

Proposed Optical Reconstruction Updates

Analysis Tools Meeting
Nov. 8, 2016

H. Greenlee

The Trigger Data Product

- Larsoft owns the shared trigger data product.
 - Class `raw::Trigger`.
 - `#include "lardataobj/RawData/TriggerData.h"`
- Class data members.

```
unsigned int fTriggerNumber; ///< Trigger counter
double      fTriggerTime;   ///< Trigger time w.r.t. electronics clock T0
double      fBeamGateTime;  ///< BeamGate time w.r.t. electronics clock T0
unsigned int fTriggerBits;   ///< Trigger bits ... dedicated bit-by-bit function available
```

Trigger Data Product Creation

- The trigger data product would typically be included in artroot format raw data (real data or mc).
- To my knowledge, there is no shared code that actually fills this data product.
 - That is, code that fills the trigger data product is experiment-specific.
 - In case of MicroBooNE, trigger data product is filled by swizzler (for real data), based on information in binary event record, or by a MicroBooNE-specific trigger simulator producer module (for mc).

Trigger Data Product Usage

- There is a currently some shared code that uses this data product, in larana package.
 - larana/OpticalDetector/OpHitFinder/OpHitAlg.cxx.
 - Called from OpHitFinder module.
 - larana/OpticalDetector/OpFlashAlg.cxx.
 - Called from OpFlashFinder module.

Proposed Change

- Currently, OpHitAlg.cxx and OpFlashAlg.cxx are setting the time of optical hits and flashes relative to the beam gate time data member (fBeamGateTime) of raw::Trigger.
- MicroBooNE would like to change OpHitAlg.cxx and OpFlashAlg.cxx to set the time of hits and flashes relative to the trigger time (fTriggerTime).
- Up to now, the MicroBooNE swizzler has been filling fBeamGateTime and fTriggerTime with the same value. Now we want to fill fBeamGateTime with something else.

Code Status

- Proposed changes are committed on a branch v05_07_00_br (branched off of tag v05_07_00).
 - Released as larana version v05_07_01 (a dependent of larsoft patch release v05_08_00_01).
 - Not merged to develop.

Questions, Comments

- Are any other experiments using OpHitAlg.cxx and OpFlashAlg.cxx?
 - I think the answer is yes, since some DUNE people have touched the code.
- How are other experiments filling fBeamGateTime and fTriggerTime? Are they different?
- In general, it probably makes more sense to calculate the time of optical hits and flashes relative to the trigger time as opposed to the beam gate time, since some experiments, or some triggers, may not even have a beam gate.