CTOF Calibration Suite Work
June 6, 2019
[black = to do; red = to do with high priority]

1 GAIN BALANCE:
- On "View All" plots, put GMEAN and LOGRAT in the same window but tab selectable.
- To ensure that the muons used to calibrate the gains enter the counters approximately normal to their top and bottom faces, we need to put a selection cut in place to require for a given counter a corresponding hit on the other side of the barrel. Of course, this is only for cosmics as beam-related particles will not meet this requirement. So, add an option in the CTOF gain balance code to select between two different options for the gain balance algorithm when starting the code:
  1). Compute GMEAN and LOGRAT as it is being done in the code now (default)
  2). Compute GMEAN and LOGRAT requiring a hit on the opposite side of the barrel. The algorithm is defined to require for a hit in counter N a hit in counter N_{opp}=N+23 OR N+24 OR N+25, where if $N_{opp} > 48$, $N_{opp}=N_{opp}-48$. This OR allows for improved statistics.

2 UPSTREAM DOWNSTREAM:
- Label x-axis of right tu-td display plot. Use the same title for both display plots.

3 ATTENUATION LENGTH:
- Use the same title for both display plots.
- Add titles to postage stamp plots as e.g. "ATTEN 1".

4 EFFECTIVE VELOCITY:
- Use the same title for both display plots.
- Add titles to postage stamp plots as e.g. "VEFF 1".
- Adjust y-scale of plots to center distributions (i.e. use Δt_{ud}).
- Remove spurious point on all display and postage stamp plots at (0,0).

5 RFPAD:
- Use the same title for both display plots.
- Update titles on postage stamp plots as e.g. "RFPAD 1".
- When clicking on "Adjust Fit/Override", allow for input of Gaussian amplitude, centroid (which is the RF offset), and width. Replot the distribution with these fixed constraints.

6 PADDLE2PADDLE:
- Update titles on the postage stamp plots as e.g. "P2P 1".

7 TDC CONV:
- Use the same title for both display plots.
- As the TDC ranges are different for the U and D PMTs due to different cable lengths, include the ability to select different fit ranges in the "Adjust Fit/Override" window.
- Update titles on the postage stamp plots as e.g. "TDC CONV 1".

8 HPOS:

- Use the same title for both display plots.

9 Check plots:

- Replace labels of ADC Left and Right with proper Upstream and Downstream labels
- Labels on top of pop-up windows when clicking on “View All” are backwards. They should be y-axis vs. x-axis (e.g. vertex time vs. hit position, etc).

10 Program startup screens:

- On Tracking/General screen get the “trigger” selection to work. However, if the code requires events to have a good electron in ECAL, this option should be removed altogether

11 Other program work:

- Update code to calibration around hardware failures for all steps.
- Fix issues with using EVIO files as an input source (if they remain).
- Clicking on “RESET” should effectively bring program back to its starting point with all histogram zeroed and popping up the screen to input calibration parameters.
- Add option to save histograms.
- Change plot/fit display using both mouse click to select counter and up/down arrow selection.
- When clicking on “Adjust Fit/Override”, there is an option for to adjust fits for “All paddles in sector 1 layer 1”. This is redundant to selection of “All paddles in layer 1”. Remove one of these options to clean up the selection screen.
- Color coding of parameters flagged in table should match those highlighted in the detector picture.
- Fit curves on all plots should match the parameters in the table – this is not the case if the parameters are entered by hand via over-ride.

12 Program output:

- Program outputs files CtofGraph*.txt and CtofHist*.txt. These files should not be created.

13 New calibration step:

- Another calibration tab needs to be added to build in a calibration step for CTOF that has been done using a stand-along groovy script. This is to plot for all counters the TDC time – FADC time and output a parameter file (CTOF_CALIB_FADC_xxx.txt) of the centroids compatible with the database: S L C upstream downstream width. The width is a parameter that should be set to 10 ns default (the allowed difference in the TDC/FADC time difference in ns). It should be user changeable when selecting “Adjust Fit/Override”. I can send you the simple groovy script that is being used so you can see the details.