

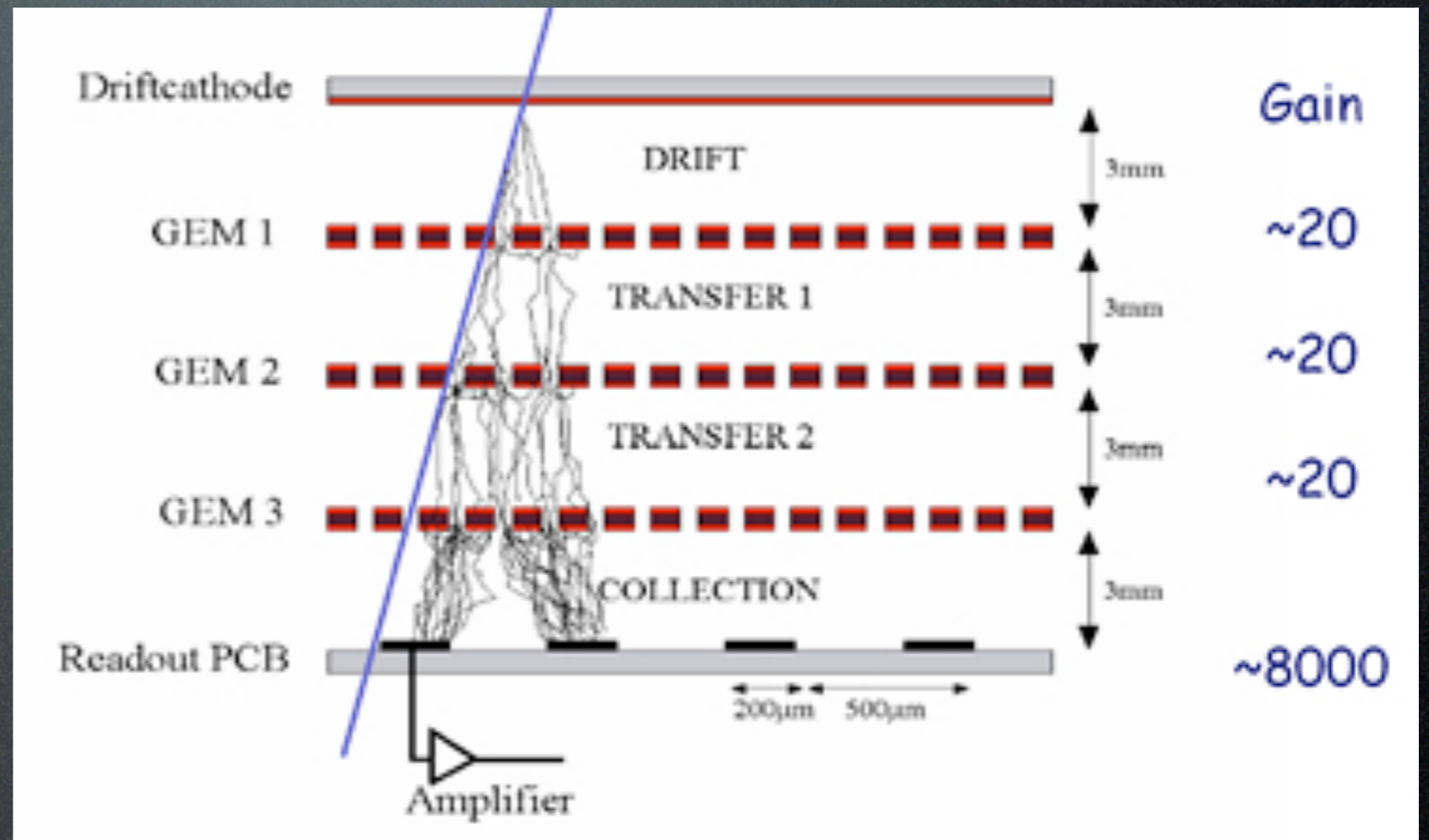
GEM – a bit more realistic response

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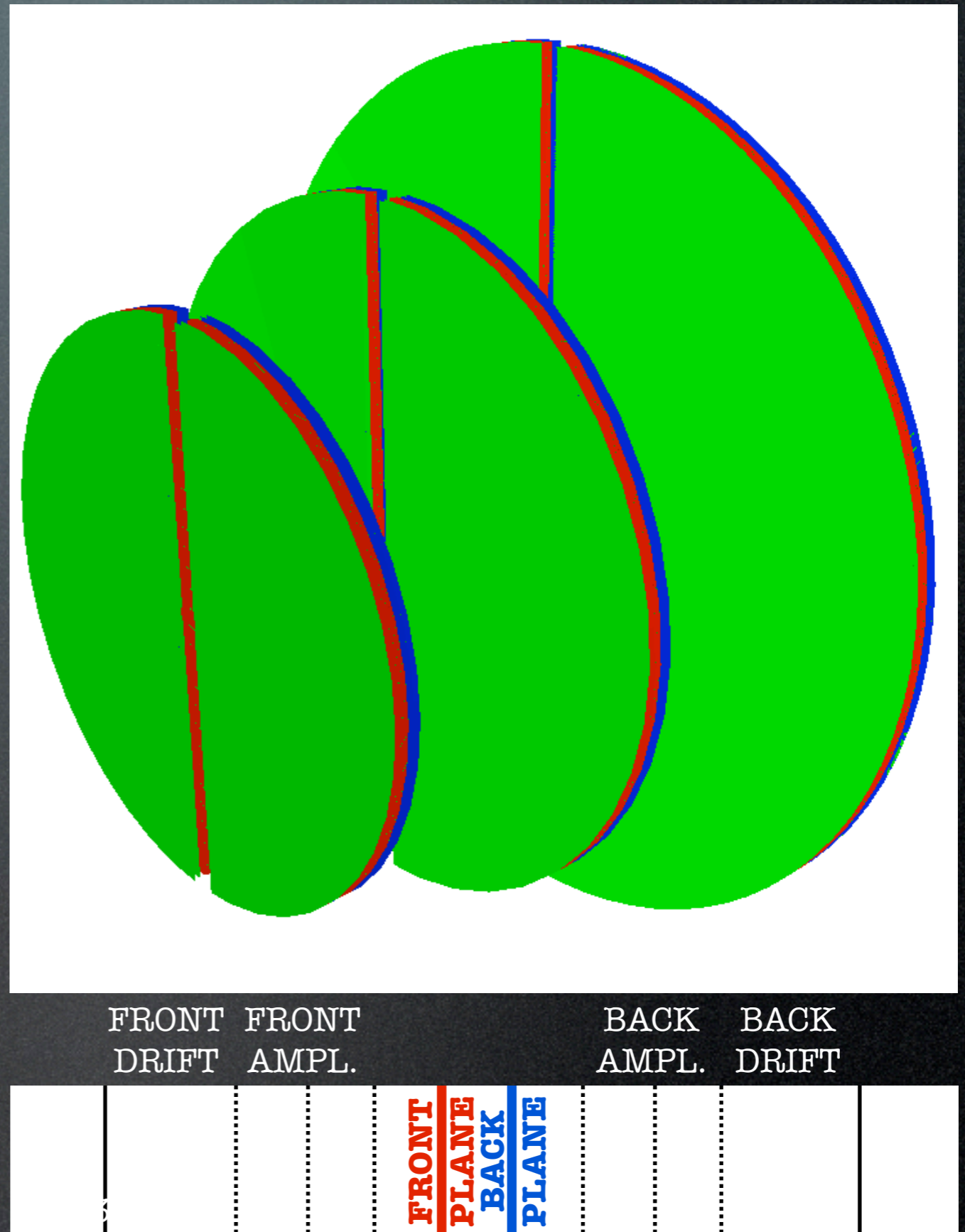
GEM - intro

- GEM - Gas Electron Multiplier
- readout plane divided into strips (200 μm width)
- two different perpendicular strip orientations per readout plane implemented
- records trajectory position



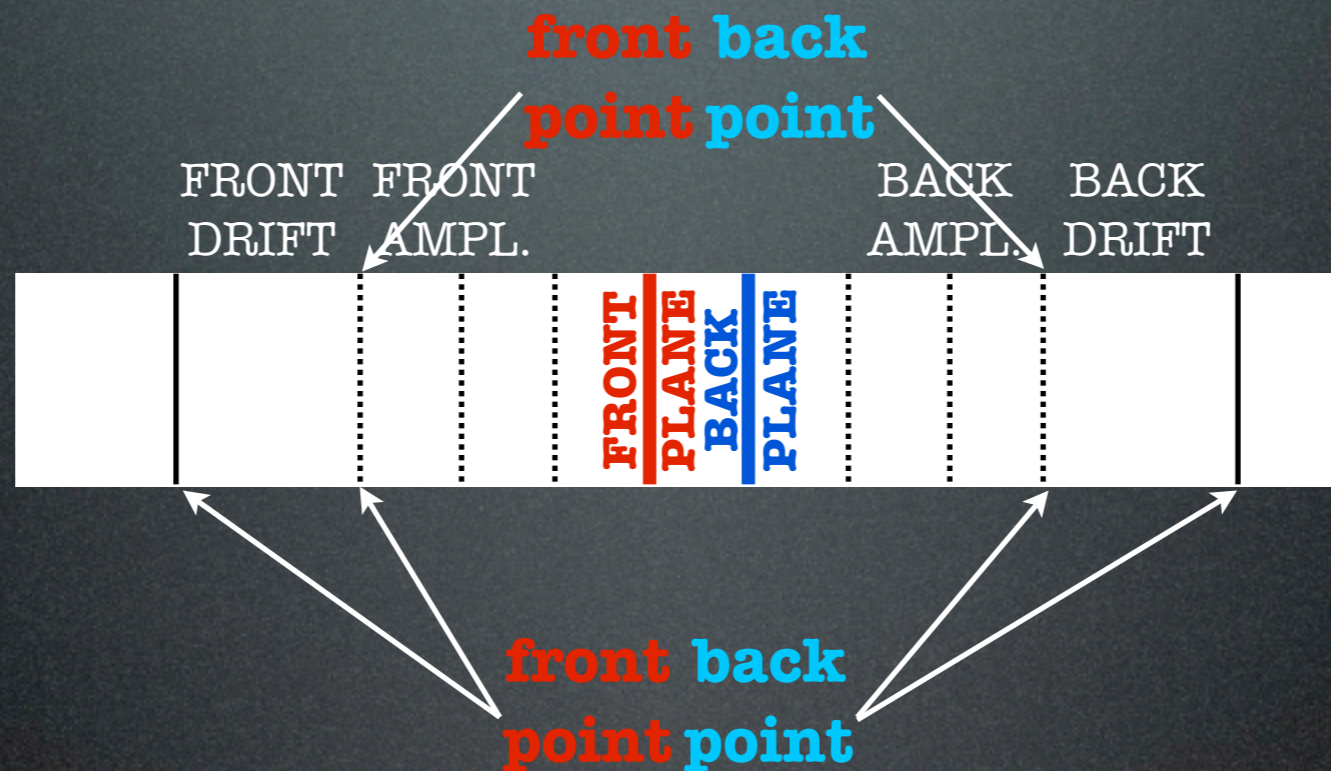
GEM Tracker

- record track position at 3 stations at $z \approx 120, 150, 190 \text{ cm}$
- each station has two drift volumes and two sensitive planes: front and back
(and therefore 4 different strip orientations)



Active drift volumes

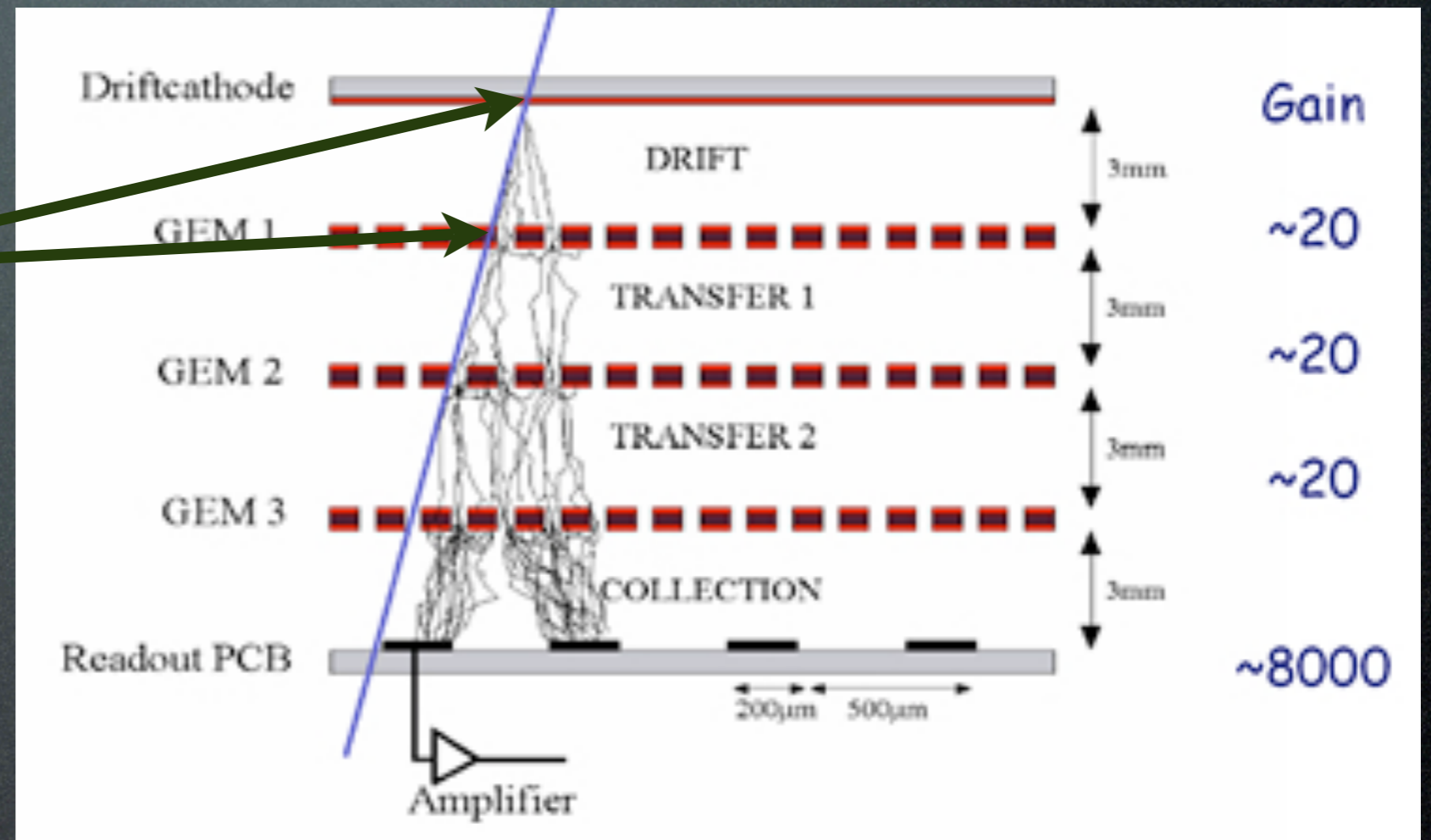
Previous implementation - record MC points position at the outer amplification foils



Current implementation - record MC points positions at the entrance to and exit from the drift volume - it enables better simulation of the signal along the particle trajectory

Realistic digitization

- Recorded positions:
- The drift volume thickness is 1cm



- The particle trajectory in the drift volume can be approximated by a straight line even for small momenta tracks

Realistic digitization

- Previously, for a MC point corresponding strips were fired

```
FireStrips((pnt->GetIn()+pnt->GetOut())/2.);
```

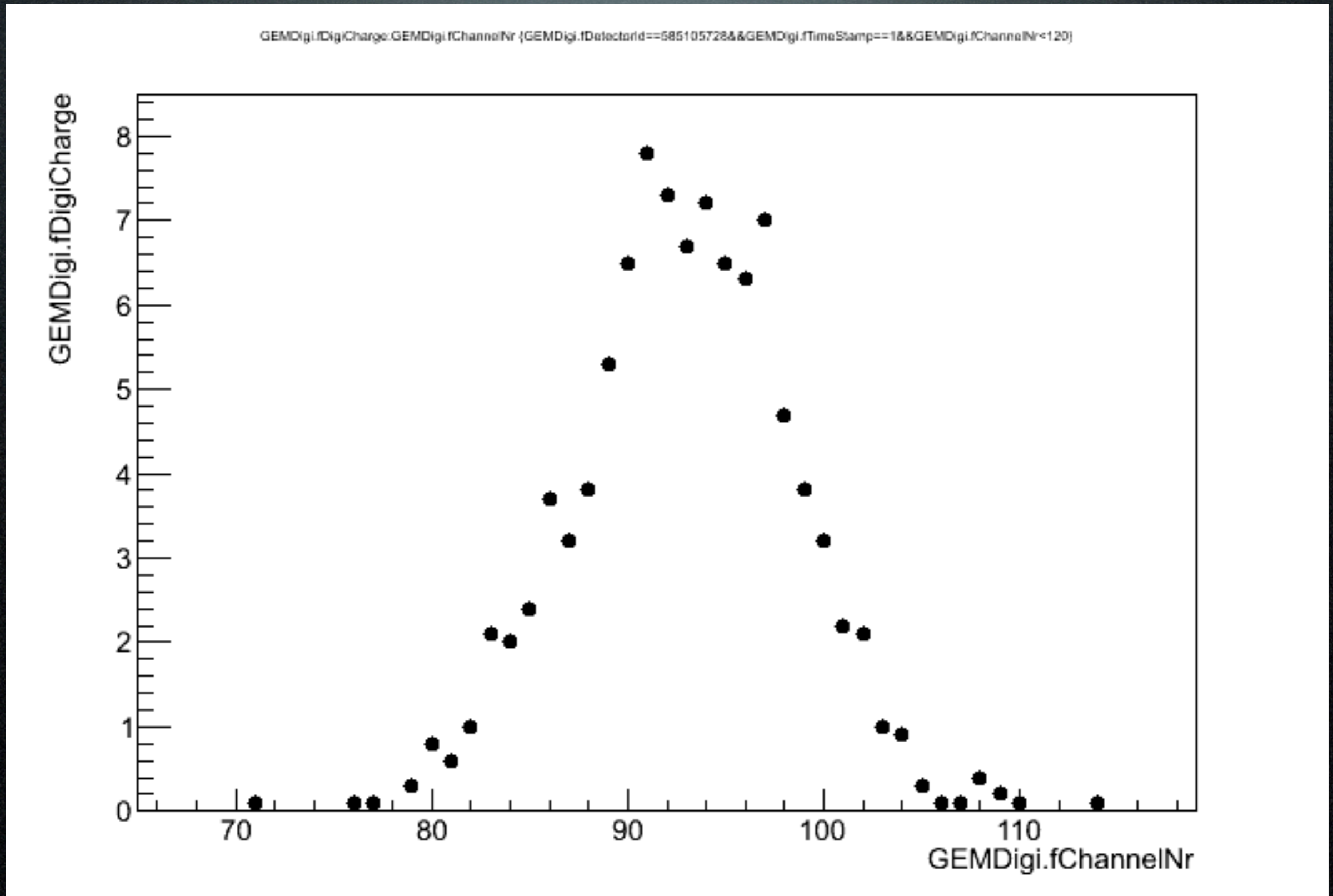
- Currently, a particle trajectory inside the volume is divided into 1000 pieces, and each piece fires strips assuming charge diffusion:

```
for ( Int_t idiv = 0 ; idiv < 1000 ; idiv++ ) {
```

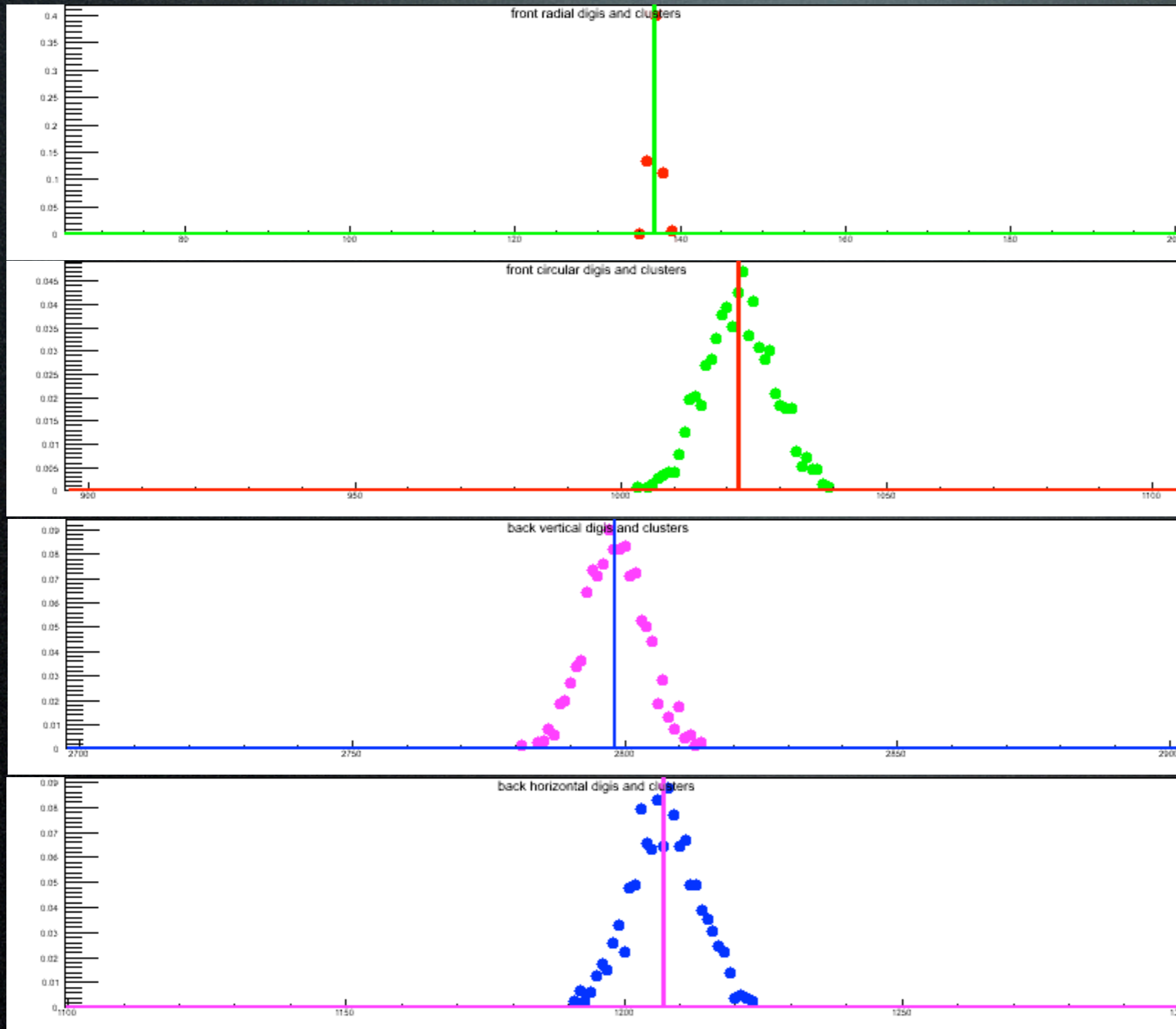
```
    FireStrips(pnt->GetIn()+idiv*(pnt->GetOut()-pnt->GetIn()/1000+Smearing);
```

```
}
```

Realistic digitization, result



Cluster finder

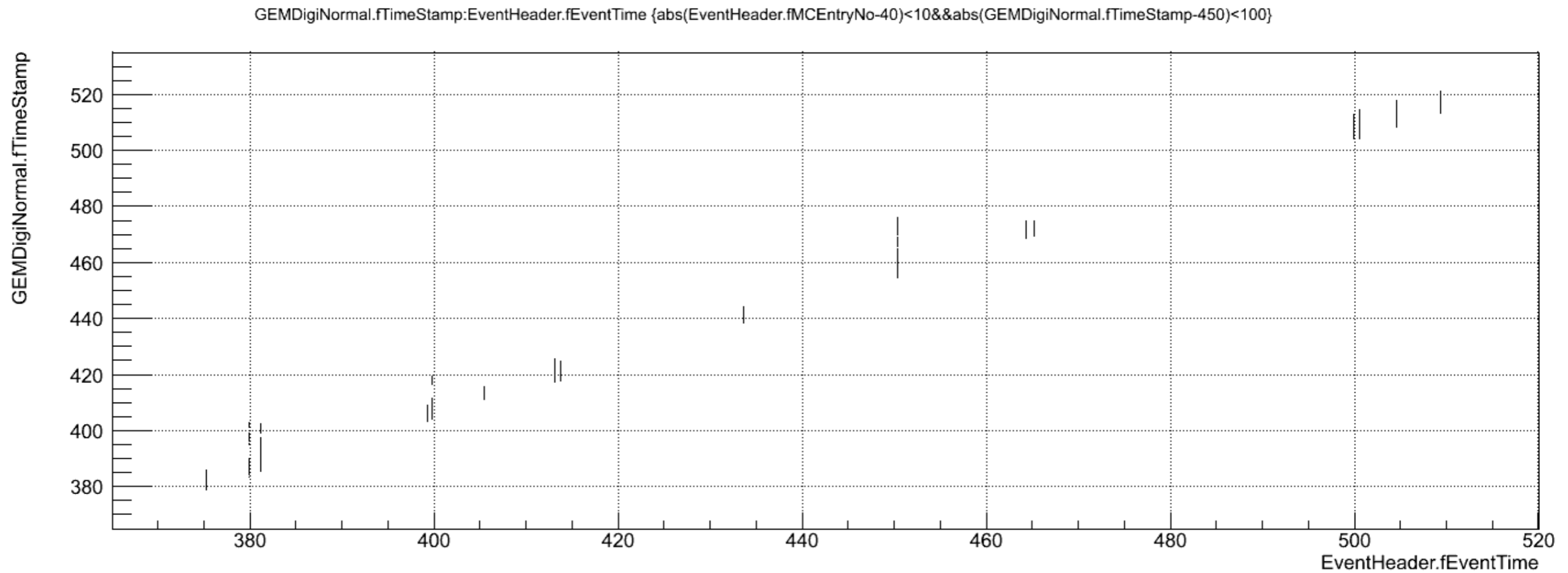


Example of cluster finder results for the different strip views.

Time-based digitization

- The strips are fired with a `fTimeStamp`, which adds up:
 - event time
 - particle tof
 - signal tof to electronics

Time-based digitization



Summary

- The initial version of the realistic detector response implemented including the charge diffusion and time response
- Simplistic clusterization implemented
- Reconstruction still bases on the MC events' structure
- Future: use the time stamp information
- The changes are already in trunk SVN