

Reco. Meeting Follow-up

<https://sbn-docdb.fnal.gov/cgi-bin/sso/ShowDocument?docid=39017>

Summary

wire-cell-toolkit ready to run

- Xin validated all functions except for the “clustering_neutrino”
- Brett is working on fixing the IO part for “clustering_neutrino”

configuration ready to run for SigProc (artROOT) -> img -> clus

- some cleanup needed before merging

working on CookedFrameSource

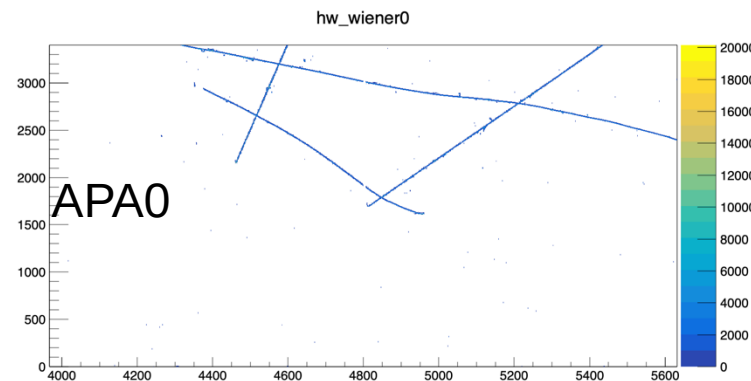
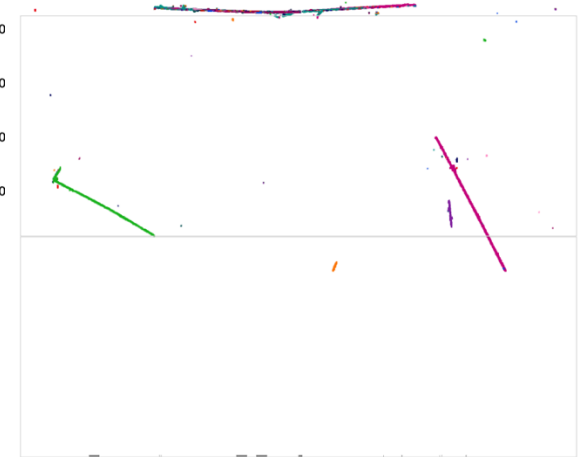
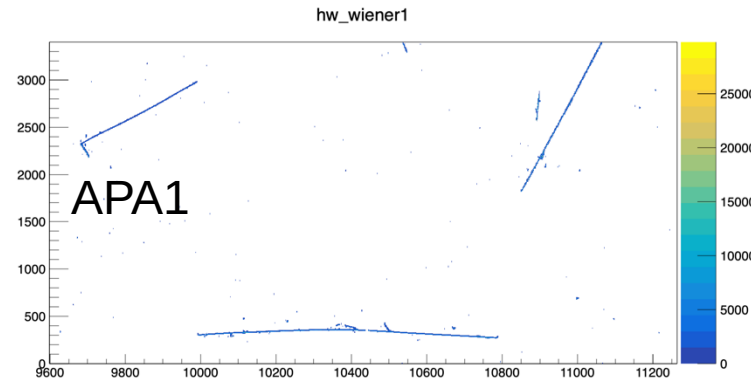
CookedFrameSource needs works:

- refactor to take more general inputs
 - traces: recob::Wire
 - summary: vector<double>
 - mask: int
- plan:
 - frame_tags: ["orig"],
 - recobwire_tags: ["sptpc2d:gauss", "sptpc2d:wiener"],
 - trace_tags: ["gauss", "wiener"],
 - summary_tags: ["", "sptpc2d:wienersummary"],
 - mask_tags: ["sptpc2d:badmasks"],
- what is “badchannles”?

Data	WCLSre.....	sptpc2d.....	wiener.....	std::vector<recob::Wire>.....	11276
	WCLSre.....	sptpc2d.....	badmasks.....	std::vector<int>.....	..264
	WCLSre.....	sptpc2d.....	wienersummary.....	std::vector<double>.....	11276
	WCLSre.....	sptpc2d.....	dnnspsbadchannels.....	std::vector<int>.....	0
	WCLSre.....	TriggerResults		art::TriggerResults.....	1
	WCLSre.....	sptpc2d.....	gauss.....	std::vector<recob::Wire>.....	11276
	WCLSre.....	sptpc2d.....	badchannels.....	std::vector<int>.....	...88
	WCLSre.....	sptpc2d.....	dnnspsbadmasks.....	std::vector<int>.....	0
	WCLSre.....	sptpc2d.....	dnnsps.....	std::vector<recob::Wire>.....	11276

Example of SigProc -> imaging

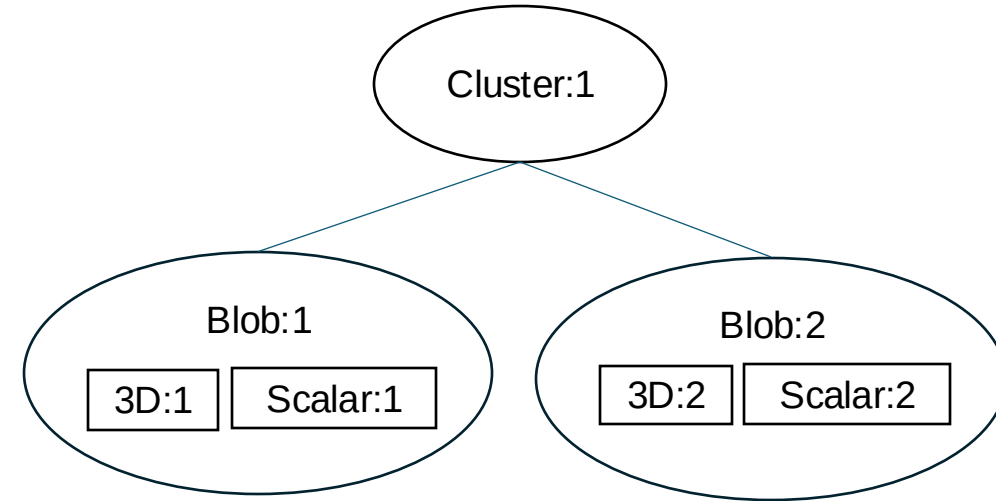
- Example showing SigProc vs. imaging
 - SBND run 14737, event 279
 - Thanks to Lynn and Moon for preparing the data!
 - showing imaging projection roughly makes sense (e.g., x-offset)
 - color coding indicates clustering results from blob boundary overlapping
 - **tracks not fully clustered!**
- More on imaging refer to Ewerton's related talks



Software porting of MicroBooNE clustering

New data structure **PointCloudTree** to reduce memory usage

- Cluster::3D() ~ a view from 3D PointCloud in all children, no copy needed
- Use **Facade** to realize traditional operations
- Utilities to convert PointCloudTree to **ITensorSet**
 - A general interface
- Developed by Brett. Very new concept to me.



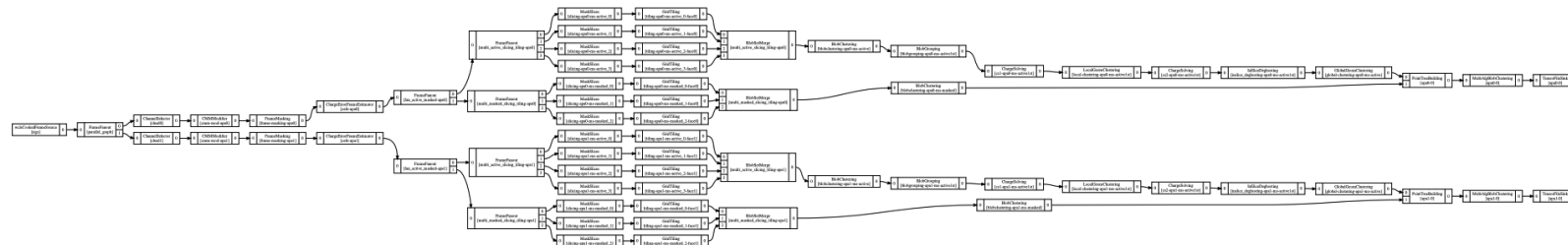
Translated thousands of lines of MicroBooNE code - Haiwang

Code review manually and using LLM - Xin

Validated using same MicroBooNE events - Xin

- Converter made - Brett

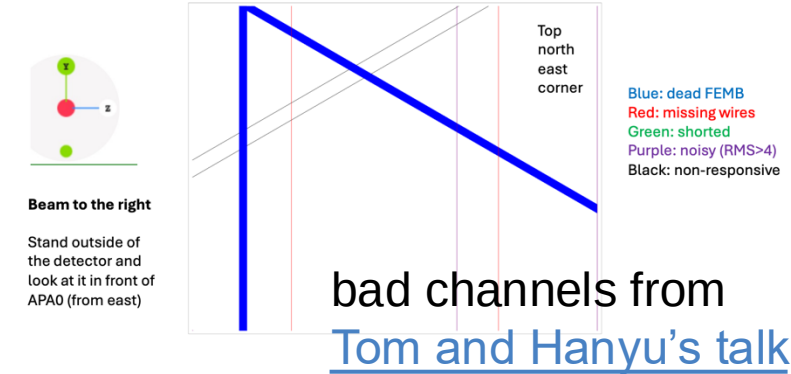
Based on **Ewerton's** imaging developments



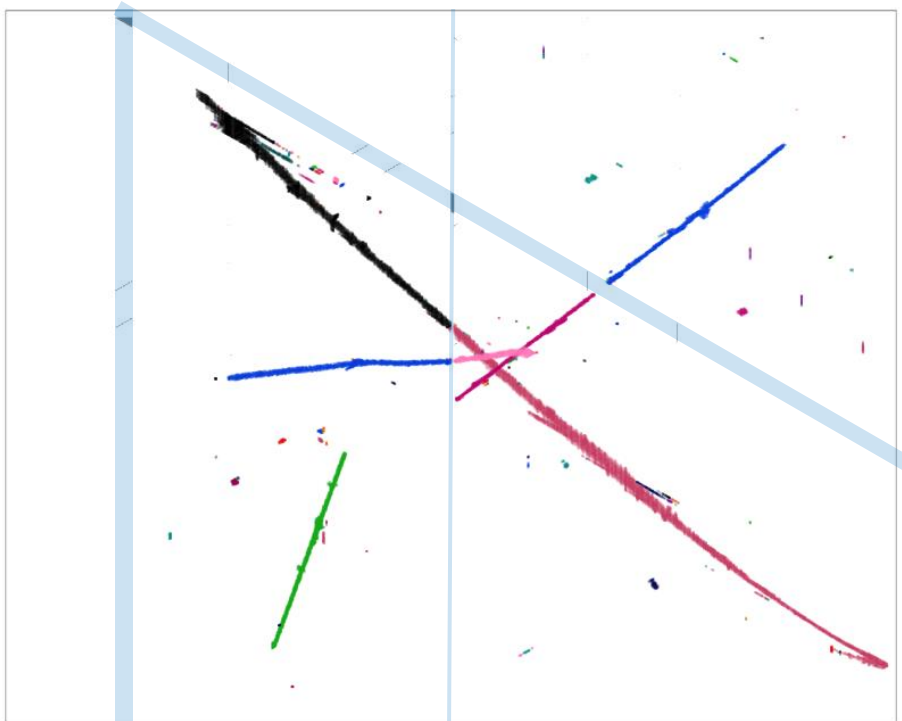
Clustering example

- SBND run 14737, event 279
- jumping gaps due to bad channel and APA center gap
- smaller activities clustered to larger ones

APA0 (East) bad channels [real geometry]



3D imaging

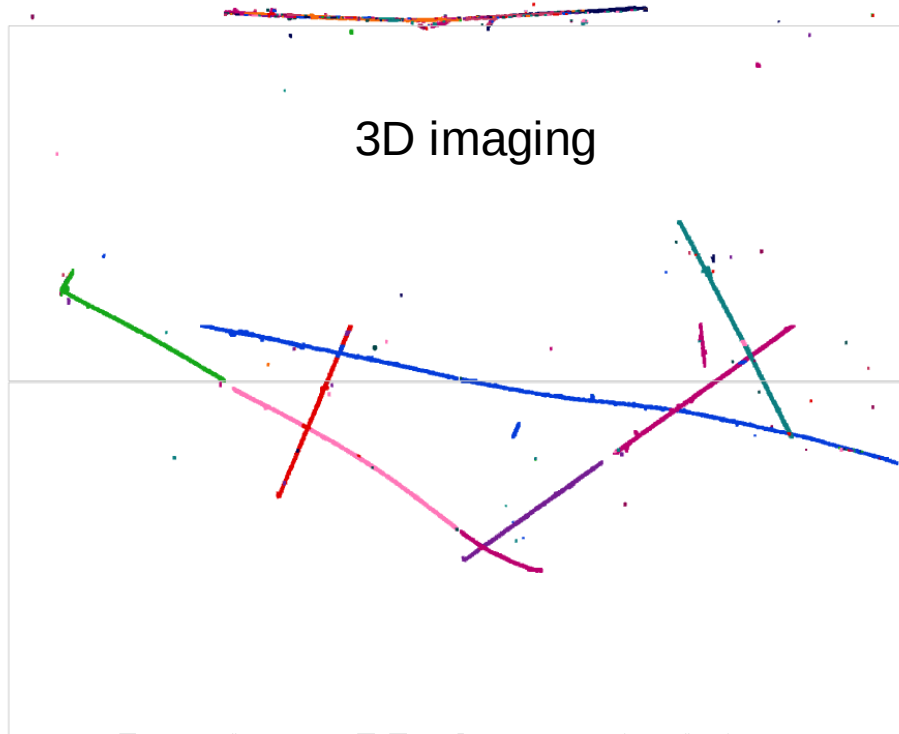


Clustering



Top view of both APAs

- Cross APA clustering underdevelopment
- A list of 4 SBND event: <https://www.phy.bnl.gov/twister/bee/set/35591e89-5845-47ad-8214-52412ef7cfa1/event/list/>
- Other capabilities not checked yet:
 - connecting dashed lines (prolonged, parallel)
 - over clustering protection (random coincidence)
 - nue clustering



3view live + 2view dead

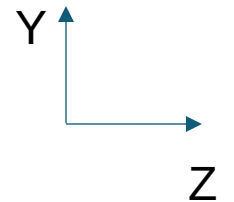
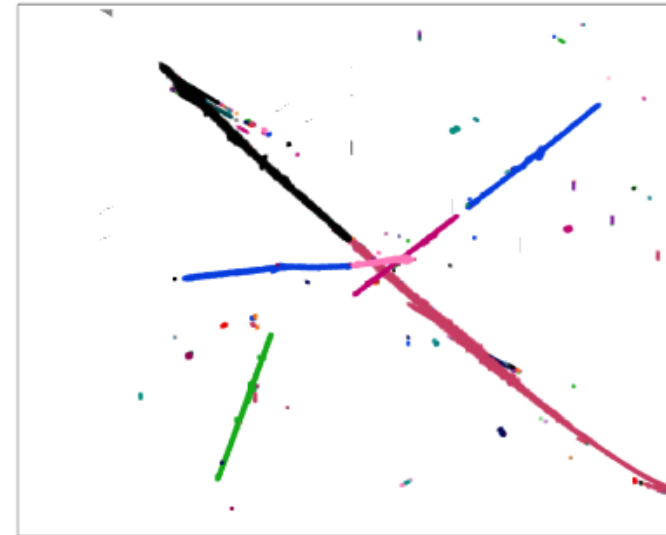
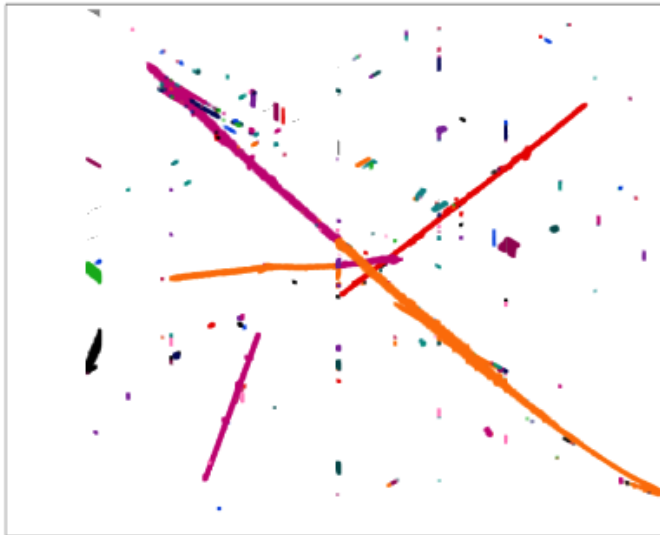
2view live: <https://www.phy.bnl.gov/twister/bee/set/bf1731bd-120c-40fe-b814-5d238e6a4c57/event/0/>

3view live: <https://www.phy.bnl.gov/twister/bee/set/d06c6cb0-9f3f-49e7-8d62-e83a2ffb48b4/event/0/>

2view

3view

img



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