

WEEKLY ANALYSIS UPDATE

05 July 2024

Samikshya Kar

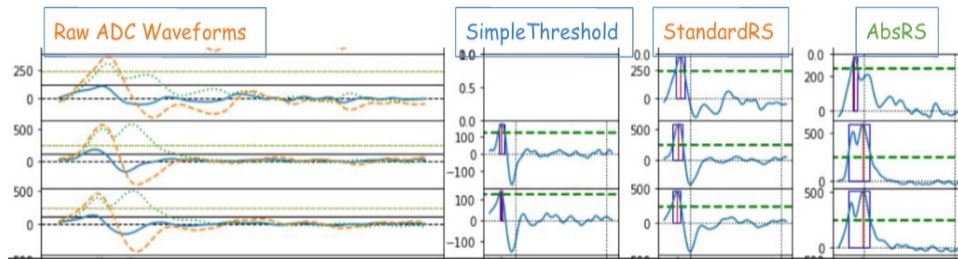
Outline

- Trigger Record (Datafile:
np04hd_raw_run**026482**_0000_dataflow0_datawriter_0_20240528T145108.hdf5.copied)
- Using `tpgsandbox` repository for TPG emulation
- Offline discussion at CERN: Bismuth physics (input from Alex Oranday) as source to test TPG algorithms
- A rough check of the Standard Running Sum algorithm on Raw ADC from emulated TPs

TPG Algorithms

DEEP UNDERGROUND NEUTRINO EXPERIMENT

TPG RS Comparison - Waveforms and TPs



- Features of the TPG algorithms

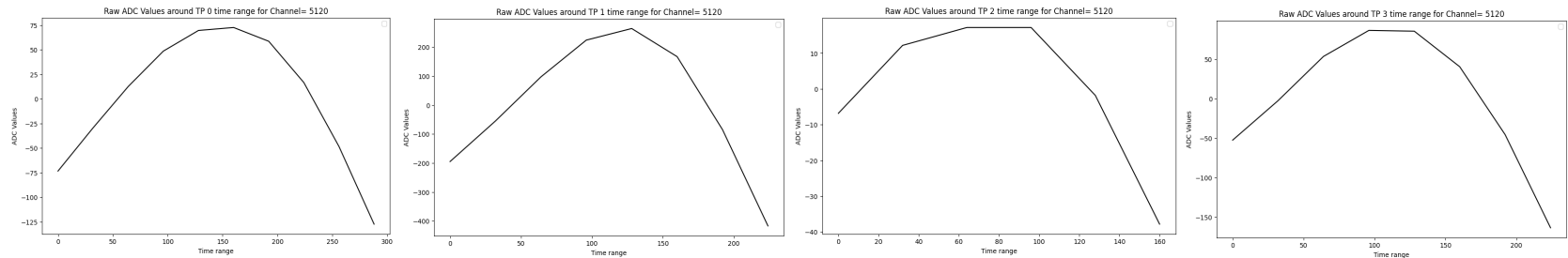
- Hit finding works correctly across WIB frames - TP parameters match ADC waveform
 - Latest change to TPG RS algorithms extracts TP parameters from RS waveforms
- RS behaviour seems to be very stable and robust
 - Hit parameter extraction is predictable and under control in most cases
 - RS waferom transformation causes double (multiple) TPs to be created - investigation

- Pedestal Subtraction: Collection Plane
- Running Sum: Induction Plane
 - Absolute Running Sum: $y_n = R.y_{n-1} + |x_n|/s$
 - Standard Running Sum: $y_n = R.y_{n-1} + x_n$

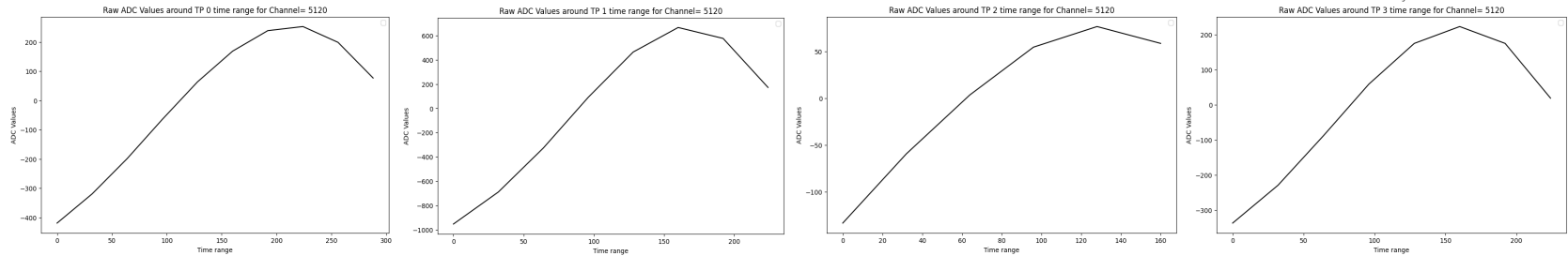
Source: Presentation of Ivana from last DAQ general Meeting

Visualisation of Raw ADC Values

Raw data around
TP time range

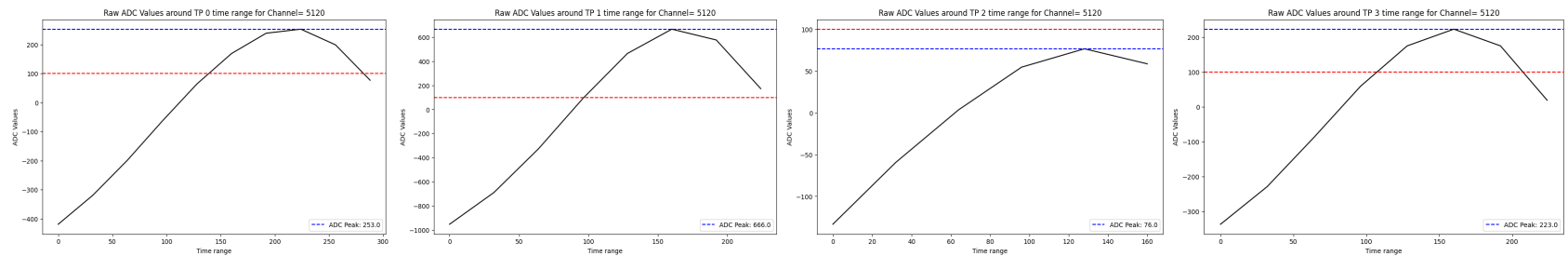


Raw data (same
range) after
StdRS

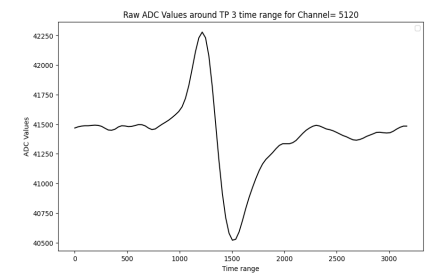
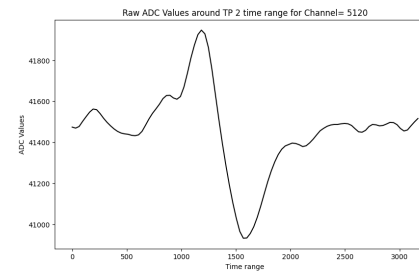
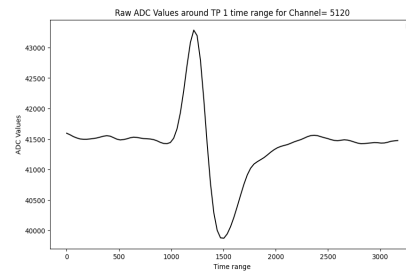
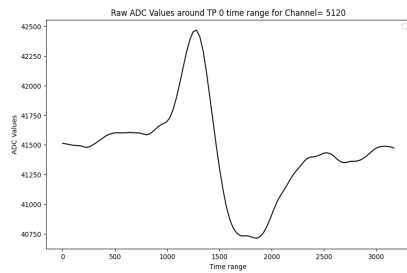
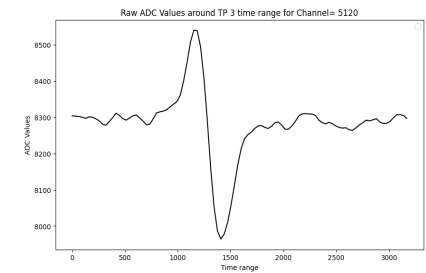
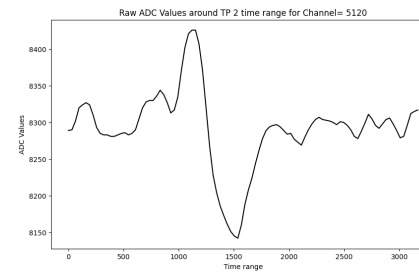
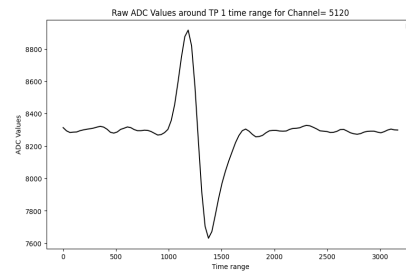
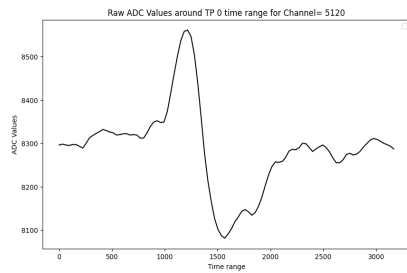


Standard Running Sum enhances the positive part of the peak (greater chance to pass the positive threshold)

Threshold: ---
(=100)



Standard Running Sum Algorithm



THANK YOU!

Steps for Bismuth Physics

- Raw data for APA 2 induction channels
- Why? Because:
 - For run 026482: APA2,3,4: 0,1: ST 5000, 2: ST 250; APA1: 0,2: ST 5000, 1: ST 300
- Histogram of TPs per channel for induction planes
- Charge (ADC) histogram for the collection (and induction) TPs that are in the peaked bins
- Conversion of charge to Energy and the Energy plot
- Matching the TPs from all 3 planes
- Histograms (charge and energy) for summed ADCs between all 3 plane

Steps for Plots in Slide 4

- Raw data for APA 2 induction channels
- TP Emulation from the above data using `tpgsandbox`
- For a given channel, a few number of TPs taken
- Filtered Raw dataframe for `time_start` to `time_start + time_over_threshold` time range for each TP
- ADC normalisation by subtracting mean