Calorimeter Sum versus TACK Delay for Various Trigger Sources for EM

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Try making a function which fits the preamp output. The output from the diode on the CsI is a current souce of the form Io*exp(-t/tau) where tau~.9 usec. This current is integrated on the feedback capacitance around the preamp C which is also being discharged by a resistance R. Then the voltage on the feedback capacitance (ie the preamp output) is

$Vo := 1$ $\tau csi := 1.8$ [usec] $RC := 25$ [usec] $GLC := 6$ [ticks] $x := \frac{RC}{\tau csi}$

$$Vcalc(t) := \left| \begin{array}{l} t \leftarrow \frac{t}{\tau csi} \\ Vo \cdot \left[\frac{x}{(x-1)}\right] \cdot \left(e^{-\frac{t}{x}} - e^{-t}\right) \end{array} \right.$$

$$tmax(x) := \left[\frac{x}{(x-1)}\right] \cdot \ln(x) \cdot \tau csi \qquad \frac{tmax(x)}{.05} = 102 \quad \text{[ticks]}$$

This pulse will have to be scaled to an appropriate height and shifted by some fixed delay (due to the GLC and TREQ delays). Notice that the preamp has a suprisingly long (25 usec time constant) tale.

1) Trigger source is the External Scintillator Trigger:

data :=

D:\..\TACK_CAL_ExtTrig.dat

$imax := rows(data) - 1$ $jmax := cols(data) - 1$

$i := 1 .. imax$ $j := 0 .. jmax$

$imax = 100$ $jmax = 12$ $k := 0 .. .9 \cdot imax$

Each column of data contains the data for one delay point. The value at the top of the column is the delay. Cal sums that are zeros have already been eliminated. Next eliminate the largest 10% of the pulse heights for each delay in order to get rid of the shower pulses which have a big variance.

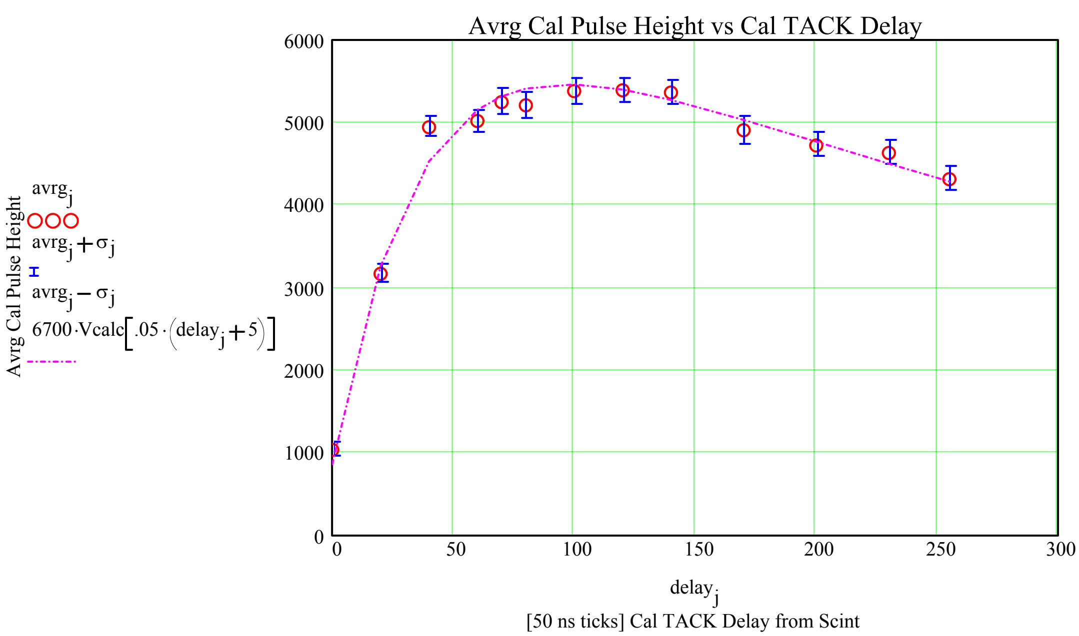
$delay_j := data_{0,j}$

$calsum_{i-1,j} := data_{i,j}$

$calsum^{<j>} := sort\left(calsum^{<j>}\right)$

$calshort_{k,j} := calsum_{k,j}$

$avrg_j := mean\left(calshort^{<j>}\right)$ $\sigma_j := \frac{stdev\left(calshort^{<j>}\right)}{\sqrt{imax}}$



2) Trigger source is the Tracker 3-in-a-row:

data := D:\..\TACK_CAL_3RowTrig.dat

$imax := rows(data) - 1$ $\quad$ $jmax := cols(data) - 1$

$i := 1 .. imax$ $\quad$ $j := 0 .. jmax$

$imax = 100$ $\quad$ $jmax = 12$ $\quad$ $k := 0 .. .9 \cdot imax$

Each column of data contains the data for one delay point. The value at the top of the column is the delay. Cal sums that are zeros have already been eliminated. Next eliminate the largest 10% of the pulse heights for each delay in order to get rid of the shower pulses which have a big variance.

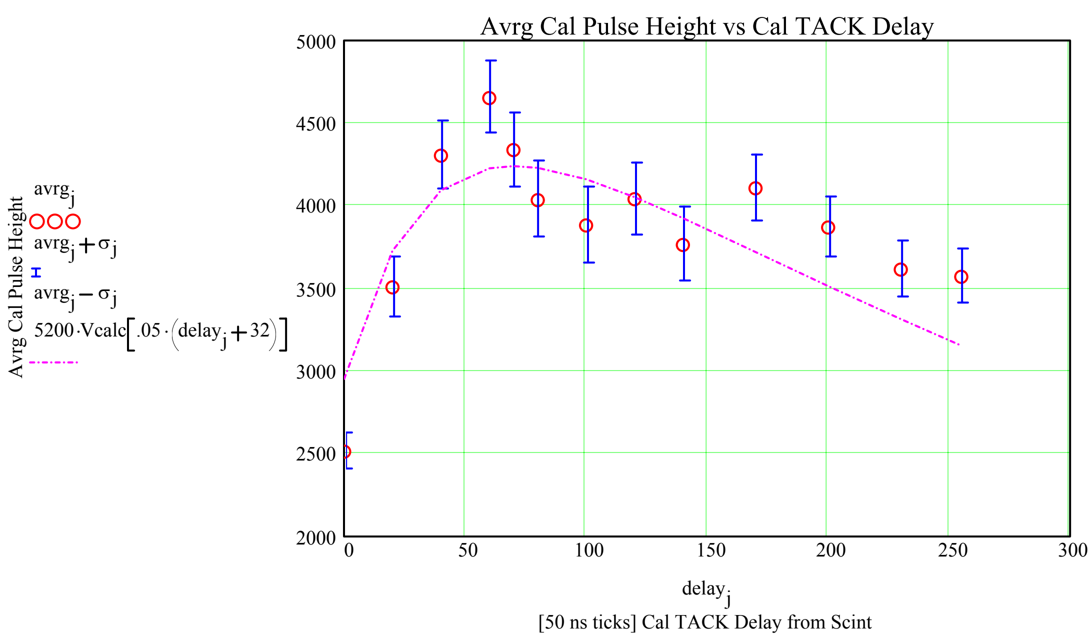
$delay_j := data_{0,j}$

$calsum_{i-1,j} := data_{i,j}$

$calsum^{\langle j \rangle} := sort\left(calsum^{\langle j \rangle}\right)$

$calshort_{k,j} := calsum_{k,j}$

$avrg_j := mean\left(calshort^{\langle j \rangle}\right)$ $\quad$ $\sigma_j := \dfrac{stdev\left(calshort^{\langle j \rangle}\right)}{\sqrt{imax}}$



3) Trigger source is the Cal Low Discriminator:

data := D:\..\TACK_CAL_CalLowTrig.dat

$imax := rows(data) - 1$ $\quad$ $jmax := cols(data) - 1$

$i := 1 .. imax$ $\quad$ $j := 0 .. jmax$

$imax = 100$ $\quad$ $jmax = 12$ $\quad$ $k := 0 .. .9 \cdot imax$

Each column of data contains the data for one delay point. The value at the top of the column is the delay. Cal sums that are zeros have already been eliminated. Next eliminate the largest 10% of the pulse heights for each delay in order to get rid of the shower pulses which have a big variance.

$delay_j := data_{0,j}$

$calsum_{i-1,j} := data_{i,j}$

$calsum^{\langle j \rangle} := sort\left(calsum^{\langle j \rangle}\right)$

$calshort_{k,j} := calsum_{k,j}$

$avrg_j := mean\left(calshort^{\langle j \rangle}\right)$ $\qquad$ $\sigma_j := \dfrac{stdev\left(calshort^{\langle j \rangle}\right)}{\sqrt{imax}}$