

dunetpc - Task #24422

CRP sorting for ProtoDUNE DP geometry with vertical drift

05/14/2020 03:45 PM - Vyacheslav Galymov

Status:	New	Start date:	05/14/2020
Priority:	Normal	Due date:	
Assignee:	Vyacheslav Galymov	% Done:	0%
Category:		Estimated time:	0.00 hour
Target version:			

Description

The sorting algorithms used for DP CRPs makes implicit assumptions on the drift direction being along x (horizontal). This needs to be generalized for vertical drift geometry.

```
static bool sortTPCCRM(const TPCGeo& t1, const TPCGeo& t2)
{
    double xyz1[3] = {0.};
    double xyz2[3] = {0.};
    double local[3] = {0.};
    t1.LocalToWorld(local, xyz1);
    t2.LocalToWorld(local, xyz2);
    // First sort all TPCs into same-z groups
    if(xyz1[2]<xyz2[2]) return true;
    // Within a same-z group, sort TPCs into same-y groups
    if(xyz1[2] == xyz2[2] && xyz1[1] < xyz2[1]) return true;
    return false;
}
```

The current TPC ordering for vertical drift is illustrated below:

Total number of TPC 4

TPC C:0 T:0 (301 x 597.03 x 301) cm³ at (150.5,0.015,150)

drift direction (0,1,0) from cathode around (150.5,-298.515,150) through 597.037 cm toward 2 wire planes

maximum wires on any plane: 960

active volume (300 x 597 x 300) cm³, front face at (150.5,-0.015,0) cm;

main directions: width (1,0,0) height (0,1,0) length (0,0,1)

TPC C:0 T:1 (301 x 597.03 x 301) cm³ at (-150.5,0.015,150)

drift direction (0,1,0) from cathode around (-150.5,-298.515,150) through 597.037 cm toward 2 wire planes

maximum wires on any plane: 960

active volume (300 x 597 x 300) cm³, front face at (-150.5,-0.015,0) cm;

main directions: width (1,0,0) height (0,1,0) length (0,0,1)

TPC C:0 T:2 (301 x 597.03 x 301) cm³ at (150.5,0.015,451)

drift direction (0,1,0) from cathode around (150.5,-298.515,451) through 597.037 cm toward 2 wire planes

maximum wires on any plane: 960

active volume (300 x 597 x 300) cm³, front face at (150.5,-0.015,301) cm;

main directions: width (1,0,0) height (0,1,0) length (0,0,1)

TPC C:0 T:3 (301 x 597.03 x 301) cm³ at (-150.5,0.015,451)

drift direction (0,1,0) from cathode around (-150.5,-298.515,451) through 597.037 cm toward 2 wire planes

maximum wires on any plane: 960

active volume (300 x 597 x 300) cm³, front face at (-150.5,-0.015,301) cm;

main directions: width (1,0,0) height (0,1,0) length (0,0,1)

Total number of channel wires = 7680

Currently the two fully active ProtoDUNE DP CRPs are on the positive x side, so in this scheme 0, and 2. To be consistent with the convention already used for the rotated-drift ProtoDUNE DP geometry (where the active CRPs are 1 and 3 ([Bug #24419](#))) in order to preserve compatibility with the channel data representations for both geometries after unpacking raw DAQ data, propose that the CRPs on positive x side should be 1 and 3.