Update on Wire-Cell TPC simulation for FD

Haiwang Yu (BNL)
for the Wire-Cell Team
Mar 1, 2020

BROOKHAVEN
NATIONAL LABORATORY

raw::RawDigit and sim::SimChannel consistency

Extract *raw::RawDigit* and *sim::SimChannel* from artROOT file using WCT TPC simulation

- also serves as a basic validation

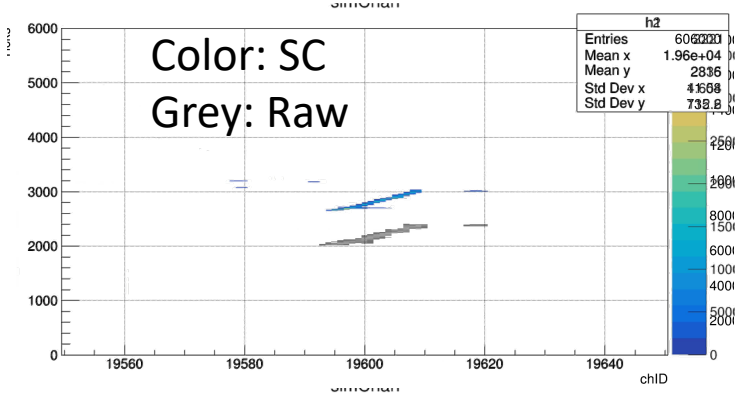
Check *raw::RawDigit* and *sim::SimChannel* consistency

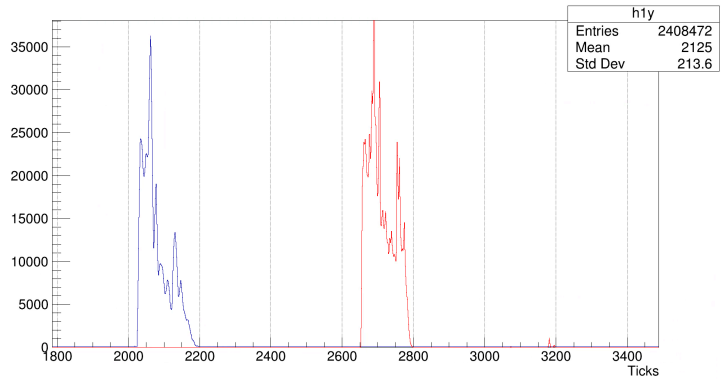
- *sim::SimChannel* is essentially depo rasterization to link depo to waveform
  - used for truth tracing

- Initial configuration has an offset due to inconsistent *G4RefTime* setup
- Fixed this
- and instead of hard coded *G4RefTime*, will use variable from the services_dune.fcl
  - detectorclocks_dune.fcl
    - *dunefd_detectorclocks.G4RefTime*

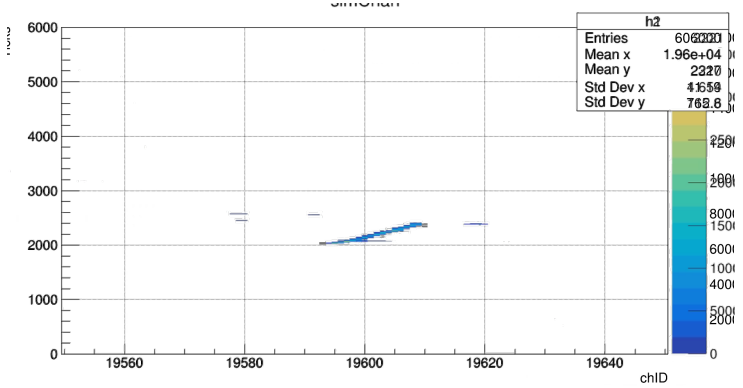
raw::RawDigit and sim::SimChannel consistency

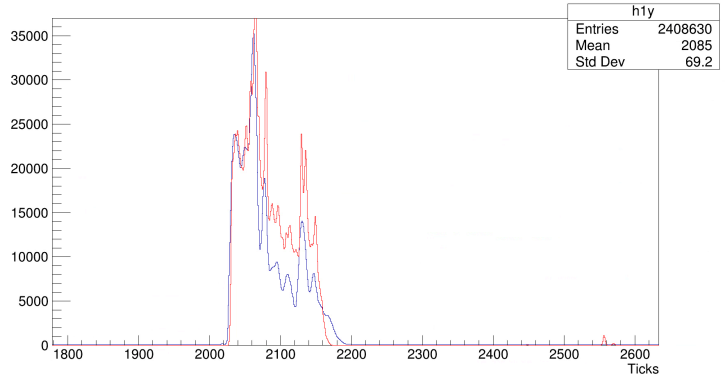
-250 μs





0 μs





Copy configurations to dunetpc

- Wire-Cell configuration: https://github.com/HaiwangYu/wire-cell-toolkit/tree/dune-vd/cfg/pgrapher/experiment/dune-vd
- Needs to be copied to dunetpc/dune/DUNEWireCell in current workflow
- Made a local branch, some issues pushing to redmine remote

```
$git remote -v
origin  ssh://p-build-framework@cdcvs.fnal.gov/cvs/projects/dunetpc (fetch)
origin  ssh://p-build-framework@cdcvs.fnal.gov/cvs/projects/dunetpc (push)
/dune/app/users/yuhw/vd/dunetpc/dune/DUNEWireCell
$git push origin feature/yuhw_wct_vd:feature/yuhw_wct_vd
Enumerating objects: 19, done.
Counting objects: 100% (19/19), done.
Delta compression using up to 4 threads
Compressing objects: 100% (16/16), done.
Writing objects: 100% (16/16), 11.14 KiB | 1.39 MiB/s, done.
Total 16 (delta 5), reused 1 (delta 0), pack-reused 0
error: remote unpack failed: unable to create temporary object directory
To ssh://cdcvs.fnal.gov/cvs/projects/dunetpc
 ! [remote rejected]     feature/yuhw_wct_vd -> feature/yuhw_wct_vd (unpacker error)
error: failed to push some refs to 'ssh://cdcvs.fnal.gov/cvs/projects/dunetpc'
```

FD Horizontal Drift validation

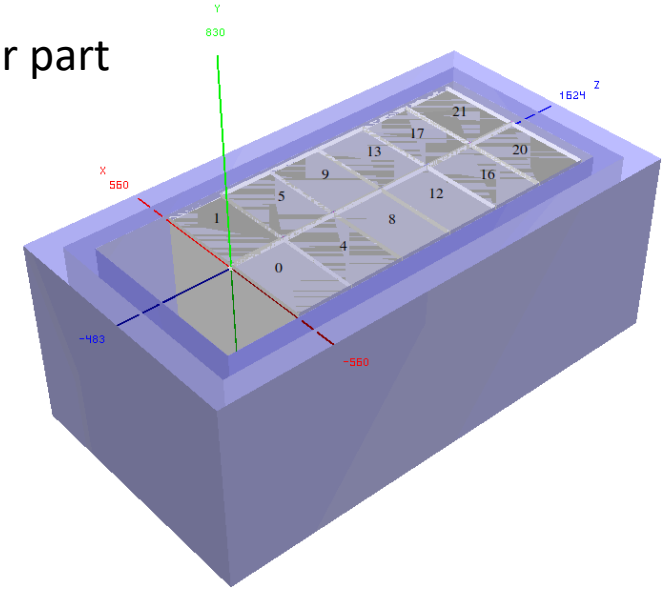
https://cdcvs.fnal.gov/redmine/projects/dunetpc/wiki/DUNE_Geometries#Far-Detector-Workspace-1x2x6-Geometry

WC: APA: 0 - 11

x [-3.6, 3.6]
y [-6, 6]
z [0, 13.9]

pos1: [1.0, 1.0, 2.5]
pos2: [-1.0, 1.0, 2.5]

Lower part



X

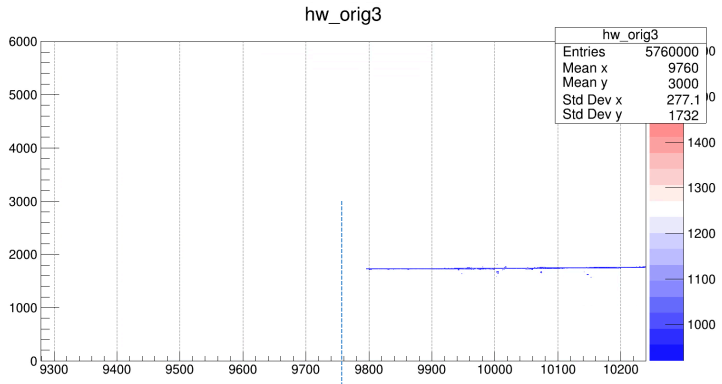
Upper, Y > 0

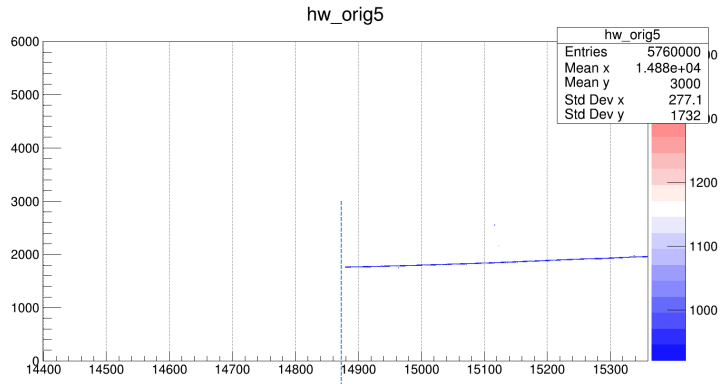
	mu-xp				
1	3	5	7	9	11
	mu-xm				

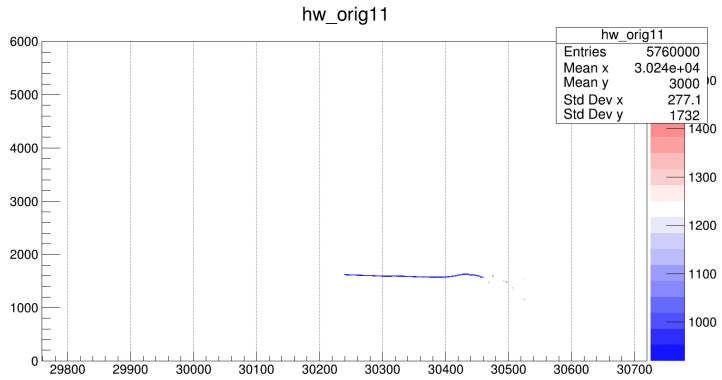
Lower, Y < 0

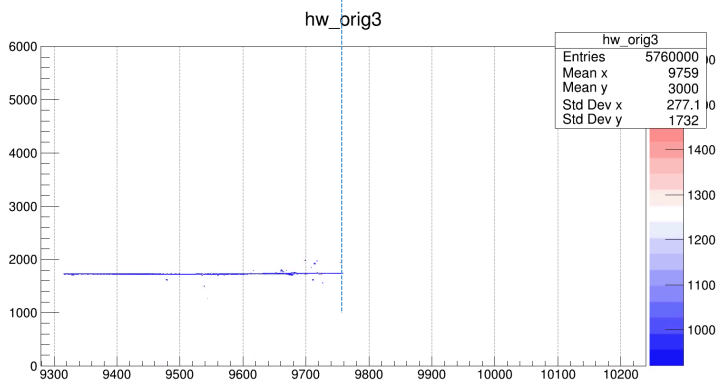
0	2	4	6	8	10

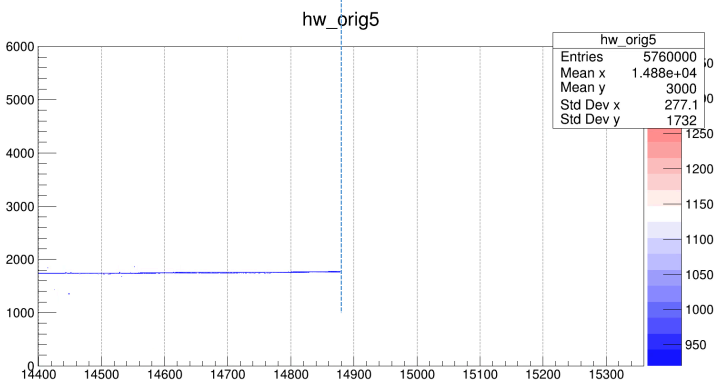
Horizontal Drift validation - W

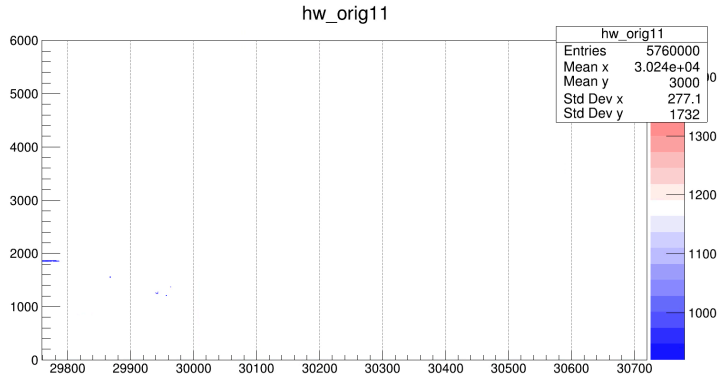




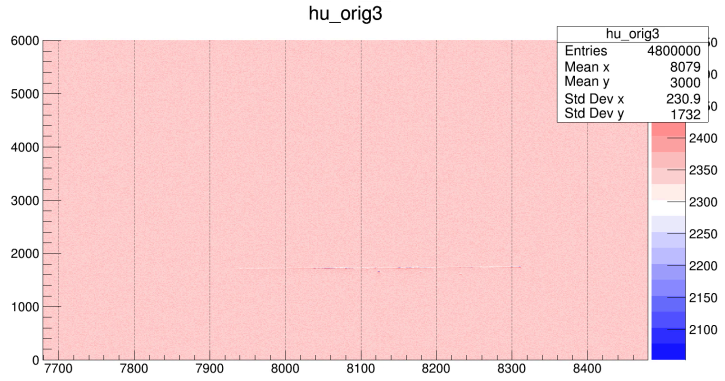


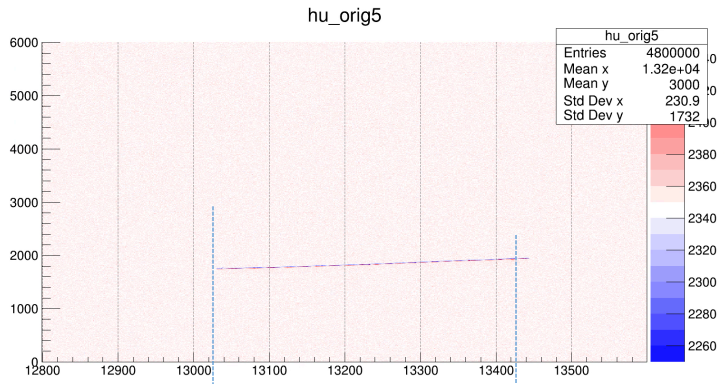


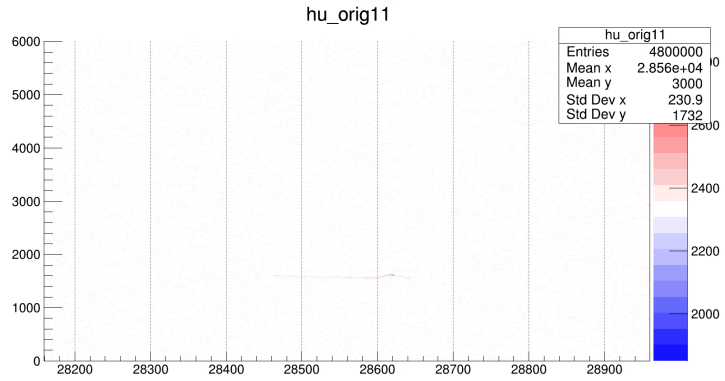


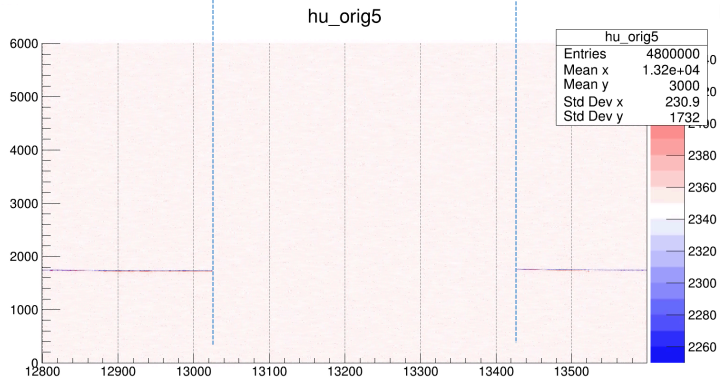


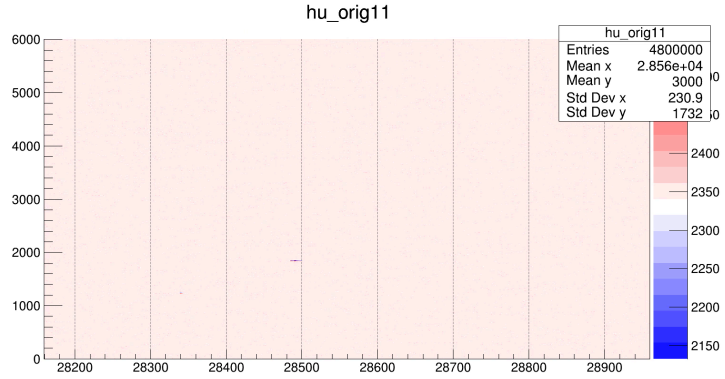
Horizontal Drift validation - U











Next

Working on porting V. Galymov's 3-view geometry

- Should be done in 1-2 weeks

Full chain exercise with gen + g4 steps from VD

- has been hacking to use HD gen and g4

Field response calculations

- 2-view for FD
- 3-view