



MarlinTPC Reconstruction

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A horizontal dotted line in a light yellow-green color runs across the bottom of the slide, mirroring the one at the top.



Overview

- Current trunk: ~v00-05-01
 - **Some changes in my branch need to be committed**
- Processors
 - **What is complete**
 - **What needs work**
- Changes to the MarlinTPC directory structure
- Event display



The TPC Data Model

- Goal is to have a general “algorithm” for reconstruction physics objects
 - What I have been using:

```
<execute>
  > <processor name="MyAIDAProcessor" />
  > <processor name="MyConditionsProcessor" />
  > <processor name="MyGlobalFieldProcessor" />
  > <processor name="MyTrackerRawDataToDataConverter" />
  > <processor name="MyPedestalSubtractor" />
  > <!--processor name="MyLinearityCorrector" /-->
  > <!--processor name="MyTimeShiftCorrector" /-->
  > <processor name="MyPulseFinder" />
  > <processor name="MyGainCorrectorProcessor" />
  > <processor name="MyCountsToPrimaryElectronsProcessor" />
  > <processor name="MyHitFinder" />
  > <processor name="MyTrackSeeder" />
  > <processor name="MyTrackFitterLikelihood" />
  > <processor name="MyHepRepOutput" />
  > <processor name="MyLCIOOutputProcessor" />
</execute>
```



AIDA, Conditions Processors

- AIDAProcessor creates a directory structure for storing histograms, etc
 - **Worked with JAIDA (last time I tried it)**
 - **Works with RAIDA (just tried it)**
 - But the tuple format for RAIDA is different
 - Bad: int a, b,c
 - Good: int a, int b, int c
- ConditionsProcessor
 - **Gets LCCD from a variety of sources**
 - **SimpleFileHander: conditions in a separate file**
 - **DataFileHander: conditions in the data file**



GlobalFieldProcessor

- Works for a limited number of field types
 - **Some field maps from Mokka**
- Very easy to use for uniform field
 - **GEARBField just returns the field information from GEAR**
- Very hard to use otherwise
 - **Download field map information from Mokka database**
 - **Put data in an Icio file**
 - **Make sure that a class exists for the map type**
- A consistent field data format would be nice
 - **Maybe a Mokka plugin?**



ChannelByChannel/Pedestal

- ChannelByChannelCorrector
 - Doesn't exist yet
 - A method of describing these “non-gain” electronic corrections doesn't exist
- PedestalSubtractor
 - Gets pedestal information from LCCD
 - Subtracts pedestal
 - Preserves overflow
 - Doesn't check for polarity
 - Is this ok? Will negative polarity have a negative pedestal?



Linearity/TimeShift

- **LinearityCorrector**
 - **Doesn't exist**
 - **A method of describing non-linear FADC corrections doesn't exist**
 - **Processor parameter might work, LCCD is better**
- **TimeShiftCorrector**
 - **Gets time offsets from LCCD**
 - **Tries to make changes “in place”**
 - Not so good, violates LCIO data model



PulseFinder

- Gets pedestals, electronics parameters from LCCD
- Valid pulses are parameterized by
 - **Start/End threshold**
 - **Minimum length/height**
- Splits pulses
- Tags for overflow, double-pulse candidate
 - **Anomalous-shaped might need a better description, what is underflow?**
- Tested for positive pulses
 - **Not for negative, maybe someone else has?**



PulseFinder continued...

- Two methods of calculating pulse time
 - **Derivative method (default)**
 - Looks like a weighted measure of the derivatives
 - **Parabolic fit**
 - Finds the max/min bin
 - Fits a parabola to the log of the surrounding bins
- Two methods of calculating the pulse charge
 - **Integrated (default)**
 - Sums up the bins
 - **Pulse height**
 - Just return the max/min bin



GainCorrector/CountsToPrimary

- GainCorrector
 - **Retrieves the gain from LCCD**
 - Not really, it uses `getChannelCalibrationFactor(0)`
 - Perhaps a new method should be added:
 - `ChannelCorrection::getChannelGain()`
- CountToPrimaries
 - **Gets TPCConditions from LCCD**
 - Removes the TPC amplification by dividing by `_tpc_conditions->getAmplification()`



Directory Change / Event Display

- Maybe put all of the LCCD handler classes in another folder
 - **src/reconstruction/ConditionHandlers**
- Event Display
 - **HepRep works ok**
 - Can't fill in polygons with Wired plugin (HepRApp works)
 - Tracks can't be drawn in the LCIO parameterization
 - Line segments works
 - **Other options**
 - CED
 - Eve?