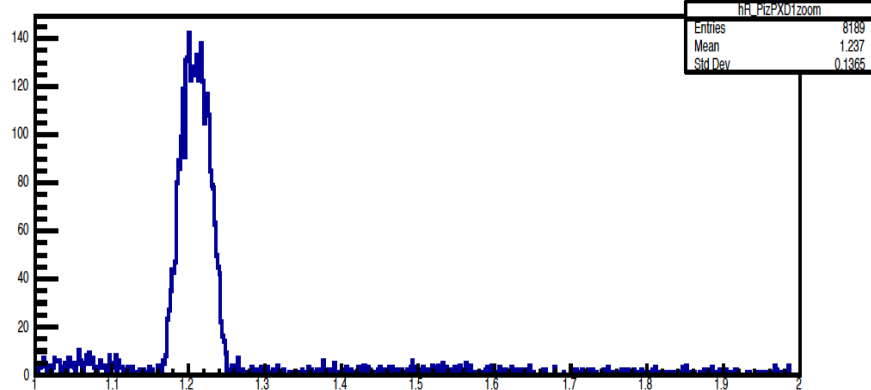
$z(\text{PXD1})$ at $R = 1.4$ cm



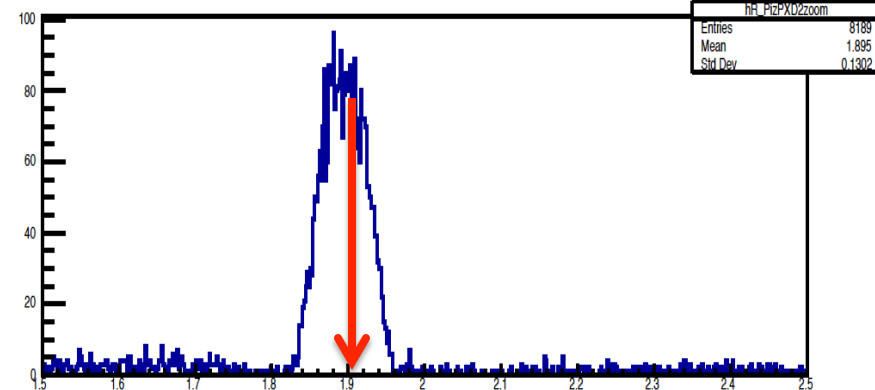
$z(\text{PXD2})$ at $R = 2.2$ cm



hR_PizPXD1zoom



$\sim 821 \mu\text{m}$



**$z=19\text{mm (PXD2)}$
 $n\text{PXDHits}=0$**