

# Change to geometry code affecting some drift distance calculations

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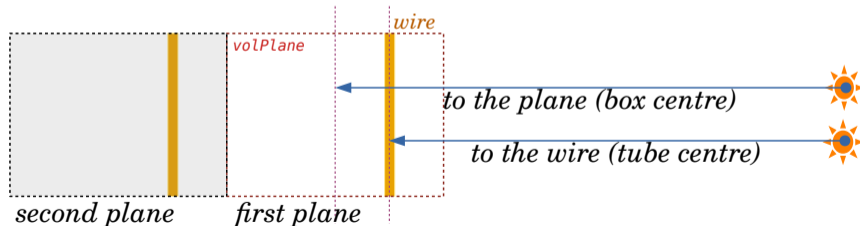
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# One-slide explanation of the change

- wire plane in GDML is its own volume
  - box sized — quite thick for a plane
  - *contains* the volumes of the wires
- wires must be placed *somewhere within* the wire plane box
- `geo::TPCGeo::PlaneLocation()` reports the *center* of the box
- LArG4 **associates** use it to determine drift distance

The latter is correct only if wires happen to lie on the median plane of the plane box.



- I have discovered the issue (now [#22431](#)) looking at ArgoNeuT geometry
- if wires lie in the middle of the wire plane box, not a problem  
(*e.g. not a problem for DUNE 10kt geometry, it seems*)
- otherwise, still not a big deal (what's 2 mm of drift among planes?)
- fix to `geo::TPCGeo::PlaneLocation()` was directly put into `develop`  
(and I was chastised for that, since it makes hard to trace back changes)
- nevertheless I consider `geo::TPCGeo::PlaneLocation()` *deprecated*; better options:
  - `geo::PlaneGeo::GetCenter()`: less fragile
  - `geo::TPCGeo::DistanceToReferencePlane()`, `geo::PlaneGeo::DriftPoint()`,  
`geo::PlaneGeo::DistanceFromPlane()`: drift-direction aware
- in fact, can we *officially deprecate it*?

## Other stuff I recently pushed

- added utility functions `util::counter()`, `util::zip()`, `util::enumerate()`
  - reminiscent of the Python equivalent functions
  - documented in [Doxygen](#)
  - one day they will be made obsolete by `range` library...
- added `TickLabel` option to `raw::OpDetWaveforms` dumper module, to dump **the time of each sample** in the waveform:

```
The event run: 1 subRun: 23 event: 1 contains data for 3520 optical detector channels
A pedestal of 8000 counts will be subtracted from all ADC readings.
  on channel #0 (time stamp: 127.916): 2636 time ticks
  content of the channel (20 ticks per line):
    0 | 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
      | [ ... repeated 23 more times ]
  480 | 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 -1 -1 -1 -4 -9
  500 | -11 -10 -9 -8 -6 -5 -3 -2 -2 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1 0
```

- deprecated for removal an obscure data product proxy method (`getIf()`) that nobody uses (for a reason); [Doxygen example](#) also shows how to update the code