Status report on

DNNROI sigproc

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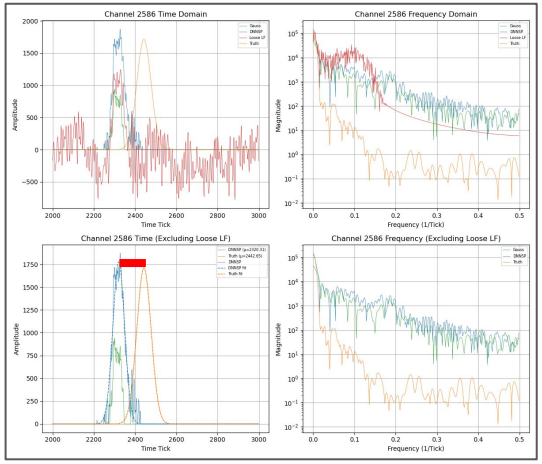
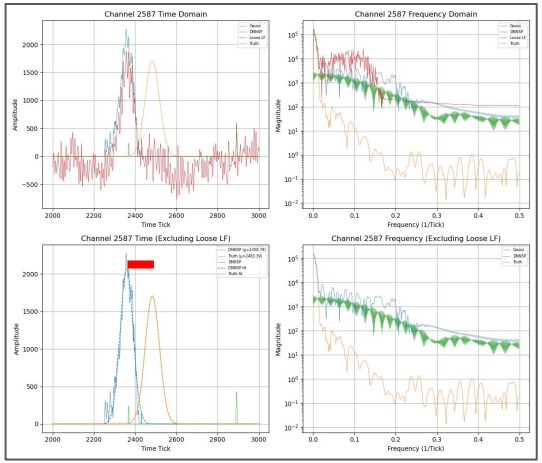
Truth offset issue – debugging

```
Channel 2586: DNNSP fit μ = 2320.31
Channel 2586: Gaussian fit mean for waveform_truth_new = 2442.65
Channel 2586: Truth–DNNSP mean diff = 122.34
Saved waveform plot to 'plots_waveform_04212025_xz80/APA2_u/waveform_channel_2586.png'
Processing channel 2587...
Channel 2587: DNNSP fit μ = 2358.79
Channel 2587: Gaussian fit mean for waveform_truth_new = 2483.39
Channel 2587: Truth–DNNSP mean diff = 124.60
Saved waveform plot to 'plots_waveform_04212025_xz80/APA2_u/waveform_channel_2587.png'
```




```
Average (Truth – DNNSP) mean across channels: 124.90
```



- Scanned channel 2580 - 2597 (APA2, u plane)
- Averaged offset from the simulation: ~ 125 time tick
- 0.5 us * 125 = 62.5 us

Truth offset issue – debugging

```
[  gen   ] <DepoFluxSplat:0> speed=1.565 mm/us, origin=100 mm, tbins: 6125 0.5us ticks: [-312.5,2750]us, reftime=0 us, tick offsets=(0,0,0)
```

```
[  gen   ] <DepoFluxSplat:1> speed=1.565 mm/us, origin=100 mm, tbins: 6125 0.5us ticks: [-312.5,2750]us, reftime=0 us, tick offsets=(0,0,0)
```

```
// Arbitrary time added to tbin of traces on per plane basis.
m_tick_offsets.clear();
m_tick_offsets.resize(3,0);
auto jto = cfg["time_offsets"];
if (jto.isArray()) {
    if (jto.size() == 3) {
        for (int ind = 0; ind < 3; ++ind) {
            m_tick_offsets[ind] = jto[ind].asDouble() / wtick;
        }
    }
    else if (!jto.empty()) {
        THROW(ValueError() << errmsg{"DepoFluxSplat: time_offsets must be empty or be a 3-array"});
    }
}
log->debug("speed={} mm/us, origin={} mm, tbins: {} {}us ticks: [{},{}]us, reftime={} us, tick offsets=({},{},{})",
           m_speed / (units::mm/units::us), m_origin/units::mm,
           m_tbins.nbins(), m_tbins.binsize()/units::us,
           m_tbins.min()/units::us, m_tbins.max()/units::us,
           m_reftime/units::us,
           m_tick_offsets[0],m_tick_offsets[1],m_tick_offsets[2]);
```

```
// Acceptance window
const double wtick = get(cfg, "tick", 0.5 * units::us);
const double wstart = cfg["window_start"].asDouble();
const double wduration = cfg["window_duration"].asDouble();
const int nwbins = wduration / wtick;
m_tbins = Binning(nwbins, wstart, wstart + nwbins * wtick);
```

- gen/src/DepoFluxSplat.cc
- Where the -312.5 comes from?

Memory and Time consumption w/o DNN ROI

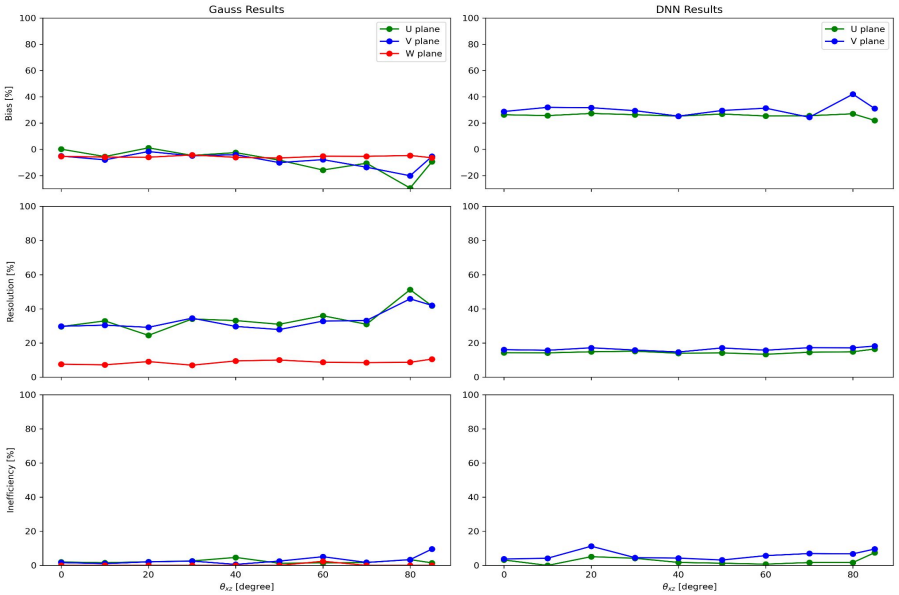
Run		VmPeak (MB)	RSS Peak (MB)	Elapsed Time (s)
1	SP	5291.3	2583.6	88.01
	DNN SP	12074.0	9344.7	168.71
2	SP	4800.1	2104.6	61.13
	DNN SP	9892.5	7188.8	131.96
3	SP	4800.0	2112.6	72.08
	DNN SP	10074.9	7368.6	167.94
4	SP	4771.3	2083.5	55.77
	DNN SP	9096.5	6830.3	126.23
5	SP	4771.3	2083.5	56.84
	DNN SP	9746.9	7034.6	164.48

Metric	SP (avg.)	DNN SP (avg.)	Ratio (DNN SP/SP)
RSS Peak	2193.6 MB	7553.4 MB	**3.45x**
Elapsed	66.8 s	151.9 s	**2.28x**

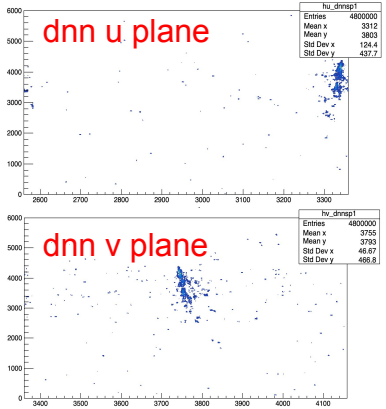
- Measured the consumption with “WC Signal Processing + Pandora reconstruction”
- PD-HD data run026763, run027673, run028588

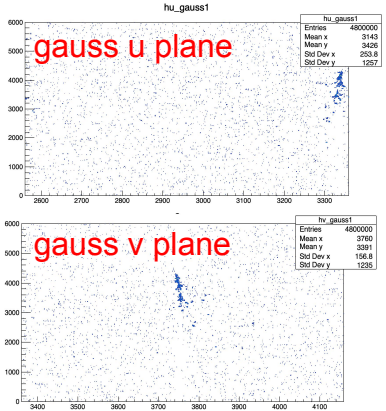
Back Up

DNN ROI evaluation – single shower event



- APA2
- Configuration
  - Mean momentum: 1 GeV
  - ThetaYZ: 0
  - ThetaXZ varies in range from 0 to 85





- Possible causes might affect the problem
  - Baseline subtraction seem to be happen in both gauss and dnnsp
  - Time offset observed in truth track (Generated from DepoFluxSplat)