

DecompViewer Petcat (Decomp)

Hands-on Day 2

DecompViewer

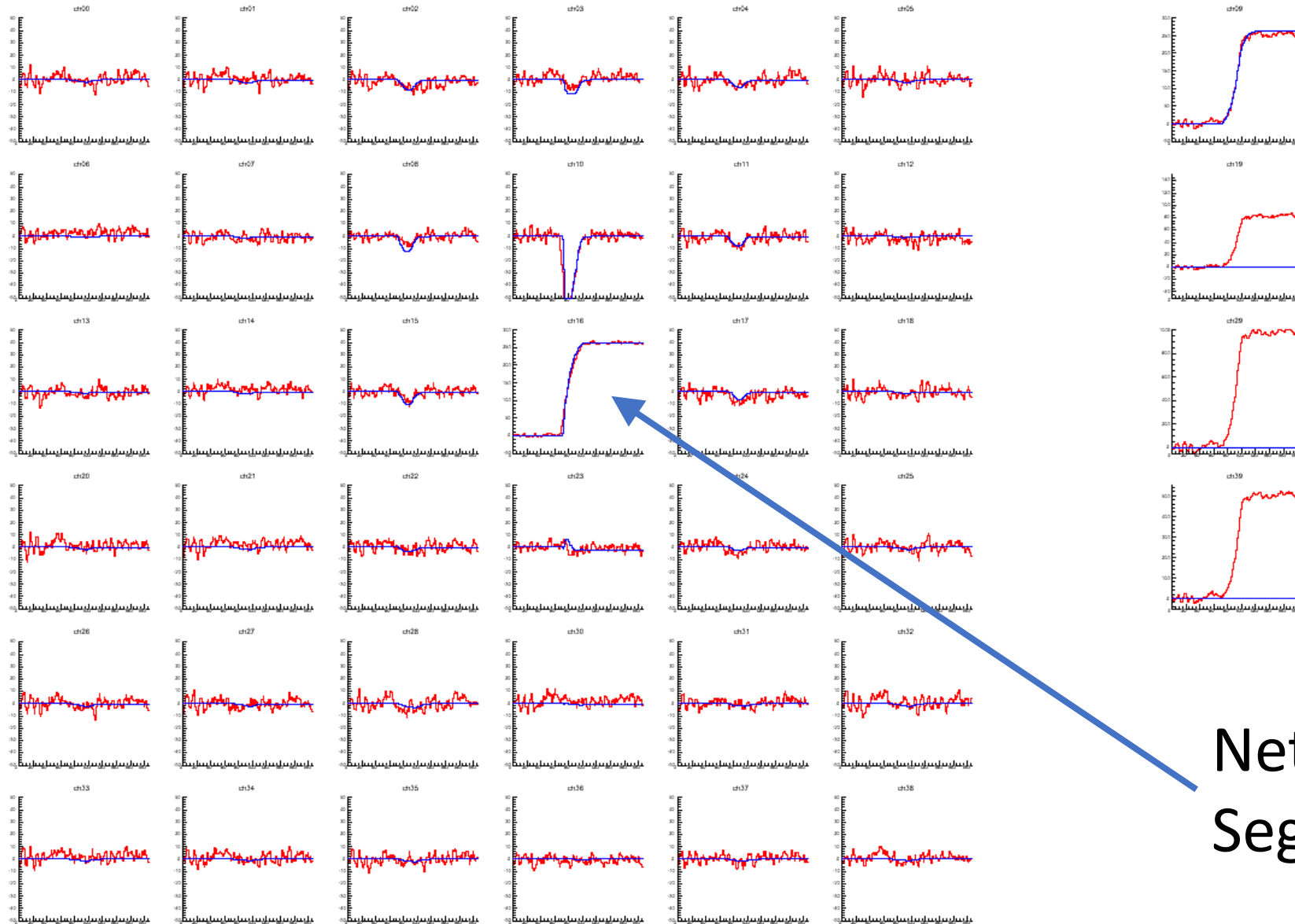
Download & Build

- git clone <https://github.com/GRETINA-LBNL/DecompViewer>
- cd DecompViewer
 - cat README.md
 - ls
- scons
 - ls
- ./DecompViewer
 - Error?
 - printenv | grep LIB.*PATH
 - export LD_LIBRARY_PATH=\${LD_LIBRARY_PATH}:.:
 - Works now? Gives “usage message”
 - Put export command at end of ~/.bashrc to fix forever
- ./DecompViewer [yourDataPath]/HandsOnII-Decomp/Run318Pencil.root

DecompViewer (event number and energy gates mean we can all look at the same exact event)

- Look at a few events together, Discuss net, induced
 - Show double-click zoom
- Find an event with segment energy but no interaction point, Discuss causes...
- Energy threshold in Decomp
- Post-processing coalescence
- Add energy gate 100-200 keV
- Look at a few events
- Add energy gate 661-664 keV
- Look at a few events
- Can we see integral crosstalk?
- Can we see net+induced in same segment?
- Any pattern in segment(s) hit? Maybe 1 or 2 most likely?
- Discuss future plans with Decomp fit(s) superimposed

Waveforms example (380keV) with Decomposition Fit



Cores
(CC)
in 4
ADC
gains

Net Charge
Segment

Segment Mapping

0

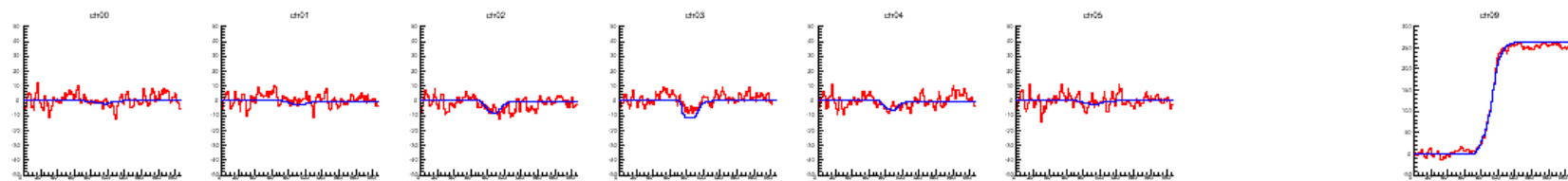
1

2

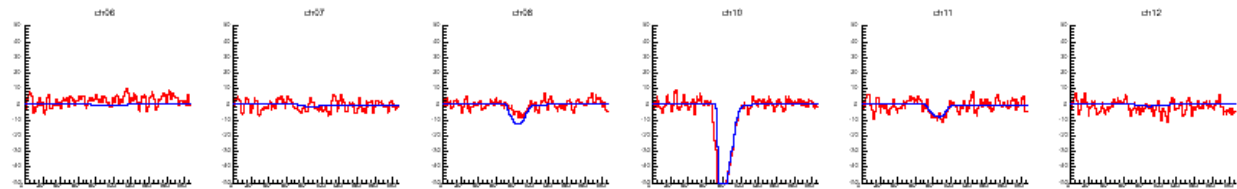
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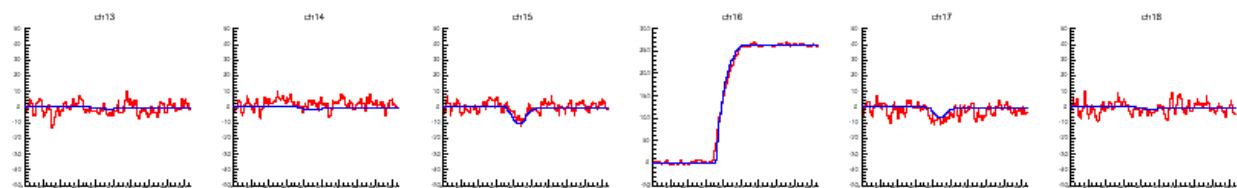
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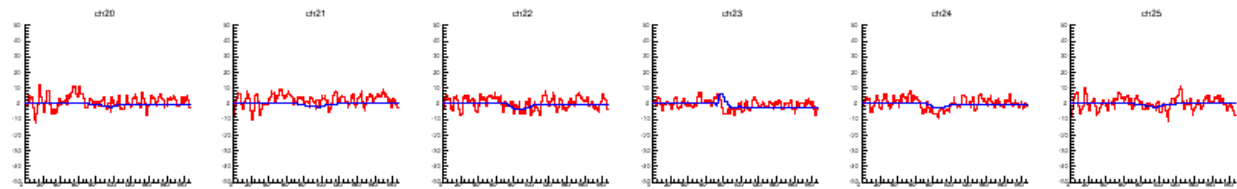
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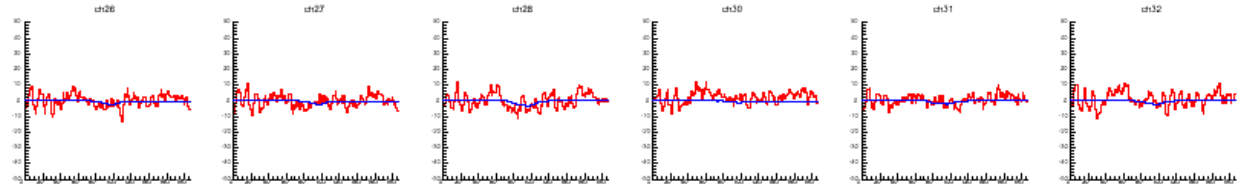
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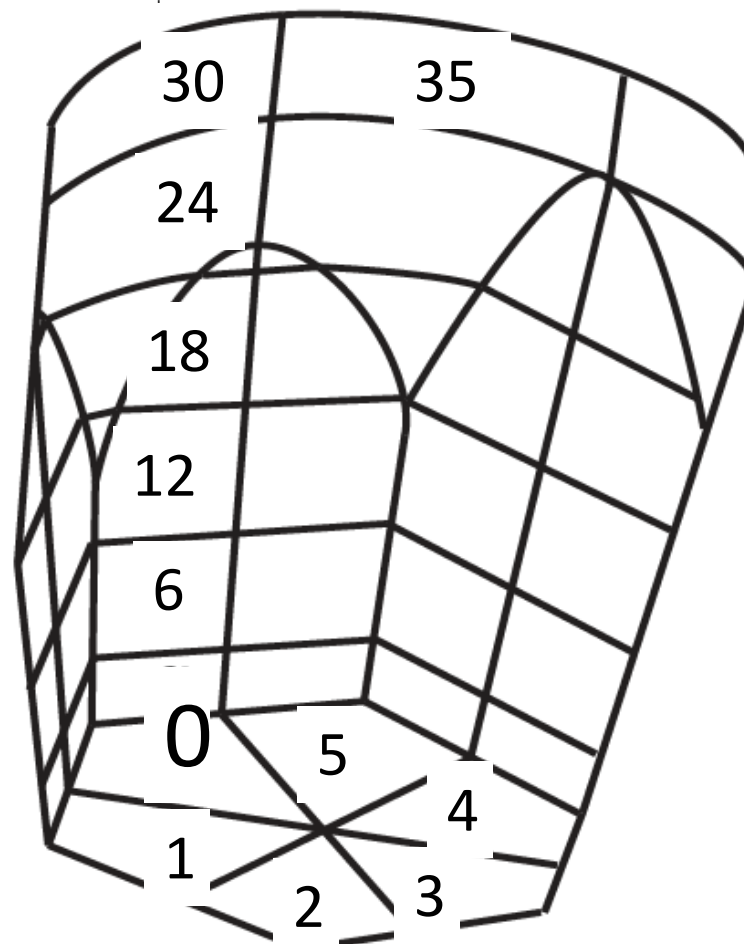
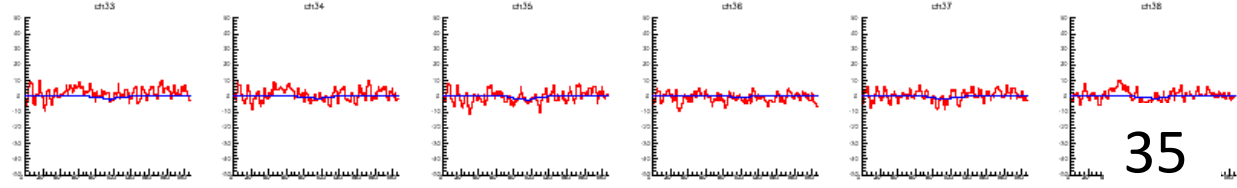
18



24



30



0

1

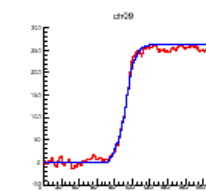
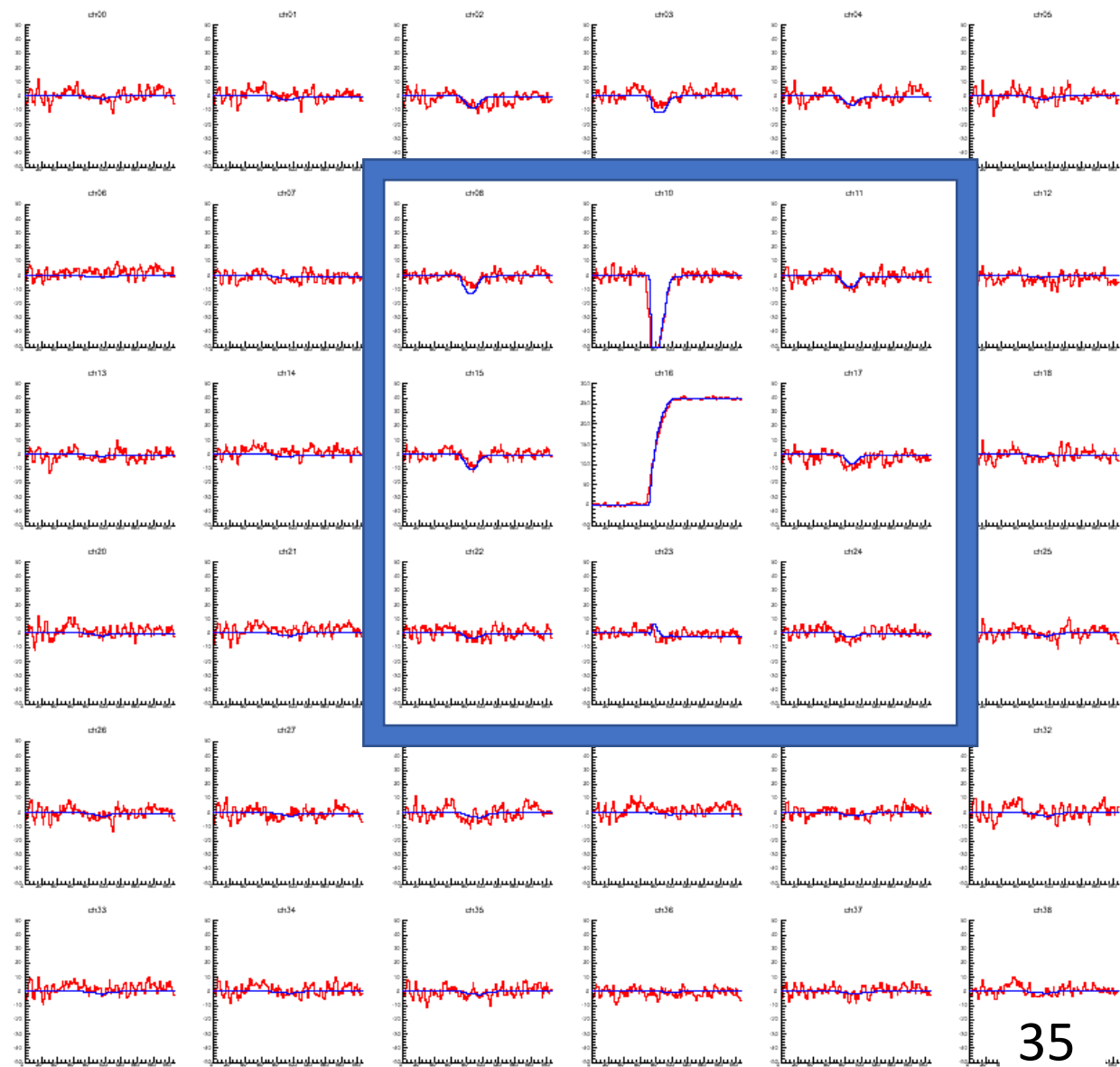
2

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5

Neighbors



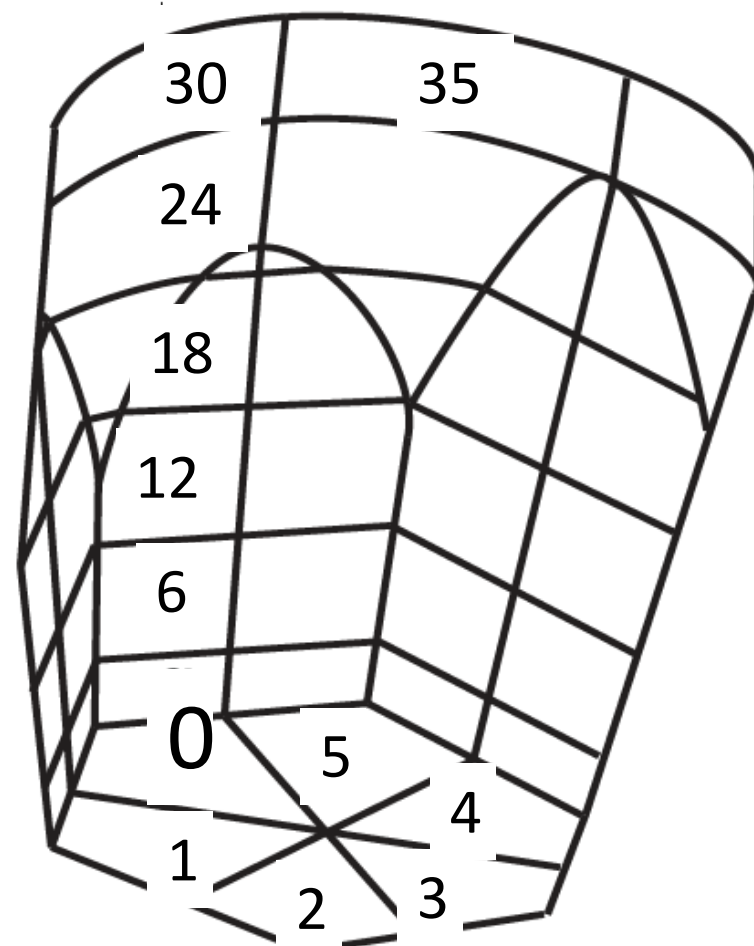
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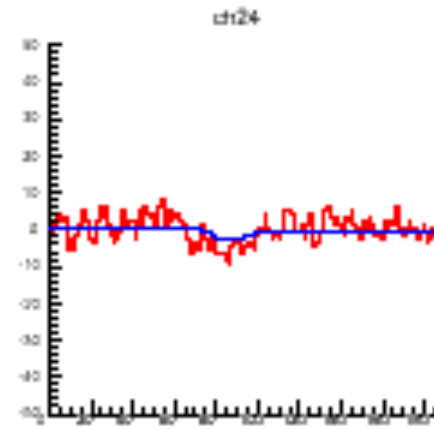
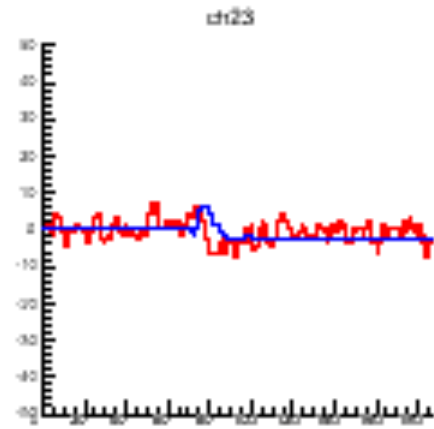
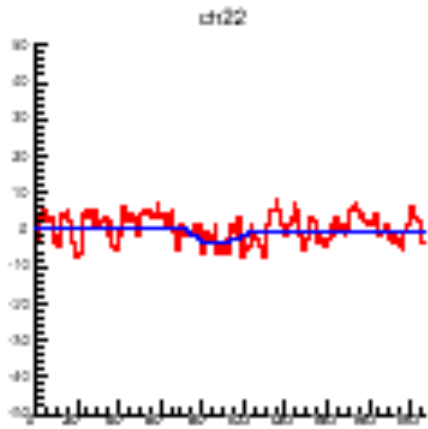
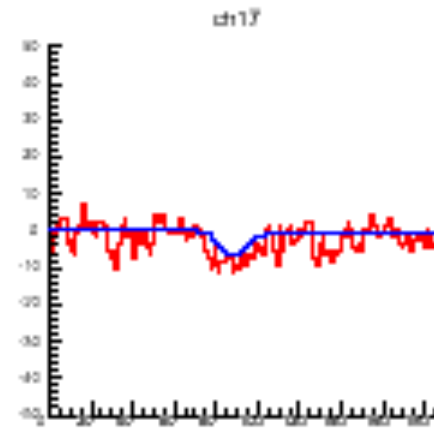
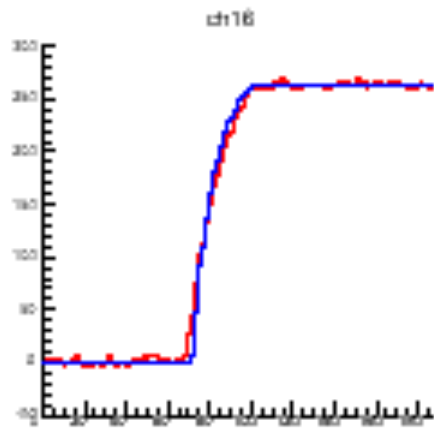
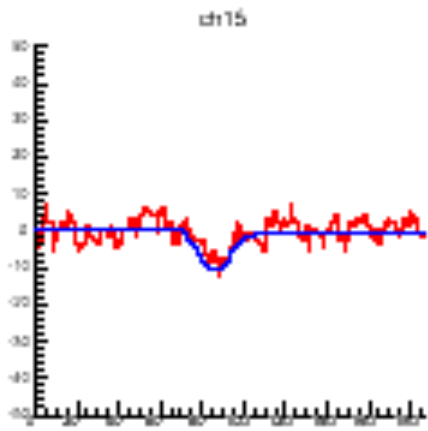
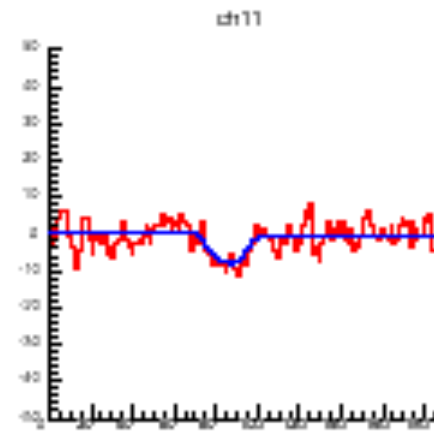
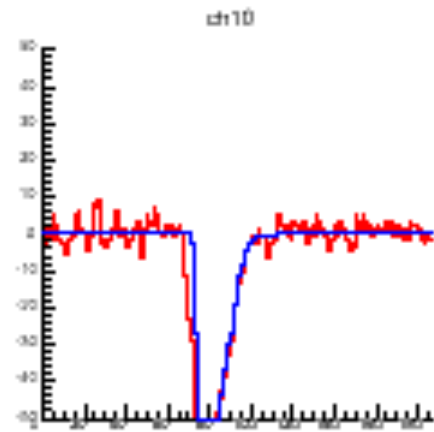
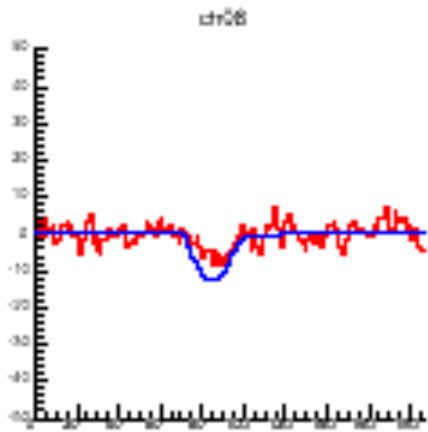
30



Neighbors used in fit

- Only 50 samples (500ns) fit

- 185 samples collected



Petcat Download & Build

- git clone <https://github.com/mcromaz/petcat>
- cd petcat
- edit SConstruct (the equivalent of a Makefile)
 - Comment out 2nd “dbg = Environment line”
 - Un-comment 3rd “dbg = Environment line”
 - save
- scons petcat (builds the code)

Create file named petcat.cfg

- holeNum 9
- xtalNum 0
- inputFile [yourDataPath]/HandsOnII-Decomp/Run318GlobalRaw-662.dat
- basisFile [yourDataPath]/HandsOnII-Decomp/BasesEtc/q4p4_a8_fastpreamp_basis_xt.dat
- detMapFile [yourDataPath]/HandsOnII-Decomp/BasesEtc/detmap_Q4pos4_CC9.txt
- filterFile [yourDataPath]/HandsOnII-Decomp/BasesEtc/filter.txt
- trGainFile [yourDataPath]/HandsOnII-Decomp/BasesEtc/tr_gain_Q4pos4_CC9.txt
- xTalkParsFile [yourDataPath]/HandsOnII-Decomp/BasesEtc/q4p4_a8_fastpreamps_xtalk_pars_in.txt

Petcat + GRUTinizer exercises

- Running petcat
 - ./petcat (with petcat.cfg in working directory)
- Suggestion:
 - 1 desktop for GRUTinizer
 - 1 desktop for Petcat

Changing the penalty factor:

- The signal decomposition algorithm attempts to fit both one and two interactions per segment (three interactions for $\text{net}=1$ are fit as well). The solution chosen is that which yields the best χ^2 weighted by a static penalty factor. The altering PENALTY variables in decompose.c to see it's effect. What happens when you 'turn off' the two interaction point fit in this way?

Changing the time window

- When a trigger is issued for GRETINA, a waveform snippet which captures charge collection process in the net charge segments (and induced signals in the neighbors) is taken from the continuously running flash ADCs. It is these waveforms (mode 3 data) that are used by the signal decomposition algorithm to locate interactions points. To account for walk in the trigger time, a longer waveform - usually 186 samples or 1.86 us for experiments - is taken rather than the 50 samples (500 nS) in the basis. The preprocessor time aligns and windows the experimental waveforms to the 50 samples required for a direct comparison to the basis set.
- The timing routines are located in the file `talign.c`. Try adding small artificial offsets to these windows to examine the effect of errors in windowing. Examine position resolution and visually inspect the distribution of interaction points. Do positive or negative offsets have greater impact? Why?
- See `align_cfd_1()`, uncomment, change value of line `// t += 4.0`

Altering the coalescence distance:

- The signal decomposition algorithm attempts to fit 2 interaction points per segment. If this solution is chosen (given χ^2 and the penalty factor) the post-processor examines if the two points fall within a 'coalescence' length. If so the two interactions are combined into one. Try altering the coalescence length (the preprocessor variable `COAL_DIST_DEFAULT` in `petcat.h`) and examine its impact of position resolution.
- Does setting the `COAL_DIST_DEFAULT` variable to 0 turn off coalescence?