

ndlar_flow light readout signal processing evaluation

A brief look at light hits

Work in progress

Motivation

Pileup study:

- ★ Take 2x2 recorded waveforms and look at the hits
 - How many hits, where in the waveform, times between hits
- ★ How does this change if we create artificial pileup by adding waveforms from different files/events together?
- ★ What if we subsample the waveforms to simulate a slower adc rate?

For now: looked at distributions of hits in data and simulation (also sum_hits)

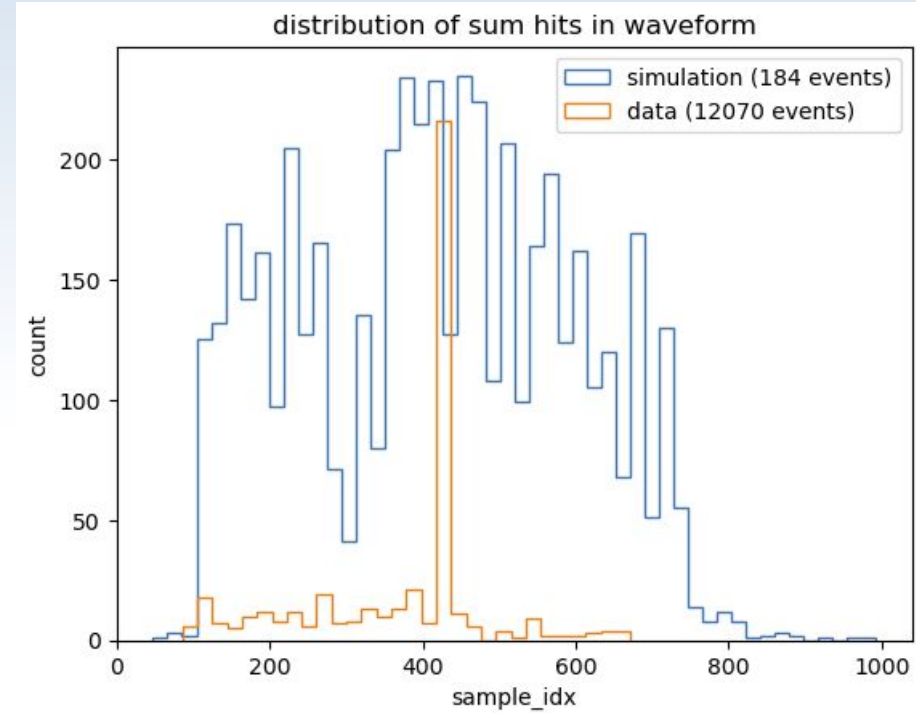
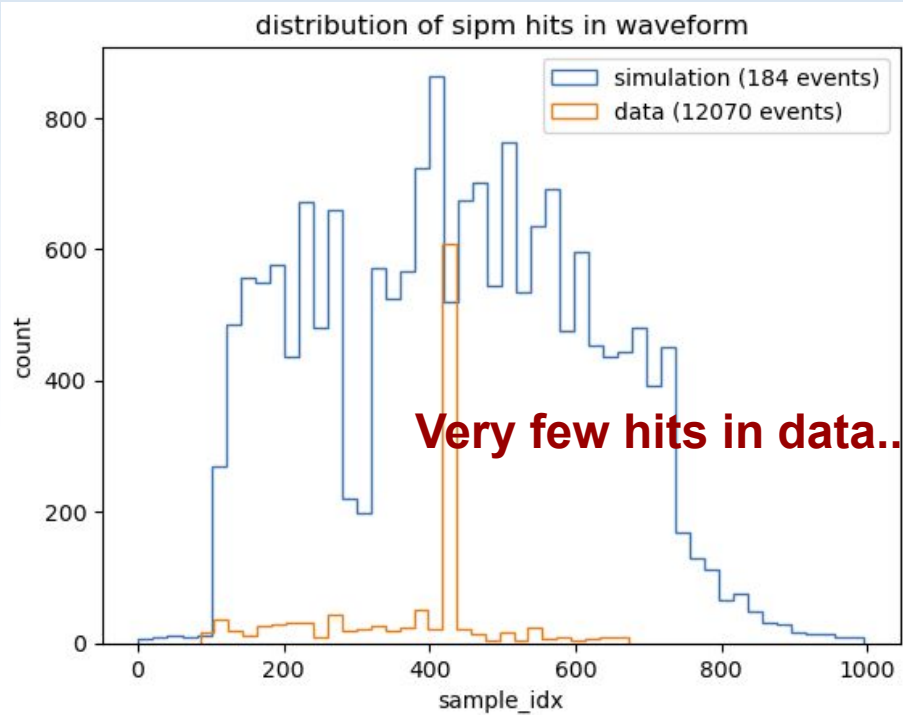
Next step: create artificial pileup

Files used

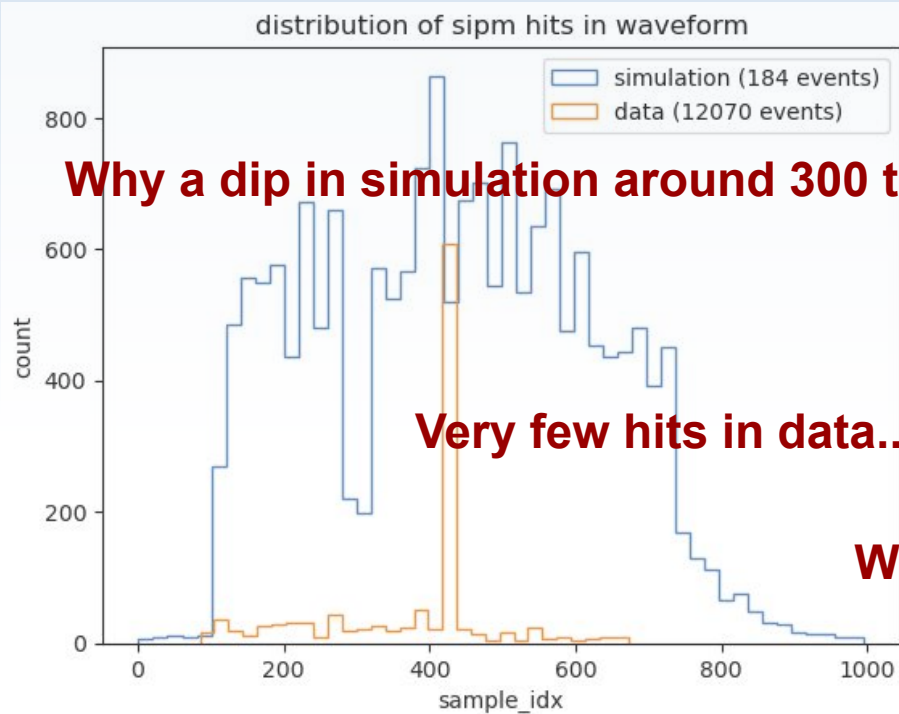
- ★ /global/cfs/cdirs/dune/www/data/2x2/simulation/productions/MiniRun5_1E19_RHC/MiniRun5_1E19_RHC.flow.beta2a/ FLOW/0000000/MiniRun5_1E19_RHC.flow.0000037.FLOW.hdf5 (184 events)
- ★ /global/cfs/cdirs/dune/www/data/2x2/sandbox/v1/light_data/flow_files/mpd_run_hvramp_rctl_104_p71.FLOW.hdf5
- ★ /global/cfs/cdirs/dune/www/data/2x2/sandbox/v1/light_data/flow_files/mpd_run_hvramp_rctl_104_p72.FLOW.hdf5
- ★ /global/cfs/cdirs/dune/www/data/2x2/sandbox/v1/light_data/flow_files/mpd_run_hvramp_rctl_104_p73.FLOW.hdf5 (12070 events)

Sandbox files have been manually run through the second stage of the light workflow, with the flash finder disabled

For 1 MR5 file and 3 data files from the sandbox



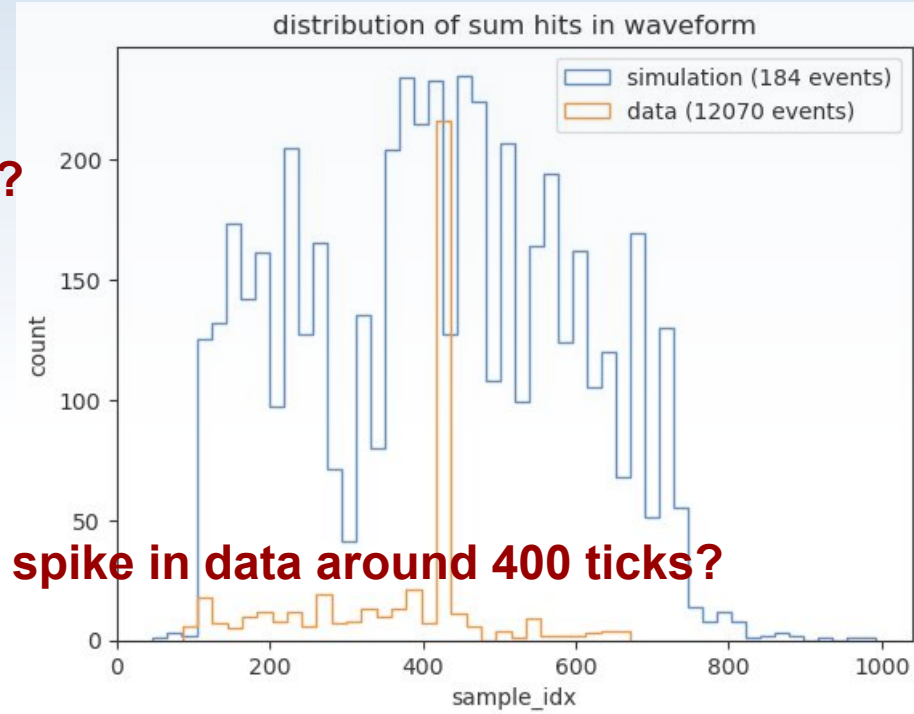
For 1 MR5 file and 3 data files from the sandbox



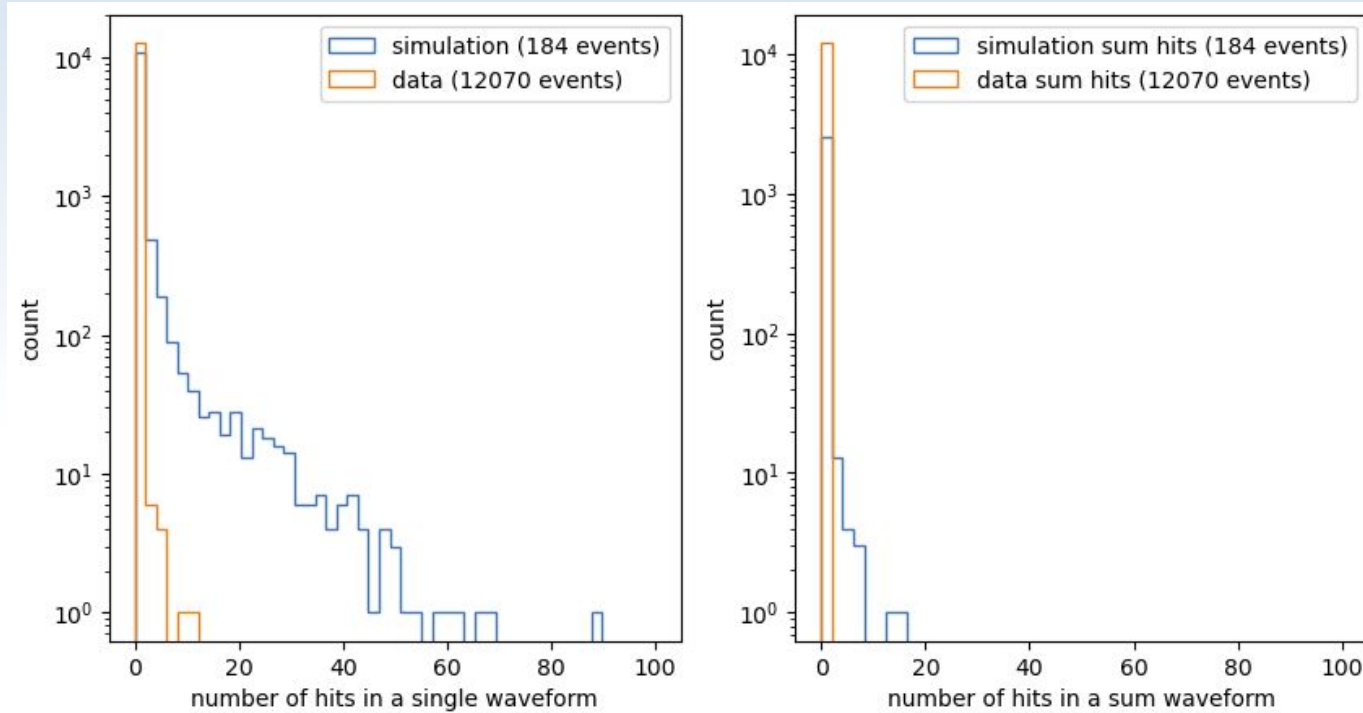
Why a dip in simulation around 300 ticks?

Very few hits in data..

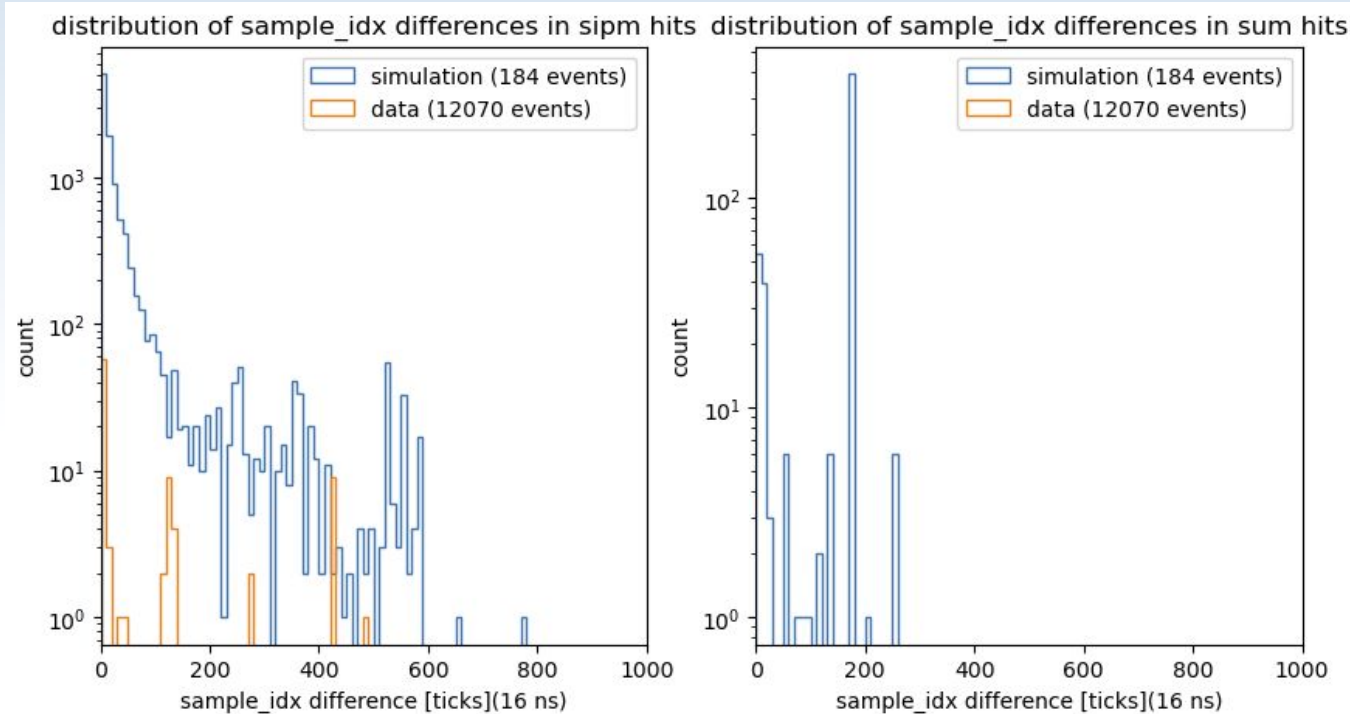
Why a spike in data around 400 ticks?



Number of hits per waveform in data is small



For waveforms with multiple hits, how far are they apart?



Zoom of the previous plot, shows at least 2 ticks between hits

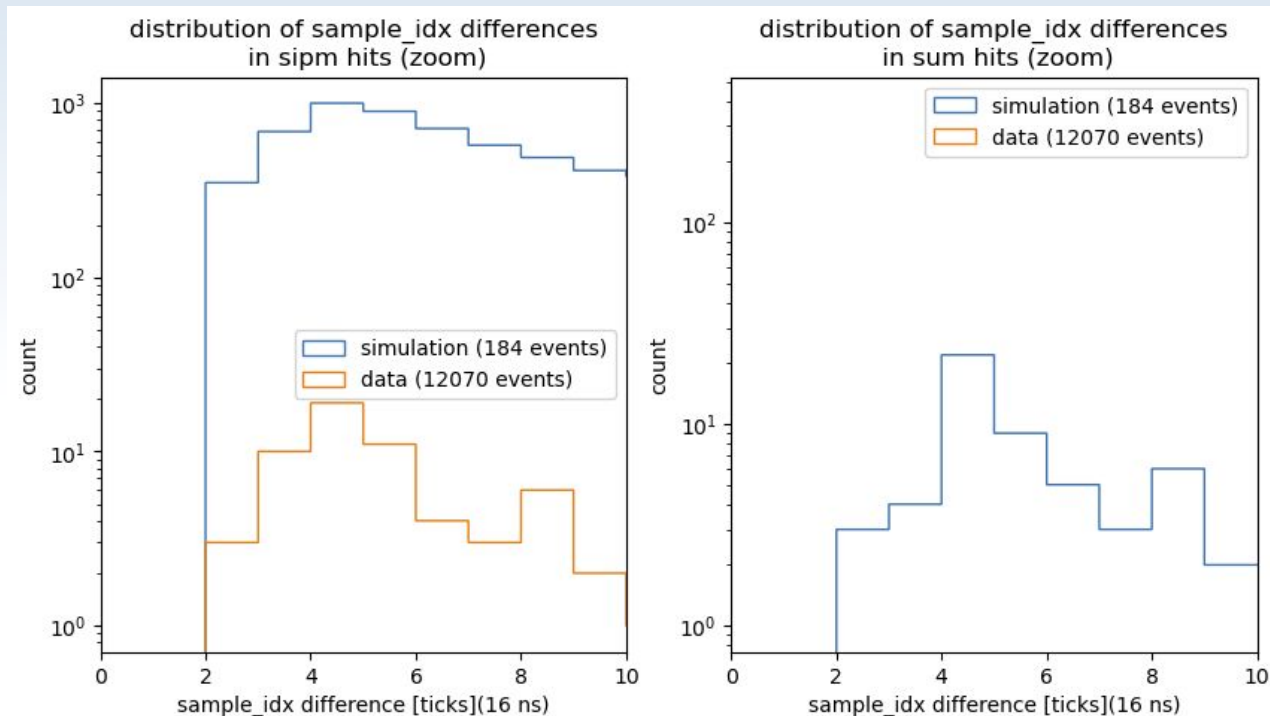
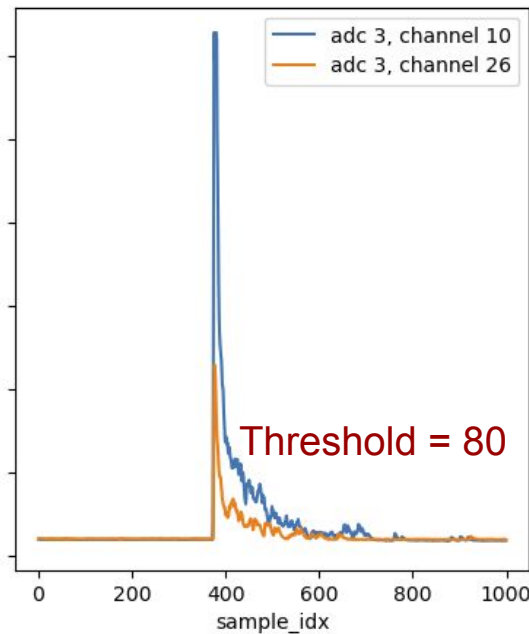
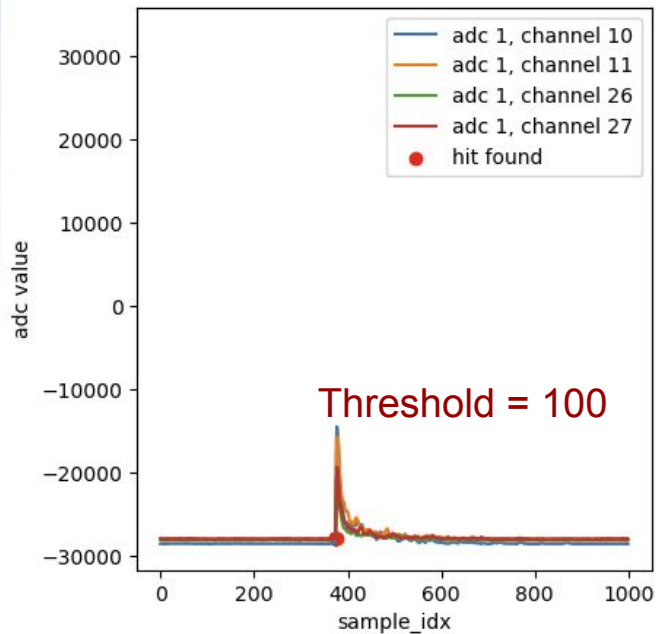


Illustration of “missed hits”

Hits found for event 26, and example waveforms that have no hits



4 hits found for event 26 in this file

On the left the 4 waveforms corresponding to those hits, and the hits

On the right two waveforms from the same event with no hits