Timing profile of the photons in dRICH detector
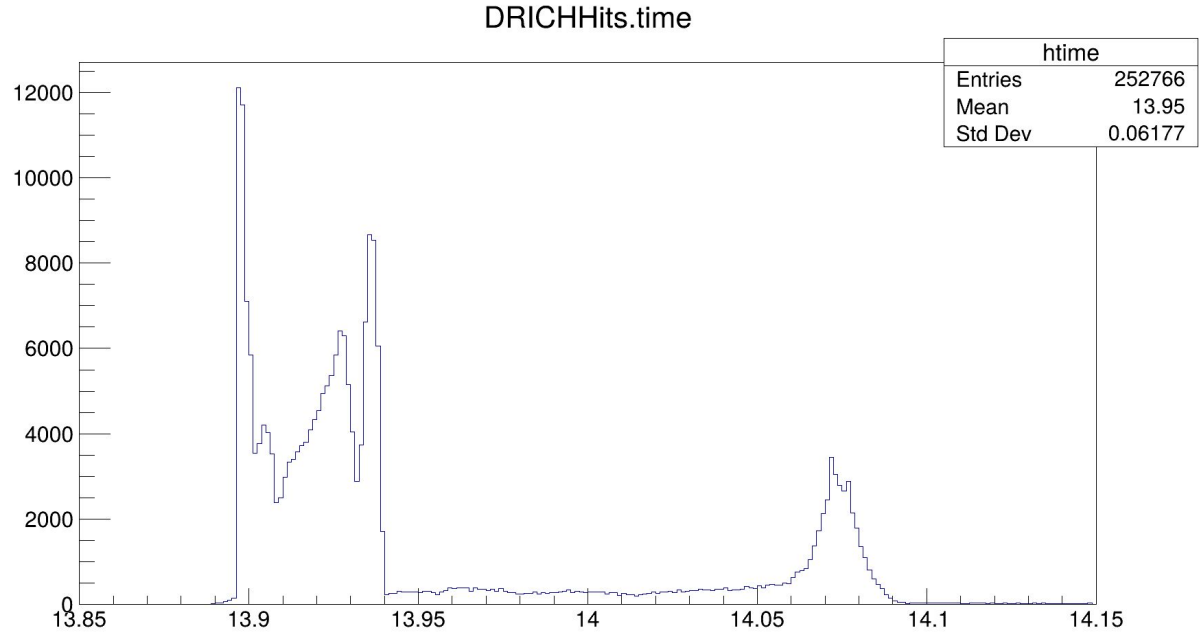
On behalf of ePIC collaboration
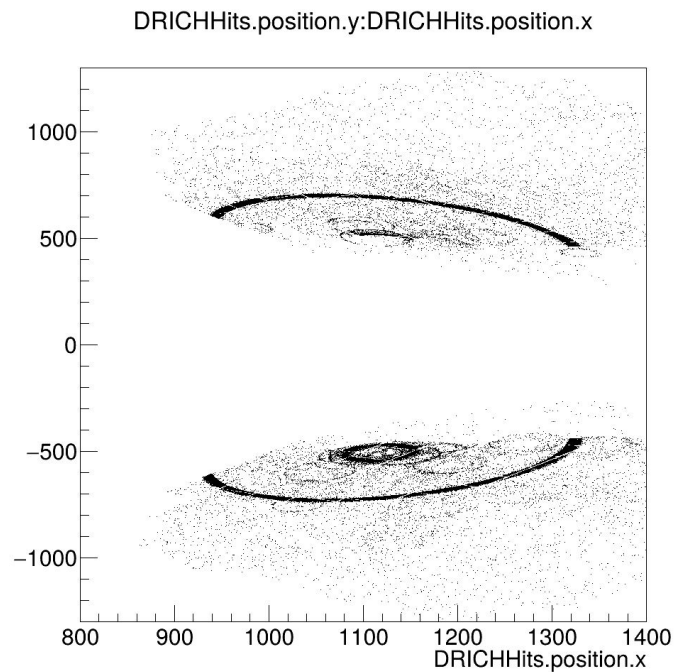
- Momentum = 10, 42 GeV
- n = 1000
- Particle Pion-, kaon-
- Pseudorapidity b from 2.2,
- 2.4, 2.7
- For both aerogel and gas
- Single particle event
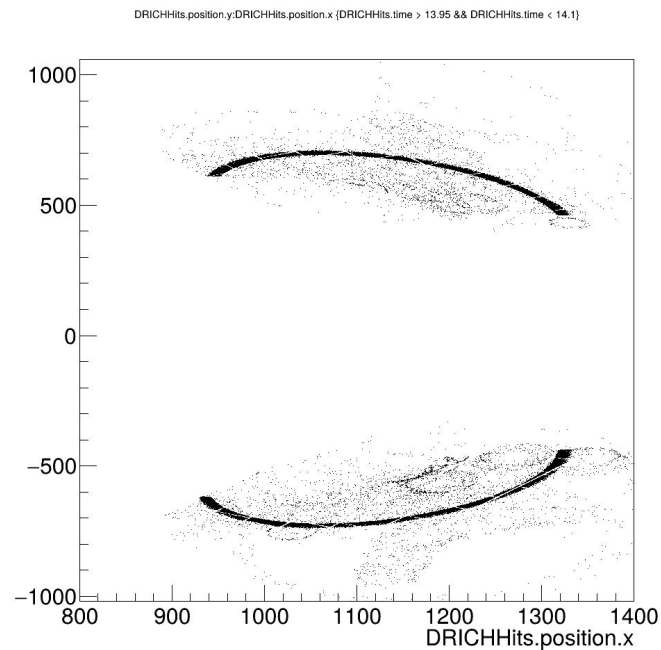- No noise introduced

Hit times of each photons

- Momentum = 10GeV
- Particle Pion-
- Pseudorapidity = 2.4

DRICHHits.time

htime	
Entries	252766
Mean	13.95
Std Dev	0.06177

Time cut 13.89 - 14.1. full signal length (2 sectors)

DRICHHits.position.y:DRICHHits.position.x

Aerogel ring:Time cut - 13.95 - 14.1ns (2 sectors)

DRICHHits.position.y:DRICHHits.position.x {DRICHHits.time > 13.95 && DRICHHits.time < 14.1}

Time cut 13.89 - 14.1. full signal length (2 sectors)
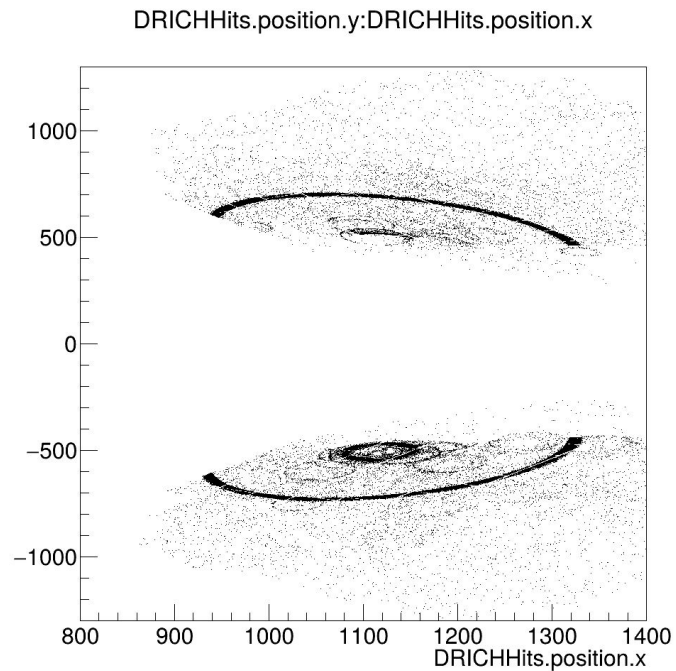
Gas ring - Time cut - 13.89 - 13.94ns (2 sectors)

DRICHHits.position.y:DRICHHits.position.x

DRICHHits.position.y:DRICHHits.position.x {DRICHHits.time > 13.89 && DRICHHits.time < 13.94}
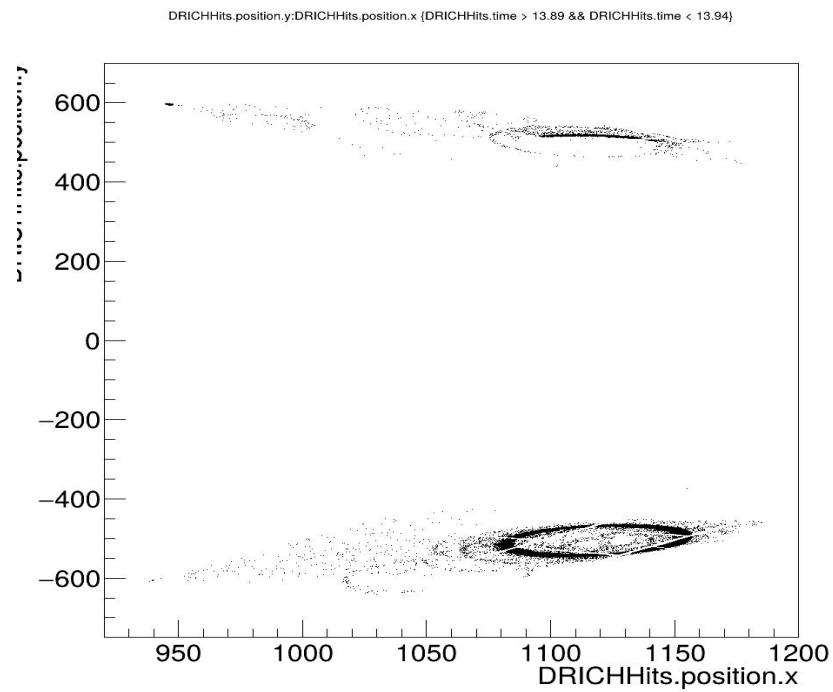
Observation

- Time cut for aerogel ring is 13.95 -14.1 ns irrespective of the momentum, pseudorapidity, and particle
- For gas there's a very minute variation with change in pseudorapidity. Details in slide 9.

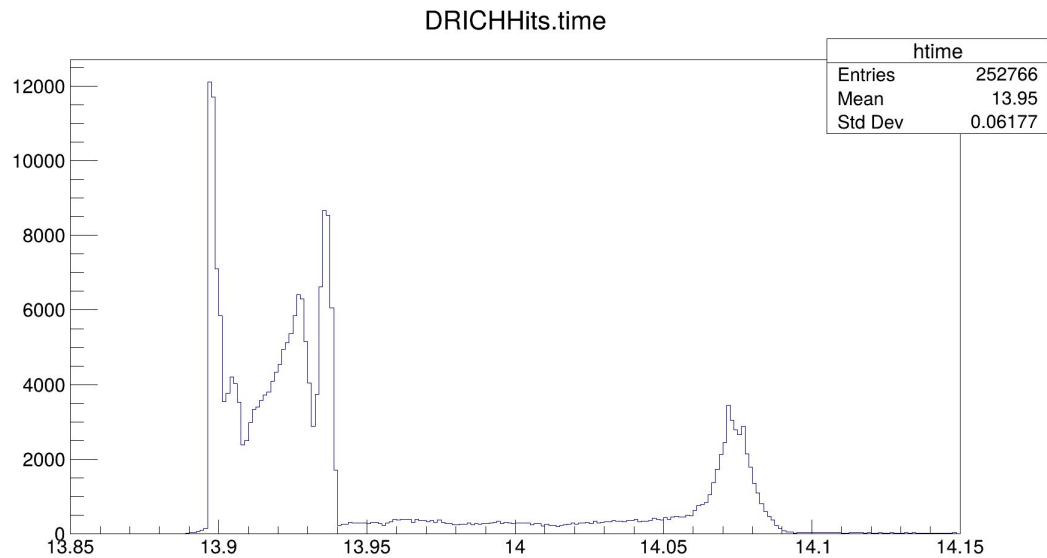Will do for physics events next

doubts

1. All the rings (for pion- and kaon-) are forming in sectors 2 and 3, as the study is conducted only for negatively charged particles. The magnetic field's effect on -ve particles explains this behavior.

DRICHHits.position.y:DRICHHits.position.x
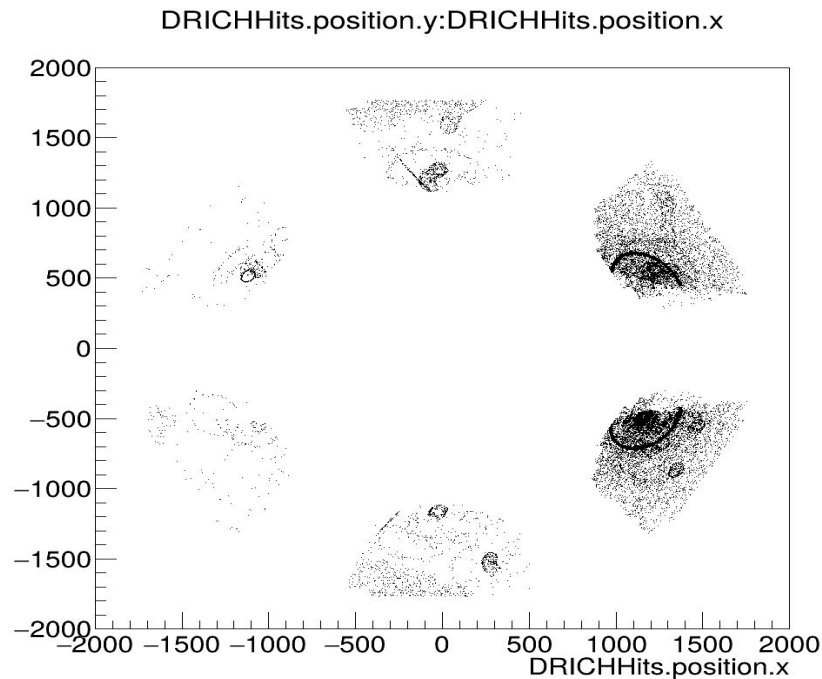
doubt

2. what does entries in this signify?
     rawhits?

DRICHHits.time

doubt

3. For pions we have both aerogel and gas rings, but for kaon we get only one of the either rings.

particle	momentum	psedurapdity	signal time for gas	signal time for aerogel
pion-	10	2.2	13.91-13.95	13.95-14.1
	10	2.4	13.89-13.94	13.95-14.1
	42	2.7	13.85-13.94	13.95-14.1
kaon-	10	2.2		13.95-14.1
	10	2.4		13.95-14.1
	42	2.7	13.86-13.94	

doubt

4. What is the dimension of the flange.