

Summary and Questions from conference call on July 19 2011

Following the Conference call on 19-7-2011, we have 3 open question regarding the document “TOF_and_POS_resolution.pdf“:

1. John: Negative values of ADC (corrected ADC) channels on fig 1.
2. John: Check with cosmic if we see +-50 cm of HAND or the BB shadow some of the detector.
3. Shalev / Or : Stability check to HV changes during the run

Answers:

currently, July 26, Hall A logbook is still of line, so I can't verify the HV stability. Moreover, lack of logbook I can't chose correct cosmic run to compare different positions (HAND self trigger was disconnected during the production and only occasionally had been connected).

I can compare the position distribution from the elastic run, when there was no BB in front to the production. The only limitation of the elastic run might arise due to limited acceptance of HRS.

Position comparison is shown in fig 1:

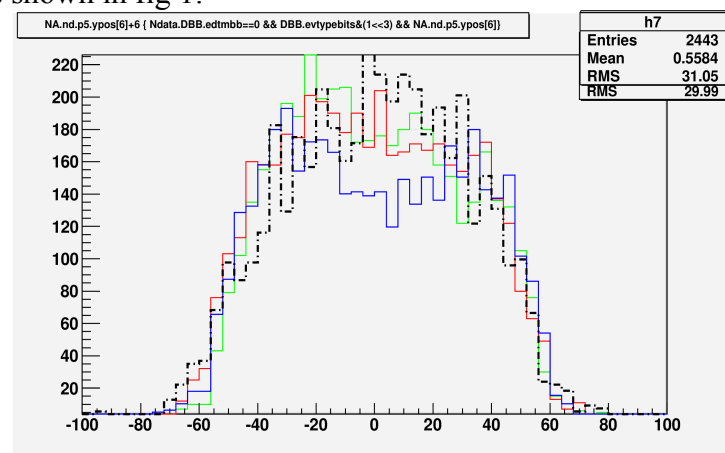


fig 1

Red line – Expected distribution (uniform +-50 cm with Gaussian distortion).

Green Line – Position distribution for one of the bars in plane 5.

Blue Line – Position distribution for on of the bars in plane 1.

Black Line (dash line) – Position distribution of the same bar as for Green Line, but from production run.

For conclusion:

I don't see any difference in the position distribution for these two cases. I think that even when BigBite located in front of HAND, it's scintillators are fully illuminated.

About the ADC issue:

In order to use the ADC data, the first step that we should do is to find the pedestals, situation when we don't have a valid TDC value because the signal didn't pass the discriminator.

The straight forward way to find these offsets is to plot the ADC distribution with the requirement of TDC=0. Fig 2:

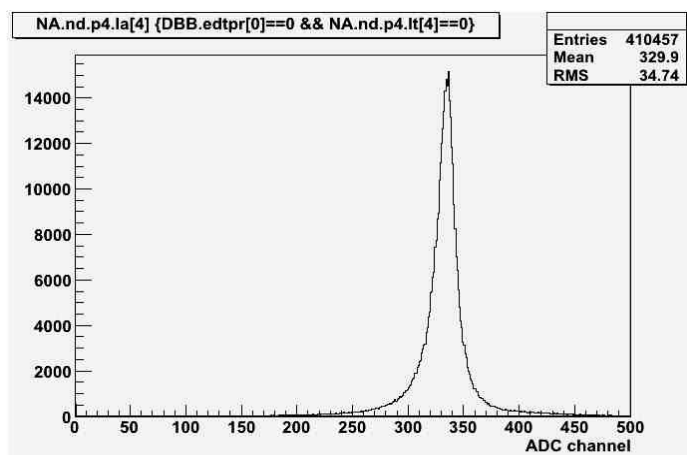


fig 2

I took the maximum value of the ADC distribution with TDC=0 to be a pedestal offset.

ADC distribution with the requirement of TDC>0 fig 3:

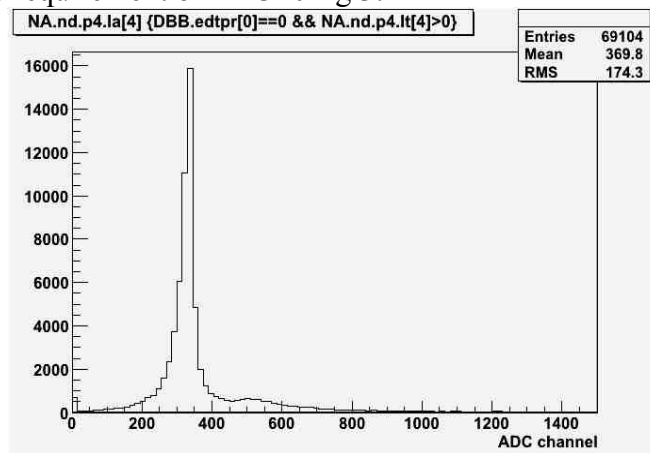


fig 3

The fact that ADC distribution have large peak at pedestal channel is due to high noise / high singles rate.

The main “problem” that can't be seen in figures above is that the high peak with TDC>0 (fig 3) is located at slightly smaller ADC channels.

This difference can be clearly seen in ADC vs TDC distribution on fig 4:

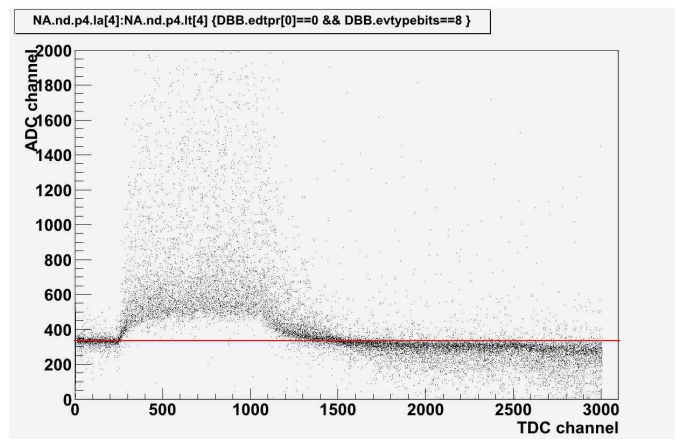


fig 4

In fig 4 clearly seen that events that arrive BEFORE the GATE have lower ADC channels than the events that arrived after the GATE. This is common stop TDC, smaller channel – close to stop signal – late signal. The number of TDC channels is consistent with their resolution, 0.5 ns, and read out window of 1.5 μ s (in total 3000 channels).

The shape of the GATE near the channel 1100 is not sharp due to the discrimination response function, it's not ideal.

We saw this during the run period however, I got an impression that the behavior that presented in fig 2 and 3 is normal to high noise environment. Thus I looked only on the relevant region, GATE.

I chained number of runs in order to identify the location of the peak of interest (recoil and triple), fig 5:

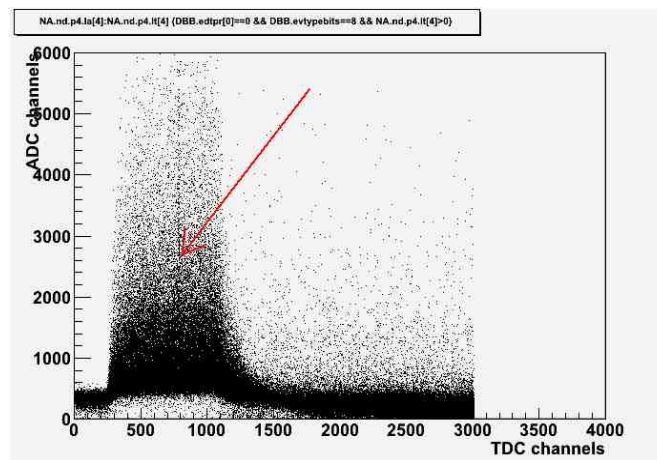


fig 5

The red arrow points to recoiled particles into HAND. It's location is consistent with the one found during the online analysis for recoils and triple coincidence.

For the elastic case we have same picture:

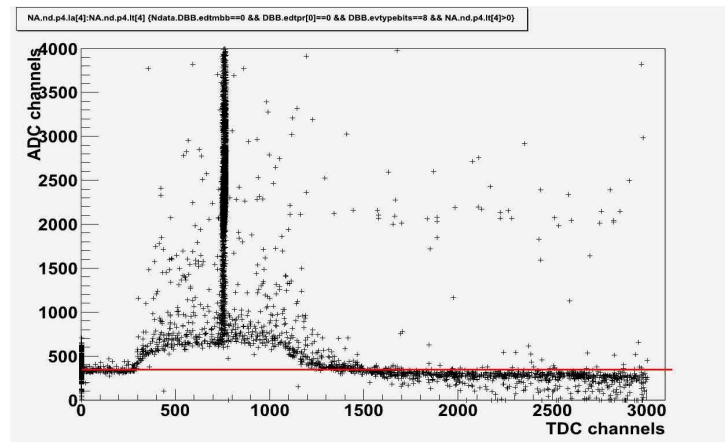


fig 6

Question:

Some body know the exact explanation for this effect and / or what should I check?