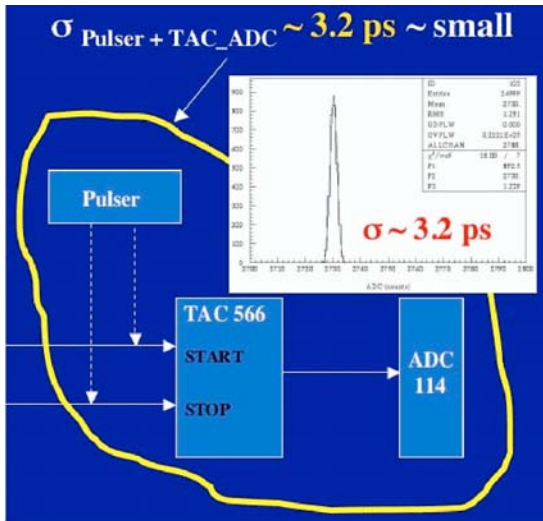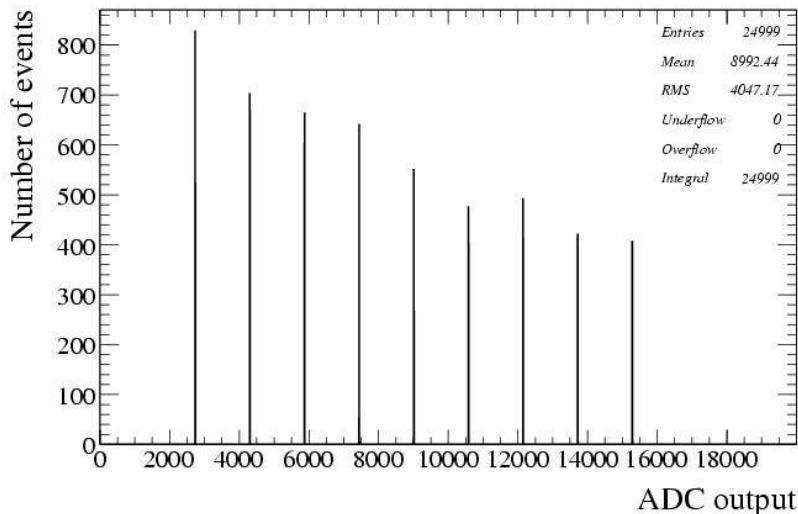# Calibration of TAC566 & ADC144 with the new pulser

Principle

The nine pulses

The pulser makes pulses every 5 ns with a maximal uncertainty of 3 ps.

Here, we have the distribution of the ADC Output Counts for a great number of events. The different values of ADC Output are located in nine narrow peaks. Each peak is due to a pulse.

As delay between two peaks is known, the relation between number of counts and time can be found.

Fitting the pulses

      With a ROOT macro, I have fitted each peaks with a Gaussian. The program writes in a file the mean value and its uncertainty for each peak.
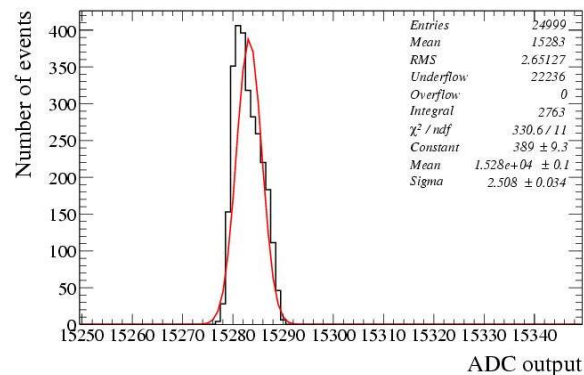

Pulse 1
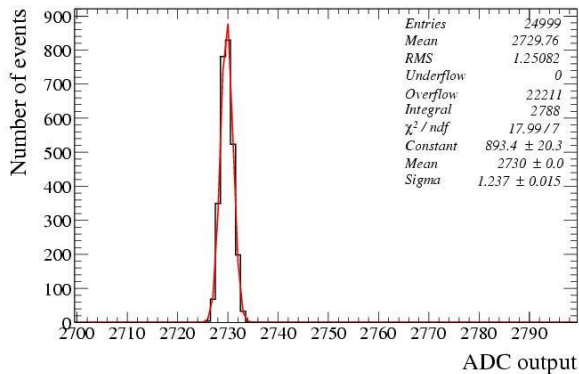
The uncertainties given by ROOT on mean of the gaussian seems to be too little (0.1 for about 2). It's probably due to asymmetry of the peak. This error seems to be proportional to the sigma of the distribution of the peak. I have taken 0.7 sigma plus ROOT error for the peak position uncertainty.
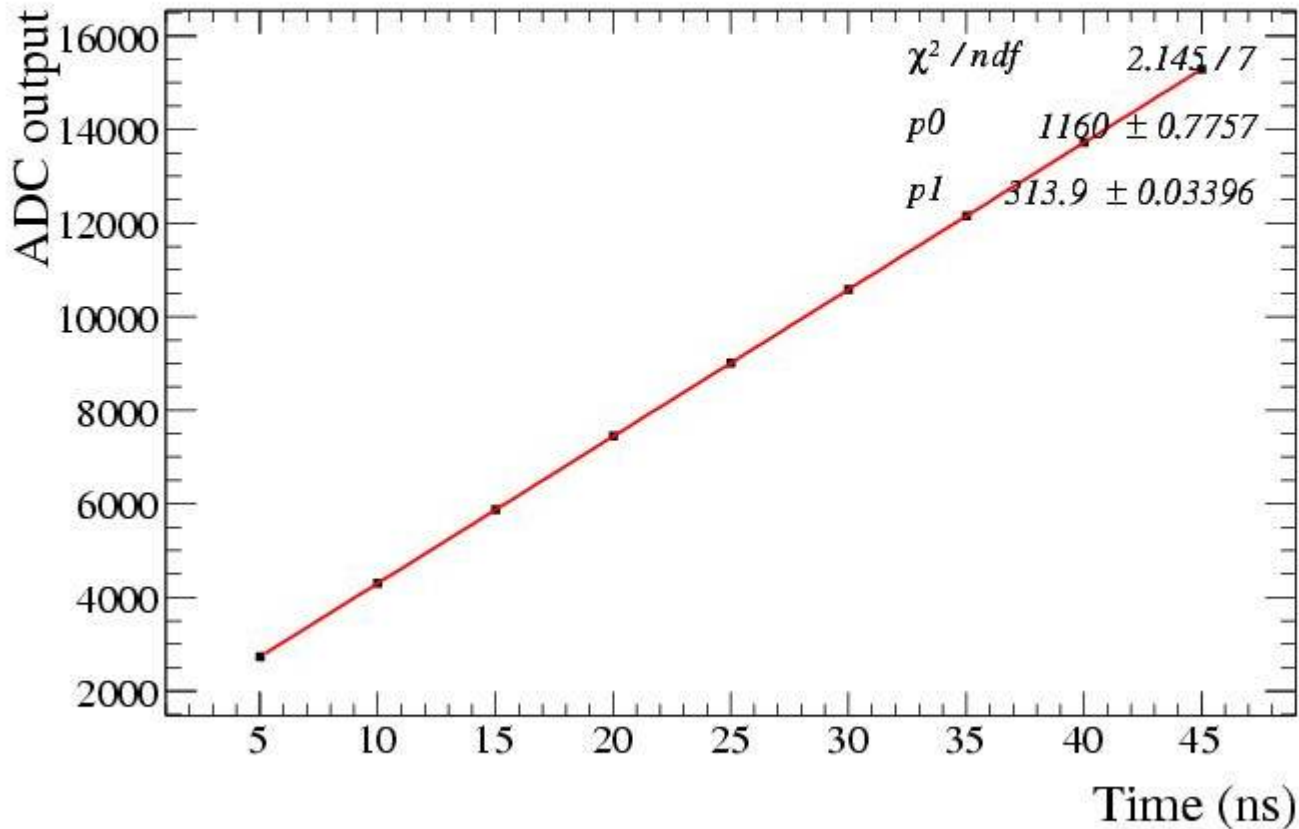

Pulse 5
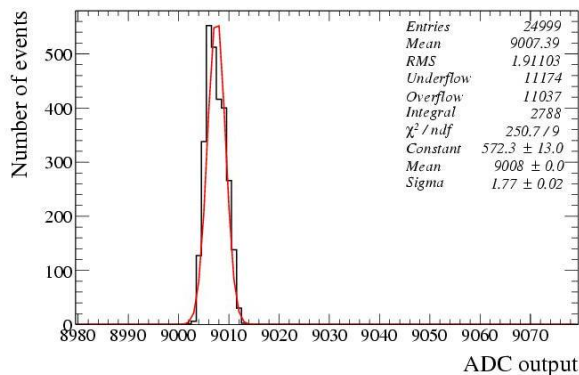
Pulse 9

Linear fit of Time(TDC counts)

Calibration of TAC 566 and ADC 114

χ^2 / ndf $2.145 / 7$

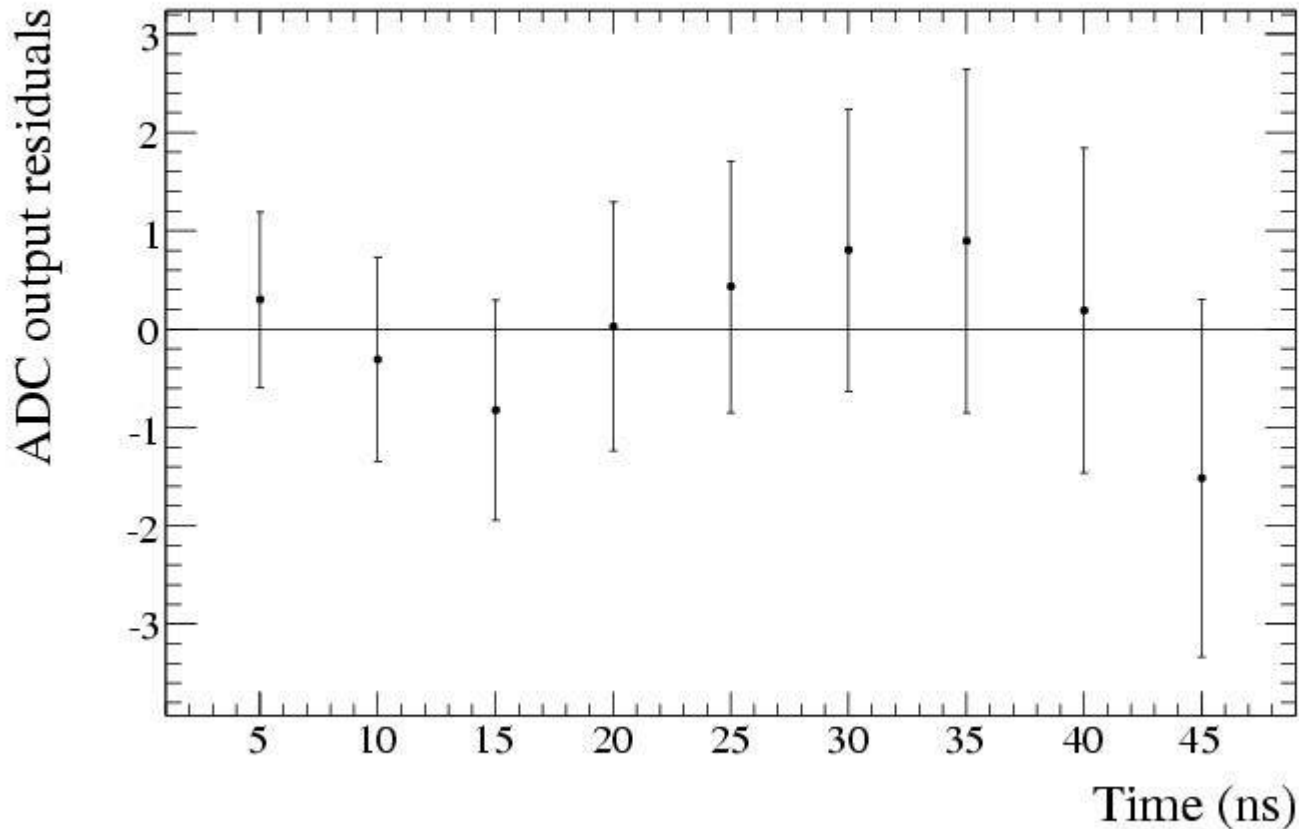$p0$ 1160 ± 0.7757

$p1$ 313.9 ± 0.03396

I have plotted the time (supposed to be known exactly) in function of ADC counts.

The program fit this data and calculate the residuals of fit.

I have found 3.1857 ± 3.10^{-4} ps/count.

Fit residuals and comments

Fit Residuals for calibration of TAC 566 and ADC 114

The residuals show a maximal variation around the fit of about 1 counts = 3 ps.

There is a regularity in residuals plot. But it's hard to found a function which fit it well. Nevertheless for all the points the 0 is in error bar.