D2O Processed Data Variable Description

Currently, the processed data is stored at */data13/coherent/data/d2o/processedData* in *phylogin1* cluster which can be accessed by ssh with the command:
"ssh your_username@phylogin1.phy.ornl.gov".
data13 is the current disk, and once it is full, the location will change to a different disk number. The processed data is in root format with filenames structured as run####_processed_v5.root (eg. run18735_processed_v5.root). #### is the run number and v5 is the current version of the processed data. The document corresponds to version v5. For changes in older versions, please refer to the elog.

Following are the root branches in which the data is stored.

1. **Int_t eventID**
   eventID is the event identifier, starting from 1 and incrementing with each event. During post-processing, after-pulsing events are removed, so the eventID may not be continuous.
2. **Int_t nSamples[23]**
   nSamples represents the number of samples in each waveform. Currently, it is set to 45 for all channels. There DAQ stores data from 23 channels, which includes 12 PMTs, 10 SiPM, and 1 SNS beam-on (proton-on-target) signal, also called Event61). The PMT channels are indexed from 0-11, SiPMs from 12-21, and Event61 is channel 22.
3. **Short_t adcVal[23][45]**
   adcVal contains ADC values for each channel. This is a two-dimensional array (channel number * nSamples). For example, the 45-sample waveform of first channel is stored at adcVal[0][0] to adcVal[0][44], and similarly for other channels.
4. **Double_t baselineMean[23]**
   baselineMan is the mean ADC value of first 20 samples of waveform for each channel.
5. **Double_t baselineRMS[23]**
   baselineRMS is the RMS of the ADC values of the first 20 samples in the waveform for each channel.
6. **Double_t pulseH[23]**
   pulseH is the highest ADC value in the waveform above the baseline for each channel.
7. **Double_t area[23]**
   area is the integral of the ADC values above baseline from bin 23 to 40 for each channel.
8. **Int_t peakPosition[23]**
   peakPosition is the bin number of the highest ADC value in each waveform. This can range from 20 to 44, depending on the pulse position in the waveform. The peak is typically around bin 30, but there is a jitter of about 6 bins due to CAEN electronics.
9. **Long64_t nsTime**
   nsTime represents the event time (in nanoseconds) from the start of the run. The event time corresponds to when the ADC sample of any waveforms in the event exceeds the trigger threshold. It is not the time of the first sample in the waveform.

10. Int_t triggerBits

triggerBits contains information about different trigger types. It is an integer variable where each bit corresponds to a separate trigger type. External triggers (e.g., Low-Light, High-Light, and Min-Bias) are sent by the calibration system, while PMTs, SiPMs, and Event61 has internal threshold triggers.

The table below shows the trigger types, their corresponding bit, and the integer value related as (2^{bit} = triggerBits for a single trigger type)

Trigger type	bit	Integer value
Event 61	0	1
PMT	1	2
Min-Bias	2	4
High Light	3	8
Low light	4	16
SiPM	5	32

A single event can have multiple trigger types. For example, If an event has both PMT and SiPM triggers, its triggerBits value will be 100010 (binary) which is 34 (decimal).