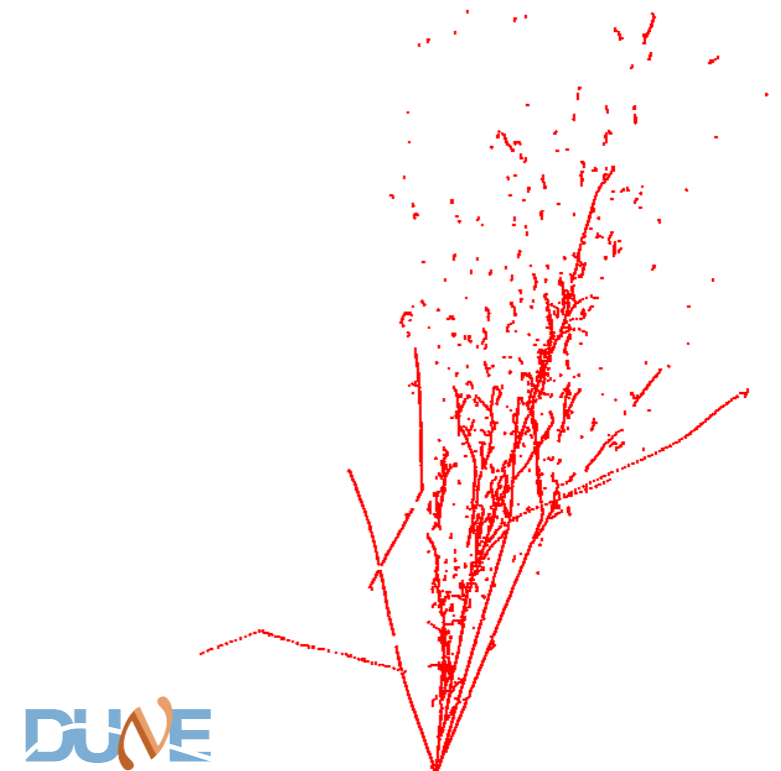


Pandora Updates

LArPandoraContent v03_13_00
using Pandora v03_11_00

L. Escudero for the Pandora Team
LArSoft Coordination Meeting
June 19, 2018





PFParticleMetadata

- **As requested by MicroBooNE and ProtoDUNE, we now persist the in-Pandora scores for each particle for:**
 - **i) neutrino/testbeam (vs. cosmic ray) - “NuScore” or “BeamScore”**
 - **ii) track (vs. shower) for MicroBooNE - “TrackScore”**
- New data product, `larpandoraobj::PFParticleMetadata`, and association, for each PFParticle.
- Right now, it’s a map from `std::string` key to `float` value, but plans for increased use in allowing in-LArSoft use of different Pandora reconstruction hypotheses.
- Requires the updated pandora external product, `v03_11_00`, to hold the information whilst in Pandora.
- Added example of use in: [LArPandoraAnalysis/ConsolidatedPFParticleAnalysisTemplate_module.cc](#)

```
pandora..... | art::Assns<recob::PFParticle, larpandoraobj::PFParticleMetadata, void>.... |
pandora..... | std::vector<larpandoraobj::PFParticleMetadata>... |
```

**Experiments affected: all
(uboone, DUNE, protoDUNE)**

Example output:

```
Found PFParticle 11 with:
- NuScore = 0.0357866
Found PFParticle 22 with:
- TrackScore = 0.93541
```

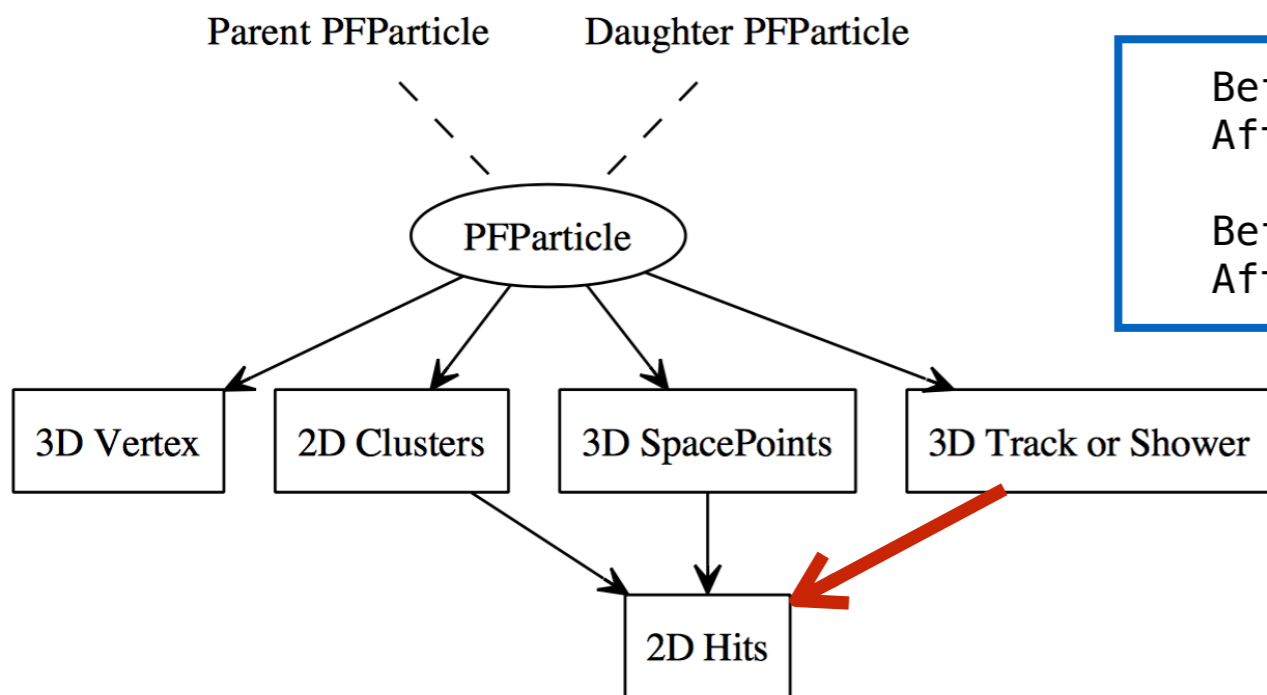


Track/Shower → Hit Associations

- **With help from Giuseppe, Kirsty, Adam and Vito, dug into unexplained changes in reported track completeness. Changes not observed inside Pandora (well tested), so suspicion lies with LArSoft ↔ Pandora translation steps.**
- **Discovered that Track/Shower to hit association were done via SpacePoints, only associating “quality hits” successfully used in the creation of a 3D SpacePoint, missing some hits also associated to the original object.**
- **Now associations formed by via Track/Shower → PFParticle → Clusters → Hits (recommended route). LArPandora change increases number of reported Track/Shower → Hit associations. Expected to improve completeness reported when using directly Track/Shower → Hit associations**

Example event eventdump

Before		art::Assns<recob::Shower, recob::Hit, void>		824
After		art::Assns<recob::Shower, recob::Hit, void>		846
Before		art::Assns<recob::Track, recob::Hit, void>		13062
After		art::Assns<recob::Track, recob::Hit, void>		14033



Note: No changes in PFParticles → Hits!

**Experiments affected: all
(MicroBooNE, DUNE, protoDUNE)**

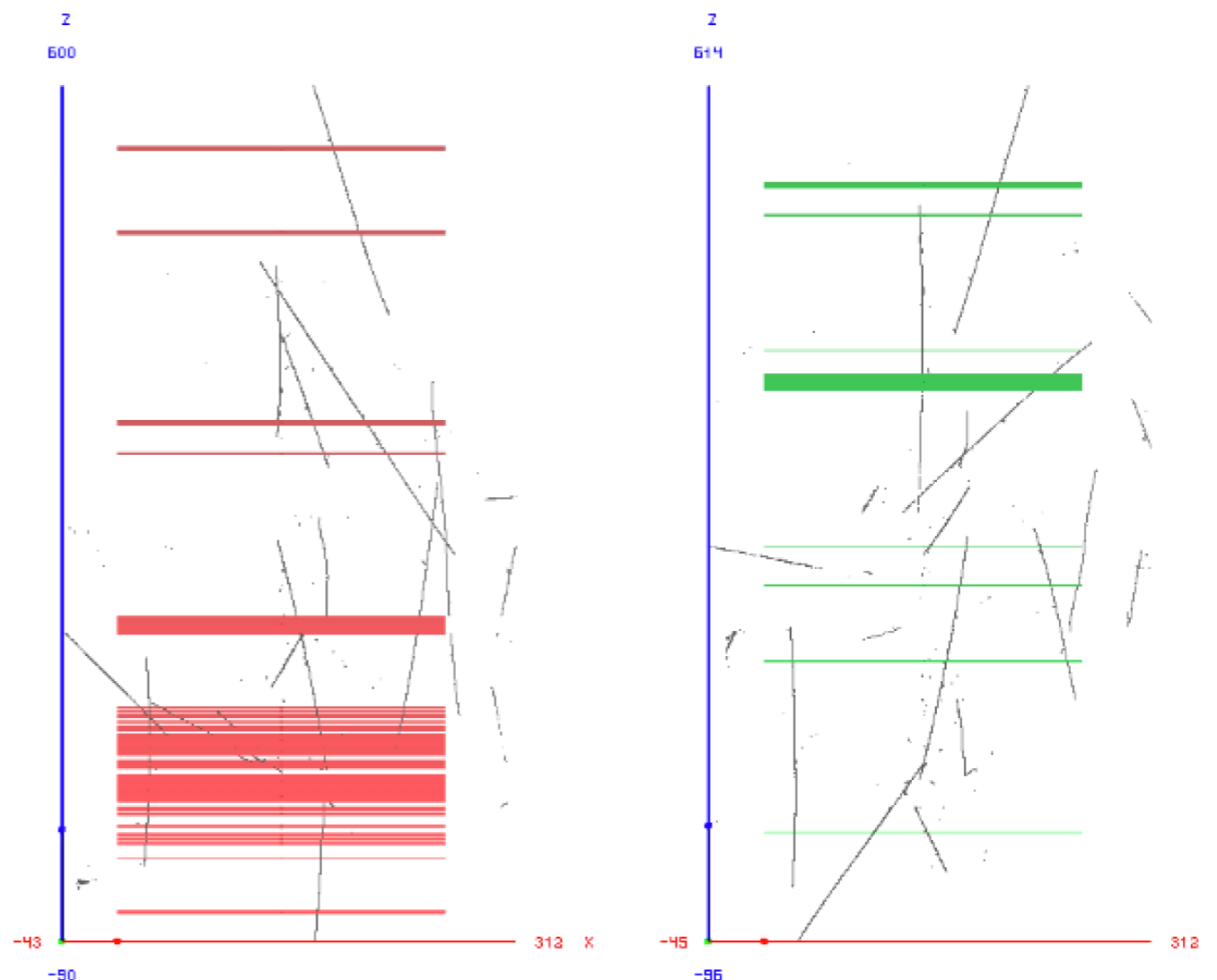


Detector Gaps

- **Further digging into LArSoft ↔**

- **Pandora translation yielded likely origin of change in track completeness for MicroBooNE:**

- Discovered that wire-gap treatment had effectively been disabled.
- Issue stems from point at which gap info passed to Pandora worker instances:
 - ChannelStatusService not available during initialisation step.
 - Now ensure all information extracted at start of processing first event.
- Affects detectors with registered bad channel status in DB (MicroBooNE only?)



- **A couple of other small changes:**

- Exception handling improvement in ProtoDUNE test beam particle identification tool.
- Cheating reco chain functional again, as requested by James Pillow, working on shower energy estimation.



Requests for this week

[pandora](#)

Please make v03-11-00 available as an external

[larpandoracontent](#)

Please merge feature/Pandora_v03_11_00

[larpandora](#)

Please merge feature/Pandora_v03_11_00

- There are no .fcl or .xml changes

Thanks!
Any questions?