



Geometry Updates

Brian Rebel
June, 2011

Geometry Reorganization



- We needed to reorganize the Geometry package to account for experiments with multiple TPCs/drift volumes, ie LBNE
- Fairly straightforward to do conceptually - make the Geometry object hold a list of TPCGeo objects, TPCGeo objects hold a list of PlaneGeo objects, everything else stays the same
- Basically insert one layer between Geometry and PlaneGeo objects
- Guiding principal is to “do no harm” to currently coded algorithms and methods, so many of the Geometry methods that took plane and wire number arguments have another tpc argument added to the list with a default of 0 (ie a 1 TPC experiment)



Organization in Block Form



Geometry

TPCGeo

PlaneGeo

WireGeo

WireGeo

WireGeo

PlaneGeo

WireGeo

WireGeo

WireGeo

TPCGeo

PlaneGeo

WireGeo

WireGeo

WireGeo

PlaneGeo

WireGeo

WireGeo

WireGeo

Changes You Might Notice



- Implemented some exception throwing, specifically for methods that attempt to locate the nearest channel to a point in space
- `Geometry::ChannelToPlaneWire()` now has to have a TPC argument, already fixed throughout the code
- TPCGeo object can now provide the dimensions of the TPC and the active volume in the TPC
- Geometry provides the dimensions of the cryostat

Topic Change: Random Number Generator



- Changed code from using TRandom3 to using the art::RandomNumberGenerator service to pull random numbers
- Somewhat out of date description of the service is linked on the wiki (uses fw-speak, but translation is relatively easy)
- Each module can have its own random number engine(s), state of the engine is tracked by the provenance facilities of ART
- Initial seed for each engine is chosen using the system rand() function
- Random number interface is through CLHEP objects and the service
- All instances of TRandom have been removed from the code except in EventGeneratorBase - GENIE uses its own ROOT generator, still working on CRY
- Unintentional benefit - several cases where gRandom was being reset in different modules making repeatability unlikely