PLAN TO ADD A DATA PRODUCT T0

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Need for a T0 data product

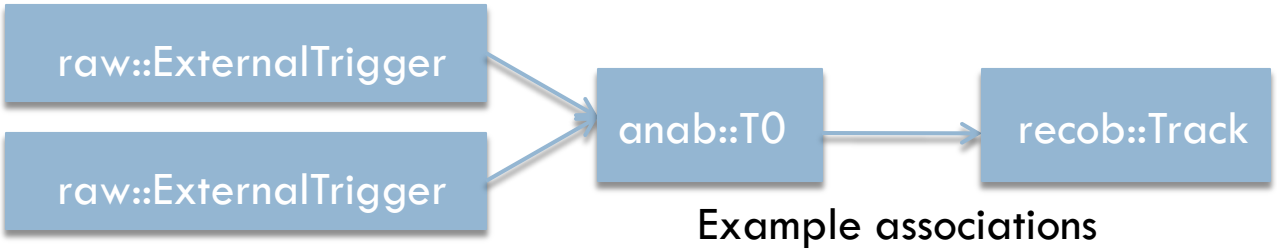
- Current reconstruction is designed around beam events where there is a known interaction time.
- In the 35 ton, for supernovae and proton decay there will be no known initial interaction time.
- Cosmogenics can also be used for calibration for existent experiments.
- To be able to reconstruct these events you need to be able to feed information from other sources (such as photon counters or scintillation counters) into reconstruction.
- This requires a new data product which links reconstruction with these measurements.
  - The data product can be used to correct x coordinate in 3D reconstruction and correct for electron lifetime in calorimetry.

Structure of the data product I

- It is currently residing in a feature branch of lardata before being merged with develop subject to approval;
  - feature/php13tkw_T0
  - https://cdcvs.fnal.gov/redmine/projects/lardata/repository/entry/AnalysisBase/T0.h?rev=feature%2Fphp13tkw_T0
- New files T0.cxx, T0.h and modified classes.h, classes_def.xml.
- T0 has public attributes;
  - double fTime (T0 of event)
    - Need to agree on a unit (ns?)
  - Unsigned int fTriggerType (Type of trigger used)
    - Can be photon detectors, scintillator counters or MC truth
  - Unsigned int fTriggerBits
    - Can specify counter coincidences, etc.

Structure of the data product II

- T0 has been written to have associations with;
  - Recob::Track,
  - Recob::Shower,
  - Recob::OpFlash, (Photon detectors)
  - Raw::ExternalTrigger (External muon counters)
- Accessed with anab::T0
- Filling anab::T0s using MCTruth or counter information is underway in 35t.



Example associations