Analysis for gain and after-pulse rate

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Workflow

- After running Alexander's script that generate root files for the data from V1742.

- Also need to use Alexander's wfviewer script to ascertain pixel location and signal time window.

- This analysis script will give estimates of the integrated charge of the 3x3 cluster (gain).

- It also counts whether there is after pulse next to the signal within time window 100 ns.

- Running this script takes ~40 minutes at my test stand, but ~80 minutes at Bob's computer.

- (Size of EVT file for a run with 20k event: 2.1 GB, Root file: 8.8 GB)

- Target size of a run: 40k with 5% signal occurrence.

Algorithm

1. Search for a signal peak in a wide time window and compare its index with that of trigger to determine the delay.

2. Using this time delay to set a narrow time window, and check whether there is a signal pulse in it.

3. If so, integrated the area of the pulse. If not, take one data point at the middle of time window.

4. Sum outputs of 3x3 pixels in one event.

5. Outputs of above steps are fit by roofit using one Gaussian for pedestal, one Gaussian for SPE and one Gaussian for Double PE.

6. Check whether there is pulse after the signal pulse.

Further offline

- For different runs, investigate the relative evolution on gain. For example, the relative value of gain with respect to no B-field when doing the B-field strength scan.

- Welcome different algorithms. Difference between them can serve as an estimate of systematics of the study.