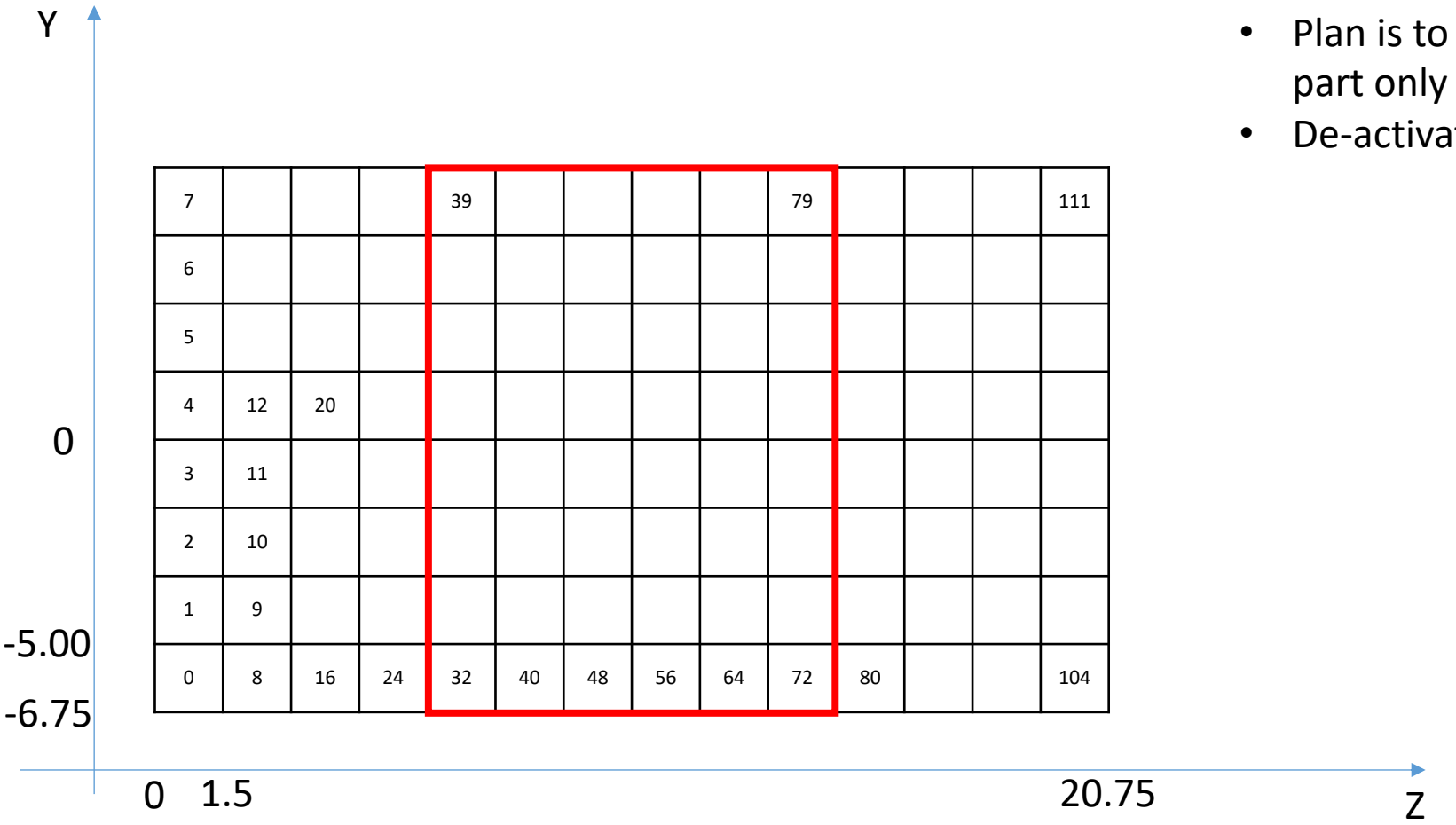
Wire-Cell Sim/SigProc Update

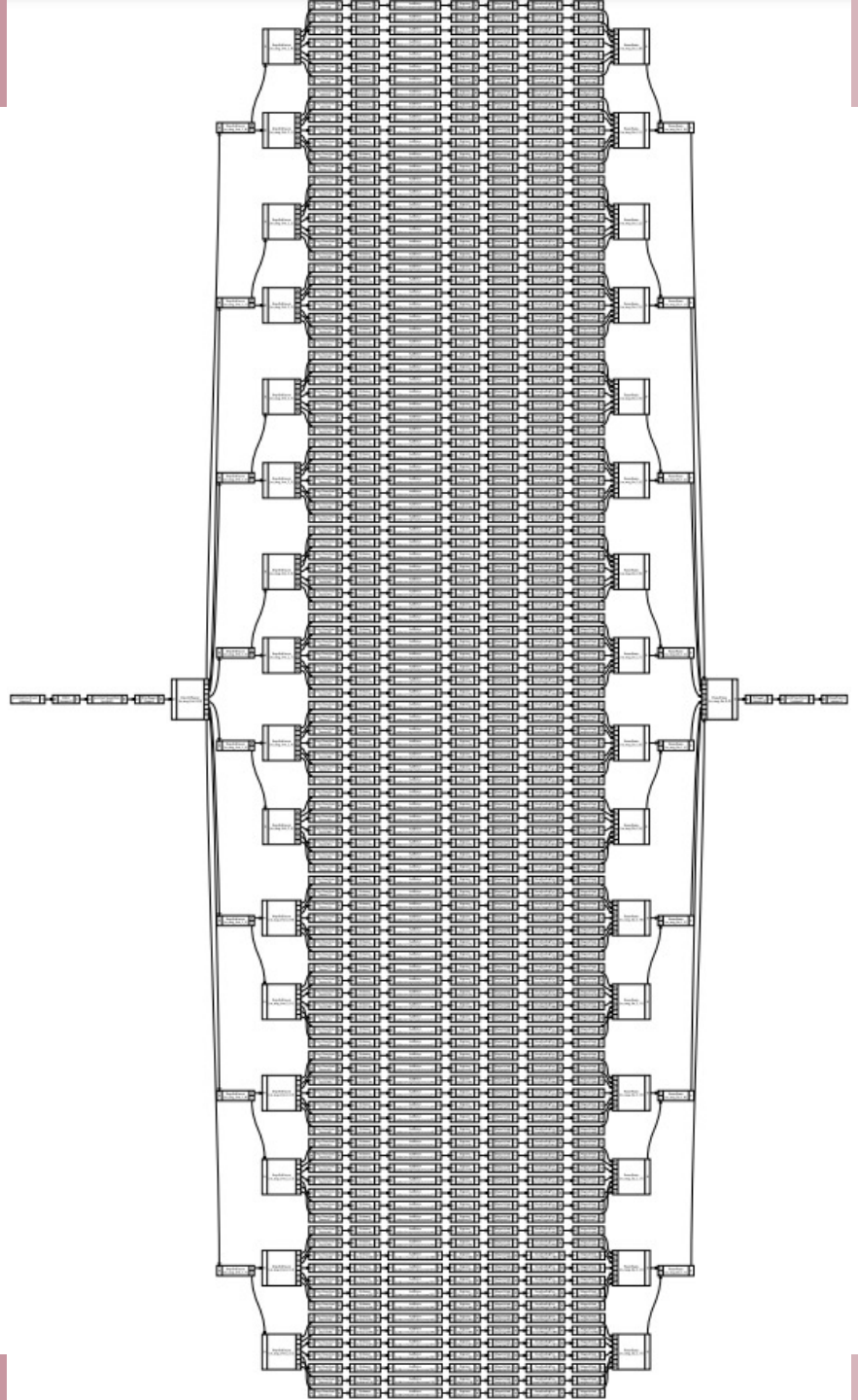
- process partial CRMs for 1x8x14 - done
- combined Sim/SigProc configuration - done
- DNN-ROI finding to improve current SigProc
  - configuration - done
  - new *wirecell ups* product with *pytorch* sub-package enabled ~2-4 weeks
  - re-train new model for DUNE-VD ~ 2-4 weeks
- the jsonnet for all 3 items above:

https://github.com/HaiwangYu/wire-cell-toolkit/blob/wcp-porting-img/cfg/pgrapher/experiment/dune-vd/wcls-sim-drift-simchannel-nf-sp.jsonnet

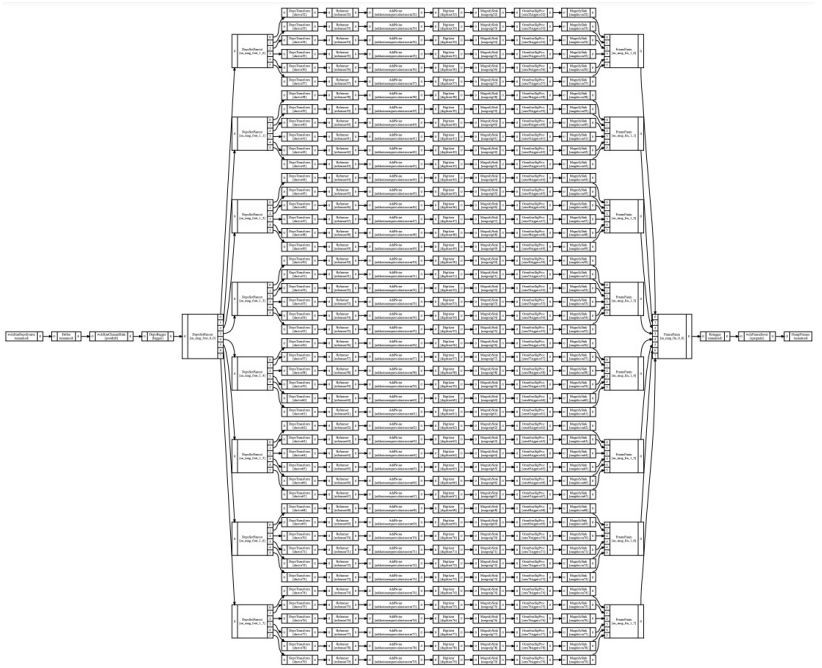
process 1x8x6 from 1x8x14



- Plan is to do charge processing for the red part only without modification of the gdml
- De-activate in the wire-cell configuration

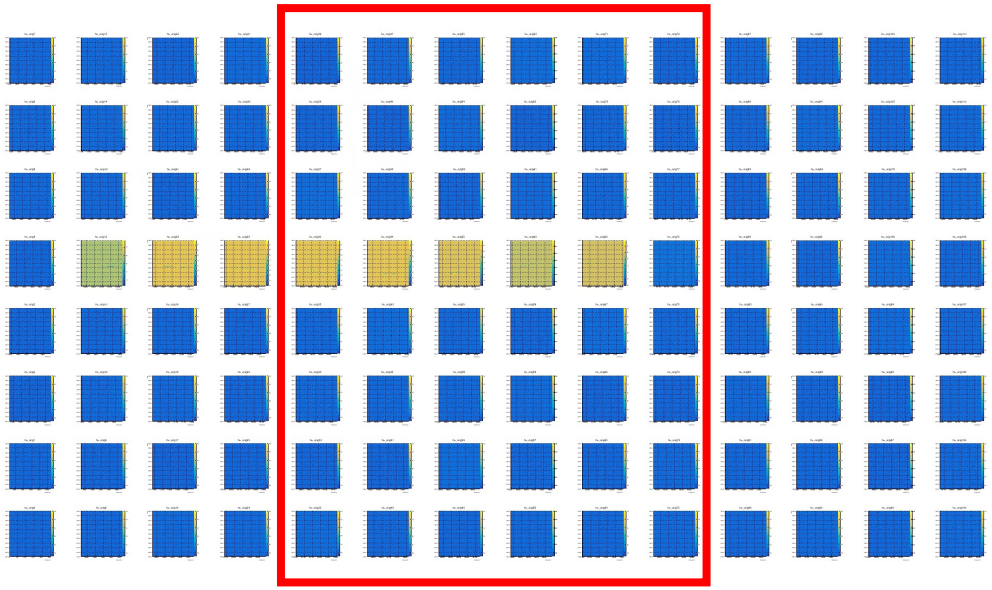


- Wire-Cell is based on Data Flow Programing
- Needs to make sure all CRMs are routed correctly
- Limitation from TBB that a single fanout/fanin node multiplicity should be <= 10 ⟶ need layered fan nodes
- So currently only provide several options in fcl instead of arbitrarily activate/de-activate a CRM

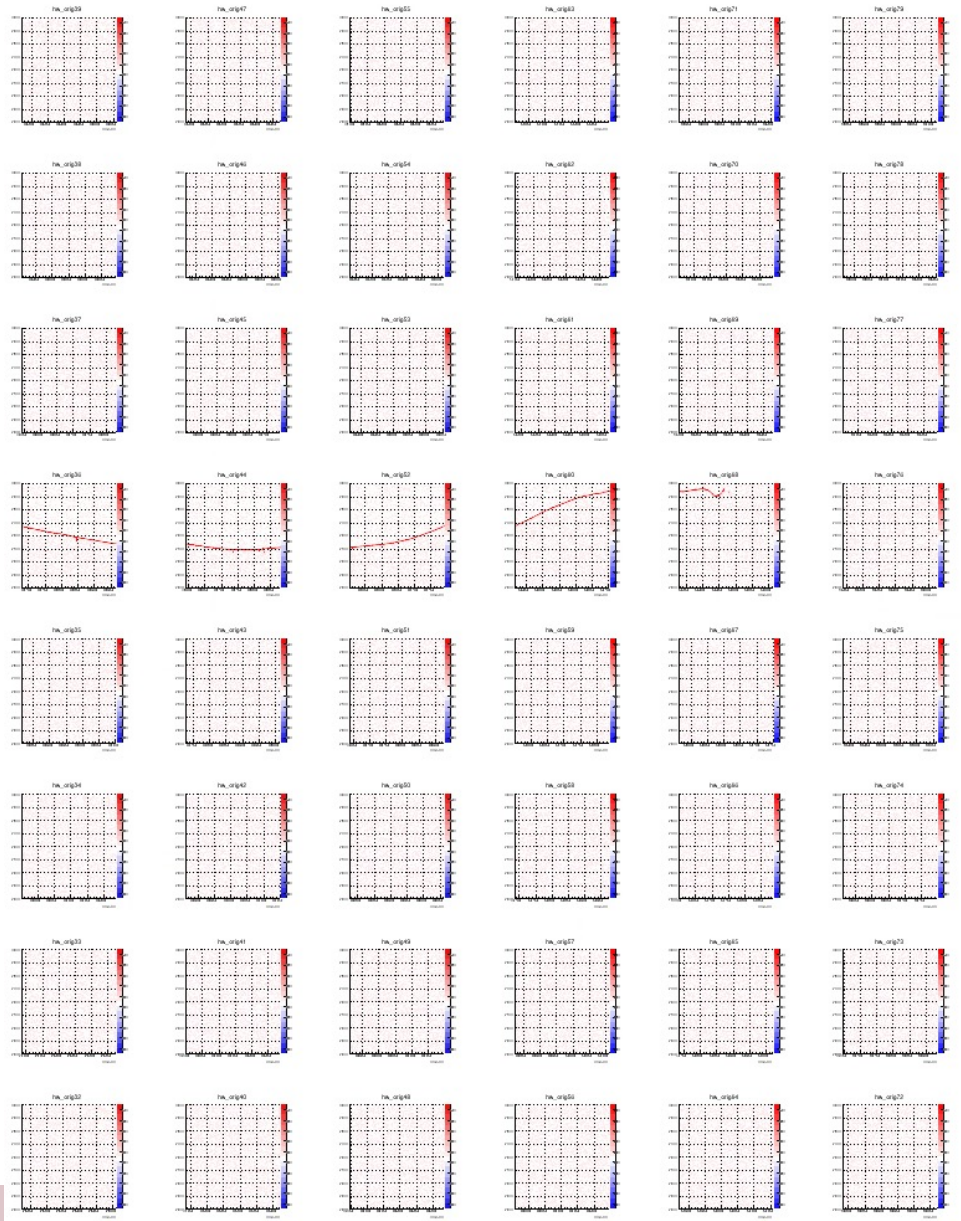


process 1x8x6 from 1x8x14

1x8x14

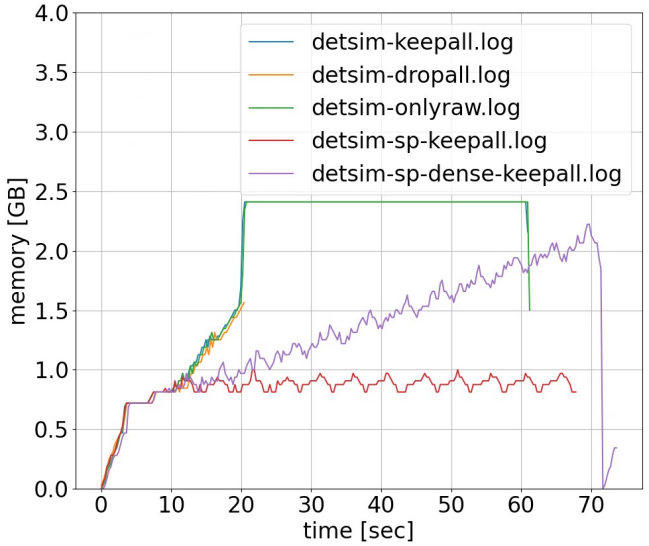


1x8x6



combined Sim/SigProc configuration

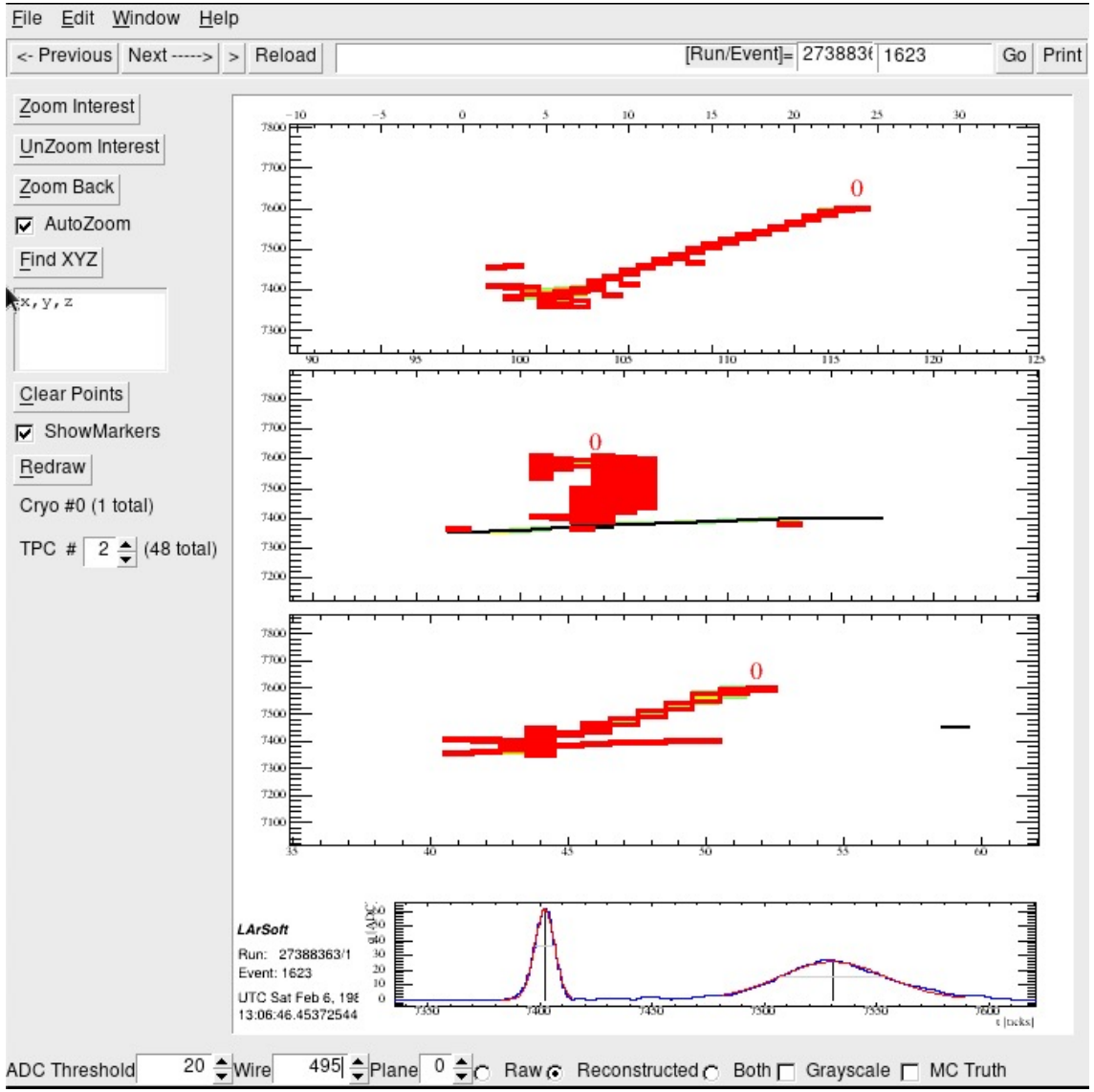
https://indico.fnal.gov/event/50647/

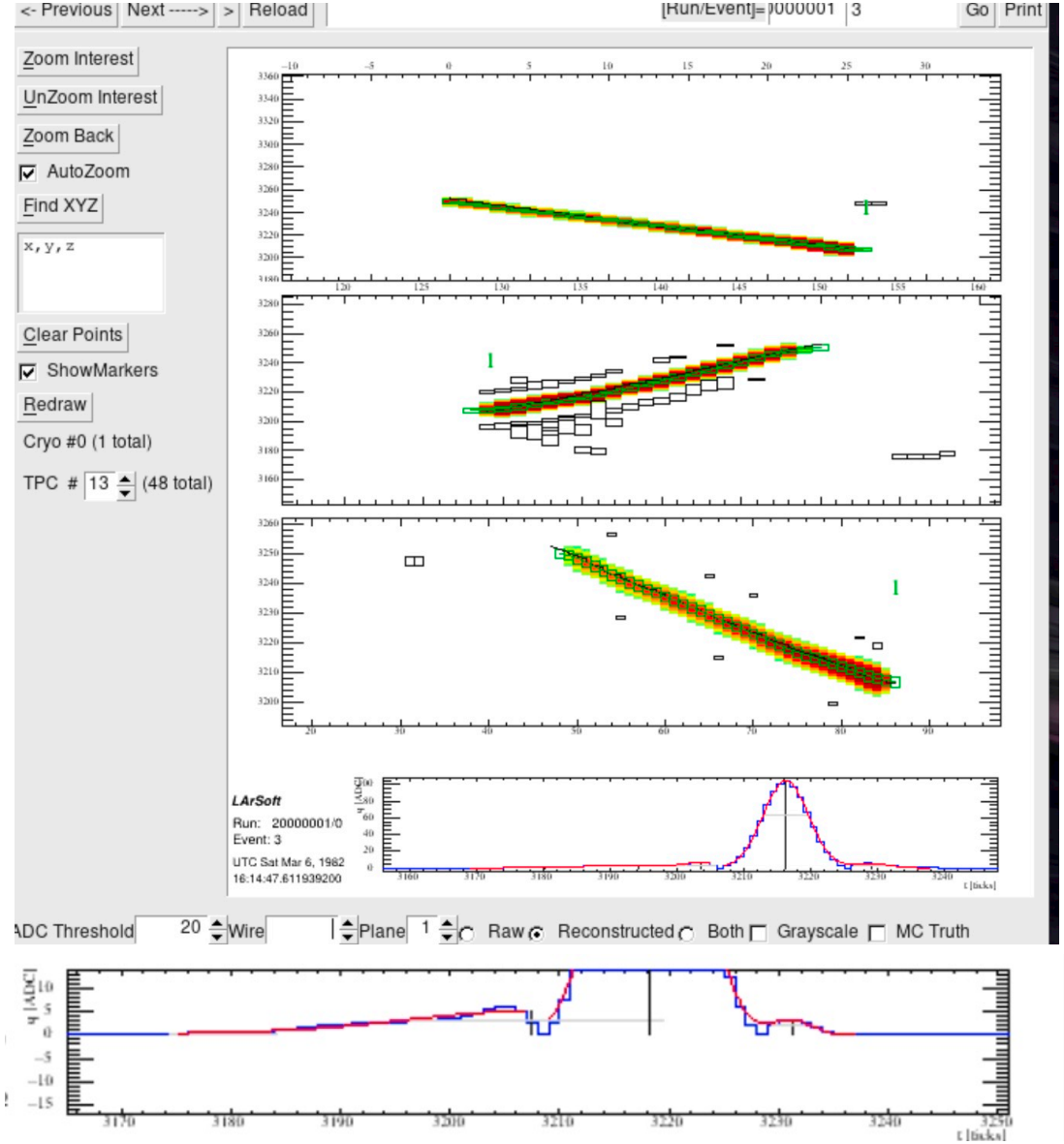


i9-9900K (16 core), NVIDIA 2080Ti, libtorch 1.3 compiled from source

Work	Memory summary	WireCell run time, total (DNNROI) (sec)	disk (MB)
1x1x1	VmPeak = 3685.62 VmHWM = 1180.31	5.7	8.4
1x1x2	VmPeak = 3693.43 VmHWM = 1181	11	8.7
1x8x6	VmPeak = 3947.16 VmHWM = 1424.61	188.7	9.7
1x8x6 detsim alone	VmPeak = 6203.51 VmHWM = 4936.85	total: 123 (WC run: 33.4)	137
1x1x1 DNNROI (GPU)	VmPeak = 11155.9 VmHWM = 2911.88	8 (1.29 (including torch init time)+0.36)	8.3
1x1x1 DNNROI (CPU)	VmPeak = 5794.52 VmHWM = 1803.86	33 (13.75+12.54)	8.3
1x1x2 DNNROI (CPU)	VmPeak = 5988.39 VmHWM = 1912.36	55 (11*4)	8.6

SigProc issues found by Wenjie, Maria, Dom and etc





DNN ROI finding

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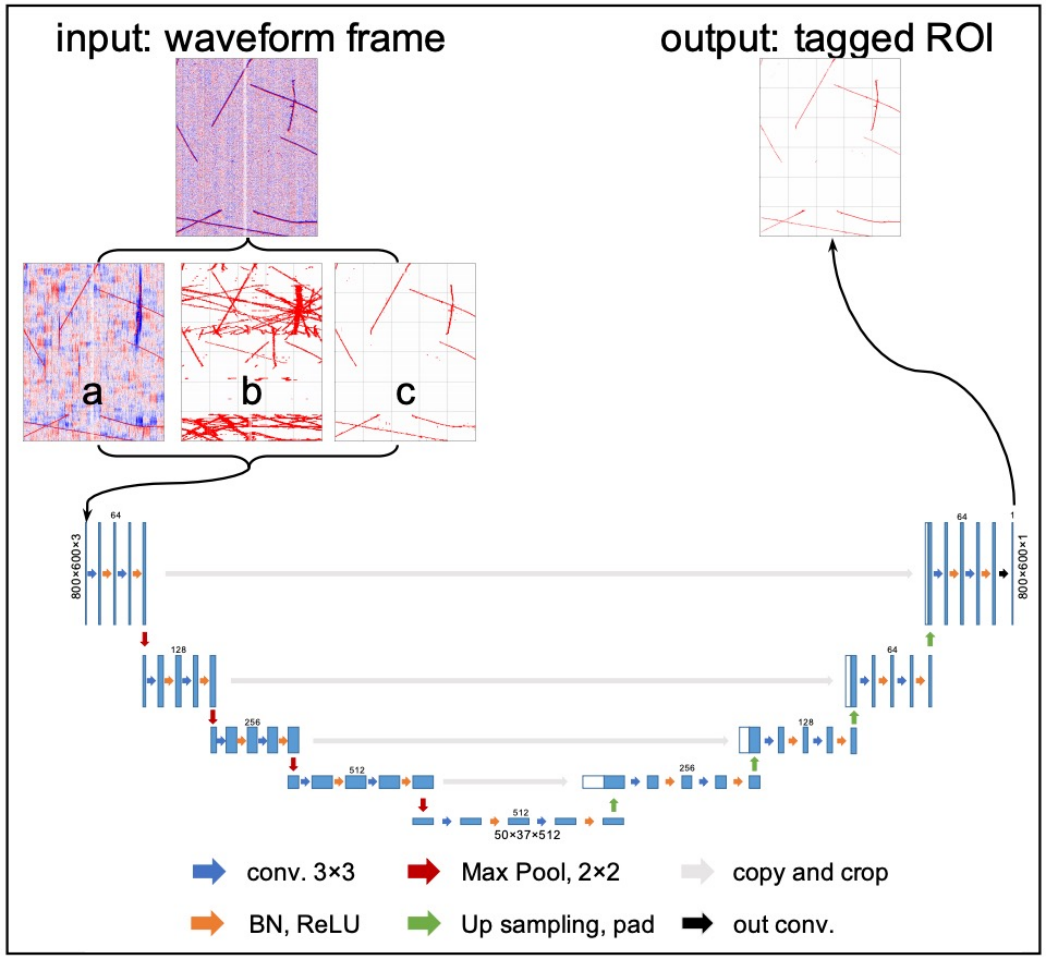
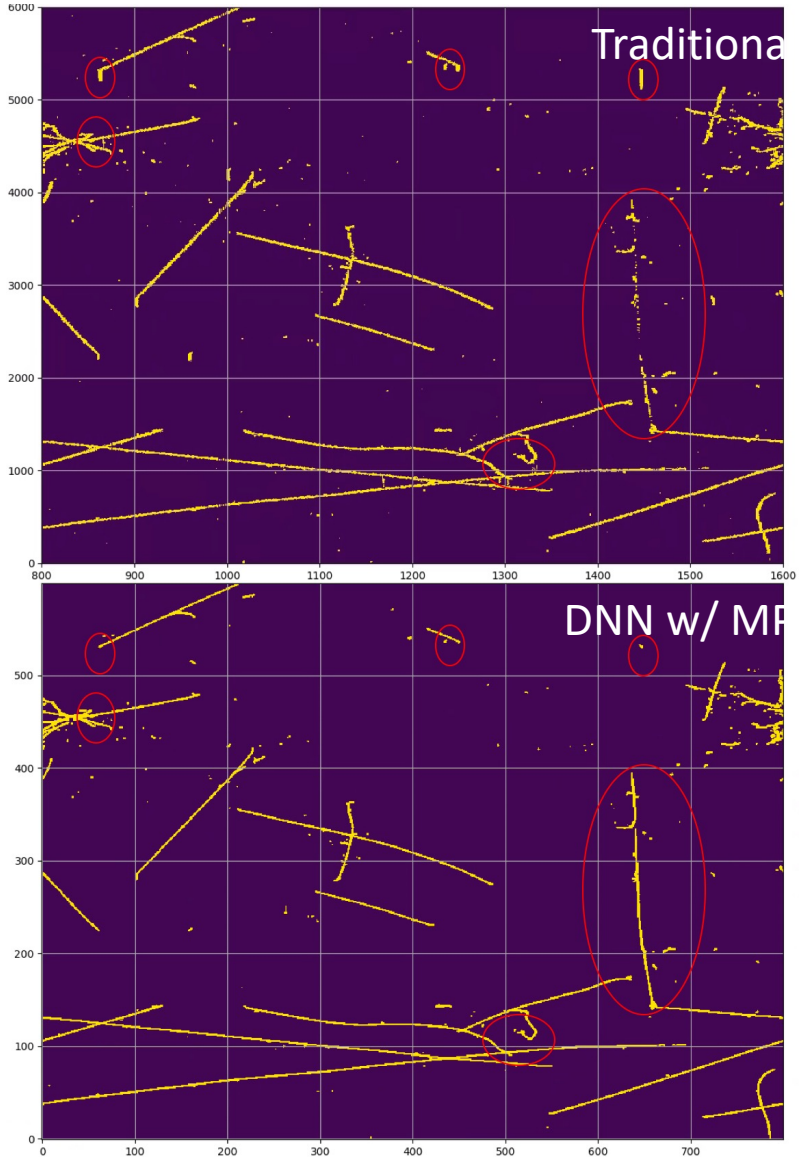
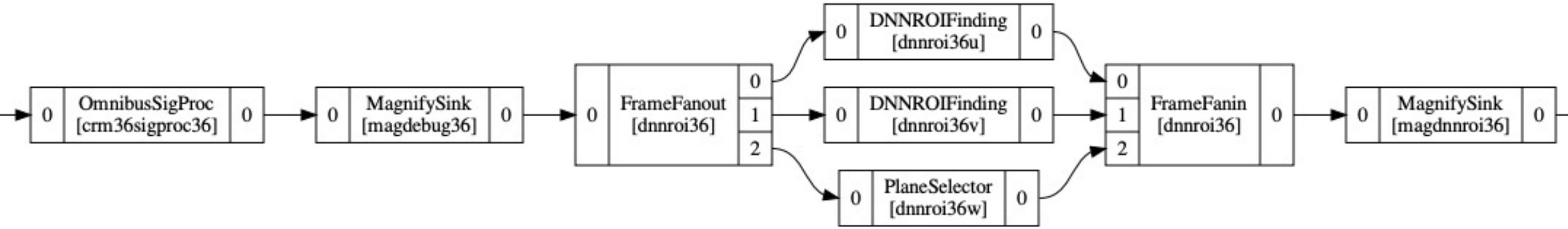
DNN ROI finding with multiple input channel

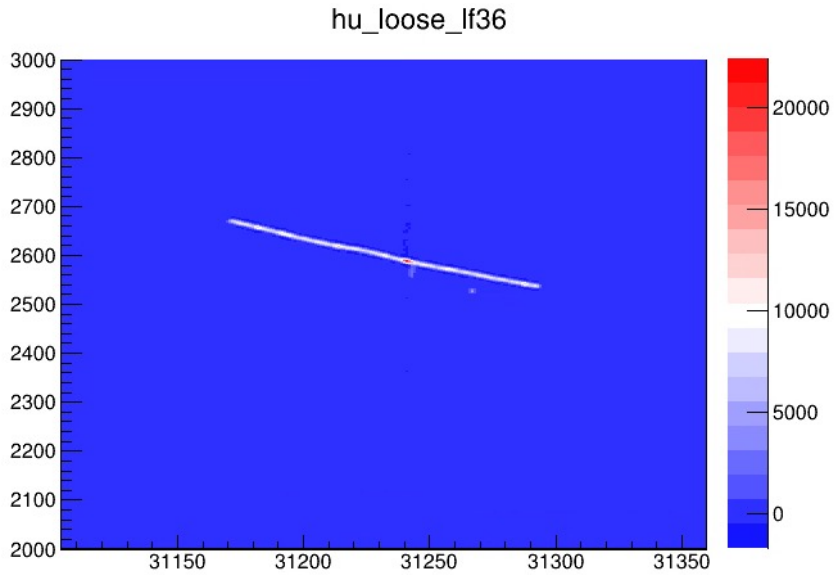


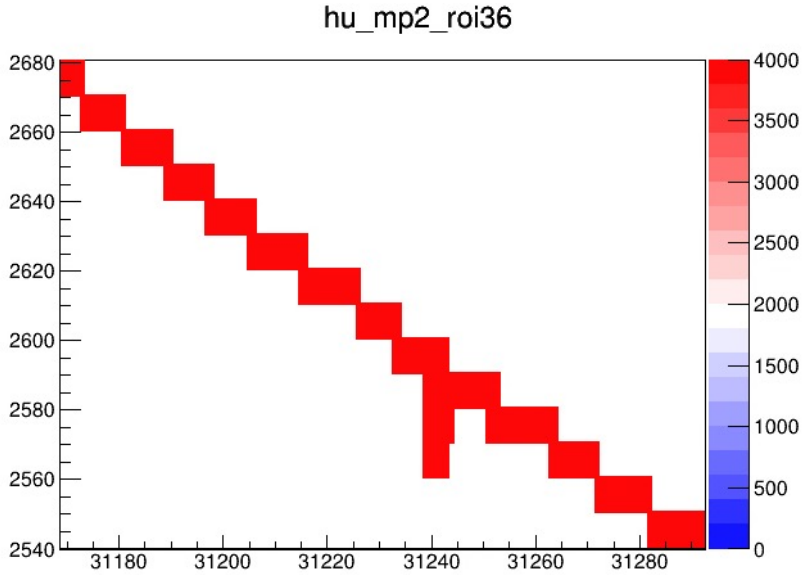
tested on ProtoDUNE data

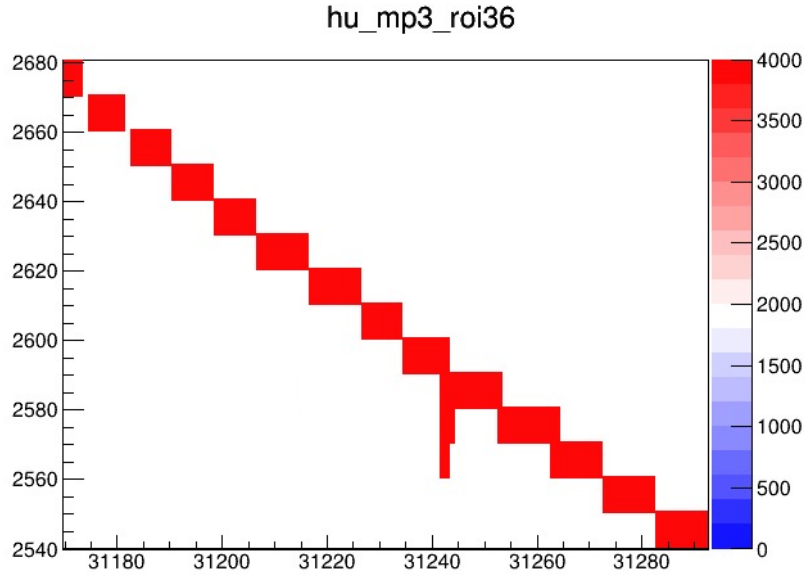


Configuration for DUNE-VD

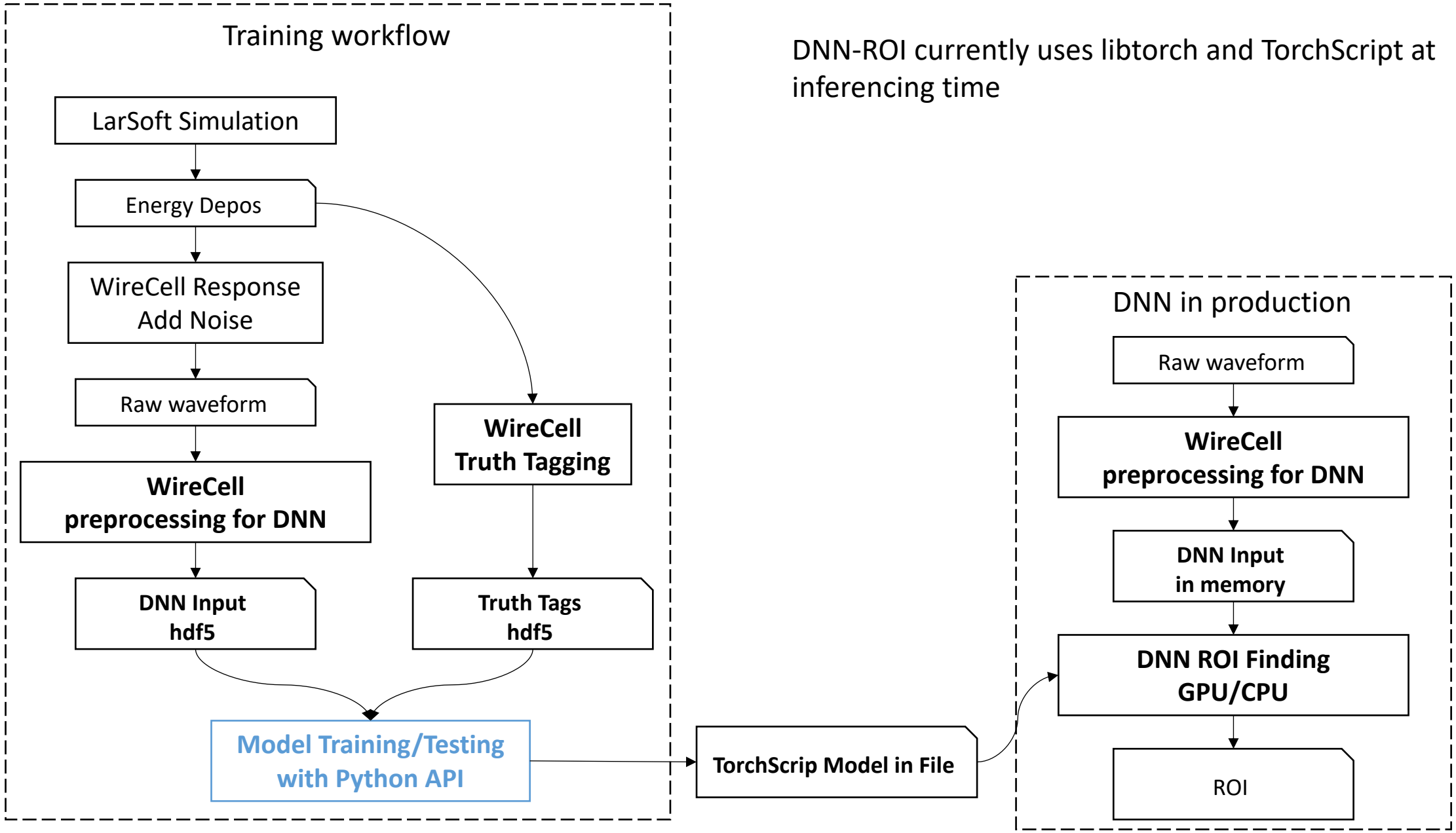








need new wirecell ups product with libtorch



DNN-ROI currently uses libtorch and TorchScript at inferencing time

need new wirecell ups product with libtorch

- As a a ups product, the “WireCellPytorch” was not built.
- But there is an OK version libtorch ups product now.