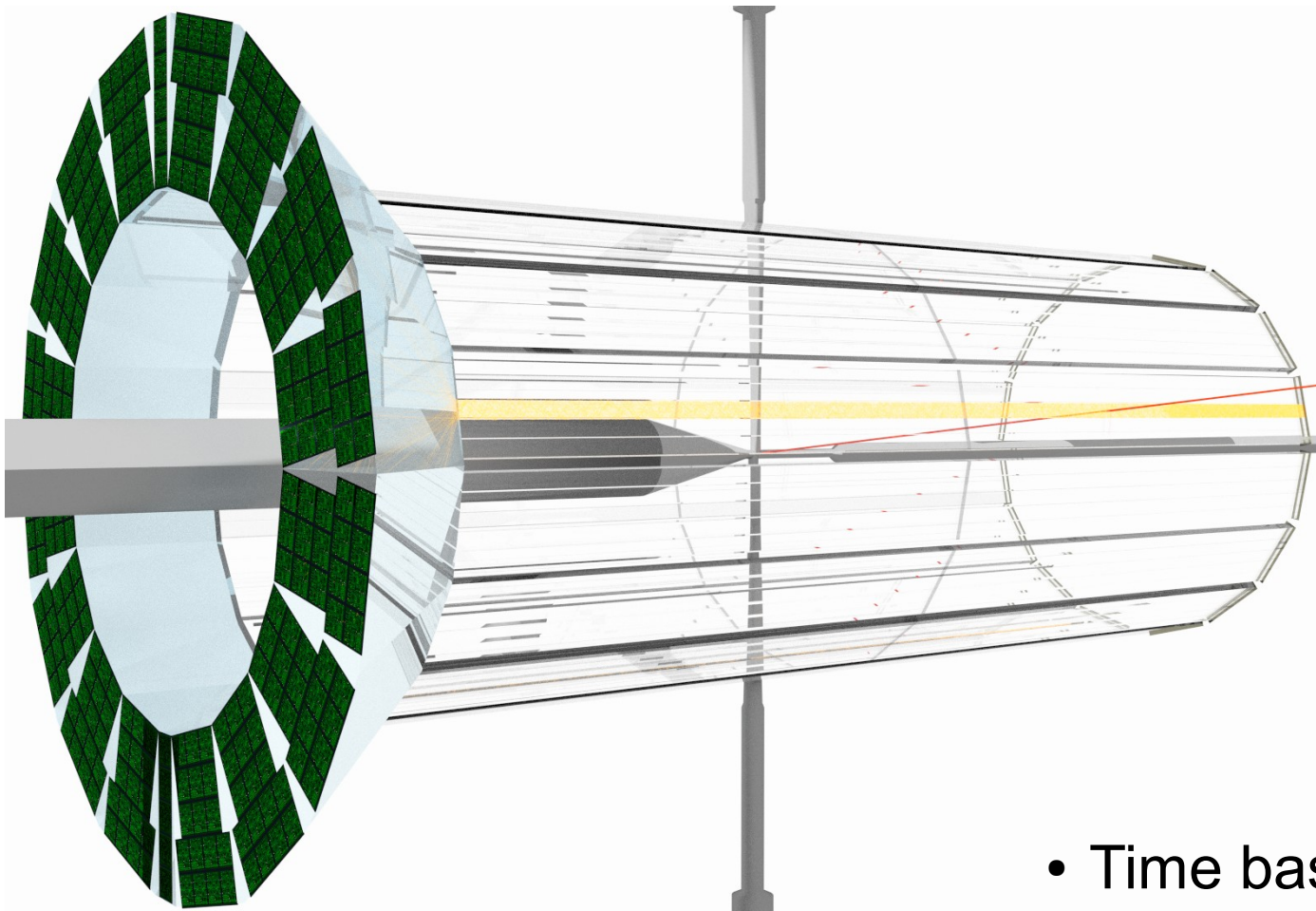
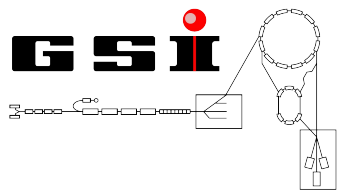


Status of the time-based sim & reco



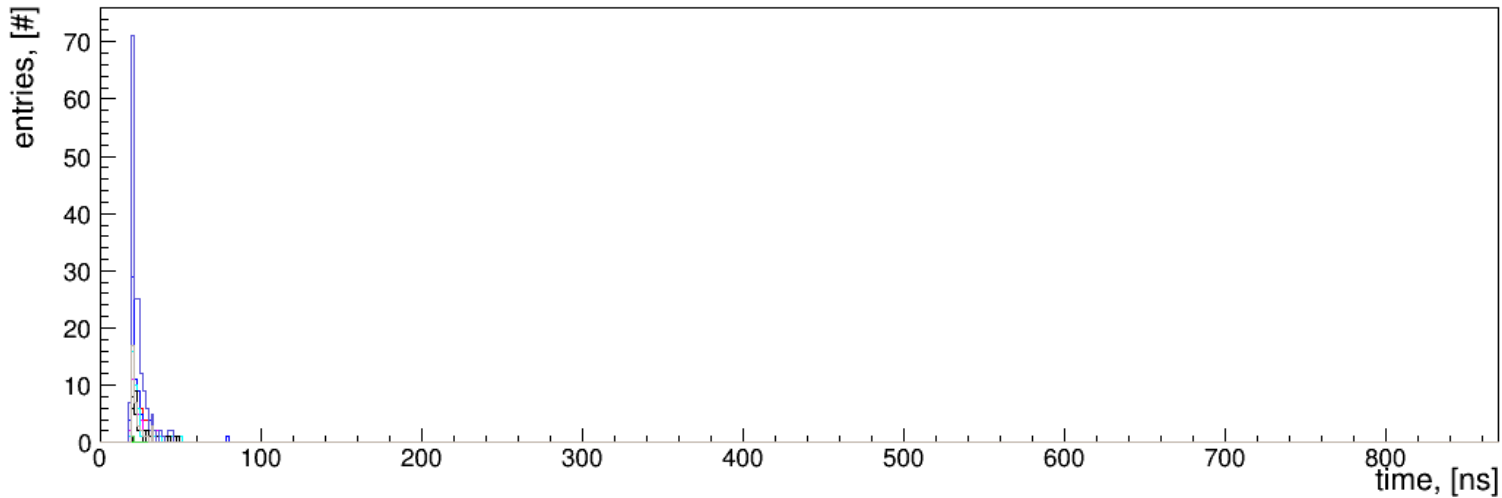
- Time based simulations
- Pileup behavior
- Hits separation
- Summary and outlook



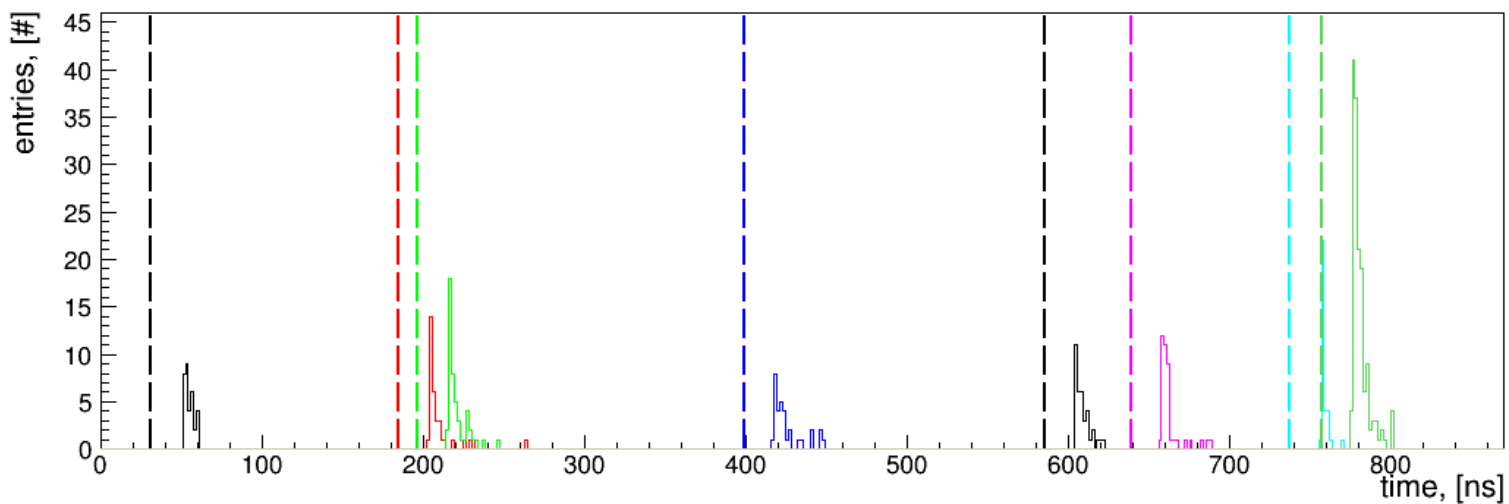
Roman Dzhygadlo,
PANDA Cherenkov Group

Time based simulations

- Time spectrum after event based simulation:



- After assigning time stamp: `fRun->SetEventMeanTime(50);`



Pileup simulation with WriteOutBuffer

- In PndDrcDigiTask:

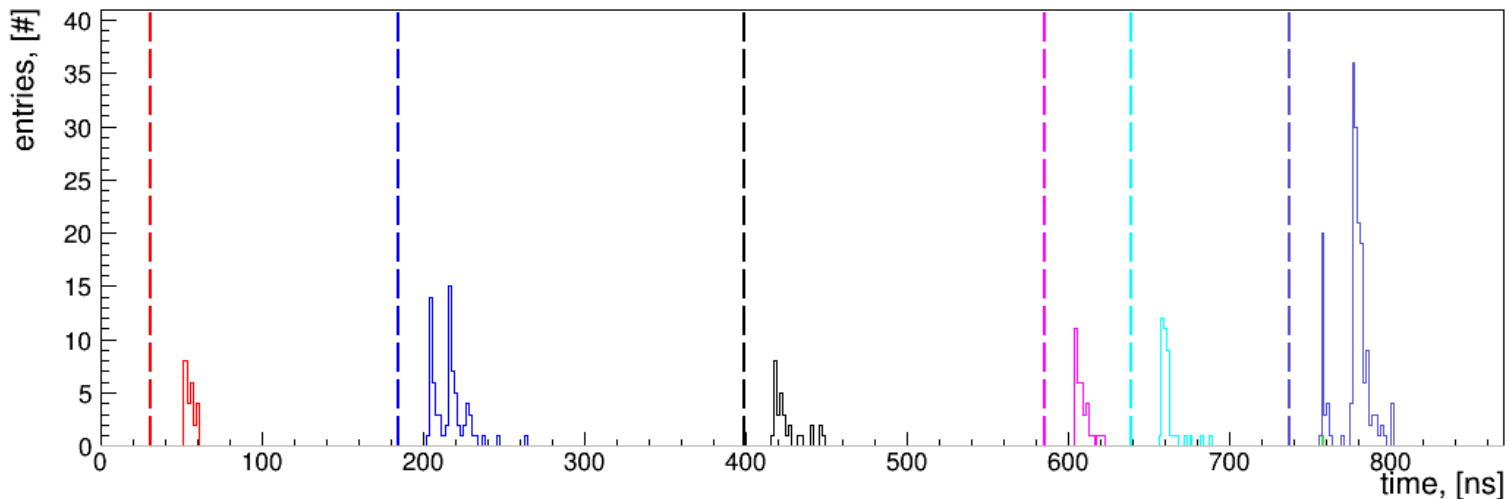
```
fDataBuffer->FillNewData(digi, timeStamp, timeStamp + fDeadTime);
```

- Default Modify(): hit in the same pixel within dead time is ignored.

- To save hits from the last event if fDeadTime_map is empty in the last-1 event:

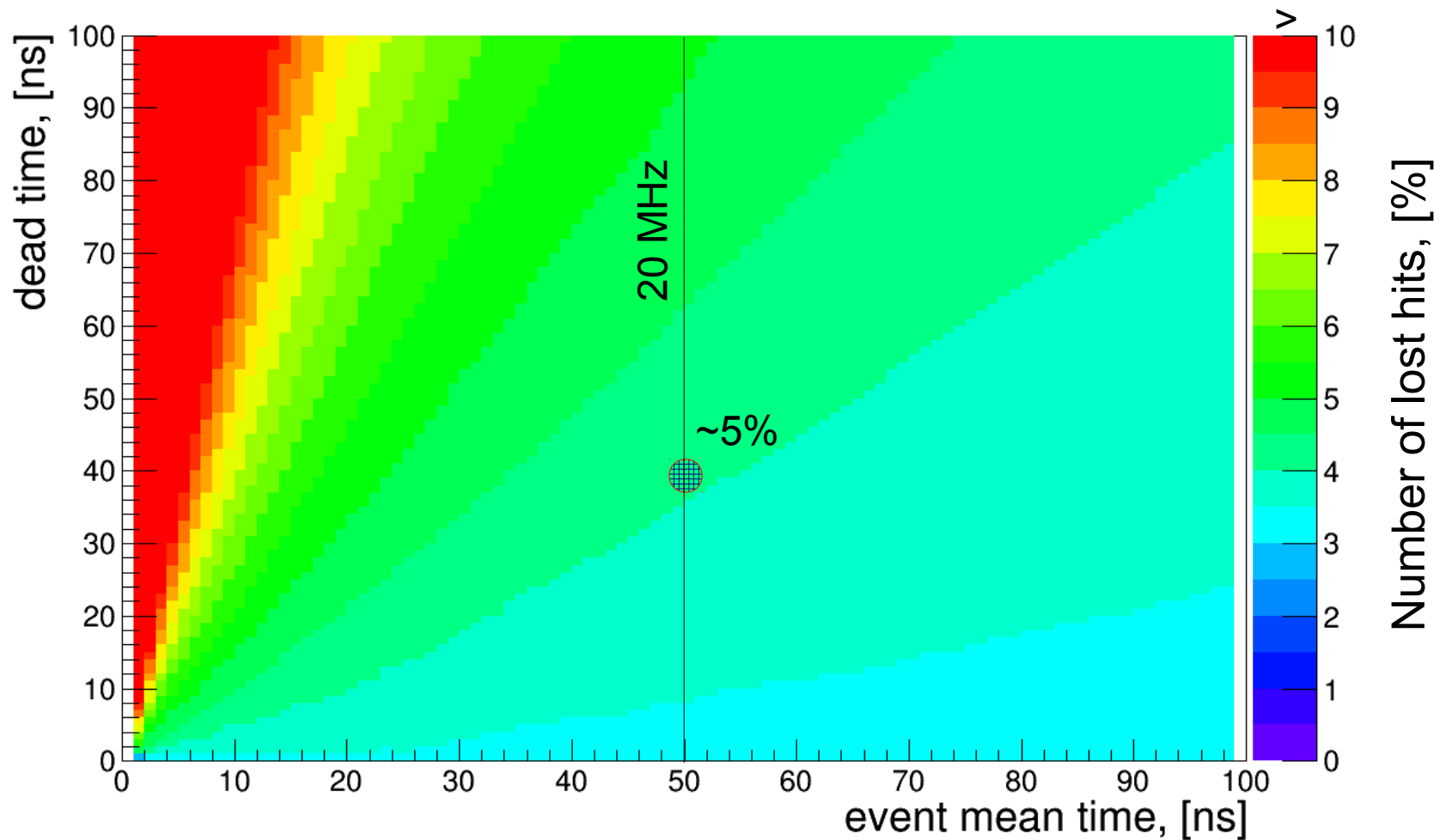
```
In FairWriteoutBuffer  
    virtual Int_t GetNData() {return fDeadTime_map.size();}
```

```
In PndDrcWriteoutBuffer  
    virtual Int_t GetNData() {return fStartTime_map.size();}
```



Pileup behavior

- 5 charged tracks in each event
- $p = [1,3]$ GeV/c $\theta = [22, 140]$ degree $\varphi = [0, 180]$ degree



- ~5 % of photons are lost due to pileup (@ 20MHz and 40 ns dead time)

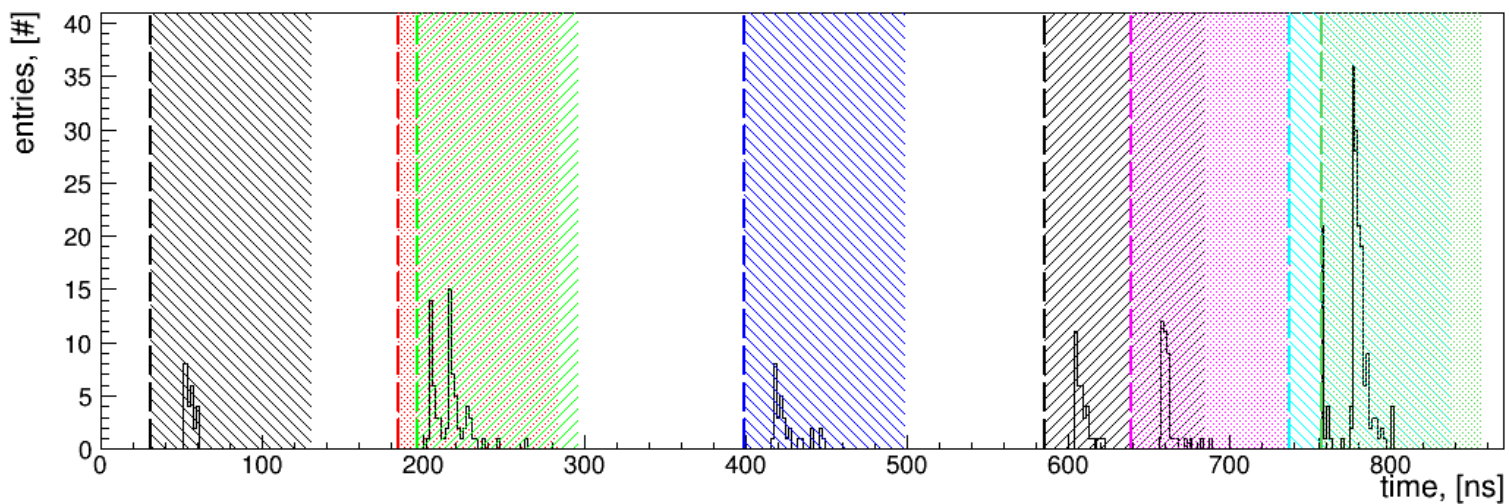
Hit finder

- Time spectrum after event based simulation:

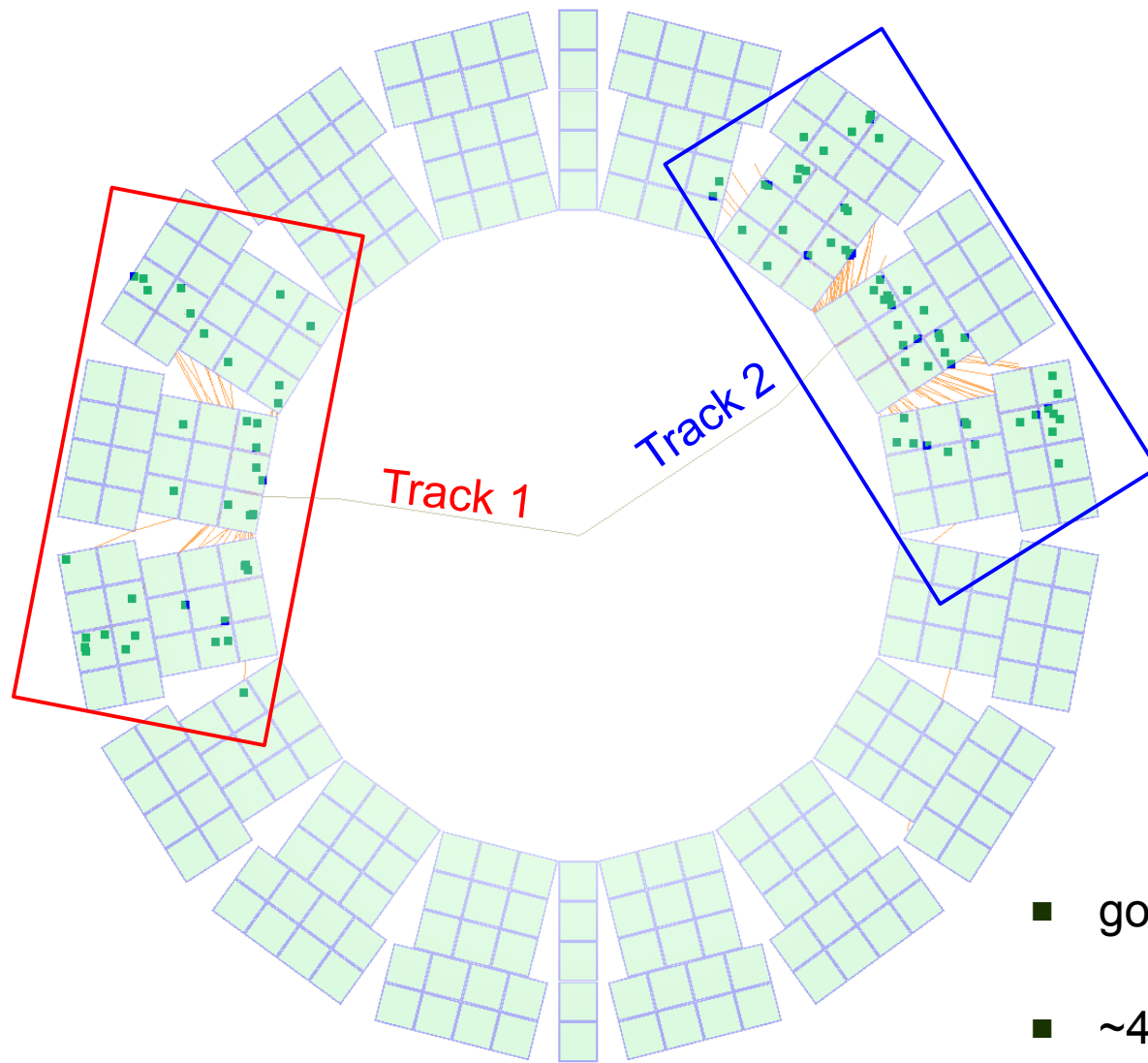
In PndDrcHitFinder:

```
fDigiArray = FairRootManager::Instance()->GetData(fInBranchName,  
          fStopFuncutor, eventTime, fStopFuncutor, eventTime+100);
```

- Events-hits relationship after hit finder:



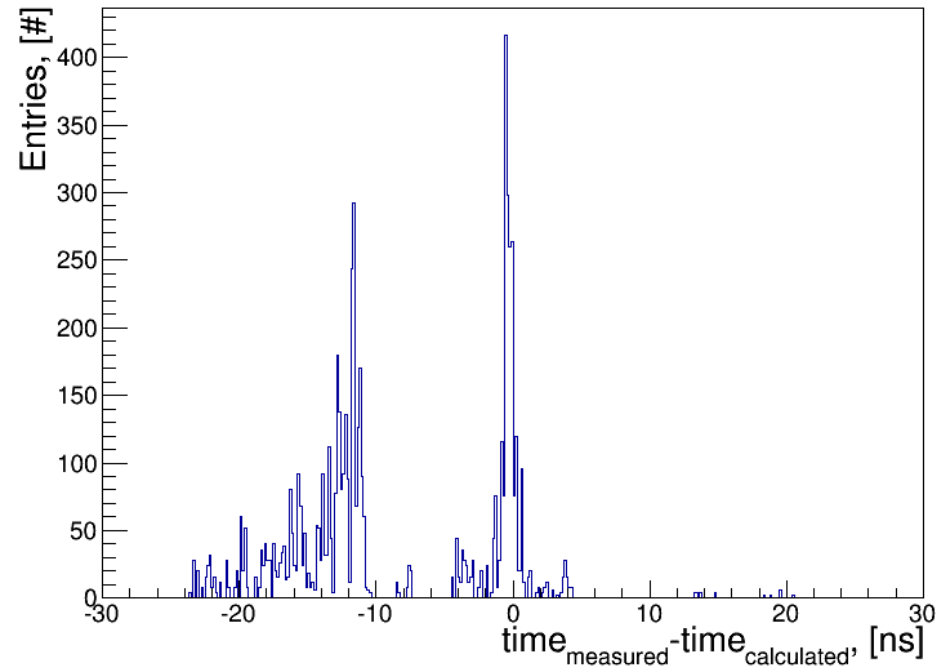
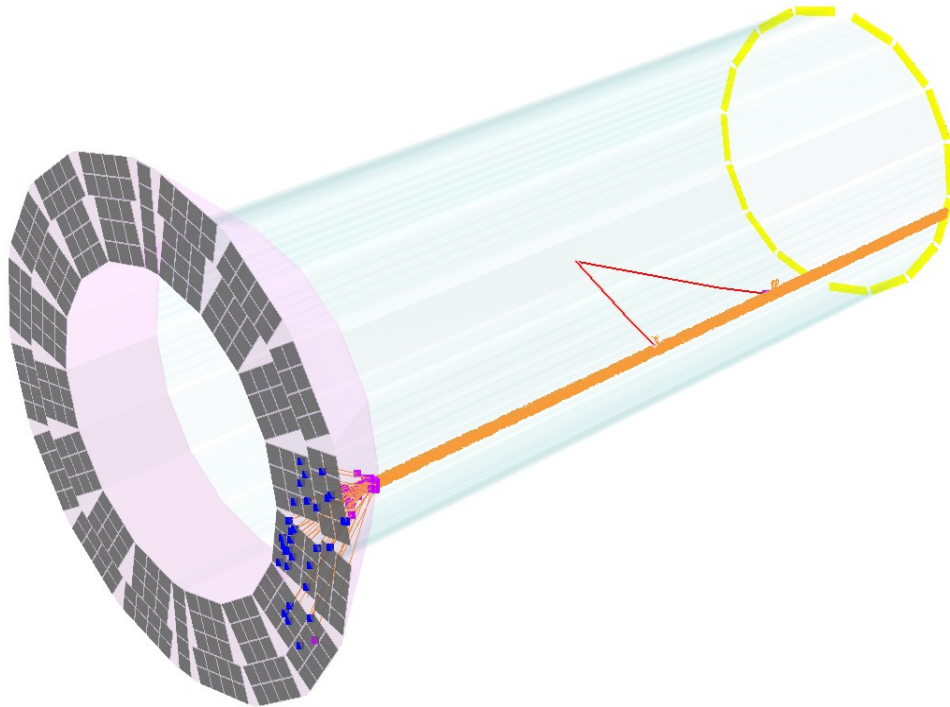
Hits separation



- good separation in space
- ~4 % of tracks are hit same bar box (using DPM)

Hits separation

- Good separation in time



- 90% of 2 tracks in same barbox still could be separated using delta timing.

Summary

- Time-based simulation works for Barrel DIRC.
- Up to 5 % of hits are lost due to pileup @ 20 MHz
- Hit's lost is quite constant up to 100 MHz
- Hits from different track are good separated in space and time.

Outlook

- Evaluation of efficiency lost of the reconstruction due to events overlapping